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Abstract

The rationale for the legal protection of copyright works is based on the perceived need to encourage the creation of works which are considered to be socially beneficial. By awarding authors proprietary rights in their creations, copyright law allows authors the ability to earn direct financial returns from their efforts, and, thus, copyright law provides the required incentives for authors to create copyright works. Since the early days of commercial software development, copyright protection has been extended to computer programs; thus, by providing such protection it was assumed that their production should be encouraged, and that without such protection they will not be produced to the extent required by society. Comparatively recently, we have witnessed large-scale production of open-source software, which is licensed on generous terms, giving users the right to freely use, modify and redistribute such software. By adopting such licensing terms, the authors of open-source software are unable to charge licensees a fee for permission to use their software, which is the reward which copyright assumes authors seek to create such software. This development has made it necessary to re-evaluate the rationale for copyright protection of computer programs, and determine whether the continued protection of computer programs is justifiable.

This study seeks to first establish a coherent theoretical justification for copyright protection, which it is submitted should be an economic justification, rather than a moral justification. The legal analysis in this work seeks to establish whether the copyright protection of computer programs is consistent with the economic justification for copyright protection. In particular, the analysis focuses on the current scope of copyright protection, and seeks to establish whether such protection is excessive, stifling creativity and innovation, and, thus, imposing too high a social cost. It is contended that copyright doctrine has generally sought to minimise these costs, and that current scope of copyright protection of computer programs leaves enough creative room for the production of new software.

Despite the fact that the effect of open-source software licences is that authors are unable to earn the direct financial rewards which copyright enables authors to earn as an incentive to create such software, their authors continue to

have financial incentives to create such software. Commercial firms who invest in open-source software do so because they seek to provide financially-rewarding related services in respect of software, or because it serves to promote sales in their complementary products. Similarly, the participation of individual computer programmers is largely consistent with the standard economic theories relating to labour markets and the private provision of public goods. Individuals are principally motivated by economic motives, such as career concerns.

Copyright protection gives participants the choice to opt for the direct financial rewards which its proprietary protection enables, or the more indirect financial rewards of open-source software development. It is submitted within this research that rather than undermining the rationale for copyright protection of computer programs, the development of open-source software has illustrated that copyright protection allows for the emergence of alternative business models, which may be more economically advantageous to authors.

Abstrak

Die rasional agter outeursregbeskerming wat deur die reg verleen word is gebaseer op 'n behoefte om die skepping van werke wat sosiaal voordelig geag word te bevorder. Outeursreg verleen aan outeurs direkte finansiële vergoeding vir hul inspanning deur die vestiging van eiendomsreg oor hul werke. Dus, outeursreg voorsien outeurs van die nodige insentiewe om sulke werke te skep. Sedert die begindae van kommersiële sagteware ontwikkeling, is outeursregbeskerming uitgebrei om aan rekenaarprogramme sulke beskerming te bied. Deur die bied van outeursregbeskerming word daar aangeneem dat die ontwikkeling van rekenaarprogramme aangemoedig word en dat sonder die genoemde beskerming programme nie geproduseer sal word tot in 'n mate benodig deur die samelewing nie. Onlangs egter, is daar 'n grootskaalse ontwikkeling van oopbronsagteware opgemerk. Hierdie sagteware word onder ruime terme gelisensieer en gee aan gebruikers die reg om die genoemde sagteware te gebruik, te wysig en vrylik te versprei. Deur sulke terme van lisensiëring aan te neem word outeurs verhoed om vanaf lisensiehouers 'n fooi te vorder vir die toestemming om die sagteware te gebruik. Outeursreg neem aan dat hierdie vergoeding die basis vorm waarom outeurs sulke sagteware ontwikkel. Hierdie ontwikkeling maak dit nodig om die rasional agter outeursregbeskerming van rekenaarprogramme te her-evalueer en ook om vas te stel of die volgehoue beskerming van rekenaarprogramme regverdigbaar is.

Hierdie studie poog om, eerstens, 'n samehangende teoretiese regverdiging vir outeursreg te vestig. Daar word aan die hand gedoen dat hierdie beskerming 'n ekonomiese, eerder as 'n morele regverdiging as grondslag moet hê. Die regsontleding vervat in hierdie werk poog om vas te stel of die outeursregbeskerming wat aan rekenaarprogramme verleen word in lyn is met die ekonomiese regverdiging van outeursregbeskerming. Die analise fokus in besonder op die huidige bestek van outeursregbeskerming en poog om vas te stel of sodanige beskerming oormatig is, of dit kreatiwiteit en innovasie onderdruk en derhalwe te hoë sosiale koste tot gevolg het. Daar word geargumenteer dat outeursreg in die

algemeen poog om sosiale koste te verlaag en dat die huidige omvang van outeursregbeskerming van rekenaarprogramme voldoende kreatiewe ruimte vir die ontwikkeling van nuwe sagteware laat.

Die effek van oopbronsagteware is dat outeurs nie in staat is om direkte finansiële vergoeding te verdien, wat as insentief gesien word vir die ontwikkeling van sagteware, nie. Ten spyte hiervan is daar steeds voldoende finansiële insentiewe om sodanige sagteware te ontwikkel. Kommersiële firmas belê in oopbronsagteware om finansiëel lonende verwante dienste ten opsigte van sagteware te voorsien. Dit kan ook dien om verkope in hul onderskeie aanvullende produkte te bevorder. Eweweens is die deelname van individuele rekenaarprogrameerders oorwegend in lyn met die standaard ekonomiese teorieë ten opsigte van die arbeidsmark en die privaat voorsiening van openbare goedere. Individue word gemotiveer deur ekonomiese motiewe, soos byvoorbeeld oorwegings wat verband hou met hul loopbane.

Outeursregbeskerming bied aan deelnemers die keuse om voordeel te trek uit die direkte finansiële vergoeding wat moontlik gemaak word deur outeursregbeskerming of uit die meer indirekte finansiële vergoeding gebied deur die ontwikkeling van oopbronsagteware. In hierdie navorsing word daar geargumenteer dat die ontwikkeling van oopbronsagteware geïllustreer het dat outeursregbeskerming die ontstaan van alternatiewe besigheidsmodelle toelaat wat ekonomies meer voordelig is vir outeurs in plaas daarvan dat dit die rasionaal vir die outeursregbeskerming van rekenaarprogramme ondermyn.

In memory of my grandfather, Osman Jacob Karjiker, and my parents, Abdurahman Osman Karjiker and Ayesha Karjiker (née Rawoot), for all the sacrifices made and their relentless insistence on the pursuit of education

To Nazeera Karjiker (née Moola) for her care, patience and support

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Chapter 1: Introduction

“[T]he soundness and effectiveness of the law of copyright is a significant factor in the creation of intellectual property and ultimately in enriching our culture and promoting our knowledge and well-being.”¹

As the above quote suggests, the rationale for copyright protection is a distinctly instrumental one. The reason we consider it appropriate to protect copyright works, such as computer programs, is that we consider such works to be socially beneficial, and, therefore, their production should be encouraged. Thus, by protecting computer programs, copyright law has assumed that such protection is warranted by the need to encourage their creation; without such protection, they will not be produced to the extent required by society. As copyright protection was extended to computer programs in its earliest phases of commercial software development, the critics of the decision to provide such protection may have had an arguable case at that time to claim that such protection was inappropriate or unnecessary. Whether the assumption to afford such protection was justified will probably remain a moot point. It is, however, more important to try and determine whether the continued protection of computer programs by way of copyright is necessary.² Intellectual property scholarship in South Africa has, arguably, focused on the immediate issues concerning black-letter law, with very little analysis of the conceptual foundations of intellectual property as a legal institution.

What has made a reassessment of copyright protection of computer programs a pertinent subject of enquiry is the ubiquity of software in our lives, whether in our work environment, personal lives or leisure activities, and the emergence and growth of open-source software. Software has — in a period of approximately 35 years — become, and will, no doubt remain, central to how we function as humans. Because

¹ Dean O 1988 *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: Stellenbosch University 2.

² This work will be confined to an analysis of the copyright protection of computer programs, and it will not concern itself with other legal methods by which computer programs may be protected, namely patents and confidential information (or trade secrets).

of the functional nature of computer programs we should be more vigilant about the social costs of affording them copyright protection than the other types of copyright works. Copyright protection does not come free: it imposes social costs, and it is expensive to administer such a system. Information, like a computer program, in the era of the Internet, can be reproduced and disseminated at practically no cost, and, thus, any restriction on its use is a social cost. The generous terms under which open-source software is licensed generally gives users the right to freely use, modify and redistribute such software, which avoids some of the social costs associated with proprietary software. These rights are given added significance by the fact that users are provided with the human-friendly source code of the licensed software, which facilitates users' knowledge of its operation, and possible modification. This is in sharp contrast to the manner in which proprietary software is licensed: authors reserve to themselves the exclusive rights afforded by copyright, charge users a fee for access to the software, and do not reveal the source code to licensed users. In terms of *incentives*, from an economic perspective, the effect of the liberal licensing terms associated with open-source software means that their authors are unable to charge licensees a fee for permission to use their software, which is the reward which copyright assumes authors seek to create such software. In other words, the developers of open-source software have forsaken the direct financial rewards which copyright protection makes possible, while still producing software of the highest quality. It, therefore, appears that copyright protection, and its associated direct financial rewards, is not central to the incentives of open-source software authors in the sense assumed to be necessary by copyright law.

The level of participation by individual programmers, and investment by commercial firms, in open-source software development, suggests that there must be incentives that go beyond ideological concerns about the morality of protecting software by way of proprietary rights. Not all of these participants are hostile to the policy of copyright protection for computer programs. In addition, the level of cooperation between software developers appears to confound previous notions about the assumed desire to produce products which give their creator a competitive advantage. It is for this reason that it is important to be able to distinguish open-source software from proprietary software in a way that plausibly accounts for open-

source software development. If such an account cannot be provided, it is strongly arguable that open-source software strikes at the rationale for copyright protection of computer programs: at best, the emergence of open-source software casts doubt over the assumption that copyright protection for computer programs is necessary, and, probably worse, that such protection is socially detrimental because such protection is unnecessary, and is socially harmful.

The emergence, and impressive subsequent growth, of open-source software development can, thus, be considered as providing us with a kind of natural experiment, or case study, into the incentives, if any, required for software production, and, thus, calls for an investigation into the behavioural determinants in relation to the production of computer programs.³ Are they the economic incentives which are assumed to be required by authors, and form the basis of copyright law? Have advances in technology and the profusion of the Internet changed the way we create copyright works, particularly computer programs, which makes our previous concerns of seeking to encourage the creation of such works largely unnecessary?⁴ Does the emergence of open-source software development suggest that in the absence of copyright protection we would still be assured of having the necessary level of software development, but at lower social costs than is currently the case with such protection?⁵ Consequently, the purpose of this work is to investigate whether the development and growth of open-source software provides us with any insights concerning the current policy of providing copyright protection for computer programs. In other words, does the emergence of open-source software require us to reconsider whether computer programs should be among the types of works that are afforded copyright protection?

The issue of copyright protection, and intellectual property law generally, and its impact on society has become a highly politicised matter. Open-source software

³ McGowan D "Legal Implications of Open-Source Software" 2001 *U III L Rev* 241 242.

⁴ Boyle J *The Public Domain: Enclosing the Commons of the Mind* 1ed (2008) 186; Trosow S "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 2003 *Can J L & Juris* 16 217 220.

⁵ McGowan "Legal Implications of Open-Source Software" 243.

has, for some time now, been the flagship for counter-culture, and has been held out as a shining example of needless property rights in information, which is exploited by corporations.⁶ Copyright protection, or specific instances thereof, has been criticised as being an inhibitor to the dissemination of information and harming creative endeavours. The emergence of open-source software has been a catalyst for a wave of other collaborative efforts, such as the Creative Commons licenses, the iCommons/free culture movement, the Science Commons project, and the OpenCourseWare educational resources, which all seek to replicate its permissive licensing paradigm in other areas of creative endeavour.⁷ While it may be true that in certain cases copyright protection does appear to result in imposing unacceptably high social costs, and that copyright law needs to adapt to changing behavioural determinants brought about by technological changes, the debates concerning the merits of copyright protection have, unfortunately, largely been conducted from polarised positions. If the critics of copyright protection have been guilty of focusing on exceptional instances of the failure of copyright to serve the public interest and proclaiming, rather overdramatically, “the death of copyright,”⁸ the defenders of copyright protection have also, too easily, succumb to the temptation of resorting to inflammatory and emotive language. Examples of the latter, with particular reference to the subject matter of this study, have been the claim that open-source software amounts to “an intellectual-property destroyer,” or the description of the Linux open-source software as “a cancer.”⁹

Accordingly, an ancillary goal of this work is to provide a more balanced assessment of the significance of the open-source phenomenon, steering away, as far as possible, from arguments which resort to, or seek to exploit, popular aphorisms, hyperbole or dismissive retorts. Instead, the analysis will proceed by

⁶ Lambert P "Copyleft, Copyright and Software IPRs: Is Contract Still King?" 2001 *EIPR* 23 (4) 165 167.

⁷ Bollier D *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 1ed (2008) 40.

⁸ Dusollier S "Open Source and Copyleft: Authorship Reconsidered?" 2003 *Colum JL & Arts* 26 281 282.

⁹ Azzi R "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 2010 *U Ill L Rev* 1271 1273; Miller J "Allchin's Folly: Exploding Some Myths About Open Source Software" 2002 *Cardozo Arts & Ent LJ* 20 491 491-2.

establishing the theoretical basis for copyright protection generally, and to determine whether the protection of computer programs is consistent with such rationale.¹⁰ It is submitted that a sound rationale for copyright protection should not merely serve to provide a basis for such protection, but should also be able to provide a basis for determining the scope and term of copyright protection. Having established a sound rationale for copyright protection, the protection of computer programs should be assessed against such rationale to ensure that it is consistent with it.

The analysis of the protection of computer programs will focus on the current scope of copyright protection of computer programs, which is central in trying to determine whether such protection is excessive, stifling creativity and innovation, and, thus, imposing too high a social cost. Computer programs, due to their intrinsically functional nature, are materially different to other types of works protected by copyright. While other types of copyright work may be created for ideological, reputational or aesthetic reasons, this is almost certainly not the case with computer programs; they are primarily created to perform some function, and the technical efficiency of their design in achieving the desired result tends to be of overriding importance. Consequently, it is important to see whether the law has appreciated this distinction, and whether it has informed its determination of the appropriate scope of copyright protection. The analysis concerning the scope of copyright protection of computer programs will focus on the legal developments in the US and the UK (as there is a dearth of case law on the subject in South Africa), which are, arguably, the leading jurisdictions concerning copyright protection of computer programs, and software development. Finally, there will be an examination, and analysis, of open-source software development and whether it affects, or undermines, the rationale for the protection of computer programs.

¹⁰ The economic analysis in this work does not include, or take into account, anti-competitive conduct by, or amongst, authors or publishers. It is assumed that authors (or publishers) compete amongst themselves for consumers in their particular markets, and publishers compete to secure the rights of competing authors. The analysis of any anti-competitive conduct amongst authors or publishers such as cartel behaviour, or price fixing, is the subject of competition law.

Chapter 2: History of copyright and the moral justifications for copyright protection

“In the 50 or so years that policy makers, lawyers, judges and academics have been discussing intellectual property (as intellectual property) there has not yet developed any consensus as to its fundamental nature or justification.”¹

2 1 Introduction

As indicated in Chapter 1 (*Introduction*), the purpose of this work is to investigate whether the development and growth of open-source software provides us with any insights concerning the current policy of providing copyright protection in respect of computer programs. The open-source software phenomenon serves as a kind of natural experiment. In other words, does the emergence of open-source software require us to reconsider whether computer programs should be among the types of works that are afforded copyright protection? In order to answer this question, it is necessary to consider the justifications for affording copyright protection to specified categories of works, and computer programs in particular. We will first examine the justifications for copyright protection generally before considering the position with respect to computer programs.

2 2 Why seek justifications?

We have witnessed a digital technological revolution during the past 40 years, with developments such as the personal computer, mobile communications, and the Internet, transforming the way in which we communicate and coordinate social activities. There has been a convergence of computers and telecommunications; phone calls are now made via the Internet using VOIP technology,² and so-called

¹ Deazley R *Rethinking Copyright: History, Theory, Language* 1ed (2006) 137.

² Voice over Internet Protocol.

smart mobile phones have the ability to run a wide range of computer software. The importance of intellectual property rights in digital technology needs no elaboration. Computer programs are not only present in communication devices and computers. The use of computer programs is ubiquitous; a wide range of domestic and office electrical appliances, such as DVD players, washing machines and fridges, rely upon computer programs which have been incorporated into their manufacture.

Although copyright as a form of intellectual property,³ like other forms of property, exists by virtue of its recognition by the state, specifically through legislation, “[l]aw needs some form of social justification if it is to be successfully legitimised.”⁴ Intellectual property rights are legally, economically and socially significant; they are the “most spectacular” form of limited monopoly grant to private individuals by governments.⁵ However, we no longer merely accept laws or social institutions (or consider such laws or institutions to be justified) simply because they emanate from an established authority such as the legislature.⁶ We condemn “blind mandates of power” and seek reasons for the existence of laws; we require that laws are based on sound philosophical or economic justifications.⁷ Power and authority are subject to greater scrutiny than at any point in human history.

The intangible nature of copyright means that it is not intuitively perceived by laypeople — and even some lawyers — as property. It is because of these

³ “Intellectual property” is the generic term used to refer to the different legal regimes concerning copyright, patents, trade marks, designs, and confidential information, “which began their existence independently of each other and at different times in different places.” (Drahos P *A Philosophy of Intellectual Property* 1ed (1996) 14.)

⁴ May C *A Global Political Economy of Intellectual Property Right: The new enclosures?* 1ed (2000) 17.

⁵ Hurt R and Schuchman R “The Economic Rationale of Copyright” 1966 *The American Economic Review* 56 (1) 421 421.

⁶ Spector H “An Outline of a Theory Justifying Intellectual and Industrial Property Rights” 1989 *EIPR* 11 (8) 270 270; Hughes J “The Philosophy of Intellectual Property” 1988 *Geo L J* 77 287 288.

⁷ Spector “An Outline of a Theory Justifying Intellectual and Industrial Property Rights” 270.

perceptions that intellectual property requires specific justification.⁸ A further problem in relation to intellectual property is the perception that it is liberty-inhibiting: copyright, for example, prevents a person from performing a song in public, or from using his property, such as computer, to make a copy of the song.⁹ The intangible nature of intellectual property makes this perceived incursion on personality troublesome because there is no physical interference with another's person or property. The performance or copying appears to harm no one.¹⁰

It is, arguably, the younger generations who are, increasingly, challenging the *status quo* and the rationale of social institutions. For example, Tunisia has just seen a change of government following an uprising that has been dubbed the "Twitter revolution" because the use of various forms of digital communication was considered to be instrumental in the coordination of the protests.¹¹ The main demographic of users of new technology, and the various methods of digital communication such as Twitter, Facebook, and MXit, are the young — those under the age of 30. They are not only enthusiastic users of technology, but are probably also the largest consumers of intellectual property. However, their attitude towards intellectual property appears to be wholly at odds with how the law seeks to regulate intellectual property.

It is not uncommon today to find persons under the age of 30 years old, the cyber generation, who have never purchased music or computer software. Accessing and copying copyright works has become easy and, more importantly, socially acceptable, particularly amongst the members of the cyber generation. In

⁸ Gordon W "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1989 *Stan L Rev* 41 1343 1347. As discussed below, Hegel, for example, did not consider there to be a need to justify intangible property — it was just property.

⁹ Bently L and Sherman B *Intellectual Property Law* 3ed (2009) 34-5; Palmer T "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 1990 *Harv J L & Pub Pol'y* 13 817 855.

¹⁰ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1345-6; Posner R "Intellectual Property: The Law and Economics Approach" 2005 *Journal of Economic Perspectives* 19 (2) 57 64.

¹¹ Legalbrief 2011 *Analysts downplay Twitter revolution* 1369ed Juta Cape Town.

fact, we have witnessed the emergence of political parties — Pirate Parties — in various countries whose agenda it is to campaign against, or seek the dilution of, intellectual property rights. There is probably only one other area of law that has involved such political campaigning in recent years: environmental law.

The emergence of these Pirate Parties should not be considered as merely providing light-hearted comic relief to the elections in which they participate. The new Tunisian State Secretary for Youth and Sport in the wake of Twitter Revolution, Slim Amamou, is a member of the Tunisian Pirate Party.¹² The Swedish Pirate Party has two Members of the European Parliament (MEPs). These parties will continue to augment their positions because they appeal to the cyber generation, who are already generally apathetic toward the political process. They represent something with which the cyber generation (who will, in the course of time, comprise an ever-larger proportion of the electorate) associates itself: free and unrestricted access to copyright works.

It would, therefore, not be an exaggeration to state that it is *only if* intellectual property law in its present, or an amended, form can continue to be justified that will it be able to withstand the criticisms and the sustained attacks to which it has been, and will be, subjected.¹³ The aim of finding coherent justifications is, accordingly, not merely an academic or esoteric exercise; it will, ultimately, determine whether intellectual property law continues to exist as a legal institution.

What we seek to establish when considering the justifications for intellectual property is why it exists and what purpose it serves.¹⁴ As will become apparent in this chapter and Chapter 3 (*Economic justification for copyright protection*), intellectual property is “not so obviously or easily justified as many people think.”¹⁵ Although this work may refer to the justifications for “intellectual property” generally

¹² *ibid.*

¹³ Spector "An Outline of a Theory Justifying Intellectual and Industrial Property Rights" 270.

¹⁴ Deazley *Rethinking Copyright: History, Theory, Language* 137.

¹⁵ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 245, quoting Hettinger E, "Justifying Intellectual Property" 1989 *Phil. & Publ. Affairs* 18 31 at 39-40.

where the arguments are equally applicable to other forms of intellectual property such as patents and trade marks, the scope of this work is more modest: the focus will be on copyright protection, which will serve as the basis for a closer examination of the copyright protection of computer programs. Of course, should it be established that copyright protection of computer programs is justified, that will only serve as the starting point to a further enquiry: we then need to consider the extent to which computer programs should be protected by copyright.¹⁶

2 3 Description and nature of copyright

Before considering the issue of justifications for copyright protection, it may be helpful to briefly consider what is meant by “copyright”, and the nature of copyright. Of course, attempting to give a short overview of a subject as technical as copyright has its inevitable pitfalls; it must necessarily involve a certain level of abstraction. However, this is not intended to be an introductory work on the subject of copyright. The following description of copyright and its nature should be sufficient to provide the background for a meaningful consideration of the justifications for copyright protection.

Broadly, copyright is the statutorily created system providing a limited period of protection to a creator of specified types of works of intellectual creation, or products of the mind, allowing its creator to exploit such creations for personal gain.¹⁷ The protected works are principally “creative expression[s] of ideas in tangible form”.¹⁸ It is because copyright seeks to protect intellectual creations that it, together with other areas of the law such as patents, trade marks, confidential information and designs, falls under the collective term “intellectual property.”¹⁹ Hughes describes it as follows:²⁰

¹⁶ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 28.

¹⁷ Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 2.

¹⁸ Palmer T "Intellectual Property: A Non-Posnerian Law and Economics Approach" 1989 *Hamline L Rev* 12 261 264.

¹⁹ Davis J *Intellectual Property Law* 3ed (2008) 1. According to Reichman, “[t]he term “intellectual property” was not coined until the late nineteenth century. Only when Josef Kohler and Edmond

“A universal definition of intellectual property might begin by identifying it as nonphysical property which stems from, is identified as, and whose value is based upon some idea or ideas.”

Copyright, as is the case with other intellectual property, is different from real rights, personal rights and personality rights, and is a distinct category of subjective rights.²¹ Due to its intangible nature it is not a real right. Although its intangible nature might resemble a personal right, it does not represent a claim to receive any performance by another. Intellectual property rights "do however *operate* like rights *in rem* in imposing a duty of non-interference on all subjects within the legal system."²² Our courts appear to regard copyright as giving rise to a proprietary interest, and, therefore, copyright can be “called "intellectual property", as indeed it is.”²³ More recently, the Supreme Court of Appeal has held that, due to their territorial nature, intellectual property rights such as copyright constitute immovable incorporeals.²⁴

Picard perceived that copyright, patent, and trademark laws had more in common with each other than with the older forms of property known to Roman law was it recognized that a new class of rights in intangible creations had arisen.” (Reichman J "Charting the Collapse of the Patent-Copyright Dichotomy: Premises for a Restructured International Intellectual Property System" 1995 *Cardozo Arts & Ent LJ* 13 475 480).

²⁰ Hughes "The Philosophy of Intellectual Property" 294.

²¹ Klopper H, et al. *Law of Intellectual Property in South Africa* 1ed (2011) 145; Deazley *Rethinking Copyright: History, Theory, Language* 141.

²² Deazley *Rethinking Copyright: History, Theory, Language* 141.

²³ *Video Parktown North (Pty) Ltd v Paramount Pictures Corporation; Video Parktown North (Pty) Ltd v Shelburne Associates and Others; Video Parktown North (Pty) Ltd v Century Associates and Others* 1986 (2) SA 623 (T) 631.

²⁴ *Gallo Africa Ltd and Others v Sting Music (Pty) Ltd and Others* 2010 (6) SA 329 (SCA) 336. Section 22(1) CA 1978 provides that “copyright shall be transmissible as movable property by assignment, testamentary disposition or operation of law.” This characterisation appears to be confined to matters relating to transfers of copyright, and is not meant to be a definitive description of the nature of copyright. In contrast, section 1(1) CDPA 1988 expressly provides that copyright is a property right.

However, the idea that copyright and other forms of intellectual property constitute “property” has been criticised by some commentators.²⁵ Property can be thought of in terms of relations between persons, and a contest for the control of objects that are desired or required by individuals.²⁶ Insofar as property is categorised by the legal relations between persons, the ability to exclude others is essential (the requirement of *excludability*), not the determination of the use by the right holder. The other essential requirement for property is the ability to alienate the thing owned (the requirement of *separability*).²⁷ Because of its intangible nature, copyright is unable to satisfy the proprietary criteria of excludability and separability. Deazley illustrates his point as follows:²⁸

“[Copyright] adheres to no rational understanding of the notion of excludability in that once publicised (whether orally or captured in tangible form) it is beyond the power of an author to exclude others from making use of his or her original expression; nor will use by another exhaust the original expression or prevent either the author (or indeed anyone else) making an exactly identical and concurrent use of the same. Neither does it accord with any sensible concept of separability. An author’s original expression, by definition, cannot be given, traded or licensed to another so as to *become the original expression of that other* – the original expression must always be contingent upon, and so linked to, its originating author.”

It is claimed that the reason for the initial difficulty in accepting intangible matter such as copyright as constituting property was due to a stubborn adherence to “the Roman law doctrine of occupancy, which was said to underlie the foundation

²⁵ For example, Spector states that “there is a marked tendency to consider that the true nature of copyright and patent rights is not that of proprietary rights but rather that of legal monopolistic privileges.” (Spector “An Outline of a Theory Justifying Intellectual and Industrial Property Rights” 270.)

²⁶ Drahos *A Philosophy of Intellectual Property* 4.

²⁷ Deazley *Rethinking Copyright: History, Theory, Language* 140. Deazley based this characterisation of property by Penner (Penner J *The Idea of Property in Law* (1997) OUP). Jeremy Waldron (cited in Trosow “The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital” 223) and Wendy Gordon (Gordon “An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory” 1354) also regard the right to use as being integral to a property right. However, Gordon considers the right to exclude as generally the most important right (1356).

²⁸ Deazley *Rethinking Copyright: History, Theory, Language* 160.

of title to property”.²⁹ Due to its intangible, and non-excludable, nature the subject matter could not be occupied in a similar manner to corporeal property.³⁰ English law classified intellectual property rights as personal rights, but this is said to have had little to do with logic, and more “to do with chance, history and the internal dynamics of the English legal system.”³¹ Copyright is, thus, said to be at most a personal right, allowed to function like a real right because of the award of state-sanctioned privileges.³²

Furthermore, it is claimed that the use of the term “property” — a veritable “conceptual juggernaut”³³ — in relation to copyright is no accident. The association of the term “property” with the monopoly or privilege granted by the state is said to be the result of a deliberate campaign by the 17th-century English publishers and booksellers in order to strengthen their case by invoking rhetoric.³⁴ As the earliest form of protection in relation to literary works was by way of the grant of a crown privilege, which process was riddled with corruption, they adopted the term “property” as a substitute for “privilege,” which had a distinctly negative connotation.³⁵ Having embraced the use of the term “property”, the language of the system “represents part of the reason for the system existing in its current form.”³⁶ It is also submitted that the uniformity with which all forms of property are justified is a deliberate consequence of political economic power to give primacy to ownership rights in order to ensure that a system of exchange, and markets, can be

²⁹ Sherman B and Bently L *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 1ed (2000) 21.

³⁰ 21.

³¹ Drahos *A Philosophy of Intellectual Property* 20.

³² Deazley *Rethinking Copyright: History, Theory, Language* 160.

³³ 160.

³⁴ 143. According to Mackaay, it was at the time of the French Revolution that the notion of intellectual creations as constituting property first appeared. This was a reaction to the generally corrupt system of privileges, which was replaced by a system, based on individual liberty, giving every person the right to exploit their creations (Mackaay E "Economic Incentives in Markets for Information and Innovation" 1990 *Harv J L & Pub Pol'y* 13 867 867-8).

³⁵ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 821.

³⁶ Deazley *Rethinking Copyright: History, Theory, Language* 163.

established.³⁷ The successful use of the term “property” in relation to the privileges granted in respect of intellectual creations, as in “intellectual property,” is said to have resulted in the continual “reification” of such rights, and the relentless, expansion of the domain and duration of copyright protection.³⁸ Deazley sums up this position as follows:

“[T]he conceit and language of intellectual property as a *natural property right* has provided one of the key foundations for rampant expansionism which is the story of copyright law throughout the twentieth and into the twenty-first century.”³⁹

The role of the state in the reification of intellectual creations has been noted. Property is not protected because it has an existence independent of the state, which existence is merely recognised or acknowledged by the state: it exists because it is recognised by the state.⁴⁰ The state is essential for property rights: “without it there would be no institution of property.”⁴¹ Copyright protection afforded to authors is a consequence of state coercion, which prevents an author’s work from being copied.⁴² In fact, the guaranteeing of property rights is a *raison d’être* for the existence of the state.⁴³ Furthermore, it is claimed that the recognition and the continuing expansion of property rights – particularly intellectual property - has only been possible as a result of the increase in the power of the state, which is required to enforce those rights. May quotes the following passage from De Jouvenel to highlight the growth of power of the modern state, which makes such enforcement possible:⁴⁴

“[O]ne observes on the contrary that the evolution from monarchy to democracy has been accompanied by a prodigious development of the means of coercion. No king has had at his disposal a police force comparable to that of modern democracies.”

³⁷ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 23.

³⁸ Deazley *Rethinking Copyright: History, Theory, Language* 144.

³⁹ 152.

⁴⁰ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 16.

⁴¹ 17.

⁴² Hurt and Schuchman "The Economic Rationale of Copyright" 421.

⁴³ Mackaay "Economic Incentives in Markets for Information and Innovation" 884.

⁴⁴ 885-7.

There is still a reluctance to simply acknowledge that copyright, jurisprudentially, constitutes property. For example, it is not uncommon to see copyright described as a “bundle of rights”, and thereby to avoid the thorny issue of whether it constitutes property.⁴⁵ Gordon claims that there is an illogical preoccupation with trying to justify the legal institution of property, whereas there seems to be no such preoccupation in respect of other legal institutions such as contract.⁴⁶ These other legal institutions require similar justification.

The reticence to accept copyright as property has been challenged as being a consequence of adopting an “overly narrow and conservative” model of property.⁴⁷ It has been suggested that a possible reason for the reluctance to accept intellectual property as property is a consequence of a human shortcoming: a psychological tendency to be tethered to physical objects, or a failure to realise what the advances in technology have made possible.⁴⁸ This conservatism and adherence to the requirement of occupancy was considered to be inconsistent with the new social, economic, technological and cultural circumstances. The notion of occupancy was transformed – if not rejected – to be a special instance of a more general basis for property: labour. The basis for the appropriation of property, relying on Locke’s philosophy of “possessive individualism (or a version thereof),” was labour.⁴⁹ It was thus claimed that whereas physical property exists independently, but can only be subject to private property through occupancy, copyright is created through the endeavours of the author, and belongs to him on creation.⁵⁰

⁴⁵ Klopper, et al. *Law of Intellectual Property in South Africa* 146.

⁴⁶ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1425.

⁴⁷ Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 23.

⁴⁸ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1348.

⁴⁹ Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 23-4.

⁵⁰ Drahos *A Philosophy of Intellectual Property* 26.

In so far as the role of the state is concerned in recognising intellectual property as property, it is not the case that only intellectual property, and not tangible property, depends on state guarantees and enforcement, or that intellectual property requires such recognition to a greater extent than tangible property. There are various types of tangible property, and tangible property will similarly only be legally protected if the owners of a particular type of property act in a manner which the law recognises as preserving such rights. The practical differences between tangible and intangible property are not as stark as it might first appear. The differences between intangible property and tangible property are said to be comparable to the distinctions between movable and immovable property. For example, movable and immovable property differs in the following respects: how transfer is effected; the different time periods for acquisitive prescription; the extent to which a non-owner can pass valid title; and, the inapplicability of neighbour law to movable property.⁵¹

Although jurisprudentially the recognition of intellectual property as property may present problems, it is not an issue which affects the matters examined in this work. It is not necessary to confute one theory of the classification of copyright, or other intellectual property, in favour of another. For purposes of this study, to do so would be drawing distinctions without there being a difference. The intended economic analysis of the justification for copyright protection of computer programs is not dependent on whether copyright is jurisprudentially classified as property or personal rights. As this work will approach the analysis of the copyright protection of computer programs from an economic perspective, it is more important for there to be clarity concerning the economic effect of intellectual property. We can proceed with the analysis on the basis that from an economic perspective copyright, and intellectual property generally, constitutes property. From an economic perspective, “[t]he social arrangements that govern the ownership, use, and disposal of anything that people value are called property rights.”⁵²

Copyright confers on the copyright holder three valuable economic rights: the exclusive right to do, or to authorise the doing of, any of the listed acts in respect of

⁵¹ Mackaay "Economic Incentives in Markets for Information and Innovation" 878-9.

⁵² Parkin M *Microeconomics* 9ed (2010) 44.

the specific type of eligible work reserved to the copyright holder (the rights of exclusion);⁵³ privileges of use; and, powers to transfer these entitlements, similar to those which the law confers in respect of tangible property.⁵⁴ For purposes of this work, it is sufficient to note that copyright grants the holder the right to manufacture, distribute, or sell copies of the relevant work, or a derivative work.⁵⁵ The essence of copyright is to control the copying of a work.⁵⁶ Most significantly, it is important to note that these rights are exclusive to the copyright holder, and “[a]n exclusive right is the basic form of a property right.”⁵⁷ In other words, what is required is that there must be certainty concerning the contents of the rights (a clear “assignment” of rights), the holder of the rights, and the ability of the holder to deal with such rights.⁵⁸ Property law as an institution started with its essence being the recognition of the possession of physical objects to allow undisturbed use by the possessor, and has developed into the recognition of *any* asset (or right) entitling the holder to withhold or restrict its use.⁵⁹

However, copyright does not protect abstract ideas or creations *per se*; it requires that they be reduced to a tangible medium of expression corresponding with one or more of accepted categories of protected expression.⁶⁰ More specifically, the

⁵³ See, for example, sections 6 – 11B Copyright Act 98 of 1978.

⁵⁴ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1365; Moore A "A Lockean Theory of Intellectual Property" 1997 *Hamline L Rev* 21 65 87.

⁵⁵ Abrams H "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1983 *Wayne L Rev* 29 (3) 1119 1129; Hettinger E "Justifying Intellectual Property" 1989 *Philosophy and Public Affairs* 18 (1) 31 34.

⁵⁶ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1133.

⁵⁷ Mackaay "Economic Incentives in Markets for Information and Innovation" 876.

⁵⁸ O'Hare M "Copyright: When is Monopoly Efficient?" 1985 *Journal of Policy Analysis and Management* 4 (3) 407 408.

⁵⁹ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 20-1. This is of course not to deny that the recognition of property or rights is contingent on the prevailing political and economic environments.

⁶⁰ S 2(2) CA 1978 and s 3(2) CDPA 1988. The requirement in s 2(2) CA 1978 does not apply to broadcasts or programme-carrying signals. A more detailed consideration of the idea-expression

Copyright Act⁶¹ (CA 1978) specifies nine types of eligible work, including literary works, artistic works and computer programs.⁶² The position is similar in England, where the eligible works are defined in the Copyright, Designs and Patents Act 1988 (CDPA 1988).⁶³

Although protection is only afforded to the specified types of work, some of these types of work are broadly and non-exhaustively defined. For example, literary works are defined to include novels, poetry, letters, lectures, scripts, memos, tables and compilations (including computer data).⁶⁴ Dean correctly notes that to describe the listed examples which could be protected as "literary" works is a misnomer.⁶⁵ The term is not meant to imply that the subject matter needs to satisfy any literary standard as the Act expressly prohibits any assessment of literary quality.⁶⁶ As is evident from the case law, both in South Africa and England, copyright protection may be extended to subject matter as banal as the insert included in medication packaging (which contains details about its composition and contra-indications),⁶⁷ the design of medical account forms,⁶⁸ and examination papers⁶⁹ - "things which have no pretensions to literary style".⁷⁰ The essential requirement to obtain copyright protection is originality.⁷¹ Copyright law's standard for originality is rather

dichotomy will be undertaken in Chapter 4 (*Scope of copyright protection of computer programs*), concerning the protection of software.

⁶¹ Act 98 of 1978.

⁶² S 2(1). The eligible works are literary works, musical works, artistic works, cinematograph films, sound recordings, broadcasts, programme-carrying signals, published editions, and computer programs.

⁶³ Ss 3 – 8. There are differences between the CA 1978 and the CDPA 1988: the CA 1978 protects dramatic works as a species of literary work (rather than as a separate type of eligible work, as is the case under the CDPA 1998), and the CA 1978 protects computer programs as a *sui generis* type of protected work (and not as a species of literary works, as is the case under the CDPA 1988).

⁶⁴ S 1(1) CA 1978, definition of "literary work".

⁶⁵ Dean O *Handbook on South African Copyright Law* 14ed (2012) 1-8.

⁶⁶ S 1(1) CA 1978, definition of "literary work".

⁶⁷ *Biotech Laboratories (Pty) Ltd v Beecham Group Plc and Another* 2002 (4) SA 249 (SCA).

⁶⁸ *Accesso CC v Allforms (Pty) Ltd and Another* [1998] 4 All SA 655 (T).

⁶⁹ *University of London Press v University Tutorial Press* [1916] 2 Ch 601.

⁷⁰ 608, cited in *Klep Valves (Pty) Ltd v Saunders Valve Co Ltd* 1987 (2) SA 1 (A) 21.

⁷¹ S 2(1).

modest. It simply requires that the subject matter must not have been copied, and that it must have been produced by the author's own, non-trivial, labour and effort.⁷² Unlike patent law, there is no requirement that the subject matter must be inventive, novel, unique, useful or have any particular merit.⁷³ Thus, "fairly broad rules grant copyright to virtually all works within specified classes."⁷⁴ The position is neatly summarised by Cornish, as follows:⁷⁵

"Copyright everywhere is open to those who cross a low threshold of creativity, and differences between national laws over the concept originality operate only at this margin. No system reserves copyright only for those works which pass a substantial test of aesthetic merit."

The reason for mentioning these "humble and transitory" examples of subject matter that have received copyright protection is to contrast it with the romantic notions of the author which commonly features in some of the justifications for copyright protection, and whose works are used to demonstrate that such works deserve protection because of the genius which they exhibit.⁷⁶ Although the author of a copyright work is considered to be the "corner-stone" of copyright because ownership either vests in the author or is derived from him,⁷⁷ the idea that the author is central to copyright is continually looking more tenuous. The addition of new types of eligible work such as sound recordings, broadcasts, program-carrying signals, and published editions indicates "a shift away from seeing intellectual property rights

⁷² *Klep Valves (Pty) Ltd v Saunders Valve Co Ltd* 22-23; *Haupt t/a Soft Copy v Brewers Marketing Intelligence (Pty) Ltd & Others* 2006 (4) SA 458 (SCA) 473; *Marick Wholesalers (Pty) Ltd v Hallmark Hemdon (Pty) Ltd* (1999) 707 JOC (T) 715-6.

⁷³ *Klep Valves (Pty) Ltd v Saunders Valve Co Ltd* 21. However, in *Waylite Diary CC v First National Bank Ltd* 1995 (1) SA 645 (A) the court appears to have introduced an objective test to evaluate whether effort expended in the creation of the work was worthy of protection by considering the effort expended and product of the effort. This decision has been criticised by Dean, who insists that the test of originality should be purely subjective: the only issue should be whether the requisite effort was expended (Dean *Handbook on South African Copyright Law* 1-24).

⁷⁴ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1441.

⁷⁵ Cornish *W Intellectual Property* 3ed (1996) 318.

⁷⁶ 318.

⁷⁷ Dean *Handbook on South African Copyright Law* 1-31.

primarily as rewards for mental labour to instead viewing them as important economic assets.”⁷⁸ However, for convenience, this work will continue to refer to the “author” of any intellectual creation, as this is also the terminology of the CA 1978.

In the UK, the CDPA 1988 already draws a distinction between those eligible works which are considered to be authorial works, and those considered to be entrepreneurial works. Originality is a requirement for authorial works — literary works (including computer programs), dramatic works, musical works and artistic works — but not the entrepreneurial works.⁷⁹ The copyright protection afforded to the entrepreneurial works — cinematograph films, sound recordings, broadcasts, cable programmes, and published editions — thus protects the financial investment rather than creative endeavour. It may, therefore, not be too cynical to suggest that what copyright protects “might be viewed more as products of the market than of the mind.”⁸⁰

As stated above, the discussion of the jurisprudential nature of copyright *qua* property does not provide any definitive answer. The economic analysis of the justifications for copyright does not require an answer. This fact is neatly summed up by Benjamin Kaplan’s pragmatic approach to the analysis of intellectual property:⁸¹

“Examining the view from the top of the hill, I find one temptation easy to resist, and that is to sum up copyright with just the word “property” or “personality” or any one of the other essences to which scholars, foreign and domestic, have been trying to reduce the subject. . . . [C]haracterizations in grand terms then seem of little value: we may as well go directly to the policies actuating or justifying the particular determinations.”

⁷⁸ Davis *Intellectual Property Law* 3.

⁷⁹ S 1(1)(a) CDPA.

⁸⁰ Davis *Intellectual Property Law* 3.

⁸¹ Hughes “The Philosophy of Intellectual Property” 365, quoting from a speech delivered by Benjamin Kaplan in a lecture at Columbia Law School.

2 4 The historical role of justifications in the development of copyright

It may come as no surprise that the history of the development of copyright (and patent) protection in England⁸² indicates that its emergence was not the result of a philosophically-based enquiry into the appropriateness of that type of protection, approved by the populace or their duly appointed representatives. Rather, its emergence was dictated by the prevailing social structure and the invention of the European printing press.⁸³ The emergence of copyright was “distinctly instrumental.”⁸⁴

Prior to the invention of the printing press, books were of limited economic value, and, hence, there was little point in seeking any copyright-type legal protection.⁸⁵ Although copying of literary works did take place before the invention of the printing press, “these acts only incurred moral censure and no legal consequences.”⁸⁶ The reasons why the printing press transformed the economic value of cultural assets such as literary works were the following:⁸⁷ First, prior to the invention of the printing press there was very little demand for such works as the majority of the population was illiterate. Second, the creators of such works were generally affluent and motivated by non-financial interests such as cultural advancement, producing the works in their leisure time — sometimes anonymously.

⁸² As will become clear below, the reason for specific reference to the development of English copyright law is the fact that England, with the passing of the Statute of Anne (1710), was the first country with a “modern” copyright law in that it granted general copyright protection to authors, and because our copyright law is almost wholly derived from English law.

⁸³ Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 4; Mackaay “Economic Incentives in Markets for Information and Innovation” 901. The first printing presses were actually invented in China during the 11th century CE. Subsequent references to the invention of the printing press in this work are references to its development in Europe.

⁸⁴ Drahos *A Philosophy of Intellectual Property* 14.

⁸⁵ Watt *R Copyright and Economic Theory* 1ed (2003) 17; Boldrin M and Levine D *Against Intellectual Monopoly* 1ed (2010) 30; Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 4; Mackaay “Economic Incentives in Markets for Information and Innovation” 901; Posner “Intellectual Property: The Law and Economics Approach” 66.

⁸⁶ Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 4.

⁸⁷ Watt *Copyright and Economic Theory* 18-20.

Another reason why some creators were not motivated by financial concerns was the fact that works were often created under a system of patronage. If anyone claimed ownership of the work, it would be the patron, not the author of the work. The patrons were also not financially motivated: their patronage was for personal consumption, and the accumulation of works was probably motivated by issues of status. The invention of the printing press and the consequent development of the printing industry gave rise to a new profession: the literary author.⁸⁸ Third, the costs of reproducing works before the printing press were very high because they were manuscripts. The reason these copies were so expensive was that it involved the time-consuming task of producing another manuscript. By the late 14th century there were still only a few dozen copies of any particular work.⁸⁹ Furthermore, the copies would almost certainly be of an inferior quality because of human error, which reduced their value. In other words, the quality-adjusted cost of copies was very high.⁹⁰ Following the invention of the printing press by Johannes Gutenberg, printing industries rapidly arose in the European capitals, the first in Venice in 1469.⁹¹ The result was that good quality books, particularly reprints of popular titles, were soon readily available.⁹²

Although the modern justificatory theories — particularly the moral or ethical justifications — for copyright protection, and modern copyright laws, focus on the author, historically it was the publishers who initially campaigned for, and obtained, protection.⁹³ Realising the commercial value of the market for books, it was not long before the printing industry sought to protect their new-found economic interests by seeking monopoly grants. The greater availability of books did not merely make them commodities, they sped up the dissemination of ideas, some of which were

⁸⁸ 20.

⁸⁹ Foer J "Secrets of a Mind-gamer" <http://www.nytimes.com/interactive/2011/02/20/magazine/mind-secrets.html?nl=todaysheadlines&emc=thab1> (22 January 2011).

⁹⁰ Posner "Intellectual Property: The Law and Economics Approach" 66.

⁹¹ Garfield S *Just My Type* 1ed (2011) 83-4; Watt *Copyright and Economic Theory* 15.

⁹² Kretschmer M and Kawohl F "The History and Philosophy of Copyright" in Frith S and Marshall L *Music and Copyright* (2004) 22-3.

⁹³ Breyer S "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 1970 *Harv L Rev* 84 (2) 281 292.

considered to be seditious, heretical, obscene or blasphemous. Commencing with the first grants of privileges to the printing industry by the city council of Venice in the 15th century,⁹⁴ “the late medieval [European] states had a readymade device for controlling the dissemination of new ideas while solving the profitability problem of some printers: the crown privilege.”⁹⁵ Besides its role as a device for censorship, the awards of printing privileges provided the medieval monarchs with revenues as these privileges were purchased.⁹⁶ Because these monopoly awards of privilege were financially beneficial to both the monarchs and the publishers, they were “the defining economic instrument of late feudalism.”⁹⁷

Copyright thus had its origin in the grant of royal decrees and privileges in European countries during the 15th to 18th centuries.⁹⁸ The practice of granting crown privileges was widespread in Europe by the 16th and 17th centuries.⁹⁹ The publishers had managed to make common cause with the medieval authorities, and so it was that “the rise of Anglo-Saxon copyright was a saga of publishing interests attempting to protect a concentrated market and a central government attempting to apply a subtle form of censorship to the new technology of the printing press.”¹⁰⁰ This was significantly different to subsequent statutory copyright protection, which focused on creativity and the principle of authorship, whereas the crown privileges

⁹⁴ Harison E *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 1ed (2008) 5; Watt *Copyright and Economic Theory* 15; Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 4; Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 292; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 265.

⁹⁵ Kretschmer and Kawohl "The History and Philosophy of Copyright" 23; Mackaay "Economic Incentives in Markets for Information and Innovation" 901.

⁹⁶ Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 4; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 264.

⁹⁷ Kretschmer and Kawohl "The History and Philosophy of Copyright" 23.

⁹⁸ Drahos *A Philosophy of Intellectual Property* 14; Mackaay "Economic Incentives in Markets for Information and Innovation" 901.

⁹⁹ Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 4.

¹⁰⁰ Hughes "The Philosophy of Intellectual Property" 291.

were concerned with the trade in books.¹⁰¹ These early privileges given to specific publishers often gave them the exclusive rights to publish classes of books, which also gave them a buying monopoly over authors' works falling within the relevant classes.¹⁰² Importantly though, prior to these privileges, copyright simply did not exist, and had not developed, under English common law.¹⁰³

The origin of copyright in England is very much a tale of publishing interests securing monopoly privilege and censorship.¹⁰⁴ In 1553 Queen Mary assumed the throne in England and restored Roman Catholicism as the state religion. She was notorious for her religious zealotry and the resultant persecution of the Protestants, which earned her the sobriquet "Bloody Mary."¹⁰⁵ Because it served her efforts to suppress the spread of seditious and heretical information, she was prepared to give the Stationers' Company (the Company) control over printing in England.¹⁰⁶ Indeed, the suppression of seditious and heretical views was the "prime motivation" for granting the Company control over printing.¹⁰⁷

The Company was a London craft guild of "writers, illuminators, bookbinders and booksellers, established since 1403."¹⁰⁸ Being a craft guild, the Company was eager to obtain monopoly protection for its members and eliminate any threat of competition from non-members.¹⁰⁹ Following its incorporation by royal charter on 5 May 1557, the Company was granted the exclusive privilege to print and distribute

¹⁰¹ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1134-5.

¹⁰² Plant A "The Economic Aspects of Copyright in Books" 1934 *Economica* 1 (2) 167 178.

¹⁰³ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1128.

¹⁰⁴ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 264.

¹⁰⁵ Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 5.

¹⁰⁶ Drahos *A Philosophy of Intellectual Property* 22. A similar situation prevailed in France.

¹⁰⁷ 127.

¹⁰⁸ Kretschmer and Kawohl "The History and Philosophy of Copyright" 23; Drahos *A Philosophy of Intellectual Property* 22. The term "publishers" in the rest of this chapter will be used as the collective term for any or all of the illuminators, bookbinders and booksellers, but not authors. The stationers were the predecessors of the modern publishers (Cornish *Intellectual Property* 297).

¹⁰⁹ Drahos *A Philosophy of Intellectual Property* 22.

books.¹¹⁰ The Company's position was strengthened when, in 1637, it was authorised by the Star Chamber — the court tasked with the control of publishing and printing presses — to “seize and destroy unauthorized books and presses, eliminating both economic competition and threats to established political and religious authorities at one blow.”¹¹¹ Although the Company was given the right to control the printing presses, and all published books were subject to its approval and registration,¹¹² torture and killing remained the Crown's preferred method of suppressing seditious and heretical views.¹¹³

After Charles I was deposed, and the Star Chamber was abolished, in 1641 the system of royal privileges was abolished, but was soon replaced with a series of Licensing Acts, commencing in 1643, which were also censorship laws and maintained the Company's monopoly on printing.¹¹⁴ The last of the Licensing Acts was passed by Charles II in 1662 and lapsed on 3 May 1695.¹¹⁵ By this time the negative effects of the Company's monopoly was becoming apparent to the English parliament: consumers were paying inflated prices for poor quality, error-riddled publications.¹¹⁶ The immediate effect of the lapsing of the Licensing Acts was that the Company lost its long-held printing monopoly, and was soon encountering

¹¹⁰ Kretschmer and Kawohl "The History and Philosophy of Copyright" 23-4; Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1135; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 267; Drahos *A Philosophy of Intellectual Property* 22; Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 5. Dean states that the Company was chartered in 1556.

¹¹¹ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 267-8.

¹¹² Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 11-2; Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 5.

¹¹³ Drahos *A Philosophy of Intellectual Property* 22.

¹¹⁴ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1137; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 268.

¹¹⁵ Kretschmer and Kawohl "The History and Philosophy of Copyright" 26; Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 11-2; Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1138; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 268. Abrams and Palmer claim that the last Licensing Act ended in 1694.

¹¹⁶ Kretschmer and Kawohl "The History and Philosophy of Copyright" 26.

competition from other publishers.¹¹⁷ This was not a situation which the Company chose to ignore; its monopoly profits were fast being eroded. Its campaign to extend its monopoly was at least as sophisticated as that of any modern-day lobby group. Plant describes its efforts as follows:¹¹⁸

“Whenever exceptional profits attracted interlopers, the case against unregulated competition was argued by the Company with a skill which our present-day trade associations hardly excel.”

Although the Company failed to get the Licensing Acts re-enacted, they did manage to secure the passing of the first copyright statute, the Statute of Anne, on 10 April 1710.¹¹⁹ The Statute of Anne has been described as a “watershed” moment,¹²⁰ or “revolutionary,”¹²¹ in the development of copyright because authors’ rights were recognised for the first time and they were allowed to register their own works. Until the Statute of Anne, the interests of the authors were largely absent; the crown privileges and the Licensing Acts were solely concerned with protecting the interests of the printing industry.¹²² Drahos sums up the position of authors prior to the passing of the Statute of Anne as follows:¹²³

¹¹⁷ 267; Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 11-2.

¹¹⁸ Plant “The Economic Aspects of Copyright in Books” 175-6.

¹¹⁹ Abrams “The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright” 1139; Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 5; Deazley *Rethinking Copyright: History, Theory, Language* 13; Drahos *A Philosophy of Intellectual Property* 14; Plant “The Economic Aspects of Copyright in Books” 179; Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 11-2. The Act’s full title was the “Act for the Encouragement of Learning”.

¹²⁰ Abrams “The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright” 1139-40; Dean *The Application of the Copyright Act 1978 to Works Made Prior to 1979* Thesis: 6; Watt *Copyright and Economic Theory* 20.

¹²¹ Drahos *A Philosophy of Intellectual Property* 23.

¹²² Abrams “The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright” 1148; Watt *Copyright and Economic Theory* 15. Some authors had managed to obtain letters patent from sovereigns in respect of their works (Kretschmer and Kawohl “The History and Philosophy of Copyright” 24).

¹²³ Drahos *A Philosophy of Intellectual Property* 23.

“At this stage of copyright’s history the author had only a cameo role. The central players were the Crown and the printing trade and neither was particularly interested in the rights of the author, or the value of a right of copy to the economy or culture. Unless an author was lucky enough to secure a personal privilege, his position was weak, so much so that, if he allowed a manuscript to be publicly circulated, there was nothing to prevent a member of the Stationers’ Company from registering the copyright and exploiting it. The right to print books belonged to those members of the Stationers’ Company who registered the particular work and not to the author.”

There is an alternative, possibly cynical, explanation for the Statute of Anne introducing the interests of author: it was the only way for the publishers to secure some legal protection for their interests following the end of the Licensing Acts. In fact, after the monopoly privileges of the Company were terminated in 1641, and before the enactment of the Licensing Acts, the Company mentioned the interests of authors — as a subsidiary matter — as part of their motivations to have their monopoly reinstated.¹²⁴ Meanwhile, the authors had also realised the economic value of their creations and lobbied for protection of their interests.¹²⁵ Following their failure to get the Licensing Acts re-enacted, the publishers, realising that their earlier role to satisfy the desire to censor material was no longer a pressing concern, were astute enough to change tack and lobby for the protection of the rights of authors, and to ensure that any rights granted to authors were assignable.¹²⁶ They argued that copyright could be assignable and provide an author’s heirs financial support after the author’s death.¹²⁷ The publishers reasoned that it did not matter who the law gave primacy to, as any benefit derived by them also benefitted the authors, who could negotiate with publishers for a fair share.¹²⁸

¹²⁴ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 268.

¹²⁵ Watt *Copyright and Economic Theory* 20.

¹²⁶ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 292; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 268.

¹²⁷ Plant "The Economic Aspects of Copyright in Books" 178.

¹²⁸ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 292.

As was common practice in the 18th century, and indeed still is the case today, an author's work would only be published if the author agreed to assign his rights to the publisher.¹²⁹ In fact, until the end of the 18th century it was common for the author to only receive a lump sum payment prior to publication, irrespective of the subsequent success of their work.¹³⁰ By supporting the Statute of Anne, the publishers were thus more concerned about their own financial interests, rather than vindicating the rights of authors.¹³¹ The publishers were thus prepared to make a tactical switch and advance the rights of the authors, whose interests were now considered to be more deserving of protection by the legislature than those of the discredited publishers.¹³² In fact, it was claimed that the publishers had virtually invented the idea of the author, simply to advance their own interests.¹³³ It is for this reason that some commentators like Tom Palmer claim that copyright emerges out of state power to grant privileges, rather than out of any concern for the rights of authors.¹³⁴

Although the argument that the concept of the author was invented by the publishers is probably too dismissive of authors, it is probably the case that without the lobbying of publishers the Statute of Anne would not have been passed. The basis of protection was not based on "the intellectual creativity or moral rights of the author."¹³⁵ Creativity and authorship as the basis for copyright protection did not

¹²⁹ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1153.

¹³⁰ Kretschmer and Kawohl "The History and Philosophy of Copyright" 24.

¹³¹ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1153.

¹³² 1142.

¹³³ Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 36.

¹³⁴ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 267.

¹³⁵ Watt *Copyright and Economic Theory* 20; Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1139-40. Drahos suggests that Statute of Anne was instrumental: it provided incentives to authors to create works and thereby society would be enriched (Drahos *A Philosophy of Intellectual Property* 23). Kretschmer and Kawohl however think that the Statute was "ambiguous as to where the incentive should bite precisely: at the point of

emerge on a consistent basis for granting property rights until the early part of the 18th century.¹³⁶

The success of the copyright industry to protect their products contrasts sharply with the position of inventors. Various reasons were given for the refusal to protect inventions:¹³⁷ in *The Case of Monopolies* it was held that monopolies were contrary to the common law, which abhorred monopolies because of its detrimental effect on social welfare; historically, it was associated with grants by unscrupulous monarchs; socially and economically, these creations were considered to be too important to allow any form of monopoly; and, philosophically, it was claimed that “that authors create something while inventors merely uncover what is already there.”¹³⁸ The other reason for the failure of inventors to garner support for their “natural” rights is probably the fact that inventors were individuals and lacked the lobbying power of the Company.

It is hopefully self-evident from this brief description of the early development of copyright protection that it did not evolve from any sort of philosophical or theoretical foundation. In fact, the first time that there was any concerted attempt to justify copyright protection philosophically was when the question of the existence of common-law copyright was being considered, approximately sixty years after the passing of the Statute of Anne in the case of *Millar v Taylor*.¹³⁹ It would probably be difficult to find a better example of an *ex post facto* justification for legislation, particularly one so economically significant. The issue that had to be decided concerned the status of literary works following the period of statutory protection under the Statute of Anne.¹⁴⁰ Were these works now unprotected, and could they be

creation (author) or investment in publication and distribution (proprietor).” (Kretschmer and Kawohl “The History and Philosophy of Copyright” 27.)

¹³⁶ Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 44.

¹³⁷ Drahos *A Philosophy of Intellectual Property* 29-30.

¹³⁸ 29.

¹³⁹ *Millar v Taylor* 1769 4 Burr. 2303.

¹⁴⁰ The statutory period of protection differed for works that had been published prior to the passing of the Statute of Anne, and those published thereafter. In respect of the first category, the duration of

produced by anyone? Apart from the statutory protection, were these works protected under the common law?¹⁴¹

The Company, eager to avoid competition following the expiration of the statutory protected period, particularly from Scottish publishers, claimed that literary works were protected by perpetual common-law copyright vesting in the authors.¹⁴² The Company once again showed itself to be tenacious in protecting its financial interest, even resorting to underhand tactics. Following the passing of the Statute of Anne, it continued to campaign for the extension of statutory period of protection. Having failed to achieve this in 1735, the Company supported the idea of the existence of perpetual common-law copyright protection.¹⁴³ The Company even engaged in a sham to contrive a case which could establish a precedent of supporting claims for perpetual common-law copyright.¹⁴⁴ However, the House of Lords finally rejected the notion of perpetual common-law copyright in *Donaldson v Becket*,¹⁴⁵ bringing to an end the 30-year “battle of the booksellers.”¹⁴⁶ Copyright protection was solely created, and limited, by statute.

protection was 21 years. For books published after the passing of the statute, protection was granted for an initial 14-year period, renewable for a second 14-year period if the author was still alive (Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1143; Plant "The Economic Aspects of Copyright in Books" 179-80; Kretschmer and Kawohl "The History and Philosophy of Copyright" 26-7; Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 12;).

¹⁴¹ Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 13.

¹⁴² Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1143; Deazley *Rethinking Copyright: History, Theory, Language* 14; Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 12.

¹⁴³ Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 12.

¹⁴⁴ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1145.

¹⁴⁵ 17 Parl. Hist. Eng. 953 (H.L. 1774).

¹⁴⁶ Deazley *Rethinking Copyright: History, Theory, Language* 14. Following the failure of the Company to establish a common law perpetual copyright, they continued to campaign for an extension of the statutory period of protection, on behalf of the authors: "[t]hey did better when they emphasised in those days the interests of authors, just as a century and a half before they found it

The above brief account of the development of copyright indicates that its development was more dependent on the political and social structure of the societies in which it arose, rather than as a result of a deliberate attempt to establish a sound rationale for its creation. Indeed, copyright was used to suppress seditious and heretical material which may threaten the state. Copyright also provided the publishers with protection from competition in their publications. Its purpose was thus instrumental. In contrast to the current emphasis on authors as the cornerstone of copyright, authors do not appear to have been central to the considerations. It is, therefore, not sufficient to accept copyright solely on a historical basis or tradition. In fact, historically, creativity and innovation does not appear to be dependent on the grant of property rights, and the creation of such rights appear to be contingent on a particular set of social relations. For example, Imperial China was “an example of a society that achieved spectacular outcomes in science and innovation, yet it did not rely on intellectual property rights or a customary equivalent.”¹⁴⁷ Copyright, because of its social and economic significance, should be grounded on a sound theoretical basis, particularly if protection is expanded to new types of work, as has been the case with computer programs. Hughes neatly summarises this position:¹⁴⁸

“Husserl once observed that "tradition" meant only that the particulars of the past had been forgotten. Of course, it is inevitable that the details of the past will be lost. That means that we have a choice between unreflective tradition and grand theories; I find the latter a preferable way to capture and condense a history. The grand characterization can be tested, more thoroughly than the tradition, as it is used as a guide for new situations.”

However, the mere fact that the initial development of copyright was instrumental should not be the basis for its dismissal. Dismissal of copyright on that basis fails to provide any insight as to how it actually operates and its present significance as a social institution.¹⁴⁹ What we should seek when looking at the

most profitable to profess anxiety for the safety of the realm.” The period of copyright was extended to the life of the author or 28 years, whichever was the longer, in the statutes of 1801 and 1814. (Plant "The Economic Aspects of Copyright in Books" 182)

¹⁴⁷ Drahos *A Philosophy of Intellectual Property* 15.

¹⁴⁸ Hughes "The Philosophy of Intellectual Property" 365.

¹⁴⁹ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 273.

historical development of copyright is not the chronological progression of copyright; we should try to identify those events of social and technological significance, like the development of the printing press, and whether there is an underlying rationale for development of copyright in response such changes. Only by understanding “the fundamental philosophic perception of the nature of copyright and its underlying purpose” will we be able to respond to new technological developments, such as computer programs and the Internet, on a principled and consistent basis.¹⁵⁰

2 5 Classification of justifications

As stated above, the fact that copyright, by virtue of its grant of property rights, has such significant social and economic effects requires that it should be grounded on a sound theoretical basis. However, attempting to formulate a coherent justification for intellectual property is a “formidable task.”¹⁵¹ Hettinger, rather dramatically, in tones reminiscent of John F Kennedy’s rousing speech concerning the need for America to put a man on the moon, emphasises the importance and difficulty of formulating such a justification:¹⁵²

“Focusing on the problems of justifying intellectual property is important not because these institutions lack any sort of justification, but because they are not so obviously or easily justified as many people think.”

When justifications for copyright are proffered, they almost invariably fall into three categories: (1) those based on the natural rights of the author to the product of his creation (natural rights theory), or that the property right is an author’s “just desert” for his labour (reward theory), (2) those which require the extension of a property right to an author in respect of his creation because it serves to protect his personality (personality theory), and (3) those which consider copyright as producing socially beneficial effects (utilitarian theory). The first category of justifications — the natural rights theory and the reward theory — will collectively be referred to as the

¹⁵⁰ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1186-7.

¹⁵¹ Hettinger "Justifying Intellectual Property" 51.

¹⁵² 52.

“labour-based” justifications, for reasons that will soon become clear. Both the labour-based justifications and the personality theory are examples of moral or ethical justifications for copyright.¹⁵³

Interestingly, the above justificatory theories have been employed, in one or other form, since the earliest attempts to justify copyright. Already during the 18th and 19th centuries in Britain, there was a debate concerning the nature of copyright in which the proponents of copyright either considered copyright as being a natural (or moral) right, or considered copyright as an instrument, which may serve the broader interests of society.¹⁵⁴ Those who sought a moral or ethical justification for copyright based their arguments on either the Lockean “notions of occupancy and labour as the foundation for a property system”, or the Kantian and Hegelian notions of personality, which were favoured in civil law jurisdictions – or both. Relevant to this study, the economic efficiency of copyright would satisfy the instrumentalist requirement that copyright serves a broader utilitarian goal. The utilitarian theory is thus distinctly instrumentalist as copyright is the means by which the desired social goal is realised. An economic justification for copyright, particularly computer programs, which forms the main subject of this work, would consider copyright as an instrument to promote economic efficiency, and thereby its utilitarian goal, by providing economic agents with the necessary incentives.¹⁵⁵

There is of course no *a priori* validity to the above categorisation, and commentators have chosen to label and group the justifications differently, based on their particular paradigms. Spector, for example, seeks to base his justification for copyright on the distinction between deontological or consequentialist justifications for social institutions. A deontological justification is similar to the natural rights

¹⁵³ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 7.

¹⁵⁴ Deazley *Rethinking Copyright: History, Theory, Language* 138; Kretschmer and Kawohl "The History and Philosophy of Copyright" 33. As mentioned above, the justifications for copyright were first considered in *Millar v Taylor* 1769 4 Burr. 2303. Already in that case, almost all the justificatory theories are mentioned: the reward theory, the utilitarian (incentive) theory, and the natural rights theory (Drahoš *A Philosophy of Intellectual Property* 5).

¹⁵⁵ Deazley *Rethinking Copyright: History, Theory, Language* 138; May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 7.

theory as it is based on the moral or ethical notion that certain persons are entitled to particular rights. A consequentialist justification enforces rights based on the socially beneficial consequences of the particular institution, whether it is allocative efficiency or well-being. A consequentialist justification is therefore equivalent to the utilitarian theory.¹⁵⁶ However, because he further considers that all institutional rules comprise a combination of *structural rules* (those rules which define the bundle of rights) and *positional rules* (those rules which determine the recipients of the rights), he does not consider the natural rights theory and the economic justifications (utilitarian theory) as alternative justifications for copyright. They are, according to his paradigm, complementary justifications.¹⁵⁷ The economic theory of property rights defines the bundle of rights necessary for efficiency, whereas the natural rights theory is considered to be the only equitable option to distribute such rights.¹⁵⁸

Because the primary focus will be on the economic justifications for copyright, no attempt will be made to provide a taxonomy of the various justificatory paradigms. Although there may be "many and varied" justifications for copyright, the three categories mentioned at the start of this section continue to be the most common justifications.¹⁵⁹ The labour-based justifications and the personality theory are based on ethical or moral arguments, and will be dealt with first. The economic (and utilitarian) theory of copyright, which will be the main focus of this work will be considered in the following chapter.¹⁶⁰ As will become clear in the course of discussing the moral — non-economic — justificatory theories, despite their continued use and intuitive appeal, they fail to provide satisfactory explanations for the institution of copyright.¹⁶¹ For example, right from the beginning of the search for

¹⁵⁶ Spector "An Outline of a Theory Justifying Intellectual and Industrial Property Rights" 270.

¹⁵⁷ 273.

¹⁵⁸ 273.

¹⁵⁹ Deazley *Rethinking Copyright: History, Theory, Language* 137.

¹⁶⁰ This distinction between the moral justifications, on the one hand, and the utilitarian (economic) justification, on the other hand, is adopted by a number of commentators: May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 7; Bently and Sherman *Intellectual Property Law* 4; Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 284; Hurt and Schuchman "The Economic Rationale of Copyright" 421-2.

¹⁶¹ Breyer S "Copyright: A Rejoinder" 1972 *UCLA L Rev* 20 75 75.

justificatory theories, the natural rights theory proved to be unconvincing. Those who had, unsuccessfully, argued in favour of common-law copyright in the 18th century relied on the notion that it was a natural right of an author.¹⁶² If there is a satisfactory justification for copyright, and specifically computer programs, it is the economic case for copyright. This is probably the reason why the “English judges took as their point of departure” the economic justification for copyright.¹⁶³

2 6 Labour-based justifications

As indicated above, the moral justifications for copyright can be divided into two main categories: the labour-based justifications, and the personality theory. In turn, the labour-based justifications can be divided into the natural rights theory and the reward theory, and this is the order in which they will be discussed.

2 6 1 Natural rights theory

Simply stated, the natural rights theory of copyright is based on the moral notion that an author is *entitled* to copyright protection because it protects the “fruits of his labours”: something which he has a natural, or inherent, right to. An author’s creation is his property, and copyright simply vindicates the author’s natural rights and prevents unauthorised exploitation of the author’s work.¹⁶⁴ The rights which copyright afford the author is, thus, not a privilege or some type of reward. Economic considerations, such as providing authors with incentives to create works, are, at best, secondary considerations.¹⁶⁵

¹⁶² Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1129.

¹⁶³ Drahos *A Philosophy of Intellectual Property* 28.

¹⁶⁴ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1122; Tyerman B "The Economic Rationale for Copyright Protection for Published Books: A Reply to Professor Breyer" 1974 *Copyright L Symp* 21 1 1.

¹⁶⁵ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1122.

2 6 1 1 John Locke

Although he may not have been the first proponent of the natural rights theory, John Locke is often cited as the person who formulated the theory as a basis for property ownership.¹⁶⁶ In fact, there was little that was original in Locke's political philosophy.¹⁶⁷ Before considering his philosophical theory of property, it is important to place John Locke and his written works in their social and historical context. We are all, in varying degrees, products of our social and historical environment, and it is therefore necessary to appreciate the context in which statements were made if we are to understand their proper meaning. Accordingly, we will briefly consider the political environment in which Locke wrote, and his political views.

Locke supported, and sought to justify, the deposition of the English king, James II, during the so-called Glorious Revolution of 1688.¹⁶⁸ The Glorious Revolution was led by the landed aristocracy, who owned about 65% of the land in England despite only comprising approximately 2% of the population.¹⁶⁹ The Glorious Revolution is considered to have ended the absolute right of kings, and to have ushered in a new era of parliamentary democracy. It is therefore not surprising that Locke, as a supporter of the revolution, attacked the basis on which monarchs had hitherto claimed authority – the Divine Right of Kings. His opponent in the debate concerning the Divine Right of Kings was Robert Filmer.¹⁷⁰ Having rejected the Divine Right of Kings, Locke's first *Treatise on Government* criticised the concept of hereditary power,¹⁷¹ and sought an alternative justification for obeying

¹⁶⁶ Breyer claims that the idea was already expressed in the 16th century by a French lawyer (Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 284).

¹⁶⁷ Russell B *History of Western Philosophy* 1ed (2005) 569.

¹⁶⁸ Strathern P *The Essential Locke* 1ed (2003) 27; Ward I *Introduction to Critical Legal Theory* 2ed (2004) 82.

¹⁶⁹ Ward *Introduction to Critical Legal Theory* 82.

¹⁷⁰ Strathern *The Essential Locke* 29; Russell *History of Western Philosophy* 564; Ward *Introduction to Critical Legal Theory* 83.

¹⁷¹ Russell *History of Western Philosophy* 563; Ward *Introduction to Critical Legal Theory* 83.

governments.¹⁷² This alternate justification also had to legitimise rule by the landed aristocracy or their representatives.¹⁷³ Apart from these theoretical matters, Locke's work also needed to reassure "middle England that revolution against a particular monarch did not need to threaten economic or social security."¹⁷⁴

Locke dismissed the Divine Right of Kings by rubbishing the idea that the monarchs were the actual heirs of Adam. Possibly because the deposed king Charles II had planned to make his recently-born Catholic son heir, instead of his Protestant daughter Mary, who was married to the Dutch king William of Orange, Locke condemned the paternal monarchical structures and primogeniture as also being inconsistent with the notion of hereditary succession among the supposed heirs of Adam. Furthermore, even if the king was considered to be in a quasi-paternal role, no paternal right extended to control the life and property of his children.¹⁷⁵

Locke, like Aristotle, believed that a government does not have a timeless existence, but is created and shaped by the people.¹⁷⁶ Importantly for our purposes, there are some rights, like the right to own property, which are natural rights and precede the existence of a government or law.¹⁷⁷ Before the creation of a government, people were in a "state of nature," governed by divine, natural laws. The state of nature "is characterized as that state where the moral landscape has yet to be changed by formal property relations."¹⁷⁸ Without the emergence of a government, the state of nature will persist. However, the natural rights which we enjoy, such as the right to life, liberty and property, are often exercised in a way which infringes the rights of others. This results in conflicts, and prevents humans from enjoying their natural rights. It is because of this that humans chose to enter into a social contract to form a government, and by doing so they get to enjoy their

¹⁷² Russell *History of Western Philosophy* 573.

¹⁷³ Ward *Introduction to Critical Legal Theory* 82.

¹⁷⁴ 81-2.

¹⁷⁵ Russell *History of Western Philosophy* 566.

¹⁷⁶ 573 and 584.

¹⁷⁷ Ward *Introduction to Critical Legal Theory* 101.

¹⁷⁸ Moore "A Lockean Theory of Intellectual Property" 81.

natural rights. By allowing a government to curb certain behaviour, the citizens get to enjoy their rights to a greater extent than would have been possible without a government.¹⁷⁹ Unlike Hobbes, Locke considered a government to enhance the human experience and personal liberty, rather than being “some sort of necessary evil”.¹⁸⁰

Following Grotius, Locke held that a government thus derived its power and legitimacy from the consent of the governed, through the social contract. There was nothing divine about a government’s authority.¹⁸¹ A government that disregards the will of the majority has breached its obligation of trust.¹⁸² Although he regarded the role of government as being instrumental, and not simply as a necessary evil, he believed that the role of government was distinctly limited: government authority should only extend to facilitate individual autonomy.¹⁸³ More precisely, the purpose of government, as constituted by the social contract, is to protect life, liberty and *property*; it should seek to maximise the well-being of its citizens, not act to propagate any particular form of ideology.¹⁸⁴ Because he advocated this notion of minimalist government, Locke is considered to be the father of modern liberal democracy.¹⁸⁵

2 6 1 2 Property as natural right

As indicated above, Locke considered property ownership to be a natural right which preceded the existence of a government or law.¹⁸⁶ Property is much more than a natural right; it plays *the* central role in justifying the existence of government, and a government’s actions in relation to property determines whether it (and its laws)

¹⁷⁹ Strathern *The Essential Locke* 29; Russell *History of Western Philosophy* 568-70 and 584; Ward *Introduction to Critical Legal Theory* 84.

¹⁸⁰ Russell *History of Western Philosophy* 584; Strathern *The Essential Locke* 29; Ward *Introduction to Critical Legal Theory* 83-4.

¹⁸¹ Russell *History of Western Philosophy* 573.

¹⁸² Ward *Introduction to Critical Legal Theory* 83-4.

¹⁸³ 82.

¹⁸⁴ Strathern *The Essential Locke* 30; Ward *Introduction to Critical Legal Theory* 82-3 and 101.

¹⁸⁵ Russell *History of Western Philosophy* 552; Strathern *The Essential Locke* 30.

¹⁸⁶ Ward *Introduction to Critical Legal Theory* 101.

remains faithful to the social contract by which it was created.¹⁸⁷ Conversely, property determined “contractual capacity” for purposes of the social contract as Locke advocated a qualified franchise: if you did not own property, you were not considered to be a citizen.¹⁸⁸ The centrality of property to the existence of government and political rights has been summarised as follows:¹⁸⁹

“The preservation of estates is the ‘great and chief end’ of government. Property rights underpin political rights, and political rights serve to illustrate and preserve property rights.”

Government’s principal role, and the function of law, is to protect property.¹⁹⁰ Legitimate government does therefore not arbitrarily deprive persons of their property, or threaten to do so. The other function of the law is to protect a person’s property against the involuntary deprivation by other persons. It is only when our property rights are protected that we can experience liberty. The centrality of property to Locke’s constitutional order means that property was not viewed as something meant to be considered in economic terms – as having a market value. In fact, because property ownership determined a person’s political rights, “[i]t was inconceivable to Locke that anyone should want to alienate property, unless forced to do so by adverse economic conditions.”¹⁹¹ However, today property, such as copyright, is almost exclusively considered in economic terms and is the cornerstone of the market economy. As we will see in the next section, according to Lockean theory, property is more than a natural right; it also fulfils a divine plan to reward those who have laboured on that which God has provided.¹⁹²

¹⁸⁷ Russell *History of Western Philosophy* 571; Ward *Introduction to Critical Legal Theory* 101.

¹⁸⁸ Russell *History of Western Philosophy* 573. Besides the poor, women were also excluded.

¹⁸⁹ Ward *Introduction to Critical Legal Theory* 101.

¹⁹⁰ 101. The state’s purpose of protecting the property of its citizens is arguably given disproportionate importance; someone may be incarcerated and physically punished, but it is not permissible for the state to deprive him of his property. When it comes to taxation, he justifies it on the basis of it being authorised by the majority (Russell *History of Western Philosophy* 575).

¹⁹¹ Ward *Introduction to Critical Legal Theory* 102-3.

¹⁹² 101-3.

2 6 1 3 Acquisition of property

We will now consider how, according to Locke's political philosophy, private property may be acquired and how the institution of private property is justified. It is important to note that, despite the common employment of Locke's philosophy in the context of justifying intellectual property, he made no specific reference to any aspect of intellectual property.¹⁹³ At the time he wrote the issue of copyright for authors was not yet a topical matter. It was only later that his works were applied to the subject of intellectual property.¹⁹⁴ Locke's focus, given his political affiliation to the land-owning aristocracy, was on the ownership of land.¹⁹⁵

According to Locke, God created the world for the common benefit of humans, and intended that they make use of it.¹⁹⁶ Original acquisition of property from this common, unowned pool of resources is possible through the application of sufficient labour.¹⁹⁷ By toiling and cultivating a piece of land a person becomes entitled to own it because he has used that which God has made available.¹⁹⁸ Through the application of labour one is able to appropriate that which was formerly in the common pool of resources, and exclude the rights of others to those resources.¹⁹⁹ Thus, the key factor which must be established when determining if someone is entitled to claim ownership is whether they have expended labour on the land claimed to the extent that the land can be said to be transformed.²⁰⁰ The notion that through expending labour one is entitled to claim ownership of the fruits of one's

¹⁹³ Hurt and Schuchman "The Economic Rationale of Copyright" 422.

¹⁹⁴ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 818.

¹⁹⁵ 832.

¹⁹⁶ Ward *Introduction to Critical Legal Theory* 101.

¹⁹⁷ Moore "A Lockean Theory of Intellectual Property" 78.

¹⁹⁸ Hurt and Schuchman "The Economic Rationale of Copyright" 422; Ward *Introduction to Critical Legal Theory* 101.

¹⁹⁹ Sterk S "Rhetoric and Reality in Copyright Law" 1996 *Mich L Rev* 94 1197 1234; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 224.

²⁰⁰ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 833-4.

labour becomes a general principle; “everyman has private property in the produce of his own labour — or, at least, should have.”²⁰¹ But why should this be the case?

According to Locke, the law of nature accords each person freedom, and that is why the rights to life and liberty are natural rights.²⁰² Our right to liberty is not a special dispensation from any government; if anything, the institution of government serves merely to confirm our right to liberty, and property in our person.²⁰³ Because we own our own bodies, our labour is also our “unquestionable property”.²⁰⁴ When we expend labour on a common resource, we increase its value. Locke believed that most of the value attributed to an item is as a consequence of the labour expended on it.²⁰⁵ But it is not just the increase in value that justifies the claim to ownership, it is because the object becomes an inseparable part of our person that entitles us to claim ownership.²⁰⁶ We are entitled to assert ownership over our external creations, by virtue of the labour expended; it represents “an outgrowth of rights over one's personal self”.²⁰⁷ If we are denied the right to claim property in the objects we have increased in value, it would constitute a violation of our right to liberty. To deny us property in the fruits of our labour is to deny us property in our labour, and, in turn, property in our own bodies.²⁰⁸ His argument for private property is neatly paraphrased as follows by Hettinger:²⁰⁹

“A person owns her body and hence she owns what it does, namely, its labor. A person's labor and its product are inseparable, and so ownership of one can be

²⁰¹ Russell *History of Western Philosophy* 577.

²⁰² 569.

²⁰³ Ward *Introduction to Critical Legal Theory* 584.

²⁰⁴ Moore "A Lockean Theory of Intellectual Property" 78; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 224; Hettinger "Justifying Intellectual Property" 36-7.

²⁰⁵ Hettinger "Justifying Intellectual Property" 37; Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 831-2.

²⁰⁶ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 833.

²⁰⁷ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1388-9.

²⁰⁸ Hettinger "Justifying Intellectual Property" 37.

²⁰⁹ 36-7.

secured only by owning the other. Hence, if a person is to own her body and thus its labor, she must also own what she joins her labor with—namely, the product of her labor.”

The right to property is, thus, not dependent on the consent of, or recognition by, others or the government. Although government exists as a result of a social contract, property precedes this social institution, and government merely acknowledges its existence. By this reasoning Locke intended to negate any arguments that the institution of property was derived from the royal prerogative, or unanimous assent (which required the consent of the king, in any event), as Filmer had argued.²¹⁰

2 6 1 4 Locke’s provisos

From the above, an impression may be created that Locke advocated, or condoned, the avaricious appropriation of resources. However, other than the requirement that sufficient labour must be mixed with a common resource for ownership to vest, Locke required that two further conditions, or provisos, needed to be satisfied before ownership could be acquired: first, the appropriation of ownership must not result in a loss to others as there should still be sufficient resources available for others to use (the “enough-and-as-good” or the “no-loss-to-others” requirement);²¹¹ and, second, that which is appropriated must be no more than that which is necessary (the “no-waste” requirement).²¹² The standard for determining whether a loss is suffered by others according to the enough-and-as-good requirement is human

²¹⁰ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 831-2.

²¹¹ Hettinger "Justifying Intellectual Property" 44; Moore "A Lockean Theory of Intellectual Property" 78; Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 831; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 224.

²¹² Hettinger "Justifying Intellectual Property" 44; Hughes "The Philosophy of Intellectual Property" 298; Russell *History of Western Philosophy* 577; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 224.

happiness or well-being, which “is the sole standard of intrinsic value.”²¹³ This requirement is substantially similar to the economic measurement of Pareto improvements when determining efficiency.²¹⁴ If these provisos are satisfied, there can be no objection to the appropriation of ownership based on labour.

The existence of these provisos has meant that Locke’s political philosophy is employed to justify actions by both those who are on the left and right of the political spectrum. A selective extract of Locke’s views on property can be used to justify individual avarice and capitalism, but at the same time, it can be used to adopt a more socialistic outlook.²¹⁵ On the one hand, Locke appears to stress the importance of individual autonomy, the right to be free from governmental intervention. The individual is entitled to the fruits of his labours, and everyone has an equal opportunity to endeavour in pursuit of the good life.²¹⁶ By using the resources which God has made available, the individual who endeavours is also doing that which God intended.²¹⁷ Reasoning in this manner, it is easy to conclude that “God intended the harder worker to be the richer” and that any failure to accumulate wealth “is not misfortune, but negligence.”²¹⁸ On the other hand, although God appears to have overlooked the prospect of scarcity, and the propensity for human greed, Locke tried to address these problems by requiring satisfaction of the provisos. He considers these problems to be a consequence of the emergence of the money economy.²¹⁹ The fact that property can be exchanged for money motivates people to appropriate more property that is necessary, which results in overuse of the common resources and waste.²²⁰ However, Locke’s

²¹³ Moore "A Lockean Theory of Intellectual Property" 79-80.

²¹⁴ If resources can be allocated so as to make at least one person better off and no one else worse off, then such a change is Pareto superior. Accordingly, if any change from a given allocation would make at least one person worse off, that allocation is Pareto optimal. See Harrison J *Law and Economics in a Nutshell* 1ed (1995) 32.

²¹⁵ Russell *History of Western Philosophy* 576.

²¹⁶ Sterk "Rhetoric and Reality in Copyright Law" 1236.

²¹⁷ Drahos *A Philosophy of Intellectual Property* 75.

²¹⁸ Ward *Introduction to Critical Legal Theory* 102.

²¹⁹ 102.

²²⁰ Hughes "The Philosophy of Intellectual Property" 299.

commitment to the satisfaction of these provisos has been questioned by critics because of the ease with which he was prepared to abandon them. Locke, rather too conveniently, considered positive laws which permit this scramble for resources, and which may result in an unequal distribution of wealth, to be legitimate because they have the tacit consent of the electorate.²²¹ It is probably because of this that a commentator like Moore argues that the provisos are not necessary conditions for appropriation, they are merely sufficient conditions.²²²

2 6 1 5 Natural rights theory and intellectual property

Despite the fact that Locke made no specific reference to claims relating to intellectual property, it is not hard to see why his arguments have found a receptive audience among the advocates of intellectual property.²²³ Intellectual property, such as copyright, can be more intuitively, and, arguably, plausibly justified in accordance with his political philosophy than claims to land.²²⁴ Whereas land is not created by the claimant, and the entitlement to claim specific land means that it is no longer available for use by others in common, no such issues arises in relation to intellectual property. Intellectual property, copyright, in particular, does not deprive others of anything as it would not exist but for the labour expended by its author. If it is the case that nothing could so clearly be one's own property as one's labour, then nothing can more clearly be the product of one's labour than that which he has exclusively created.²²⁵ Hettinger expresses this proposition as follows:²²⁶

"What a person produces with her own intelligence, effort, and perseverance ought to belong to her and to no one else. "Why is it mine? Well, it's mine because I made it, that's why. It wouldn't have existed but for me."

²²¹ 300 and 328.

²²² Moore "A Lockean Theory of Intellectual Property" 78. Moore only discusses the enough and as good requirement because some commentators do not consider the no waste requirement as an independent requirement.

²²³ Sterk "Rhetoric and Reality in Copyright Law" 1235.

²²⁴ Hughes "The Philosophy of Intellectual Property" 365.

²²⁵ Hurt and Schuchman "The Economic Rationale of Copyright" 422; Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1388-9.

²²⁶ Hettinger "Justifying Intellectual Property" 36.

Besides satisfying the requirement that labour be expended to vest property, intellectual creations, such as copyright works, also seems to satisfy Locke's provisos.²²⁷ As copyright does not protect the facts or ideas on which a copyright work is based, nothing can be said to be removed from the common pool of resources – “the common of ideas seems inexhaustible.”²²⁸ Others can freely create as there is no loss in resources, so no one is worse off. In fact, a copyright work may actually contribute ideas, which others are again free to use. After all, ideas are created by individuals, not society.²²⁹ So why should individuals not own their own creations? Copyright law places far fewer restrictions on others than patent law: it even allows other persons to exploit identical expressions of the same ideas and facts, provided that they were independently created.²³⁰ In comparison with other property, intellectual property does seem to place a far lower cost on society.²³¹

“[U]nlike the farmer or the industrialist, who must combine labor with liberal doses of land or capital to create something of value, the author or artist draws only on inexhaustible resources -- the wealth of human experience -- to create works of value. Thus, the author, more than most property claimants, appears quite likely to satisfy the Lockean “proviso”: after the author uses common resources, “there is enough, and as good left in common for others.””

Also, questions of a wasteful use of resources “are few and far between.”²³² Copyright law does not enable the wasteful hoarding of facts and ideas. If anything, encouraging intellectual activity increases the possibility of generating new ideas. In any event, ideas are not protected, and, unlike perishable goods, they rarely lose their usefulness.²³³

²²⁷ Hughes "The Philosophy of Intellectual Property" 300; Moore "A Lockean Theory of Intellectual Property" 82.

²²⁸ Hughes "The Philosophy of Intellectual Property" 365.

²²⁹ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 823-4.

²³⁰ Hettinger "Justifying Intellectual Property" 44.

²³¹ Sterk "Rhetoric and Reality in Copyright Law" 1235.

²³² Hughes "The Philosophy of Intellectual Property" 329.

²³³ 327-8.

2 6 2 Reward theory

As mentioned above, the other labour-based theory of property is the reward theory, which is based on the notion that the property right is an author's "just desert" for his labour.²³⁴ Although the reward theory can be justified on a consequentialist basis, namely, that by affording property protection, we provide persons with the necessary incentive to create new works, in this section we will only consider it on the basis of a normative proposition. In other words, we will simply consider whether proprietary rights ought to be granted in respect of an item on the basis that the claimant has expended labour in creating the item.²³⁵

The normative proposition that property rights should be awarded is obviously based on moral or ethical considerations.²³⁶ Labour, by its nature, is considered as something which is unpleasant and best avoided, not something that a person will ordinarily do in preference to enjoying leisure time. The reward theory tends to adopt a rather sentimental view of the author of a work. An author is regarded as a self-sacrificing genius, more concerned with creating a work, which contributes to society, rather than being concerned with receiving commensurate compensation for such contribution.²³⁷ Thus, an author who expends labour to create something socially beneficial, is morally entitled to own it, not because it would serve as an incentive to engage in creative activity but as a form of compensation for their efforts.²³⁸ The reward theory therefore encapsulates an element of distributive justice: there is the idea that the creator should be able to recoup some of the benefit of his contribution to society, which is what the award of property rights seeks to achieve.²³⁹

²³⁴ Sterk "Rhetoric and Reality in Copyright Law" 1197.

²³⁵ Hughes "The Philosophy of Intellectual Property" 288 and 296-7.

²³⁶ 303. The idea that labour is unpleasant is considered as a distinct justificatory theory, the "avoidance theory".

²³⁷ Sterk "Rhetoric and Reality in Copyright Law" 1197.

²³⁸ Cornish *Intellectual Property* 325; Hughes "The Philosophy of Intellectual Property" 302-5; Sterk "Rhetoric and Reality in Copyright Law" 1197.

²³⁹ Sterk "Rhetoric and Reality in Copyright Law" 1234.

Another reason for the idea that authors need to be rewarded for their labours is that denial of such a right would undermine claims that other — influential and powerful — persons deserve their good fortune. These prosperous persons, who include those involved in the law-making process like legislators, lawyers, judges, lobbying groups and other professionals, are protecting their own interests by promoting the interests of authors. These professionals would like to believe that they deserve their success. In a world with huge disparities of income and wealth, the belief that they deserve success helps them assuage any feelings of guilt they may have. The prosperous distinguish themselves from those less fortunate by their higher education levels and supposed intelligence. These professionals therefore ascribe their higher levels of remuneration to market rewards for the costly investment — sums spent and the opportunity costs — they have made in their education. Authors are considered to, generally, have similar educational and intelligence levels to those of their prosperous professional counterparts. Thus, if authors are not entitled to higher levels of remuneration, it becomes difficult for the prosperous few to explain the basis for their prosperity. Authors must therefore be similarly rewarded by the market, and, if the creation of property rights is necessary to achieve this, so be it.²⁴⁰

2 6 3 Criticism of the labour-based justifications

Although the labour-based justifications appear to be intuitively appealing, on closer examination it will become apparent that they are not sound arguments for justifying the grant of property rights to authors. The claim that an author should have a property right over his creation has been stated as being "an intuitive, and unanalyzed feeling".²⁴¹ This section will therefore critically consider some of arguments, or implications of, supporting a rights-based justification of property rights.

²⁴⁰ 1247-8.

²⁴¹ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 288.

2 6 3 1 Criticism of the natural rights theory

Although supporters of intellectual property rights who rely on the natural rights theory may consider such rights as being more plausibly justified as property in accordance with Locke's political philosophy than claims to land, critics have responded that the intangible nature of intellectual property makes it inappropriate for protection using arguments analogous to those used to justify ownership of land. Given its intangible nature, critics suggest that intellectual property is simply not capable of being privately owned. The reasons why Locke advocated the institution of private property in the case of land simply do not apply in the case of intangible creations. Locke considered private property as the preferred mode of control of land because it results in the optimal use of resources, and it advances individual autonomy. These critics thus, quite plausibly, adopt a more utilitarian approach to Locke's concept of private property, and emphasise the idea that resources are to be held in common ownership unless it is in the interests of social welfare to adopt a different model.²⁴² In the absence of property rights in land, there is a risk that the resource will be overused,²⁴³ and tensions between rival users could result in conflicts and unrest. Intellectual creations are radically different from tangible items because "property rights are not needed to prevent congestion, interference, or strife."²⁴⁴

Not only have critics claimed that the intangible nature of intellectual property make it difficult to justify according to Locke's natural rights theory, others have challenged the very idea that a person is entitled to the product of his labour. Because of differing abilities between human beings, the same amount of effort expended does not necessarily result in equivalent levels of output. If labour is the basis of ownership, we then by implication also accept that there will be disparities of wealth on the basis of talent or ability. Critics, like John Rawls, argue that "the

²⁴² Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 225-6.

²⁴³ This problem is also referred to as the "tragedy of the commons", and will be considered in more detail in the next chapter.

²⁴⁴ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 288-9; Sterk "Rhetoric and Reality in Copyright Law" 1235.

distribution of talents is arbitrary from a moral point of view and should not furnish a basis for the distribution of social resources."²⁴⁵ Rawls does not deny that talents should not be rewarded. These talents must be used optimally, for the benefit of society, which means that those who are talented must be encouraged to enhance their abilities through education and so direct them to vocations where their talents will best serve society. These vocations will remunerate individuals at higher levels, and so they will be motivated to seek these greater benefits for their talents. It is important to emphasise that they are not being reward for merely having had the good fortune of being talented; the higher premiums of these vocations simply reflect society's need for such activities, and serves as a signal to invest in exploiting their talents for the benefit of society through education. This is therefore a distinctly instrumentalist approach to property and remuneration.²⁴⁶

The idea that labour should form the basis of ownership raises a number of further matters that are not easily resolved. First, how does one determine whether an appropriate level of effort has been expended to justify the grant of ownership? When can it be said that the amount of labour expended is so trifling that no property right could have arisen? Robert Nozick, for example, poses the question whether a person who has added a can of tomato juice to an ocean has a claim to the ocean. If a person is particularly incompetent and expends an extraordinary amount of labour doing a relatively menial task, does that justify him having property rights in the product? Second, instead of asserting that labour forms the basis of ownership, it may be contended that the labour and its results are donated to society. Perhaps, the person in the above example has lost his right to the tomato juice rather than have a property right to the ocean. Third, Locke's suggestion that most of the value of a commodity can be ascribed to the labour expended on it is not tenable in respect of most natural resources, which was the main focus of his work. It is certainly not the case that someone who has harvested apples is responsible for creating 99 percent of its value, as Locke suggested.²⁴⁷

²⁴⁵ Sterk "Rhetoric and Reality in Copyright Law" 1237.

²⁴⁶ 1236-7.

²⁴⁷ Hettinger "Justifying Intellectual Property" 37.

A possible counter-argument which may suggest that intangible objects are very different to physical items such as apples, because they are the human creations, also does not provide an accurate account of the relative contributions to such objects. Intellectual creations do not spontaneously come into existence; they are the result of an incremental process which builds on what has preceded it.²⁴⁸ It cannot, therefore, be equitable, or justified, to allow the person who has merely put the finishing touches to an intellectual creation, or who has simply pulled the various conceptual strands together, to appropriate the full benefit of such creation by claiming property rights in it.²⁴⁹ The difficulty in determining the contribution of the last contributor has been referred to as the baseline problem. Trosow sums up the nature of problem as follows:²⁵⁰

“To the extent an intellectual work is based upon materials extracted from the commons, it is a mistake to set the baseline for applying the provisos to the point in time after the creation of the work.”

A possible riposte may be that the final product, unlike the various constituent elements of the creation, may have a significant market value. However, this also does not provide a justification for giving the final contributor the sole property right. The market value of a product is not simply a factor of the efforts of the final contributor, or even the collective efforts of all the contributors of a product. If the product is to have a market, consumers must have disposable income with which to purchase the new item. This disposable income is the result of the trade in other commodities, the efforts of persons other than the creator of the new item.²⁵¹ These other persons are required to operate in competitive markets, pricing their products at marginal costs, which benefits consumers and enables them to accumulate their disposable income. The market value of a product is thus “a socially created

²⁴⁸ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 22; Posner "Intellectual Property: The Law and Economics Approach" 60.

²⁴⁹ Hettinger "Justifying Intellectual Property" 38; Lunney G "Reexamining Copyright's Incentive-Access Paradigm" 1996 *Vand L Rev* 49 483 572-3 and 631-2.

²⁵⁰ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 225.

²⁵¹ Lunney "Reexamining Copyright's Incentive-Access Paradigm" 572.

phenomenon, depending on the activity (or non-activity) of other producers, the monetary demand of purchasers, and the kinds of property rights, contracts, and markets the state has established and enforced. The market value of the same fruits of labour will differ greatly with variations in these social factors.”²⁵² In other words, the market value of a product has not been produced by labour of its creators - certainly not the final contributor – so why should they be entitled to appropriate such value, and, worse still, through monopolistic pricing?²⁵³

Furthermore, the idea that a person is entitled to (or should be rewarded with) a property right in anything he has laboriously created is not a “natural right” which we generally recognise.²⁵⁴ There are numerous instances of intangible, and valuable, objects that are created through the expending of labour but not protected in a manner similar to intellectual property. For example, the discovery of a new mathematical technique, or the establishment of a large business (guaranteed to draw a large number of consumers) in an area, may provide tangible benefits for others, but we do not permit the discoverer of the mathematical technique or the owner of the business to extract any form of compensation from others who benefit from their efforts. There is no principled basis on which these intangible objects bestowed on others — also called positive externalities in economic literature — can be distinguished from those which the law does protect, like the specified works under copyright law.²⁵⁵ It is not simply a matter of the ease with which others can be charged for these benefits, but whether any rights to charge should be recognised.²⁵⁶

On a more contemporary and practical note, the Lockean principle emphasising the right of a person to claim ownership of the fruits of his labour may be inapplicable in respect of an ever growing number of new creations. Locke’s political philosophy was, on the whole, adequate and useful until the industrial revolution. New products, like sophisticated computer programs, are complex

²⁵² Hettinger "Justifying Intellectual Property" 38.

²⁵³ 39; Lunney "Reexamining Copyright's Incentive-Access Paradigm" 572-5.

²⁵⁴ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 288-9; Hurt and Schuchman "The Economic Rationale of Copyright" 423.

²⁵⁵ The concept of “externalities” will be further considered in the next chapter.

²⁵⁶ Hurt and Schuchman "The Economic Rationale of Copyright" 423.

products, requiring contributions from large numbers of persons. Furthermore, these creations are increasingly developed and owned by corporations, who have become hugely important economically and something which Locke had not factored into his philosophy.²⁵⁷

Thus, although we can readily accept that each person should own their own body, there is no clear case for asserting that a person should similarly be given ownership of other objects, even if it has been created by him.²⁵⁸ The reward theory too faces some strong criticisms.

2 6 3 2 Criticism of the reward theory

The reward theory, as mentioned above, is based on the notion that the property right is an author's "just desert" for his labour. As with the natural rights theory, there are some cogent arguments against the reward theory. Again, the idea that the author of a work deserves property rights in his creation raises a number of issues that are not easily resolved. Some of these issues have already been raised in respect of the natural rights theory, and, where this has been done, they will be dealt with more briefly in this section to avoid any unnecessary repetition.

If someone is to be rewarded for their labour, the reward must presumably be proportional to the effort expended. It is thus necessary to somehow measure the effort expended because that will allow the determination of the appropriate reward, based on the level effort expended. But measuring the amount of effort expended is anything but straightforward. Should someone be entitled to a reward for expending large amounts of labour although the social contribution of the result achieved could have been achieved with considerably less effort. For example, a talented individual who only needs to exert a trivial amount of effort would, on this basis, thus be entitled to little or no reward for his creation. Should effort be exalted at the expense

²⁵⁷ Russell *History of Western Philosophy* 578 and 581-2.

²⁵⁸ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1388-9.

of its social contribution? There is, at present, no objective way of measuring, and comparing, the efforts of two people which can be used as a basis for the reward theory.²⁵⁹ There may also be other factors that could be regarded as material when considering the level of effort, such as the level of risk of embarking on a particular project or the social value of the product produced. However, rewarding persons on the basis of these two factors serves to incentivise people to engage in a particular activity, rather than rewarding them for their efforts. The reward theory can only consider voluntary past action as the basis for reward.²⁶⁰ To do otherwise would involve seeking justifications in terms of the incentive theory, which will be considered with the other utilitarian justifications in the next chapter.

Alternatively, it may be suggested that the reward must be based on the market value of the object produced. However, as has already been discussed above, the market value of a product is a socially created phenomenon which depends on numerous factors, which have nothing to do with the labour expended on its production. It would, therefore, be untenable to reward the author of work based on the market value of his creation, as this would, almost certainly, result in disproportional remuneration. More importantly, to base the remuneration of authors on market rewards is to fail to appreciate the basis of the market economy. The market price of a product serves as a signal to influence future behaviour rather than serving as reward for the producer of the product for the effort expended. For example, if the current price of a product is high and enables its producer to earn an economic profit, it serves as a signal to other producers to enter the market for such product. The market price for the product cannot be a reward for labour expended because the same amount of labour will be expended on the continued production of the product when its price falls, following the entrance of competitors to the market. If the market price is considered to be reward for labour expended, it would be difficult to explain why, later, the same amount of effort realises a lesser return for

²⁵⁹ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 834; Spivak P "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 1988 *UCLA L Rev* 35 723 760.

²⁶⁰ Hettinger "Justifying Intellectual Property" 42.

the same amount of labour expended.²⁶¹ Sterk quotes Hayek's summing up of this position.²⁶²

"The remunerations which the market determines are, as it were, not functionally related with what people have done, but only with what they ought to do. They are incentives which as a rule guide people to success, but will produce a viable order only because they often disappoint the expectations they have caused when relevant circumstances have unexpectedly changed ... The element of luck is as inseparable from the operation of the market as the element of skill."

Furthermore, a grant of property rights would subject such reward mechanism to the dictates of the market economy, which can be very fickle indeed. Despite its market failure, a particular author's work may be of huge social importance. Leaving a deserving author's remuneration to the vagaries of the market economy would therefore, arguably, be a rather dismissive approach to rewarding deserving people.²⁶³

As explained in relation to the criticism of the natural rights theory, it is not suggested that there should be no reward for talented individuals. What should be rewarded is not the talent *per se* because, as John Rawls has argued, the distribution of talents is arbitrary. What should be done is to incentivise such persons to invest in the further development of their talents for the benefit of society. The market economy will give talented individuals the necessary signals of the vocations where to best invest their efforts in a manner that will be socially beneficial. These signals will be in the form of higher remuneration levels in such vocations.²⁶⁴

Even if one subscribes to the view that talents should be rewarded in a more direct manner, there are various forms of reward which could be used, other than the grant of property rights in the object which has been created. We do not generally

²⁶¹ Sterk "Rhetoric and Reality in Copyright Law" 1247-9.

²⁶² 1249.

²⁶³ 1237-8.

²⁶⁴ 1236-7.

accept that property rights are the appropriate reward for creating something.²⁶⁵ Parents are not afforded property rights in their children, and discoverer of a new mathematical technique or scientific principle is not entitled to exclusive rights in relation to his discovery.²⁶⁶ Indeed, we cannot claim that our right to own our bodies is based on the reward for labour expended.²⁶⁷ The alternative, and possibly more effective, forms of reward may include prizes, tax reliefs, financial support or public recognition.²⁶⁸ These alternative methods of reward may be more appropriate than the automatic grant of property rights. The reward theory conjures up images of the beneficiaries of copyright protection as being stoic authors, struggling to make ends meet. However, particularly in the area of computer programs, the beneficiaries of copyright protection “are not struggling authors but faceless corporate assignees well-versed in the ways of the business world.”²⁶⁹

Thus, despite their intuitive appeal, neither the natural rights theory nor the reward theory provide adequate justifications for a property right, in the form of copyright.

2 7 Personality theory

As indicated above, apart from the labour-based theories of intellectual property, the other moral or ethical justification for copyright is the personality theory. It is often referenced in relation to intellectual property and is considered to be “[t]he most powerful alternative to a Lockean model of property”.²⁷⁰ The personality theory considers the extension of intellectual property rights to the author of an intangible

²⁶⁵ Hettinger "Justifying Intellectual Property" 41; Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 834-5.

²⁶⁶ Hettinger "Justifying Intellectual Property" 41.

²⁶⁷ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 834-5.

²⁶⁸ Hettinger "Justifying Intellectual Property" 41; Hurt and Schuchman "The Economic Rationale of Copyright" 424; Sterk "Rhetoric and Reality in Copyright Law" 1237-8.

²⁶⁹ Sterk "Rhetoric and Reality in Copyright Law" 1198.

²⁷⁰ Hughes "The Philosophy of Intellectual Property" 330.

object in his creation as the means by which the creator's personal identity can be protected.

2 7 1 Hegel and the German Idealists

The origin of this theory is generally attributed to Georg Wilhelm Friedrich Hegel.²⁷¹ However, Hegel was not the only philosopher of his generation who suggested that the development of individual personality and liberty was linked to property rights. Other contemporary writers like Wilhelm von Humboldt and Immanuel Kant also advocated the importance of property rights.²⁷²

Whereas Locke emphasised the importance of property for an individual's physical needs and safety, the personality theorists focused on the importance of property to the development of human potential. What both the natural rights theorists and personality theorists had in common was their desire to increase individual liberty.²⁷³ However, Hegel and Locke had very different concepts of liberty. As stated above, Locke rejected the Divine Right of Kings and sought to limit the power of the state over individuals. According to Hegel, the state is not an institution which fetters individual freedom. The restrictions imposed by the state makes citizens feel more secure, and these restrictions are the way in which individual freedom is realised.²⁷⁴ Hegel appeared to be prepared to do anything to ingratiate himself with the Prussian monarchy. He went so far as regarding the Prussian state as the culmination of the development of government, without any apparent contradiction with his philosophy. His account of world history as being a chronological development towards the Absolute Idea, and very nearly finding its ultimate realisation in the Prussian state, conflicted with his view that time and space

²⁷¹ Sterk "Rhetoric and Reality in Copyright Law" 1240.

²⁷² Kretschmer and Kawohl "The History and Philosophy of Copyright"19; Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 835.

²⁷³ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 835-6.

²⁷⁴ Drahos *A Philosophy of Intellectual Property* 83.

are not absolute. The Absolute Idea is just a state of “pure thought thinking about pure thought.”²⁷⁵

And if this malarkey of “pure thought thinking about pure thought” seems confusing, it is because it *is* confusing, and much of Hegel’s philosophy is intractable. The difficulty in comprehending his philosophy is expressed in the following pithy passage, which also neatly ties in with the subject matter of this study.²⁷⁶

“All anyone knows about Hegel could be written on the back of a post-card, and even then would be unintelligible. He had, in an advanced form, the talents common to solicitors, computer enthusiasts and German philosophers, of making the basically simple fantastically complex.”

Another difference between the German Idealists like Kant and Hegel, and Locke, is that, unlike Locke, they did make specific reference to the idea of intellectual property rights in intangible objects in their writings. Hegel, for example, saw no need to justify intellectual property by analogy to tangible property. Intellectual property, once it has been expressed, is as real as any tangible property. Property *per se* is important in Hegel’s system.²⁷⁷ They expressly recognised an author’s rights to his literary works. To permit unauthorised reproductions of such works would not only allow copiers to disregard the rights of the author to control the dissemination of his ideas, it would also negatively impact on the economic value of the work. However, their conceptions of the types of intellectual property that could be legitimately protected were, probably because of the period in which they wrote, considerably narrower than that which is accepted today. For example, they did not consider translations or derivative works of literary works, or copies of artistic works as infringing any rights in the original works. These adaptations or reproductions

²⁷⁵ Russell *History of Western Philosophy* 665.

²⁷⁶ Hankinson J *Bluff Your Way in Philosophy* 1ed (1989) 24. See also Russell *History of Western Philosophy* 661.

²⁷⁷ Drahos *A Philosophy of Intellectual Property* 81; Hughes "The Philosophy of Intellectual Property" 337-8.

could not be regarded as being attributable to the creator of the original works.²⁷⁸ This narrower scope of protection could probably be ascribed to the available reprographic technology at that time. Presumably these adaptations or reproductions would have involved considerable effort, and could, as a result, properly be considered to be new works. Again, it was probably because of the high quality-adjusted cost of copying that they were not considered as worth protecting.²⁷⁹

2 7 2 Hegel's conception of personality and property

Although Hegel recognises the economic value of intellectual property,²⁸⁰ protection of intellectual property is important, not because of its economic value, but because of its vital role in personal development. Kant similarly defended copyright on the basis that an author's work is an extension of his personality, and not simply something of economic value.²⁸¹ For Hegel property is not simply a necessary condition for personal development but is *the* foremost example of the embodiment of liberty.²⁸² Property is the mechanism by which self-actualisation and personal identity are realised.²⁸³

For Hegel, personal identity is established only when it is recognised by others, and for this to happen one's personality needs to manifest itself externally.²⁸⁴ It is only through property that we are recognised by others. A property right helps us to identify those who recognise and respect us as individuals because the property right compels them to interact with us. Without protection this interaction

²⁷⁸ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 840-1.

²⁷⁹ Posner "Intellectual Property: The Law and Economics Approach" 66.

²⁸⁰ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 841.

²⁸¹ Hurt and Schuchman "The Economic Rationale of Copyright" 423.

²⁸² Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 837.

²⁸³ Hughes "The Philosophy of Intellectual Property" 330.

²⁸⁴ 331.

would not take place. For Hegel, these interpersonal relations are vital because it is through such relationships, and the respect for our property, that we become free.

Property is thus crucial for establishing interpersonal relations, and personal identity.²⁸⁵ Because property is essential to the development of the human spirit, it needs to be protected by the state.²⁸⁶ The protection of property establishes the environment in which persons can establish their personal identities through external manifestations, without fear of appropriation by others.²⁸⁷ If other members in society accept an individual's claim to property, they are recognising the individual as a person.²⁸⁸ Although the protection of property reduces interpersonal conflict, that is not its primary purpose. The reduction of conflicts *per se* is not important. In contrast to Locke, Hegel does not see property in terms of a need to give legitimacy to the institution of government, establish order, or satisfy wants and desires.²⁸⁹ Also, unlike Locke, there was nothing natural about freedom or the institution of property. We become free as a consequence of the recognition of our individuality.²⁹⁰ There is no natural right to property; property is simply a social construct.²⁹¹ For Hegel, individual freedom is the ultimate goal, and society has to facilitate the achievement of that goal.²⁹² Property as an institution is essential for an individual's survival and development, not just in the biological sense.²⁹³

The notion that property fosters personal development does have intuitive appeal, particularly in the case of intellectual property. After all, what could say more about our personalities than the creations produced by our mental faculties.²⁹⁴ Our

²⁸⁵ Sterk "Rhetoric and Reality in Copyright Law" 1239-41.

²⁸⁶ Drahos *A Philosophy of Intellectual Property* 89.

²⁸⁷ Hughes "The Philosophy of Intellectual Property" 333.

²⁸⁸ 333-4 and 343.

²⁸⁹ Drahos *A Philosophy of Intellectual Property* 77; Hughes "The Philosophy of Intellectual Property" 333.

²⁹⁰ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 838.

²⁹¹ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 26.

²⁹² Drahos *A Philosophy of Intellectual Property* 78.

²⁹³ 77.

²⁹⁴ Hughes "The Philosophy of Intellectual Property" 330.

creations are probably the most revealing way of showing our personalities to others, and can serve to distinguish us as individuals. They embody the personality of the creator.²⁹⁵ It, therefore, seems perfectly obvious that respect for the individual demands that the creation of such intellectual objects, and the concomitant personal development, should be encouraged. There should be an environment where we feel free to create, safe in the knowledge that our creations will not be appropriated by others. One way to encourage the creation of intellectual creations is to extend property rights to such creations. This type of protection seems to be unobjectionable “because the *res* is not merely seized by the individual, but rather it is a product of the individual.”²⁹⁶ In fact, it would be incorrect to simply regard the intellectual creations as *products*; for some people their works are the very embodiment of their personalities.²⁹⁷ In other words, it is important that our creations should be protected as property if our individuality is to be recognised.

2 7 3 Acquisition of property

Under the Hegelian system, property is acquired through occupation. However, occupation does not require a physical act. Although physical acts like possession, labour or use may serve to indicate that the requirement of occupation has been satisfied, occupation actually arises from the subjective will to occupy the object.²⁹⁸ Because property starts as a subjective act of the will, provided it is recognised by others, there is no limitation as to what can be regarded as property.²⁹⁹ Because the subjective act of the will depends on the recognition by others, property is seen as an aspect of personality. As stated above, we only actualise our identity through recognition by others. Property is as much a part of a person as any other aspect of his personality; it is the embodiment of personality.³⁰⁰

²⁹⁵ SM McJohn “The Paradoxes of Free Software” 2000 9 *Geo. Mason L. Rev.* 25 45-6.

²⁹⁶ Hughes “The Philosophy of Intellectual Property” 365.

²⁹⁷ Sterk “Rhetoric and Reality in Copyright Law” 1239.

²⁹⁸ Hughes “The Philosophy of Intellectual Property” 334-5; May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 27.

²⁹⁹ Drahos *A Philosophy of Intellectual Property* 78-9.

³⁰⁰ 79.

Although private property is essential in Hegel's philosophy of society, he does not support a right of absolute ownership. Probably because property is merely instrumental, he recognises the fact that someone else's property can be appropriated on the basis of need.³⁰¹ This would be the case if depriving such other person of the property would amount to denying such person the opportunity to realise their freedom.³⁰²

2 7 4 Moral rights

The personality-based theories of intellectual property had a strong influence on the historical development of copyright in European systems, which emphasised the non-economic, moral interests of authors.³⁰³ In contrast, the Anglo-American development of copyright was, if anything, more focused on its utilitarian justifications or as tradable property. Because the European approach considered the non-economic interests — respect, honor, and admiration — to be the most important to the author, it is important that that which is associated with the author reflects the creator's personality. In order to preserve the author's non-economic interests, Hegel drew a distinction between intellectual property, such as copyright, and other property. Intellectual property cannot be alienated in the same manner as other property.³⁰⁴ He considered intellectual property as a "universal" aspect of an individual, alienation of which would be tantamount to slavery or suicide. Intellectual objects are considered to be continuing expressions of its creator.³⁰⁵ The creator of intellectual property does not lose the right over his work by making copies available. They are merely made available to others in so far as it contains ideas that they can use to attain self-realisation.³⁰⁶ An author's moral rights assist the author to assert

³⁰¹ 77.

³⁰² 78.

³⁰³ Hurt and Schuchman "The Economic Rationale of Copyright" 423; Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 820.

³⁰⁴ Hughes "The Philosophy of Intellectual Property" 350; Sterk "Rhetoric and Reality in Copyright Law" 1242.

³⁰⁵ Hughes "The Philosophy of Intellectual Property" 348.

³⁰⁶ 338.

the necessary rights to ensure that he gets the necessary recognition and that his work is accurately represented.

As a result of attempts to harmonise copyright law, countries following the Anglo-American tradition in copyright law have been compelled to recognise authors' moral rights, or aspects thereof. The most important of these moral rights are the paternity (or attribution) right and the integrity right.³⁰⁷ The paternity right gives the author of specified eligible works the right to be identified as author, and the integrity right gives the author the right to prevent unauthorised changes which are prejudicial to the honour or reputation of the author. French law recognises two additional moral rights: the right of disclosure and the right of retraction. The disclosure right allows an author to publish their works in any form desired, and the retraction right allows an author to withdraw any previously planned publication.³⁰⁸ These rights are said to help prevent the misrepresentation, or unauthorised dissemination, of an author's work. Kant regarded the communication of the written work to be the prerogative of the author, and any deprivation of such rights was an unjustified constraint on the author's liberty.³⁰⁹ The significant point about moral rights is that they remain vested in the author irrespective of whether copyright in the work has been assigned.³¹⁰

2 7 5 Criticism of the personality theory

Hegel's view of the centrality of property to personality, his idea that products of our intellect give rise to a property right because they are aspects of our personality, his

³⁰⁷ S 20 CA 1978, which implemented Art 6bis of the Berne Convention.

³⁰⁸ Hurt and Schuchman "The Economic Rationale of Copyright" 424; Moore "A Lockean Theory of Intellectual Property" 89; Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 841.

³⁰⁹ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 290.

³¹⁰ While these rights can be negated under South African and English law by obtaining a waiver of these rights from the author, a number of European countries, including France do not permit such waivers (Hurt and Schuchman "The Economic Rationale of Copyright" 424).

claims concerning how property is acquired, and the alienability of property in terms of personality theory all have some fundamental problems.

The personality theory raises a similar problem to that raised by the labour-based theories: the extent to which certain acts will be sufficient to qualify as bestowing property. Can it be said that every intellectual creation, no matter how trivial or generic, embodies the personality of its author? It is difficult to justify a creation which is extensively constrained by prescriptions, for example, a picture painted by numbers, as being reflective of the personality of its creator in any significant sense. Some creative works could more plausibly be said to embody the personality of its creator, like works of art like sculptures or paintings. Of course, this does not deny that the ability to make judgements on whether some types of work display an element of the author's personality may require skills in a particular field.³¹¹ However, the problem still remains. To what extent can the compilation of mundane information, such as a telephone directory, be justified as being entitled to the same proprietary protection as an epic novel, on the basis that they are both literary works, reflecting the personality of the creator? This is another problem with Hegel's philosophy of property. He provided no content to these rights of ownership. Rather unhelpfully, he considered the substantive content of property ownership to be unimportant; all that mattered was that property law should facilitate relations between people.³¹²

The "personality stake" in different intellectual creations vary and lie on a spectrum – ranging from those which could be considered as being an embodiment of personality to those which are simply generic – rather than simply falling into two discrete categories.³¹³ The issue therefore becomes a determination of where along the spectrum one can rightly say that intellectual creations are too generic to reflect personality, and, thus, be said to not constitute property? Relevant to this study, the issue is whether computer programs can simply be said to be too utilitarian to be considered as embodying the personality of its creator. Does the design of a

³¹¹ Hughes "The Philosophy of Intellectual Property" 343.

³¹² Sterk "Rhetoric and Reality in Copyright Law" 1239-41.

³¹³ Hughes "The Philosophy of Intellectual Property" 339.

computer program depend more on techniques and solutions for effective operation, or do they reflect individual idiosyncrasies?³¹⁴ It is arguable whether the technical constraints on a computer program, and the fact that it is composed of collections of algorithms, leave sufficient scope for a computer programmer to incorporate his own aesthetic.³¹⁵ However, this issue becomes more problematic when considering the fact that a sophisticated computer program is usually created by corporate entities employing hundreds of computer programmers. The personality theory cannot serve as justification for works created by corporate entities using employees to perform menial or formulaic tasks. It fails to account for the protection of works which cannot be said to embody personal expression.³¹⁶ At present, artistic or literary works, as opposed to more technical creations created by corporate entities, are not considered greater expressions of personality, and, therefore, more deserving of protection.³¹⁷ Expression of personality is not, therefore, the primary basis of current copyright protection. Hegel's philosophy does not seek to *justify* property; property is merely instrumental to the realisation of individual freedom.³¹⁸

Also, given the fact that personality theory seeks to protect that which can be considered to be expressive of the creator's personality, there is no principled reason why the types of works protected should be limited to those currently protected by intellectual property. Why do we consider a writer's work to be more expressive of his personality than a landscape gardener? Should he also have the right to object to his design being copied or changes being made to his design of a garden without his consent? Although the two situations might be distinguished on the basis of the public good nature of the literary work and utilitarian concerns, or matters of contract, it cannot be done on the basis that one creation embodies the personality of the author, and the other does not.³¹⁹ Similarly, does currently unprotected matter such

³¹⁴ 341.

³¹⁵ Hughes (342) suggests that there may be sufficient room for individuality, whereas Palmer (Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 848) does not.

³¹⁶ Hughes "The Philosophy of Intellectual Property" 365.

³¹⁷ Drahos *A Philosophy of Intellectual Property* 79-80.

³¹⁸ 80.

³¹⁹ Sterk "Rhetoric and Reality in Copyright Law" 1244.

as mathematical techniques and a new commercial concept not embody the personalities of their authors?

Of course, a more direct criticism of Hegel's theory of personality concerns the ontological nature of intellectual creations, and challenges his contentions that they reflect individuality. It is debatable whether anything we produce is capable of reflecting who we are in any significant sense, or whether products of our being can be considered as part of our person.³²⁰ Can knowledge of someone only be obtained through that which they have produced? If anything, something that has been produced by an individual can only provide the briefest insight to the individual's personality. The product takes on an independent existence, and cannot be said to be of much assistance in reflecting personality at any time before or after such event.³²¹ How an object is perceived by others is perhaps more revealing about them than it is of the author of the object.³²² Also, the types of issues addressed by the moral rights could more plausibly be justified on the basis that they protect the public, rather than the author of a work. It is the public that has the greater interest in being assured that the works they receive have been faithfully reproduced in their original form.³²³ Furthermore, from the author's perspective, these types of issues could, in any event, have been protected under the common law, using contract or delict. There was no need to introduce a proprietary right.³²⁴

The fact that acquisition of property allegedly takes place by means of the expansive, subjective idea of occupation, discussed above, is problematic. Acquisition depends "on an internal quality in the holder or a subjective relationship between the holder and the thing", which does not allow for the objective determination of ownership. As there is no objective manner in which to determine

³²⁰ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 843.

³²¹ 844-5.

³²² 844-5.

³²³ 848.

³²⁴ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 291; Hurt and Schuchman "The Economic Rationale of Copyright" 424.

whether acquisition of property has occurred, it allows “excessive claims” of ownership.³²⁵

The fact that the personality theory considers intellectual property, like copyright, as being an aspect of the author’s knowledge raises difficulties when it comes to the alienability of such property.³²⁶ If such property cannot be alienated, it, “in an Anglo-American legal sense, [is] not property at all.”³²⁷ There seems to be a difference of opinion whether Hegel considered such property to be alienable. Whereas, certain commentators consider intellectual property to be inalienable according to Hegel’s personality theory,³²⁸ others claim that Hegel “explicitly acknowledged the power of a person to alienate ... products of his physical and mental skill.”³²⁹ Under the influence of European law, the concept of the alienability of copyright has been changing in Anglo-American systems. For example, besides the moral rights, the *droit de suite*, or inalienable resale royalty right, which, under French law, gives the author of an artistic copyright work, or his successors in title, a right to a fixed percentage of subsequent sale profit, has been adopted by some American states and the United Kingdom.³³⁰ Contrary to intuition, economic analysis suggests that the *droit de suite* reduces the financial returns received by authors, and, therefore, also reduces their incentive to create. Without the *droit de suite*, an author is able to transfer the risk of the commercial value or success of the created work to the assignee. The *droit de suite* particularly affects a risk averse author because the assignee is likely to pay less for the transfer of the rights in the work as a result of the fact that the assignee will have to share future profits on a disposal with the author.³³¹ Although the *droit de suite* is regarded as a moral right,³³² it is

³²⁵ Hughes "The Philosophy of Intellectual Property" 335.

³²⁶ 365.

³²⁷ Kretschmer and Kawohl "The History and Philosophy of Copyright" 33.

³²⁸ 33.

³²⁹ Sterk "Rhetoric and Reality in Copyright Law" 1243.

³³⁰ Artist's Resale Right Regulations 2006 were introduced in the United Kingdom in February 2006 to implement Directive 2001/84/EC.

³³¹ Landes W and Posner R "An Economic Analysis of Copyright Law" 1989 *Journal of Legal Studies* 18 325 327. Although they refer to a "*droit moral*", it is clear that is substantively the same as the *droit de suite*.

simply a perpetual right of co-ownership. Irrespective of which view is adopted, it seems clear that if these creations are an aspect of the author's personality, they cannot be considered to property after the author's death. Thus, the personality theory fails to provide adequate justification for modern intellectual property, which continues to exist after the death of the author or inventor.³³³

2 8 Conclusion

As indicated, given the technological and communication revolution we are currently experiencing, it has become more important than ever to place copyright on a sound theoretical basis to withstand challenges that the institution of intellectual property, generally, is facing if it is to continue. However, as illustrated above, the labour-based theories and the personality theory fail to provide adequate justification for the institution of intellectual property generally, and copyright, in particular. We will next consider the utilitarian and economic justifications for copyright protection.

³³² Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 843.

³³³ Sterk "Rhetoric and Reality in Copyright Law" 1241-2.

Chapter 3: Economic justification for copyright protection

“While pre-modern law utilised the language, concepts and questions of classical jurisprudence, modern intellectual property law employed the resources of political economy and utilitarianism. More specifically, while pre-modern law was characterised by self-styled metaphysical discussions about the nature of intangible property — such as how the essence of the protected subject matter was to be identified — with the closure of intangible property, modern intellectual property law abrogated all interest in this way of thinking about and dealing with the subject matter it protected.”¹

3 1 Introduction

As demonstrated in Chapter 2 (*History of copyright and the moral justifications for copyright protection*), the labour-based and personality theories for copyright protection do not provide adequate justifications for the system of copyright protection. If copyright as an institution is justifiable, it has to be on the basis of utilitarian or economic theory. Accordingly, in this chapter we will consider the utilitarian and economic theories to determine whether an acceptable justification for copyright can be established.

As will become apparent, there are material shortcomings with a narrow utilitarian justification for copyright protection. Although it does not provide an adequate justification, utilitarianism is important for another reason: it is sometimes claimed that the law-and-economics approach to the analysis of law is simply a form of utilitarianism, and, therefore, subject to the same criticisms. That is why the utilitarian justification is considered in this chapter and not with the other moral justifications in Chapter 2. After an introduction to economic analysis, an argument will be made in support of the economic pursuit of efficiency (or wealth

¹ Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 4.

maximisation),² which is advocated by economic analysts, and why it is considered to be a superior norm for legal theory than utilitarianism.

Before considering the economic justifications for copyright protection, we will first consider the economic nature of copyright works, and the main non-copyright solutions to address the identified problem of the need to incentivise the production of copyright works. Given the fact that the pursuit of wealth maximisation is not based on the existence of any objective norms or rights, it comes as no surprise that there are economic analysts that criticise the economic case for copyright protection. We will thus also consider some of the economic criticisms of copyright protection, particularly the claim that it amounts to the award of a monopoly.

3 2 Utilitarian justification

A utilitarian justification of legal institutions like copyright protection is premised on the fact that it is socially beneficial to society. Given the problems with the other moral justifications that we have considered, the utilitarian justification is claimed to be the “predominant justification” for intellectual property rights.³ Utilitarian philosophy advocates that an act or institution is preferred if it is likely to maximise social happiness or utility, namely, the extent by which pleasure exceeds pain.⁴ The appropriate course of action or policy requires a calculation of the associated benefits and costs. Russell states that “[i]n its absolute form, the doctrine that an individual has certain inalienable rights is incompatible with utilitarianism, i.e. with the

² When referring to efficiency in this work, we will be concerned with allocative efficiency – the aggregate of the costs and benefits of a particular situation. In other words, we are interested in how society can get the most out of particular resources. The accepted standard for efficiency in economics is the pursuit of Kaldor-Hicks efficiency, aggregate, not individual, wealth maximisation. A given situation is Kaldor-Hicks efficient provided aggregate wealth is increased, and those who have benefitted can, in theory, compensate those who have lost. Harrison *Law and Economics in a Nutshell* 27-35; Polinsky A *An Introduction to Law and Economics* 3ed (2003) 7-11.

³ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 226.

⁴ Posner R "Utilitarianism, Economics, and Legal Theory" 1979 *The Journal of Legal Studies* 8 (1) 103 111.

doctrine that the right acts are those that do most to promote the general happiness.”⁵ In other words, utilitarianism is an outcome-based morality. As will be discussed below, the economic analysis of law is sometimes regarded as a form of utilitarianism, but they can be differentiated, and will, therefore, be dealt with separately.

From a historical perspective, the utilitarian justification of copyright protection has been very influential in the evolution of copyright in Anglo-American systems of intellectual property.⁶ In the first statutory embodiment of copyright, the Statute of Anne in 1710, the stated social purpose of copyright legislation was an “[a]ct for the encouragement of learning, by vesting the copies of printed books in the authors or purchasers of such copies, during the times therein mentioned.”⁷ It is claimed to be the “strongest and most widely appealed to justification for intellectual property” in the United States of America (US), having been enshrined in the constitutional foundations of US intellectual property law.⁸ The US constitutional provision which authorises the US Congress to enact laws to protect authors reflects the utilitarian (instrumental) basis for copyright protection: “[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”⁹ Consistent with this stated

⁵ Russell *History of Western Philosophy* 572.

⁶ Calandrillo S "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 1998 *Fordham Intell Prop Media & Ent L J* 9 301 310; Hettinger "Justifying Intellectual Property" 47; Moore "A Lockean Theory of Intellectual Property" 65.

⁷ Ng A "Copyright's Empire: Why the Law Matters" 2007 *Marq Intell Prop L Rev* 11 337 343-4.

⁸ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 310; Hettinger "Justifying Intellectual Property" 47; Moore "A Lockean Theory of Intellectual Property" 65.

⁹ Article 1, Section 8 US Constitution. See also Hettinger "Justifying Intellectual Property" 47; Moore "A Lockean Theory of Intellectual Property" 65; Ng "Copyright's Empire: Why the Law Matters" 344; Sterk "Rhetoric and Reality in Copyright Law" 1199. It is claimed by some scholars that this also supports the incentive theory of economic analysis (see SM McJohn "The Paradoxes of Free Software" 2000 9 *Geo. Mason L. Rev.* 25 37-8).

purpose, the first US copyright legislation in 1790 reflected its intended purpose of promoting social development through the encouragement of written works.¹⁰

The utilitarian justification of copyright protection is premised on the fact that the copyright works are beneficial to society and their production should be encouraged. Locke, besides his labour theory justifying the institution of property, also considered it beneficial to society as it encourages increased productivity.¹¹ However, the utilitarian justificatory approach is fundamentally different to the labour-based or personality justifications for copyright protection. The utilitarian justification is concerned with social utility; it is the public interest that is of primary importance, not the interests of individual authors.¹² Any form of restriction on personal liberty, which is what copyright protection amounts to by restricting use of copyright works, can be justified if it achieves some greater social purpose.¹³ In other words, the primary motivation for awarding copyright protection is “to encourage the production and dissemination of intellectual works” and not to reward authors.¹⁴

Copyright protection is simply a means to an end: by granting authors property rights in their creations authors are encouraged to produce sufficient works, which serves the public interest.¹⁵ The utilitarian justification of copyright is therefore instrumental (or outcome-driven), rather than rooted in notions of the natural or inherent rights of authors.¹⁶ Because these property rights are instrumental in nature, they are “something decidedly less than what we typically mean when we

¹⁰ Ng "Copyright's Empire: Why the Law Matters" 343-4.

¹¹ Hughes "The Philosophy of Intellectual Property" 299. The arguments in favour of the creation of private property rights, and the incentives which copyright protection gives authors to create works, will be considered below when considering the economic arguments justifying copyright.

¹² Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1120; Hettinger "Justifying Intellectual Property" 48; Hill T "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 1999 *Utah L Rev* 797 800.

¹³ Breyer "Copyright: A Rejoinder" 75.

¹⁴ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1123.

¹⁵ Hettinger "Justifying Intellectual Property" 48.

¹⁶ Moore "A Lockean Theory of Intellectual Property" 66.

say someone has a 'right.'"¹⁷ This state of affairs is troubling for those who adopt a principled stance to copyright protection, or those who consider rights to be divorced from "considerations of utility maximization or promotion of the social good."¹⁸

As the utilitarian justification for copyright protection only permits the grant of property rights provided it serves the public interest, copyright as an institution is decidedly "society-oriented," rather than "author-centered."¹⁹ Utilitarian philosophy subordinates the interests of authors to those of the society.²⁰ Also, the analysis of the effects of copyright is only relevant at an institutional, or societal, level; it is not concerned with position of individual authors.²¹ The implication is that if the property rights afforded to authors do not serve to maximise social utility their grant cannot be justified, and copyright as an institution should be abolished.²² Utilitarian arguments can serve to justify the institution of copyright or to undermine it should it not maximise social utility. The utility costs of awarding private rights might outweigh the utility benefits.²³ Some commentators have strongly emphasised the public nature of copyright in stronger terms, equating it with privatisation, and that the public interest — not private rights — will dictate whether copyright should be de-privatised.²⁴ According to this view, copyright works are considered to be public property and copyright removes it from the public domain. Utilitarianism thus mandates an inquiry

¹⁷ 66.

¹⁸ 66.

¹⁹ T Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 1999 *Utah L. Rev.* 797 800.

²⁰ Abrams "The Historic Foundation of American Copyright Law: Exploding the Myth of Common Law Copyright" 1187.

²¹ Moore "A Lockean Theory of Intellectual Property" 68.

²² 66. In terms of the common law copyright protection is sometimes refused on the basis of the impropriety of the material because it is considered to be scandalous, improper or *contra boni mores* (see *Goeie Hoop Uitgewers v Central News Agency* 1953 (2) SA 843 (W)). If copyright serves the public interest, the rationale for refusing to protect certain types of material may be that it serves no public interest.

²³ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 849.

²⁴ Ng "Copyright's Empire: Why the Law Matters" 371. Referring to an article by S Ghosh (Ghosh S "Deprivatizing Copyright" 2003 *Case W Res L Rev* 54 387).

into whether property rights of the kind copyright grants to authors, and the types of works protected, is the most efficient way of ensuring the production of socially beneficial works.²⁵

Accordingly, there should be a periodic re-evaluation of the overall social utility of the institution of copyright, and of the protection afforded to specific types of works. It may be the case that some types of work should no longer be protected, while new types of work should receive copyright protection. In fact, such considerations led to the extension of copyright protection to computer programs.²⁶ To some extent this work, by considering the economic case for protecting computer programs, seeks to re-evaluate the social utility of protecting computer programs.

When determining whether copyright protection maximises social utility, it is necessary to ascertain the net utility of copyright as an institution, taking into account the negative effects of copyright. The negative effects of copyright must be sufficiently offset by the social utility which copyright generates. By granting authors property rights in the works they create, copyright law establishes a seemingly paradoxical method of advancing the public interest.²⁷ The property rights granted to authors incentivises them to use their talents to produce works as it enhances their control over, and ability to exploit, their creations, and realise an adequate return on their investment. Despite the persuasiveness of the argument in favour of property rights for authors, which benefit society, current copyright protection, arguably, unduly restricts the dissemination of these works to the public, who are meant to be the real beneficiaries in terms of the utilitarian argument in favour of copyright. For example, while it is true that these restrictions are of limited duration, and that after such period of protection the works enter the public domain, the period of protection has been continually extended without any evidence that these extended periods of

²⁵ Ng "Copyright's Empire: Why the Law Matters" 338.

²⁶ T Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 1999 *Utah L. Rev.* 797 800.

²⁷ Moore "A Lockean Theory of Intellectual Property" 65; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 230.

protection are required to incentivise authors.²⁸ The constant ratcheting up of copyright protection granted to copyright holders have led commentators to question whether copyright protection maximises social utility.²⁹ As the focus of this work is the economic analysis of copyright protection of computer programs, and the fact that the utilitarian theory has significant problems (as will be discussed below), no purpose would be served by engaging in further investigation of the utility calculus of copyright protection.

Although the next section will deal with criticisms of utilitarianism, it is important to emphasise that utilitarian theory does not provide an *a priori* case for or against copyright. Whether copyright protection should be provided is a contingent matter: it depends on issues such as the state of technology and social practices.³⁰

3 2 1 Criticism of the utilitarian justification

There are “powerful” objections to utilitarianism which are directed at both its substantive merits due to its consequentialist nature, and the practical (or technical) difficulties when attempting to apply it in any particular situation.³¹ The principal shortcoming of the utilitarian justification is its substantive merit due to its consequentialist nature.³² As indicated above, any rights which are recognised on the basis of a utilitarian justification are distinctly instrumental; they will only be recognised to the extent that they maximise social utility. While justifications of rights based on moral theories such as libertarianism are indeterminate, the

²⁸ Boldrin and Levine *Against Intellectual Monopoly* 99. In the case of a work created by an individual the current period of protection is for the life of the author plus 50 year (s3(2) to 3(4) Copyright Act 1978). The period of protection in the European Union has been extended to 70 years after the life of the author. In the US, despite persuasive evidence that such extension could not be justified, the period of protection has been extended to 90 years pursuant to the US Copyright Term Extension Act 1988.

²⁹ Moore "A Lockean Theory of Intellectual Property" 66.

³⁰ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 820.

³¹ Ng "Copyright's Empire: Why the Law Matters" 510-1.

³² Posner "Utilitarianism, Economics, and Legal Theory" 115.

consequentialist nature of utilitarianism makes the utilitarian justificatory arguments more problematic.³³

There are four reasons why a utilitarian justificatory paradigm is substantively flawed. First, as already indicated, utilitarian theory does not provide an *a priori* case for or against any particular public policy or institution, such as copyright. The guiding moral principle of maximising utility and calculating public utility (the “felicific calculus”) can lead to conflicting public policies: depending on the societal demands or technology, public policy could be radically different at various times. This is particularly disturbing if one considers that utilitarian public policy decisions are, as will be demonstrated below, based on no more than guesswork that it maximises happiness. Second, from a moral perspective, particularly in the case of a morality that is grounded in individual liberty, utilitarianism can easily justify morally repugnant conduct. After all, disregarding the happiness of the individual at the expense of the community, is perfectly justifiable on the basis of utilitarianism.³⁴ This could, for example, justify ignoring the interests of authors if it is considered to provide the public with greater happiness to have unrestricted access to their works. This is probably what concerned Locke the most, and he was wary of narrow utilitarianism. He was of the opinion that if property rights are not granted to creators of items, “it can be wantonly appropriated by the social mob, [and] the laborer will realize quickly that he has no motivation to produce property and increase the common stock.”³⁵ Third, not only can it justify the violation of the rights of individuals - if there is anything such as the “rights” of individuals under utilitarianism – individuals can be forced to act against their own interests if it is deemed to benefit others to a greater extent. Fourth, the idea of a narrow concept of utilitarianism is anachronistic under any type of constitutional order which enshrines fundamental rights, as does the South African Bill of Rights³⁶ because it “can neither provide a theory of *moral* rights

³³ 114-5.

³⁴ 115.

³⁵ Hughes "The Philosophy of Intellectual Property" 299.

³⁶ Chapter 2, Constitution of South Africa 1996.

nor take either moral or legal rights seriously.³⁷ It condones the violation of such rights, or freedoms, if it maximises utility.

As a possible defense to some of these criticisms it is worth bearing in mind that legal doctrine is marked by instances of exceptions to established rules and norms. Acceptable doctrine does not require that every possible case comply with the strict requirements of the doctrine, "but only that it should be true in an overwhelming majority of cases."³⁸ Thus, even within a utilitarian construct of the law, there may be exceptions made to allow for personal liberty and issues of morality. The problem is of course to determine the circumstances in which it will be acceptable to deviate from the doctrine. Crucially, this determination cannot be made on the principles of utilitarianism.

Utilitarianism also has significant problems due to its inability to provide a workable basis for formulating public policy and legal rules. If one attempts to calculate whether public utility would be maximised by a specific course of action or policy, three problems immediately become apparent: the domain or boundary problem, the total/average utility problem, and the interpersonal-utility problem.³⁹ The domain problem itself gives rise to two issues. First, a determination has to be made of whether the utility of both humans and animals are to be considered. Second, even if we confine ourselves to consider only the utilities of humans, we need to determine which groups should be considered: all humans, or merely nationals of one state or a particular group.

The total/average utility problem requires a choice to be made about whether total utility is to be maximised, or whether average utility is to be maximised. In other words, does the distribution of utility matter? These two goals do not necessarily coincide: seeking to maximise total happiness may result in individuals being made

³⁷ Coleman J "Efficiency, Utility, and Wealth Maximisation" 1979-80 *Hofstra L Rev* 8 509 511.

³⁸ Russell *History of Western Philosophy* 572.

³⁹ Coleman "Efficiency, Utility, and Wealth Maximisation" 511; Posner "Utilitarianism, Economics, and Legal Theory" 112-3.

worse off, and, conversely, improving average happiness may reduce total happiness.

The interpersonal-utility comparison problem requires us to determine whether “a course of conduct or policy that makes some individuals better off and others worse off increases total utility, and if it does, by how much.”⁴⁰ While it may be possible to reasonably infer that the utility of a particular individual has improved or declined in different situations, it is not something that is, as yet measurable. The problem of measurability becomes exponentially more difficult, given the range of human emotions and responses, when trying to compare the relative utilities of individuals in order to ascertain whether total or average utility has increased. Happiness is a relative concept and sometimes individuals derive pleasure in socially undesirable ways (if we can be permitted to make such an *a priori* judgement) and, therefore, Posner refers to the “monstrousness” of utilitarianism, which “must logically ascribe value to all sorts of asocial behavior, such as envy and sadism, because these are common sources of personal satisfaction and hence of utility.”⁴¹

Again, the determination of a particular boundary, or a desired calculus for happiness, cannot be done on principles of utilitarian theory.⁴²

3 3 Law and economics

When the issue of the justification for copyright protection is raised, the standard response is inevitably an appeal to the notion that such protection is required to provide the necessary “incentives” to authors to create works, and to do so others must be prevented from exploiting (or “free-riding” on) the efforts of authors by giving authors a “monopoly” over their creations. In fact, we have seen elements of this in some of the justifications already considered. These concepts, and their analysis, are familiar to economists, which makes copyright such a suitable subject for

⁴⁰ Coleman "Efficiency, Utility, and Wealth Maximisation" 511.

⁴¹ Posner "Utilitarianism, Economics, and Legal Theory" 132.

⁴² 112-3.

economic analysis. Given the fact that the primary focus of this study is on the economic justifications for copyright protection of computer programs, it is necessary to provide a brief introduction to the discipline of law and economics, and the benefits and advantages of economic analysis.

3 3 1 What is law and economics?

The discipline of law and economics is an interdisciplinary subject concerned with the application of economic concepts and analysis to the study of legal issues.⁴³ Until the 1960s, the use of economic analysis in law was confined to those areas where the legal norms were explicitly economic, such as competition (anti-trust) law, regulated markets, taxation and the quantification of damages.⁴⁴ Since then, economic analysis of law has become “pervasive” because it is claimed that everything we do has financial implications, and, therefore, potentially economically significant. The laws we create are no exception as they can affect markets.⁴⁵ There are now a number of journals and academics — including two Nobel laureates — dedicated to the field and area of research.⁴⁶ The significant impact of economic analysis has led to claims that it is “the most important development in legal scholarship of the twentieth century.”⁴⁷

3 3 2 Why an economic analysis?

Law is considered to be a fertile area for economics because both law and economics are, to varying degrees, concerned with incentives. From an economic perspective, legal sanctions resemble prices because laws have implicit associated

⁴³ Parisi F "Positive, Normative and Functional Schools in Law and Economics" in Backhaus J *The Elgar Companion to Law and Economics* (2005) 58; Ward *Introduction to Critical Legal Theory* 123.

⁴⁴ Cooter R and Ulen T *Law and Economics* (2003) 1; Posner "Utilitarianism, Economics, and Legal Theory" 105-6.

⁴⁵ Ward *Introduction to Critical Legal Theory* 123.

⁴⁶ Cooter and Ulen *Law and Economics* 2. The two Nobel laureates are Ronald Coase and Gary Becker, who won the Nobel Prize for Economics.

⁴⁷ 2-3. Quoting Professor Bruce Ackerman of Yale Law School.

prices (that is, costs or benefits), which alter the behaviour of individuals.⁴⁸ For example, if the law imposes a severe legal sanction on a particular act (for example, copyright infringement), the effect of such a law is analogous to the effects of increasing the price of such an act. The legal sanction, by increasing the “price” of such conduct (“good”), will result in individuals “consuming” less of such “good” i.e. avoiding the sanctioned activity.⁴⁹

Knowing how human behaviour is altered by laws (or incentives, in terms of economics) can help lawmakers design laws in order to achieve their intended purpose, understand why the intended goals are not being achieved, or if laws are the appropriate tool to achieve the intended goals. Economics, in particular, microeconomics, is the study of how individuals make choices in cases of scarcity, and how they respond to incentives.⁵⁰ Scarcity in this context means any constraints on an individual, be it wealth, income, time, knowledge or information.⁵¹ As laws act as a constraint on individual behaviour, they too can be subjected to economic analysis. Thus, the economic analysis of law can be extremely useful in providing insights into the desirability of legal institutions – such as copyright.

Some of the assumptions economists make when analysing particular problems have been criticised or ridiculed, but much can be learnt from artfully chosen, relevant assumptions which help to simplify an otherwise complex problem.⁵² The primary assumption in neo-classical economic models is that humans are rational maximisers of their own interests; they have to be in a world that has scarcity. When economists refer to the notional “rational” agent, this idealisation — if any form of efficiency analysis is to be plausible — requires that such agent consistently acts in a manner that evidences some appreciation of the scarcity of resources, no more. It is not a statement about the psychological state or the particular preferences of an agent.⁵³ Economic analysis is particularly insightful if it

⁴⁸ 10.

⁴⁹ 3.

⁵⁰ Miceli T *The Economic Approach to Law* 1ed (2004) 15; Parkin *Microeconomics* 2.

⁵¹ Miceli *The Economic Approach to Law* 15.

⁵² Polinsky *An Introduction to Law and Economics* 2-6.

⁵³ Roederer C and Moellendorf D *Jurisprudence* 1ed (2006) 194.

can identify such consistent behaviour in a large number of agents, and when this reflects the general behaviour of individuals.⁵⁴ Economic analysis is simply concerned with the empirical question of what individuals will choose in a given set of circumstances, regardless of issues of morality.⁵⁵

Although the assumption of the individual as a rational maximiser of utility, like some of the other assumptions employed in economic models, may not be always be appropriate, it does explain a substantial spectrum of human behaviour from which useful conclusions can be drawn.⁵⁶ It allows for an examination of how humans respond to incentives using theories such as game theory, and provides insights which are more useful than mere intuition.⁵⁷ Similarly, the pursuit of efficiency or wealth maximisation as economic goals have also been criticised, but they do provide more definable and measurable criteria than other norms usually employed in traditional legal analysis, such as fairness or the public interest.⁵⁸ The case for efficiency or wealth maximisation as a normative goal is considered in paragraph 3 4 1 (*Wealth maximisation as a normative goal*).

This is not to deny that laws also seek to promote morals or social norms such as justice or individual liberty, or that a fair distribution of wealth should not be pursued. The law often pursues legal notions such as equity or justice despite the costs of doing so; it can never simply be concerned with the ruthless pursuit of efficiency.⁵⁹ Even if these other norms are the primary goals of law, economic notions such as efficiency can still contribute to their achievement because it may indicate how they can be achieved in the least costly manner.⁶⁰ No matter what policy is being pursued, wasteful activity can never be considered as socially beneficial.⁶¹ Thus, the economic goals of efficiency or wealth maximisation can be

⁵⁴ 195.

⁵⁵ Ward *Introduction to Critical Legal Theory* 124-5.

⁵⁶ Drahos *A Philosophy of Intellectual Property* 119.

⁵⁷ Cooter and Ulen *Law and Economics* 3-4.

⁵⁸ Ward *Introduction to Critical Legal Theory* 123.

⁵⁹ 126; Watt *Copyright and Economic Theory* 16.

⁶⁰ Miceli *The Economic Approach to Law* 3.

⁶¹ Cooter and Ulen *Law and Economics* 4.

instrumental in pursuing moral goals or social norms such as justice or individual liberty.⁶²

The terminology used in traditional legal analysis differs from that used in economic analysis, although they may be concerned with the same factual problem. Traditional legal analysis of an area such as copyright will be concerned with balancing the rights of authors and the interests of the public to unfettered access to the works created. Economists, on the other hand, are concerned with getting the incentives right in order for the outcome to be efficient or wealth maximising. From an economic point of view, an analysis of copyright would, thus, involve a determination of whether it is efficient, or wealth maximising, to grant property rights in respect of creative works.⁶³

The application of economic techniques to legal analysis has been beneficial as it has introduced greater analytical rigour when dealing with complicated legal issues, yielding critical insights which may have been overlooked in traditional legal analysis. Traditional legal analysis tends to be case-law based, involving a search for dogmatic consistencies in the legal system.⁶⁴ Laws have important social goals, and it is important that they are placed in a proper context; they “are not just arcane, technical arguments.”⁶⁵ Given the complexity of many legal issues, particularly copyright law, economic techniques can assist unpacking the various aspects of a problem to be addressed. Economic analysis enables the issues to be addressed in a more manageable way, and, as will be demonstrated, provides us with a deeper understanding of the subject.⁶⁶

As indicated above, economists are concerned with the optimal allocation of scarce resources among alternative uses. In the case of copyright protection this means that we are interested in a positive analysis: we are concerned with

⁶² Ward *Introduction to Critical Legal Theory* 127.

⁶³ Boldrin and Levine *Against Intellectual Monopoly* 5; O'Hare "Copyright: When is Monopoly Efficient?" 409; Landes and Posner "An Economic Analysis of Copyright Law" 326.

⁶⁴ Parisi "Positive, Normative and Functional Schools in Law and Economics" 60.

⁶⁵ Cooter and Ulen *Law and Economics* 4.

⁶⁶ Posner "Intellectual Property: The Law and Economics Approach" 57.

ascertaining whether copyright protection promotes the efficient allocation of resources.⁶⁷ More specifically, it is necessary to first identify the implicit price of copyright: the costs imposed by copyright protection, and its corresponding benefits. Consideration should then be given to the effect a change in the law would have on the implicit price. Thereafter, a conclusion can be drawn about the efficacy, and, possibly, fairness of the present copyright regime.⁶⁸

Intellectual property law, such as copyright law, is particularly suited to economic analysis.⁶⁹ Intellectual property rights are economically significant because they affect the markets in information.⁷⁰ More specifically, the reason it makes obvious sense to consider copyright from an economic perspective is that copyright law is primarily concerned with providing an economic incentive for authors.⁷¹ It is necessary to ascertain the costs and benefits of copyright in specific works to determine if it is socially justifiable. Both the philosophical and economic approaches to intellectual property “ask the same question, what are the justifications for creating property rights in abstract objects?”⁷² Without an examination of the economics of copyright as an institution it “would remain an opaque institution.”⁷³ Even critics of economic analysis of copyright law concede that it is “an important descriptive tool for understanding the operation of copyright law.”⁷⁴

⁶⁷ Landes and Posner "An Economic Analysis of Copyright Law" 325; Watt *Copyright and Economic Theory* 15.

⁶⁸ Coote and Ulen *Law and Economics* 4.

⁶⁹ Landes and Posner "An Economic Analysis of Copyright Law" 325.

⁷⁰ Drahos *A Philosophy of Intellectual Property* 5-6.

⁷¹ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1348.

⁷² Drahos *A Philosophy of Intellectual Property* 6.

⁷³ 7-8.

⁷⁴ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1351.

3 4 Utilitarianism and economic analysis

Before turning to the economic analysis of copyright protection, it is necessary to briefly address the issue of whether economic analysis of law is simply a specific form of utilitarianism. As illustrated above, the utilitarian justification for copyright, particularly in its narrow sense, does not provide an adequate justification for copyright protection, and, if economic analysis of law is simply a specific form of utilitarianism (which is what some scholars claim), it will be subject to the same criticisms.⁷⁵ In fact, those who criticise the economic analysis of law more generally have done so on the basis that economic theory is simply a version of utilitarianism, and then proceeded to show why utilitarianism is flawed.⁷⁶

There may be a possible political motivation, on the part of utilitarian theorists, for the persistent attempts to equate the economic analysis of law with utilitarian analysis.⁷⁷ Prior to the 1960s the utilitarian analysis strongly influenced legal policy, and the only instances of economic analysis were occasional applications of intuitive economic principles in judicial decisions.⁷⁸ Since the 1960s, the relative importance of the application of economic principles and utilitarian theory have reversed; utilitarian philosophy has been on the wane as a normative basis for legal policy.⁷⁹ The utilitarian theorists have, accordingly, taken to considering economic analysis of law as a species of utilitarianism.⁸⁰

⁷⁵ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 226-7.

⁷⁶ Posner "Utilitarianism, Economics, and Legal Theory" 103.

⁷⁷ The converse has also been suggested: that economic analysts sought to gain prominence for their approach by linking it to "the initial plausibility of utilitarianism in order to provide a normative basis for the various efficiency criteria." Coleman "Efficiency, Utility, and Wealth Maximisation" 510.

⁷⁸ Posner "Utilitarianism, Economics, and Legal Theory" 106; Roederer and Moellendorf *Jurisprudence* 187.

⁷⁹ Posner "Utilitarianism, Economics, and Legal Theory" 106-7.

⁸⁰ 107.

It is the case that neo-classical economics has its origins in the same moral and political philosophy which gave rise to utilitarianism.⁸¹ Utilitarianism was a response to the prevailing paternalism, directed by the aristocracy, at the turn of the 19th century. Jeremy Bentham, the most well-known utilitarian, considered it unacceptable that social values and norms should be determined by the aristocracy, or based on some alleged objective standard to which an enlightened minority compels the majority to conform. For him, utilitarianism was principally concerned with democracy because it determined social values on an aggregate basis, allowing everyone's subjective tastes and preferences to be considered.⁸² The determination of aggregate preferences must necessarily be based on the individual pursuit of pleasure, or reduction of pain.⁸³ People's preferences can be ascertained from their statements and actions.⁸⁴ Because those things that give people pleasure — be it material goods, time or attention from others — are scarce, aggregate pleasure can be maximised by the pursuit of efficiency, generally.⁸⁵ Accordingly, law should try to promote efficiency.⁸⁶ He held that the law's role was to compel man to act in a way which balances his selfish interests and those of others.⁸⁷

Economics, in its broader sense, seeks to find the most efficient way of satisfying human preferences in light of scarce resources.⁸⁸ Adam Smith, "the first and greatest theorist of *capitalism*," was a professor of moral philosophy, and considered the market mechanism to be the most efficient way to distribute material wealth. The market mechanism was not considered as the best way of satisfying *all* human preferences, or the basis for other social institutions — he was simply

⁸¹ Roederer and Moellendorf *Jurisprudence* 187.

⁸² 187-8.

⁸³ 190.

⁸⁴ 191.

⁸⁵ 191-2.

⁸⁶ 192.

⁸⁷ Russell *History of Western Philosophy* 559.

⁸⁸ Roederer and Moellendorf *Jurisprudence* 186.

concerned with the distribution of wealth.⁸⁹ When it comes to material wealth, individual self-interest is the most efficient method of distributing, and maximising, wealth because the lawgiver is “not always wise or virtuous, and because human governments are not omniscient.”⁹⁰ Material wealth, according to this broader conception of economics, is not the sole, or even primary, purpose of trading scarce resources in the market; it was simply considered the most efficient method of satisfying one of the components of overall utility — the distribution of wealth.⁹¹ Thus, to this extent, some of the economic justifications for intellectual property law, that are based on wealth maximisation — as exemplified by Posner — resembles a utilitarian approach to intellectual property law. Whereas the utilitarian approach considers the sole, or principal, purpose of intellectual property law — as with any law — to maximise aggregate utility, the economic approach confines itself to wealth maximisation.⁹² The goal of wealth maximisation can be achieved by seeking an efficient allocation of resources, and ensuring that any losses are minimised or adequately compensated by the associated benefits brought about by the legal rules.⁹³ As with utilitarianism, the wealth-maximising economic analysis of law does not claim to pursue objectively determinable norms. Depending on the economic consequences, there may be cases for or against intellectual property rights.⁹⁴

Before indicating why economic analysis is regarded as different from, and avoiding some of the criticisms leveled at, utilitarianism, it is necessary to clarify issues of terminology because this appears to be a possible source of confusion.⁹⁵ Scholars often used the term “welfare” in the context of utilitarian theory as being

⁸⁹ 187. In contrast, the classical economists, like Marx and Ricardo, consider that the distribution of material wealth too should be based on some objective norm, rather than based on the pursuit of personal satisfactions.

⁹⁰ Russell *History of Western Philosophy* 559.

⁹¹ Roederer and Moellendorf *Jurisprudence* 193.

⁹² Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 262.

⁹³ 262.

⁹⁴ Palmer "Are Patents and Copyrights Morally Justified? The Philosophy of Property Rights and Ideal Objects" 849.

⁹⁵ There are welfare economists who consider their approach to economics as simply applied utilitarianism. Posner "Utilitarianism, Economics, and Legal Theory" 104-5.

synonymous with the concept of “happiness”. Economists also use the term “welfare” in normative contexts, and employ it as a synonym for “utility”. Because of the general, indistinguishable use of concepts such as “happiness, utility, or welfare” by both economists and utilitarians, Posner considered their use as too vague, preferring to use the much narrower concepts of “wealth” or “value” in their economic, monetary sense for purposes of economic analysis.⁹⁶ By confining investigations to measurable transactions, whether based on voluntary transactions or hypothetical markets, it is considered more workable than a concept such as happiness.⁹⁷

Economic analysis, by seeking to focus on the goal of wealth maximisation, avoids the problems associated with utilitarianism: the boundary problem (whether all humans and animals are to be included in the calculus of wealth maximisation), and the problems of measuring average/total happiness and making interpersonal comparisons. The principle of wealth maximisation draws no distinction between the interests of nationals and foreigners (or immigrants) as any restrictions on trade and resources are economically harmful.⁹⁸ Furthermore, animals will be included to the extent that they enhance wealth; their quantities will be determined by the demand for them.⁹⁹

In the case of wealth maximisation, we are not concerned with trying to quantify the extent of individual or aggregate utility. Economists are not concerned with what agents believe their preferences to be, they confine themselves to that which they actually do.¹⁰⁰ Economic analysis, like Posner’s, restricts the concept of wealth to a monetary calculation and only takes into account “what people are willing to pay for something or, if they already own it, what they demand in money to give it up. The only kind of preference that counts in a system of wealth maximization is thus one that is backed up by money — in other words, that is registered in a

⁹⁶ 104-5 and 119.

⁹⁷ 130. Hypothetical markets arise where a problem of high market transaction costs prevent voluntary exchanges, resulting in resource allocation outside the market.

⁹⁸ 129.

⁹⁹ 128.

¹⁰⁰ Roederer and Moellendorf *Jurisprudence* 195.

market.”¹⁰¹ Economic analysis is concerned with aggregate effects; it merely attempts to determine which set of alternative arrangements is preferred over another, rather than in the absolute or average quantities of each set. The analysis involves a comparison of the marginal efficiency (benefits and costs) of a given set of arrangements, that is, ordinal comparisons.¹⁰² In other words, it is not concerned with the intensity of individual preferences (cardinality).¹⁰³ More importantly, a utilitarian analysis and an economic analysis of a particular issue may result in different conclusions being reached on the appropriate course of action or policy.

3 4 1 Wealth maximisation as a normative goal

While it is conceded that wealth maximisation does not necessarily result in the maximisation of happiness or welfare, or that people are purely wealth maximisers, it is nevertheless claimed that wealth maximisation may still provide invaluable normative guidance: it may be the best evidence of what increases happiness. What could be of more persuasive proof of personal utility than voluntary interaction through market trades?¹⁰⁴ Economists are not concerned with what agents believe their moral preferences to be, they confine themselves to that which those agents actually do.¹⁰⁵ What we pursue through our transactions is arguably of greater import than what we claim our ethical positions to be. Wealth maximisation is also considered to be a better tool in pursuing normative policies because wealth incentives are often more effective at achieving a desired social goal than appealing to moral values.¹⁰⁶

Even if policy decisions are based on moral or ethical principles, an economic analysis can still add to the debate by illustrating the economic consequences of any proposed policy. To the extent that the moral arguments are influenced by economic

¹⁰¹ Posner "Utilitarianism, Economics, and Legal Theory" 119.

¹⁰² Roederer and Moellendorf *Jurisprudence* 193.

¹⁰³ 196.

¹⁰⁴ Posner "Utilitarianism, Economics, and Legal Theory" 120-2.

¹⁰⁵ Roederer and Moellendorf *Jurisprudence* 194.

¹⁰⁶ Posner "Utilitarianism, Economics, and Legal Theory" 122.

considerations, “the economist has a role to play in the formation of ethical judgments.”¹⁰⁷ There are very few matters of policy that are devoid of economic considerations.¹⁰⁸ In other matters of policy, economic considerations may be the basis of such decisions, which makes the economic analysis decisive. Thus, normative analysis does not require that efficiency needs to be validated as a normative basis before it can be used to provide normative guidance.¹⁰⁹

However, Posner goes further and suggests that ethical principles such as economic liberty, keeping promises, telling the truth, and altruism can be derived from the principal of wealth maximisation. He claims that not only has it been empirically established that economic liberty leads to wealth maximisation by encouraging productive capacities, but that these other ethical principles reduce transaction costs, which is an economising principle. Also, the pursuit of utilitarian happiness is arguably a more selfish, and less socially beneficial norm, than actions based on market forces.¹¹⁰ For example, whereas the economically unproductive activity of a thief (willing to suffer the disutility of imprisonment) may be justifiable on the grounds of utilitarianism, based on increasing happiness, this would not be the case with respect to wealth maximisation as a normative value.¹¹¹

Unlike utilitarianism, the economic approach does not yield “results violently inconsistent with our common moral intuitions.”¹¹² The pursuit of lawful wealth requires cooperation between individuals because market transactions are the consequence of mutually beneficial exchanges. Such exchanges can only materialise if self-interest is constrained and sufficient altruism is exhibited.¹¹³ The market system serves as a constraint on wealthy sadists who seek personal pleasure — “utility monsters” — by requiring the sadists to seek, and obtain, the consent of their victims, which will only be achieved by paying the demand level of

¹⁰⁷ 109.

¹⁰⁸ 110.

¹⁰⁹ 109.

¹¹⁰ 123.

¹¹¹ 122-3.

¹¹² 131-2.

¹¹³ 132.

compensation.¹¹⁴ It is also more unlikely that minorities will be oppressed or persecuted in a system of wealth maximisation than in a utilitarian system because it will be “rare that the ostracism, expulsion, or segregation of a productive group” will lead to wealth maximisation.¹¹⁵

Wealth maximisation is also a more sound theoretical basis for the establishment of exclusive rights (a theory of rights) — not just property rights but also so-called “natural rights” like life, liberty and property — and their initial assignment (which could be determinate in the presence of transaction costs) than utilitarianism. Not only can wealth maximisation account for the initial vesting of rights (when there are transaction costs inhibiting exchange), it also provides an explanation for limitations on exclusive rights in cases of conflict, corrective justice and distributive justice.¹¹⁶

3 5 Economics of copyright

Before considering the economic justifications for copyright protection, it is necessary to consider the economic nature of copyright works. We will see why it is claimed that the nature of copyright works creates difficulties which may prevent their creation at a socially desirable level in a free market without the legal protection afforded by copyright. After the discussion of this alleged market failure, we will briefly consider the principal non-copyright alternatives to address this problem, and the reasons why they are considered to be inadequate solutions to this problem. The economic justifications for copyright will then be dealt with in more detail.

The phrase “copyright works” will be used to refer to the specified types of work which are currently protected under copyright law, even when discussing such types of work in a hypothesised context where such work received no such copyright protection. The reason for doing so is to avoid tortuous phrases like “the types works that are currently protected by copyright” when discussing such works in the

¹¹⁴ 131-2.

¹¹⁵ 133-4.

¹¹⁶ 125.

absence of copyright protection. Also, most of the examples used to discuss the issues raised in this chapter, or to illustrate the points made, will involve literary works. Literary works are the most widely-used copyright work to illustrate the issues of copyright for two reasons: it was historically the first type of protected work, and it is the type of copyright work which is most familiar to people. Also, probably for these reasons, the various issues related to copyright law, be it matters of substantive law, such as questions of originality, or the economic justifications for copyright protection, have been analysed more extensively in relation to literary works than other types of copyright work. Again, “author” should be assumed to mean, collectively, the creator of the work, holder of the copyright and the person who commercially seeks to exploit it (such as a publisher), unless a distinction is drawn between any of them. This accords with the notion of the author as being the central figure in copyright legislation.

When discussing economic concepts, mathematical equations and graphs will be avoided for two reasons: lawyers are generally averse to mathematical expression and tend to glaze over them, and, more importantly, descriptive accounts of economics are more accessible. After all, economics is principally a study of human behaviour — how economic agents interact and make choices. Excessive use of mathematical models and graphs has helped to create the impression that economics is a natural science, which is not the case.¹¹⁷ The economic points can be sufficiently conveyed through descriptive accounts of the principles.

3 5 1 Economic analysis and copyright policy

Before considering the economics of copyright protection, it is interesting to note that, thus far, the economic analysis of copyright has had very little direct influence on copyright law and policy, whether in the US, or elsewhere.¹¹⁸ Nevertheless, it is

¹¹⁷ Skidelsky R "Study Economic History" <http://www.nytimes.com/roomfordebate/2012/04/01/how-to-teach-economics-after-the-financial-crisis/study-economic-history> (2 April 2012).

¹¹⁸ Samuelson P "Should Economics Play a Role in Copyright Law and Policy?" 2004 *University of Ottawa Law & Technology Journal* 1 1 7. Samuelson does cite some copyright cases (for example, *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1986 797 F.2d 1222, *Computer Associates*

claimed that the economic justification for intellectual property, such as copyright, is the “principal justification” for intellectual property in Anglo-American law.¹¹⁹ This seems surprising given the extensive literature concerning the economics of copyright protection.¹²⁰ There are a number of possible reasons for the decision-makers on copyright law — lawyers and politicians — ignoring the literature concerning the economic analysis of copyright.

Most of the relevant professionals engaged in forming copyright law do not have the necessary economic expertise, which makes them reluctant to engage with literature concerning the economic analysis of copyright.¹²¹ Those who engage in economic analysis also share some of the blame for their analysis being ignored; the literature on the economic analysis of copyright protection tends to be inaccessible to persons who do not have, at least, a background in economics. There appears to be an unnecessary use of mathematical formulae, which could be avoided by providing more descriptive accounts of the analytical methods and findings.¹²²

The analytical technique of making simplifying assumptions about a given situation used by economists is one that is unfamiliar to the decision-makers on copyright law. These decision-makers tend to immediately reject any findings following such an approach if any of the assumptions that have been made are questionable because of their generalised nature. The cultural differences are compounded by the fact that economists sometimes disagree on the outcome of a particular situation.¹²³ A reason for this lack of consensus is the fact that copyright covers a diverse range of copyright works, appearing in quite different markets, which makes economic analysis far too generalised to yield a definitive answer on

Intl. Inc. v Altai Inc. 1992 982 F.2d 693 and *Sega Enterprises Ltd. v Accolade, Inc.* 1992 977 F.2d 1510) involving computer programs where the court has, in a cursory manner, engaged with the economic issues of copyright protection.

¹¹⁹ Samuelson "Should Economics Play a Role in Copyright Law and Policy?" 3.

¹²⁰ 6.

¹²¹ 6-7.

¹²² 7-8.

¹²³ 8.

the desirability of copyright protection.¹²⁴ This is the reason why it is better to consider the impact of copyright protection in respect of specific types of copyright work; it is more likely to allow one to draw definite conclusions.

Although the non-economic arguments relating to justifications for copyright protection may also not be unequivocal, the policy-makers on copyright are more likely to be persuaded by lobbying by the copyright industry because they tend to have more romantic notions about the creation of literary and artistic works. The policy-makers and the lobbyist are also more likely to have similar backgrounds, which inevitably results in a closer working relationship.¹²⁵ In this interaction, the sophistication and financial wherewithal of the copyright lobby makes it particular effective in presenting its case. Consumers, whose interests could possibly be affected by undue restrictions on copyright works, have collective action difficulties because they are dispersed and their individual financial losses tend to be too small to motivate them to coordinate their efforts.¹²⁶

However, there have been signs of a changing attitude to using economic analysis in the development of copyright law. For example, economic analysis was referred to in both the US and EU when the introduction of copyright protection for computer programs was being considered in the 1970s and 1990s, respectively.¹²⁷ Also, the 2003 US Supreme Court case of *Eldred v. Ashcroft*,¹²⁸ which considered the constitutionality of the extension of the term of copyright protection pursuant to the US Copyright Term Extension Act 1998, included extensive testimony concerning the economic effects of extending the term of copyright protection to 90 years.

¹²⁴ 8-9.

¹²⁵ 6-9.

¹²⁶ 9.

¹²⁷ 13. The introduction of copyright protection for computer programs will be dealt with in more detail in the next chapter.

¹²⁸ *Eldred v Ashcroft* 2003 537 US 186.

3 5 2 Market failure

In the previous chapter we briefly looked at the nature of copyright in terms of legal doctrine, and whether it constitutes property. We will now consider the economic nature of copyright works, which will help to explain the economic analysis and justification for copyright protection.

3 5 2 1 Public goods

Due to their intangible nature, copyright works, like other intellectual property, are regarded as *public goods* in economics.¹²⁹ Tangible property, such as a squash racquet, is generally considered to be a private good because it can be physically controlled (excludable), and enjoyed by only one person at a time (rival). A public good (or service)¹³⁰ is one that is both *non-rival* and *non-excludable*. It is the public-good quality of copyright works that makes it a particularly “interesting case for economists and lawyers to debate.”¹³¹ Unlike a private good, a non-rivalrous good can be consumed or enjoyed by an additional person without diminishing the enjoyment of others, at negligible, or no extra, cost.¹³² For example, the *contents* of a book, like the code of a computer program, can concurrently be used and enjoyed by more than one person, without any adverse effects on any of such users.¹³³ It should be borne in mind that a copyright work — the code of a computer program or the content of a book — must be distinguished from the physical medium on which it may be conveyed. The copyright work transcends the particular mode of delivery.¹³⁴

¹²⁹ In economics goods can be classified as private goods, common goods (common-pool resources), natural monopolies or public goods, depending on “the extent to which people can be *excluded* from consuming them and in the extent to which one person's consumption *rivals* the consumption of others.” See Parkin *Microeconomics* 394.

¹³⁰ For convenience, this chapter will simply refer to “good,” rather than repeatedly having to refer to “good or service.” Thus, any reference to “good” should be understood to be applicable to a “service” as well, unless it is stated otherwise.

¹³¹ Watt *Copyright and Economic Theory* 3; Landes and Posner “An Economic Analysis of Copyright Law” 326.

¹³² Boldrin and Levine *Against Intellectual Monopoly* 156.

¹³³ Moore “A Lockean Theory of Intellectual Property” 77.

¹³⁴ Watt *Copyright and Economic Theory* 4.

The non-rivalrous nature of copyright works — the fact that they can be enjoyed by others at no (or negligible) cost — raises the issue of whether it is socially beneficial to prevent such use. After all, if it costs nothing for others to utilise and enjoy a copyright work, why should they be prevented from doing so? On a crude utilitarian basis, such use by others should not be prevented, and for copyright law to do so is socially detrimental.¹³⁵

The claimed non-excludability of copyright works means that persons cannot be prevented from using or enjoying it. A well-known example of a non-excludable service is a free-to-air broadcast; no individual can be prevented from enjoying such a good if they have a radio and individual freedom.¹³⁶ Gordon states that whether a good is excludable depends on whether it can be concealed, allowing the creator to prevent use by non-purchasers.¹³⁷ Palmer, on the other hand, is of the opinion that whether a particular good is a public good, and, therefore, excludable, cannot be determined from the nature of the good itself. Rather, whether a good is public good depends on the institutional context and the prior policy considerations. A system can require that a good should be accessible to others or that it be produced for public benefit, in which case it will be more similar to a public good. Alternatively, the system may avoid introducing any mechanisms to assist the producer of a good to exclude others from the benefit of the good but leave it up to the producer to determine whether it will restrict public consumption by incurring the necessary costs to achieve that purpose. The cost of providing the good would thus include the cost of providing an exclusion mechanism.¹³⁸ Trosow, it is submitted, correctly sums up the position in relation to intangible property when he states that the non-rivalrous nature of information is an intrinsic quality of information but its excludability depends on “various extrinsic factors” such as the legal position relating to such property.¹³⁹

¹³⁵ Moore "A Lockean Theory of Intellectual Property" 69.

¹³⁶ Drahos *A Philosophy of Intellectual Property* 121; Watt *Copyright and Economic Theory* 3-4.

¹³⁷ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1466.

¹³⁸ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 284.

¹³⁹ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 228.

3 5 2 2 Positive externalities and free riding

The non-excludable nature of public goods gives rise to the so-called free-rider problem: non-paying users of the public good. The reason for non-paying users is that a public good creates benefits which others can enjoy, without the ability of the producer of the good to prevent such enjoyment. In economic jargon, this effect of public goods is said to be a consequence of the *positive externalities* they create. Indeed, it is axiomatic that a public good, because of its non-excludable nature, produces positive externalities. This results in market failure because, despite the enjoyment of the good by a large number of people, they have no incentive to pay any amount for such benefit.¹⁴⁰ What makes positive externalities economically significant, causing market failure, is the fact that the producer of the good, who has created the positive externality, is unable to charge a price from all those benefiting from the good which reflects the benefit they derive from the good.¹⁴¹

In terms of simple allocative efficiency, once a public good exists, it is futile to then insist on the exclusion of free-riders; “it is inefficient to expend resources to exclude non-purchasers if the marginal cost¹⁴² of making a given good available to one more person is zero (or less than the cost of exclusion)” because doing so simply reduces consumption of the good.¹⁴³ While the cost of providing the good to an additional person may be zero (or negligible), the cost of exclusion in the case of public goods is not negligible.¹⁴⁴ Although these free riders do not impose a direct

¹⁴⁰ Demsetz H "The Private Production of Public Goods" 1970 *Journal of Law and Economics* 13 (2) 293-293; Mackaay "Economic Incentives in Markets for Information and Innovation" 882-3.

¹⁴¹ Mackaay "Economic Incentives in Markets for Information and Innovation" 881; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 276; Sloman J *Economics* 6ed (2006) 302-3. Economics distinguishes between positive and negative externalities: negative externalities occur where a person's use of his property imposes a cost on others.

¹⁴² The marginal cost is the increase in total cost associated with an extra unit of production. A producer in a competitive market will be willing to sell an additional unit of output as long as the price offered for that unit is at least equal to the marginal costs of producing that unit. (Harrison *Law and Economics in a Nutshell* 10-3)

¹⁴³ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 285. See also Demsetz "The Private Production of Public Goods" 296.

¹⁴⁴ Demsetz "The Private Production of Public Goods" 296.

additional cost on the producer of the public good because of its non-rivalrous character, it is claimed that they have a definite deleterious effect on such producer, who seeks to charge for the good to recover his costs of creation. Once intellectual property has been released to the public, it can generally be copied easily and inexpensively.¹⁴⁵ The fact that informational works such as copyright works are so easy to copy means that it is costly to exclude others from exploiting it, which, in turn, means that it is unlikely that authors will realise sufficient returns on their investment in creating the work.¹⁴⁶ The piracy of musical works is an oft-quoted example of such conduct. Purchasers of a public good (or those who contemplated paying for such good), who contribute to the cost of creation of the good, will soon consider it in their own interest to also not pay for the good and be free riders. Consumers and competitors would prefer to wait for the product to be produced, and then simply free ride.¹⁴⁷ In terms of game-theory analysis, this behaviour of consumers or competitors becomes the dominant strategy as all rational, self-interested individuals will prefer to free ride; "they may receive the benefits of the good whether or not they pay for it."¹⁴⁸

3 5 2 3 Underproduction

The most significant problem faced by producers of public goods is that consumers — enjoying the benefits of positive externalities and the associated non-excludability — will understate their actual price preferences for such goods, which will cause producers to receive skewed signals about the actual demand for such goods, resulting in an insufficient supply of such goods.¹⁴⁹ The technical reason for the

¹⁴⁵ Watt *Copyright and Economic Theory* 5.

¹⁴⁶ Lemley M "Ex Ante versus Ex Post Justifications for Intellectual Property" 2004 *U Chi L Rev* 71 (1) 129 129.

¹⁴⁷ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 298.

¹⁴⁸ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 228. In the technical jargon of game theory and economics, free riding is the Nash equilibrium for economic actors faced with this situation (Hawkins R "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 2004 *Netnomics* 6 (2) 103 114).

¹⁴⁹ Mackaay "Economic Incentives in Markets for Information and Innovation" 882-3; Ng "Copyright's Empire: Why the Law Matters" 353; Palmer "Intellectual Property: A Non-Posnerian Law and

underproduction is that free riding prevents the establishment of a market for that particular good because of the unavailability of information concerning consumer demand: "[a] market is any arrangement that enables buyers and sellers to get information and to do business with each other."¹⁵⁰

On the basis that copyright works are public goods, free-riding behaviour causes the economic value of a copyright work, from the author's perspective, to be eroded because he is unable to sell the work in sufficiently large quantities.¹⁵¹ This problem is only aggravated by the conduct of competitors. The costs of creating copyright works (fixed costs) are generally high when compared to the costs of copying such works. Copies can be made relatively inexpensively once the copyright works are made available to the public, which gives copiers a significant cost advantage over the author. For example, in the case of literary works, the free riding by a rival publisher causes the price of books to be driven down to the rival publisher's costs of production, which would inevitably be lower than the costs of the author because the rival publisher does not have the additional (fixed) costs of creating the work. At this lower price the author will not be able to realise a sufficient return. Naturally, if this happens, the author of the work may not be able to recover the costs of creating the work, and will cease to produce such works.¹⁵²

More importantly, the possible scale of free riding might convince other prospective authors of copyright works not to create copyright works, or not provide them at the socially optimal level because of the concern that they too will not be able to recover their costs. A free market requires that the actual supply and

Economics Approach" 275; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 228.

¹⁵⁰ Parkin *Microeconomics* 44.

¹⁵¹ Hettinger "Justifying Intellectual Property" 34-5.

¹⁵² Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 282 and 294; Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 303-4; Hurt and Schuchman "The Economic Rationale of Copyright" 425; Landes and Posner "An Economic Analysis of Copyright Law" 326.

demand schedules be determinable in order to efficiently allocate resources.¹⁵³ In contrast to public goods, private goods are optimally allocated in society through competitive markets because “producers and consumers of private goods will disclose their preferences for how much a given good they will provide or buy at different levels of prices on the market.”¹⁵⁴ The nature of public goods means that a market — which would ensure the optimal production of such goods — is unable to develop because of free riding, and copyright works are examples of public goods.¹⁵⁵ Thus, in short, it is claimed that the public-good nature of copyright works causes market failure because positive externalities and free riding mean that the authors are unable to charge users prices that reflect the value of the copyright works to users, and which prices would allow authors to recover their costs.¹⁵⁶

The value of intellectual property, such as copyright, to society is considered to generally exceed the costs of its creation. It is because of this perceived social benefit of copyright works that it becomes necessary to address the problem of market failure, which impedes, or deters, their creation.¹⁵⁷ There are various possible solutions to address such alleged market failure in the case of copyright works: contract; state-sponsored creation of such works; patronage; and, legal protection by way of property rights, as in the case of copyright law.¹⁵⁸ The purpose of property rights, and to a lesser extent, contract, is to create exclusionary mechanisms, thus destroying the public nature of copyright works. Exclusion mechanisms can also take the form of technological mechanisms, which have recently been reinforced by laws outlawing circumvention of such technological

¹⁵³ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 228.

¹⁵⁴ 228.

¹⁵⁵ Drahos *A Philosophy of Intellectual Property* 121.

¹⁵⁶ Farnsworth W *The Legal Analyst: A Toolkit for Thinking About the Law* 1ed (2007) 110; Watt *Copyright and Economic Theory* 3; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 275.

¹⁵⁷ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 303.

¹⁵⁸ Farnsworth *The Legal Analyst: A Toolkit for Thinking About the Law* 115; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 276.

mechanisms.¹⁵⁹ As copyright law provides proprietary protection, the economic justification for this solution to the market failure will be the main focus of this chapter. However, before that, the other possible alternatives to proprietary protection will be considered: the use of contractual provisions, the provision of copyright works through public funding, and patronage.

3 5 3 Alternatives to copyright protection

In order to properly evaluate copyright as an institution, it is necessary to consider and appreciate the possible alternatives to copyright protection to address the problem of market failure, even if only briefly. The matter need not be restricted to a question of copyright protection or no protection.¹⁶⁰ As indicated above, we will consider whether the problem of market failure can be addressed through the use of contractual provisions or whether the creation of copyright works can be encouraged and supported by the state, or patronage.

When discussing alternatives to copyright, we are contemplating a legal regime that affords authors none of the special exclusion rights they enjoy under copyright law in respect of their copyright works and which they have made available to others. The persons to whom such copyright works are made available would thus be free to use them as they please, including making copies thereof. Gordon has coined the term “copy-privilege” to describe this state of affairs, and this chapter will use the term in the same way.¹⁶¹ The copy-privilege regime does not mean that authors have no rights in respect of their copyright works.

Apart from contract, which will be discussed below, authors of copyright works can use property law, or the law of delict relating to privacy, unfair competition

¹⁵⁹ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 228. See, for example, s 86 Electronic Communications and Transactions Act 25 of 2002 and ss 3 and 3A Computer Misuse Act 1990 Chapter 18.

¹⁶⁰ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1395.

¹⁶¹ 1397.

(confidential information) or trespass to restrict use of their works.¹⁶² These types of restrictions, together with contractual restrictions, will collectively be referred to as the “common-law restrictions.” More extreme advocates of free access to copyright works do not even consider the common-law restrictions as justifiable and consider them as unnecessary restrictions on access to copyright works.¹⁶³ Although the common-law restrictions may restrict access to copyright works, they are not specifically concerned with preventing copying of such works. The common-law restrictions primarily serve other interests or policies such as personal security or personality interests.¹⁶⁴

3 5 3 1 Contractual restrictions

Given that the difficulties faced by authors of copyright works to prevent free riding and struggling to recoup their costs of production results in market failure, the question is whether authors can use contractual provisions to address these problems. As indicated, in a situation of copy-privilege, apart from the common-law restrictions, authors would not have any special rights to enable them to prevent or restrict copying of their works.¹⁶⁵ In these circumstances, the only direct method of restricting copying is by way of contractual restrictions on others.¹⁶⁶ Use can be made of contractual provisions, such as confidentiality agreements, and property law (which governs the physical article in which the copyright work is embedded) to restrict access to the copyright work.¹⁶⁷

¹⁶² 1405; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 291-2; .The right to privacy is also enshrined in the Bill of Rights (s 14 Constitution of the Republic of South Africa 1996). Also, trespass can also constitute a criminal act (s 1 Trespass Act 6 of 1959).

¹⁶³ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1405-6.

¹⁶⁴ 1412.

¹⁶⁵ 1397.

¹⁶⁶ 1400.

¹⁶⁷ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 291-2.

These techniques can internalise externalities, particularly where the copyright work can be confined to a limited audience, and the fact that such arrangements are private (secret) mean that they could provide protection for periods exceeding those provided for by copyright law.¹⁶⁸ The author of a copyright work (or his publisher) could seek to enter into contractual arrangements with those most likely to exploit the work to the detriment of the author, such as publishers (or competitors). Subject to compliance with the requirements of competition law, publishers may voluntarily agree not to engage in free-riding behaviour and devise mechanisms to ensure compliance. This situation may not seem as far-fetched as it first appears. For a large part of the 19th century the works of British authors were not protected by copyright in the US, yet “both publishers and authors utilized a number of the voluntary and contractual mechanisms for internalization of externalities.”¹⁶⁹ A similar arrange existed in the American fashion industry.¹⁷⁰

As indicated, in the absence of copyright protection, others would be entitled to copy works which are made available to them, so these contractual obligations or similar arrangements seek to prevent copying, which is precisely what copyright law does. According to supporters of the contractual approach, copyright law can therefore be characterised as simply providing “standard terms” which substitute for actual contracts; the terms are the same as the parties would otherwise agree to, as “normal” users simply want access to the work. For example, someone who merely wants to read a book would freely accept terms that impose restrictions similar to those which copyright law currently imposes. Those persons who would not agree to these terms are those who contemplate “abnormal” use such as seeking to copy the work in a manner detrimental to the interests of the author; those persons, therefore, require actual consent from the author, as they would under copyright law.¹⁷¹ Thus, it is argued that contractual arrangements can provide much of the protection afforded by copyright law, and not much would be lost by its abolition.¹⁷²

¹⁶⁸ 292-3.

¹⁶⁹ 287.

¹⁷⁰ 293-4.

¹⁷¹ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1417.

¹⁷² 1418.

Of course, the material difference between the statutory copyright protection and the contractual approach is that the latter requires individual consent before such prohibition is effective. Only those who agreed not to copy the copyright work can be prevented from doing so, whereas copyright protection creates rights against the whole world.¹⁷³ In the absence of such agreement, copy-privilege means that there are no enforceable rights against third parties who copy a copyright work but who have not agreed not to do so.¹⁷⁴ It is due to the fact that copyright goes further than protection via a contractual regime — binding all persons equally, irrespective of how they came into possession of a copyright work — that it is valued.¹⁷⁵

As a result of the fact that contract is based on consensual agreement, it is an unsatisfactory solution to the market failure which supposedly exists in respect of copyright works. The prospect of free riding is a persistent threat as anyone “free of a contractual duty not to copy can make thousands of copies, and all who purchase their access from her would similarly be free of the author's restrictions.”¹⁷⁶ Authors would also be vulnerable to greater exploitation by publishers if they are deprived of the automatic rights which copyright law currently grants them. Possessed with these rights authors have something of economic value with which to negotiate with publishers.¹⁷⁷ Bereft of these rights, publishers could easily exploit authors due to the inequality of bargaining power: authors would not have any leverage to get publishers to agree not to free ride if the copyright work becomes available. This may result in authors receiving prices for their copyright works which are insufficient to recoup their costs. Paying these much-reduced prices are also justifiable from a publisher's perspective because a system of copy-privilege, similarly, leaves the publisher itself vulnerable to free riding by competitors.¹⁷⁸

It therefore appears that relying on contractual provisions in a copy-privilege regime will not yield the desired level of creative activity because authors are unlikely

¹⁷³ 1400.

¹⁷⁴ 1416.

¹⁷⁵ 1419.

¹⁷⁶ 1421.

¹⁷⁷ 1422.

¹⁷⁸ 1419-20.

to realise a sufficient economic return because the market failure is not adequately addressed.¹⁷⁹ Also, the fact that contractual mechanisms encourage secrecy and may provide for periods of protection exceeding those currently provided by copyright law is, arguably, not socially beneficial. After all, the reason why it is considered necessary to address the problem of market failure is because copyright works are considered to be beneficial to society and their production, and dissemination, should be encouraged. Furthermore, the contractual arguments can actually serve to support copyright protection. If it is correct that copyright protection simply corresponds to the “standard terms” that “normal” users of copyright works would agree to, copyright protection may be said to represent a form of social contract, which avoids the transaction costs¹⁸⁰ associated with explicit or implied contracts.

3 5 3 2 Public financing of copyright works

There are generally two standard responses to address the market failure caused by the production of a public good: the legal system can create property rights in relation to such good, which would create an exclusion mechanism, or there could be direct government involvement, either by the government providing such goods itself or encouraging its production through the provision of subsidies.¹⁸¹ It is claimed that government funding received by authors will incentivise them in a similar way the financial rewards they seek to earn under the proprietary system which copyright law creates.¹⁸² The attractiveness of government-sponsored creation of intellectual property is that the product, produced for public, will be

¹⁷⁹ 1422.

¹⁸⁰ Transaction costs are the costs associated with production or exchange, such as negotiating or enforcing transactions, which do not contribute to the value of that which is produced or exchanged (Ward *Introduction to Critical Legal Theory* 124).

¹⁸¹ Farnsworth *The Legal Analyst: A Toolkit for Thinking About the Law* 111-4; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 233.

¹⁸² Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 356.

available for use by all as it will form part of the public domain.¹⁸³ The benefit that the creation will fall in the public domain is, arguably, not as great in the case of copyright works as it would be in the case of technical inventions which are currently protected by patent law. Unlike patent law, copyright does not protect the underlying idea embodied in a work, which does not inhibit new creations to the extent that patent law does. It is probably due to the perceived social benefit of copyright works and innovation that governments already fund a large portion of academic research publications.¹⁸⁴

Some commentators regard public funding of intellectual property to be a more socially optimal system than the current system of intellectual property, and advocate the expansion of the system by which academic research is incentivised to all types of intellectual creation.¹⁸⁵ Public funding (or patronage) can be a particularly useful way of encouraging the creation of “works which require long periods of research or high costs of creation before they reach the publishing stage.”¹⁸⁶ These works will be unlikely to be produced in the absence of such funding, and, if produced, too costly for most consumers.¹⁸⁷ The market cannot be guaranteed to provide sufficient incentive for all types of copyright work. For example, the production of scientific publications or works which are considered as too esoteric for a sufficient market return are examples of works which could benefit from such funding.¹⁸⁸ It is claimed that this system benefits consumers in a more direct way: as the author will no longer have the exclusive rights which he does under copyright, competition among publishers will mean that the works will be more

¹⁸³ 356.

¹⁸⁴ Hettinger "Justifying Intellectual Property" 49.

¹⁸⁵ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 357.

¹⁸⁶ Hurt and Schuchman "The Economic Rationale of Copyright" 426.

¹⁸⁷ 426.

¹⁸⁸ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 306-7; Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 352-3.

widely disseminated and priced at their marginal cost of production.¹⁸⁹ In contrast with the position under the current copyright regime, this enables large numbers of consumers with lower incomes to have greater access to copyright works.

Although such government support will necessarily be funded from tax revenues and may result in increased taxation, supporters of publicly funded incentives argue that it is more efficient than the copyright system. It is claimed that the benefit of the lower prices paid by consumers will more than offset the additional taxes paid.¹⁹⁰ Accordingly, such a system of publicly-funded subsidies, grants or prizes may be considered a more equitable way to distribute the social costs of, and benefits associated with, the production and dissemination of copyright works.¹⁹¹ Despite the apparent benefits of such a system — providing the necessary incentives to authors and the cost savings experienced by consumers — a system of government support is not considered to be desirable.

Critics of the public-funding option to address the problem of the public-good nature of intellectual property point out that such a system would be impractical; the determination of the appropriate rewards for authors will be difficult to calculate and it will affect creative independence.¹⁹² Informational deficiencies have tended to be a particularly troublesome aspect of any centrally-planned economic activity, and, thus, determining consumer demand will prove to be difficult.¹⁹³ The costs of administering such a government-financed system may not represent good value for citizens. It will require the establishment of a bureaucratic system to determine

¹⁸⁹ Posner "Intellectual Property: The Law and Economics Approach" 58-9.

¹⁹⁰ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 337.

¹⁹¹ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 287; Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 336-7.

¹⁹² Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 356.

¹⁹³ 356-7.

acceptable projects and the appropriate amounts to incentivise authors.¹⁹⁴ On the plus side, given the fact that the creations in a publicly-funded system will form part of the public domain, “the reward regime would save on the legal, private, and social enforcement costs involved in protecting property rights from theft, infringement, or copying by others.”¹⁹⁵ But even a critic of copyright protection like Breyer considers it unlikely that a practical administrative system can be established which is more efficient than copyright protection.¹⁹⁶

The determination of appropriate rewards for authors — even if such remuneration is based on the volume of use and utility, as seems sensible — is a particularly thorny issue. Calandrillo, a supporter of public financing of intellectual property, acknowledges that this issue is the Achilles heel of any such proposed system.¹⁹⁷ For John Stuart Mill an administered system of remuneration will necessarily involve human decision making, introducing discretionary action which can result in arbitrary action and inadequate compensation for authors. Mill considered this problem as sufficiently serious to reject public financing in favour of a proprietary system.¹⁹⁸ A further complication of public funding that needs to be addressed are issues that involve cross-border elements: should funding be confined to copyright works produced by citizens or will foreigners who produce copyright works used domestically also be entitled to rewards; and, what about works produced by a citizen but of most value to foreigners?¹⁹⁹

¹⁹⁴ Posner "Intellectual Property: The Law and Economics Approach" 58-9.

¹⁹⁵ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 341-2.

¹⁹⁶ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 307.

¹⁹⁷ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 340.

¹⁹⁸ 346.

¹⁹⁹ 353-4.

Government financing also has the following non-economic problems: whether there will be the political will to provide the necessary funding for all forms of books, and whether there is a risk of greater censorship. While government-funded academic research has been considered to be substantially free from government interference, there is a considerable concern about the politicisation of such a system.²⁰⁰ The reason government interference may not have presented a problem in relation to academic works might be because governments generally prefer the production of utilitarian works, and a substantial portion of academic literature, such as scientific literature, is of a utilitarian nature. Public financing may therefore result in the skewed production of works to the prejudice of "pure" literature. By protecting all types of literary (and other creative) works, copyright avoids the use of value judgements, and lets the market determine the merits or monetary value of a work.²⁰¹ Furthermore, if authors are dependent on government funding, it will compromise their literary independence, and it could be a shortcut to censorship.²⁰² This makes government financing a less than suitable alternative to copyright protection.²⁰³

3 5 3 3 Patronage

As already mentioned, patronage may be a useful way of ensuring the production of works involving large investments of time and resources. Historically, patronage was an important mechanism which led to the production of great works, prior to the existence of copyright protection. Patronage does not necessarily compromise artistic integrity: if the author considers the assignment to be distasteful, he could decline the assignment or charge an amount which compensates him for any

²⁰⁰ Hettinger "Justifying Intellectual Property" 49; Posner "Intellectual Property: The Law and Economics Approach" 58-9.

²⁰¹ Reichman "Charting the Collapse of the Patent-Copyright Dichotomy: Premises for a Restructured International Intellectual Property System" 493.

²⁰² Tyerman "The Economic Rationale for Copyright Protection for Published Books: A Reply to Professor Breyer" 23.

²⁰³ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 308.

displeasure caused by carrying out the assignment.²⁰⁴ However, patronage was vehemently opposed as an alternative to copyright during the parliamentary debates concerning the Copyright Bill in 1841, while recognising the negative tax-like effects of a “monopoly” granted by copyright.²⁰⁵

Patronage has a similar pernicious quality to public funding as it could skew the types of works produced, depriving authors of their creative independence. It is also not a guarantee that the products of patronage will be disseminated to the same extent as under a copyright regime, and at similar (or cheaper) prices.²⁰⁶ More importantly, a system of patronage can hardly be said to encourage widespread authorship. It may favour established authors whereas new authors may be left without adequate reward for their works, which could have a chilling effect on the pursuit of creative endeavours. In comparison to copyright protection, patronage will extend to far fewer persons, which makes it more exclusionary in nature.

3 5 4 Economic justifications for copyright

The principal economic justification for copyright protection is to provide authors with the necessary incentives to create works. It is claimed that incentives are necessary because in the absence of copyright protection authors will not create copyright works (or create them in insufficient numbers) due to the public-good nature of such works. The reason for authors’ unwillingness to create such works is the ease with which others are able to benefit from the efforts of authors, at the expense of authors. Protection, through the provision of property rights, is thus required to rectify this market failure because these works are considered to be socially beneficial and, therefore, their production should be encouraged.²⁰⁷ The literature on

²⁰⁴ Plant "The Economic Aspects of Copyright in Books" 170.

²⁰⁵ 170-1.

²⁰⁶ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1411-2.

²⁰⁷ The property right is often described as a “monopoly right”, which, as will be discussed below, is incorrect. An alternate description for the property right might be “exclusive rights.”

the economic analysis of copyright law contains various forms of this argument.²⁰⁸ For example, some commentators start by indicating that the nature of copyright works means that the market cannot efficiently allocate resources, which results in market failure that needs to be addressed.²⁰⁹ However, the essence of the argument is as summarised here, and will be expanded below. It is an *ex ante* justification: it is forward looking in that it seeks to influence future conduct, by granting legal rights on the basis that an individual engages in the desired creative activities.²¹⁰

A second economic justification approaches the problem of market failure from the opposite perspective: it focuses on the strategic behaviour of consumers and competitors in a free market, rather than providing incentives to authors of works *per se*, and the mutually destructive, free-riding behaviour that would ensue in the absence of copyright protection.²¹¹ Again, it is claimed that new works will not be created because of the ease with which others, particularly competitors, can benefit from free riding off such investment by others. This pattern of behaviour is said to conform, analytically, to the well-known prisoner's dilemma game analysed in game theory. As we have seen, the public-good quality of copyright works means that a likely response for consumers and competitors is to wait for the good to be produced and then to free ride.²¹² Copyright protection is thus a mechanism which can prevent such socially unproductive, parasitic behaviour. This type of strategic behaviour occurs in a wide variety of everyday circumstances, and is described in common

²⁰⁸ Boldrin and Levine *Against Intellectual Monopoly* 135-6; Drahos *A Philosophy of Intellectual Property* 6; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 21-2; Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1345; Hurt and Schuchman "The Economic Rationale of Copyright" 425 ; Landes and Posner "An Economic Analysis of Copyright Law" 346; Lunney "Reexamining Copyright's Incentive-Access Paradigm" 492-3; Watt *Copyright and Economic Theory* 124-5 and 129-30.

²⁰⁹ Watt *Copyright and Economic Theory* 124-5.

²¹⁰ Lemley "Ex Ante versus Ex Post Justifications for Intellectual Property" 129.

²¹¹ Gordon W "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 1992 *U Dayton LRev* 17 853 859-60.

²¹² Mackaay "Economic Incentives in Markets for Information and Innovation" 882-3; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 275.

parlance by expressions such as “loafing on the job, shirking, cheating, free riding, or moral hazard in insurance contexts.”²¹³

We will now consider these economic justifications in more detail. The first economic justification, the traditional or standard economic justification, for copyright protection will be considered in detail.

3 5 4 1 Proprietary incentives

As discussed above, the claimed public-good nature of copyright works, and their positive externalities, encourages free-riding behaviour by consumers (and competitors) causing them to understate their actual price preferences for such goods. This leads to producers of such goods to abandon, or not commence, production because the prices received, and the quantity sold, will result in an inadequate return on their investment. The resulting market failure leads to a decrease in social welfare because copyright works are not produced at the socially desired levels. It is thus necessary to incentivise authors to create such works by eliminating such free-riding conduct, and enabling them to realise a sufficient return on their investments.²¹⁴

Of course, it is true that copyright works such as literary and artistic works have been created through the ages, even before the introduction of copyright protection. Indeed, some of the most well-known and influential creations, such as Homer’s *Iliad*, and Leonardo Da Vinci’s *Vitruvian Man*, were created without the incentives provided by copyright law. It is still the case that creative works, like those of Franz Kafka, may be created without any intention of publication, or for non-commercial motives, such as pleasure, ideological reasons or establishing one’s reputation. The authors of the latter types of work would also generally not object to the free and widespread dissemination of their works under a system of copy-

²¹³ Mackaay "Economic Incentives in Markets for Information and Innovation" 882-3.

²¹⁴ 882-3; Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 275; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 228; Watt *Copyright and Economic Theory* 3.

privilege.²¹⁵ However, other copyright works will simply not be created if there is no reasonable prospect of an adequate return on the amount of the investment made in creating such works. This will particularly be the case where there are significant costs in creating such works, or where they are created to generate an income for their creators, such as “encyclopedias, almanacs, mass circulation periodicals, technical subscription services for professions (such as citators and digests for lawyers), and motion pictures.”²¹⁶ Computer programs would, arguably, also fall into this category of copyright works which are costly to develop, and from which their authors seek to realise an adequate economic return.

In order to address an incidence of market failure, the proposed course of action must provide a practicable solution to the problem. If the purpose of the proposed mechanism is to provide authors with the necessary incentives by ensuring that they have an adequate opportunity to earn an adequate financial return, it must not be capable of being subverted through the actions of consumers or competitors. The relevant course of action will also not achieve its purpose of establishing a market if it too causes market failure by, for example, introducing other externalities or high transaction costs. For example, a system of compulsory licensing is considered inappropriate because of its high administrative costs. A system of compulsory licensing would fail to establish a market because of the, necessarily large, accompanying bureaucracy and potentially high, and costly, incidence of disputes concerning the appropriate levels of remuneration for authors, which would also discourage potential authors.²¹⁷ This problem is similar to that which would exist in a publicly-funded system, discussed above.

The recognition of property rights is a well-known mechanism to address problems of inefficiency which arise in relation to the utilisation of common resources

²¹⁵ Moore "A Lockean Theory of Intellectual Property" 96.

²¹⁶ Hurt and Schuchman "The Economic Rationale of Copyright" 425-6. Critics like Plant suggest that books which are socially desirable and costly to produce – which are exceptional cases - should be subsidised by the state rather serve as the paradigmatic cases justifying copyright protection for *all* books (Plant "The Economic Aspects of Copyright in Books" 193).

²¹⁷ Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 859.

or to address other problems of externalities.²¹⁸ An oft-cited example of the former problem is the so-called “tragedy of the commons” or “problem of the commons” which provides an account of the overgrazing which results if a village’s common green is available for all owners of livestock. Because each individual livestock owner only considers his own interests, without considering the overall effects of his conduct, overgrazing affects all livestock owners.²¹⁹ The award of property rights (in land) is considered the optimal manner to address the inefficiency arising from externalities because it forces the property owner to consider the implications and costs of all his actions, which serves to align private interests and social interests.²²⁰

The rational choice paradigm, which is central in microeconomics, considers it to be more efficient to rely on the recognition of property rights and the self-interested behaviour of individuals when allocating scarce resources rather than appealing to ideological or moral notions. This decentralised system based on property rights is considered to be superior to a publicly-funded system of providing copyright works.²²¹ The conviction with which some proponents of private property assert that it, in combination with self-interested conduct, best serves the common weal has been described as being something akin to “religious faith.”²²² This conviction has resulted in an ever-expanding concept of what can be considered to be “property,” with some asserting that “any right which a person may agree not to insist on (whether personal, familial or political) should be styled a ‘property’ right, because the right-holder has control over the effects of the exercise of the right on others (its ‘externalities’).”²²³

Commentators like Michael Novak argue that property rights are generally a good thing and the same principles should be applicable in the case of ideas.²²⁴

²¹⁸ Parkin *Microeconomics* 378 and 400.

²¹⁹ Lemley "Ex Ante versus Ex Post Justifications for Intellectual Property" 141; Ng "Copyright's Empire: Why the Law Matters" 346.

²²⁰ Parkin *Microeconomics* 378.

²²¹ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 276.

²²² Drahos *A Philosophy of Intellectual Property* 119.

²²³ Harris J *Legal Philosophies* 2ed (2000) 46.

²²⁴ Boldrin and Levine *Against Intellectual Monopoly* 123.

Similarly, some overly-zealous proponents of property even claim that the unrestricted use of information, which is what would be the prevailing norm in the case of copy-privilege, will lead to a tragedy of the commons: the overuse of information contained in information goods such as copyright works. It is thus considered necessary to erect “fences” to prevent such overuse.²²⁵ However, this analogy with the problem-of-the-commons scenario is inappropriate as the nature of intellectual property, as discussed, is non-rivalrous, unlike tangible property. While the tragedy of the commons does address the problem of externalities, it is concerned with the overuse of a finite, rivalrous, depleting common (natural) resource. On the contrary, the use of information does not decrease it or reduce its benefits: “copying information actually multiplies the available resources, not only by making a new physical copy but by spreading the idea and therefore permitting others to use and enjoy it.”²²⁶ The real issue that copyright law seeks to address is not the preservation of a resource (information), but seeking to ensure its *production* at a socially optimal level, and an incentive to exploit it.²²⁷ It is the consumption of existing goods that creates the problem of the commons whereas the free-rider problem discourages the creation of new goods.²²⁸

It is possible to make a cogent theoretical case for the protection of intellectual property such as copyright works without resorting to rhetoric based on tangible property. While it is useful to reference the effect of property rights in addressing problems associated with tangible objects, and to draw analogies with tangible property to illustrate propositions, it is important to always bear in mind the differences in nature between intangible copyright works and tangible property. The motivations for awarding property rights in tangible objects are not necessarily applicable in their entirety to intellectual property.

²²⁵ Mackaay "Economic Incentives in Markets for Information and Innovation" 882-3; Ng "Copyright's Empire: Why the Law Matters" 346.

²²⁶ Lemley "Ex Ante versus Ex Post Justifications for Intellectual Property" 143; Boldrin and Levine *Against Intellectual Monopoly* 177.

²²⁷ McJohn S "The Paradoxes of Free Software" 2000 *Geo Mason L Rev* 9 25 39-40.

²²⁸ Farnsworth *The Legal Analyst: A Toolkit for Thinking About the Law* 106-7 and 110.

3 5 4 1 1 Private property

Economically, the institution of private property is an instrument to address issues of resource allocation and use. It, like any other social institution, exists to make coordination of social and economic activities more efficient.²²⁹ Without the institution of property, individuals' lack of security would severely restrict social interaction. Insecurity and uncertainty would require individuals to dedicate large amounts of resources to seek bi-lateral undertakings to protect their interests. The resources dedicated to seeking such security are wasted if they could be employed more productively. Furthermore, the imperative of having to seek bi-lateral undertakings is not scalable and would have a debilitating effect on any society that extended beyond kith and kin.²³⁰ The extent of valued interests in such a society would remain very modest — confined almost exclusively to the emotional and psychological — and individuals would forego any, but the most essential, social interaction in the absence of private property. For this reason Parkin considers property rights to be so critical to human progress that he suggests that without it “we would still be hunting and gathering like our Stone Age ancestors.”²³¹

The creation and recognition of property rights is considered by many to be the most effective device by which scarce resources are optimally utilised. It is claimed that the importance and benefits of individual control was already recognised under Roman law, which consequently developed the concept of “*dominium*, or exclusive control over tangible objects.”²³² Property rights provide people with the necessary security that their creations will not be appropriated by others. They prevent the arbitrary deprivation of property, and “provides incentives to produce, accumulate, and trade.”²³³ It obviates the need to devote resources to

²²⁹ Efficiency is not the only explanation for the existence of social institutions such as property. Power relations also play an important role in the creation, and help determine whose efficiency and benefit will be prioritized — society's or those of politically powerful individuals (May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 19).

²³⁰ 18.

²³¹ Parkin *Microeconomics* 44.

²³² Hurt and Schuchman "The Economic Rationale of Copyright" 422.

²³³ Boldrin and Levine *Against Intellectual Monopoly* 123.

protecting the products of one's labours, which resources could be employed more productively.²³⁴

Property rights create the necessary incentives for people "to specialise and produce the goods in which they have a comparative advantage."²³⁵ By defining and protecting entitlements, the owner of such rights obtains the necessary security which allows him to value his interest and trade it for other entitlements. By improving or producing property, an individual can exchange his rights for that which he requires or sell it for profit.²³⁶ Property rights therefore allow individuals to appropriate value, which provides powerful incentives for investing in such protected subject matter.²³⁷

Property rights, like other institutions, attempt to provide structures through which we can predict the behaviour of others, particularly in societies which extend beyond persons with whom we have a personal or familial connection.²³⁸ Property law thus reduces costs by providing the basis for "patterned behaviour which can be easily understood and followed," and which is enforced by the state.²³⁹

3 5 4 1 2 Externalities

As we have already seen what makes copyright works interesting are the positive externalities, and the problem of free riding. If a good produces positive externalities, a non-altruistic creator will only be motivated to increase its production if he can capture — internalise — a sufficient part of those benefits. His willingness to create the good will be dependent on the expected return on his investment in

²³⁴ Parkin *Microeconomics* 44. See also Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1435.

²³⁵ Parkin *Microeconomics* 44.

²³⁶ Boldrin and Levine *Against Intellectual Monopoly* 123.

²³⁷ Drahos *A Philosophy of Intellectual Property* 125-6.

²³⁸ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 18.

²³⁹ 18.

creating the good.²⁴⁰ Private property is considered to be the best way in which the costs and benefits of externalities can be internalised; it internalises the costs and benefits of human behaviour by attributing it to the owner of the source.²⁴¹ The success with which property rights serve to internalise externalities in relation to tangible property is generally recognised. We have already seen its use to avoid the problem of the commons. Property rights can reduce the inefficiencies caused by externalities and correct market failure.²⁴²

It is claimed that the property rights afforded by copyright law are similarly capable of internalising costs and benefits in relation to copyright works. An author, like a farmer, will not toil if others can simply reap the benefits, while he does not receive a sufficient financial return.²⁴³ This problem is particularly relevant in relation to almost all copyright works because it is easy and cheap to copy such works, while attempting to exclude others would involve expending substantial resources.²⁴⁴ Copyright law creates an artificial mechanism by which intangible copyright works become excludable, enabling a market to develop.²⁴⁵

By giving authors a property right (or exclusive rights) in their creations, copyright is able to address the underproduction of copyright works.²⁴⁶ The exclusive rights which copyright provides an author gives the author an artificial lead time to establish a market for his product, which should allow him sufficient time to earn an adequate return on his investment.²⁴⁷ Also, during such period of exclusivity, copyright protection serves to “increase the cost of copying, raise the

²⁴⁰ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1387.

²⁴¹ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 18.

²⁴² Parkin *Microeconomics* 378; Sloman *Economics* 312.

²⁴³ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1389.

²⁴⁴ Sterk "Rhetoric and Reality in Copyright Law" 1207.

²⁴⁵ Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 228.

²⁴⁶ Sterk "Rhetoric and Reality in Copyright Law" 1204.

²⁴⁷ Reichman "Charting the Collapse of the Patent-Copyright Dichotomy: Premises for a Restructured International Intellectual Property System" 493.

return on creative authorship, and, at the margin, encourage more people to create.”²⁴⁸ The rights which copyright create forces third parties to bargain with authors for the right to use their creations. Through such bargaining consumers (and publishers) reveal their true price preferences, which allows authors to internalise some of the social benefits created by their works and correct some of the market inefficiencies.²⁴⁹ Also, despite these restrictions, it is claimed that copyright leaves enough room for creativity. There is sufficient nonprotectable matter aside from the protected expression to encourage others to create their own copyright works. This is a claim that will specifically be analysed when considering the protection of computer programs.²⁵⁰ Thus, in this way copyright law enhances the general welfare because it encourages the creation of copyright works which would not be created without such protection.²⁵¹ It does this because it facilitates the creation of a market through which authorship is rewarded and incentivised.²⁵²

But for something to constitute property in any meaningful sense and for a market to develop, it is not sufficient that others are prevented from appropriating or using someone else’s creation; it has to have value and have the character of being transferable. By preventing unauthorised exploitation of copyright works, copyright law preserves the economic value of a copyright work, which would otherwise be eroded due to its public-good character. This creates the exchange-value of a copyright work, which copyright law then allows to be commoditised and tradable by providing for the transfer — assignment — of the rights afforded. As with tangible property, this ensures that copyright can be transferred to someone that values it higher, which is a socially more efficient (wealth maximising) result. In this way,

²⁴⁸ Sterk "Rhetoric and Reality in Copyright Law" 1207.

²⁴⁹ Ng "Copyright's Empire: Why the Law Matters" 346 and 354.

²⁵⁰ Reichman "Charting the Collapse of the Patent-Copyright Dichotomy: Premises for a Restructured International Intellectual Property System" 494.

²⁵¹ Hurt and Schuchman "The Economic Rationale of Copyright" 425.

²⁵² Ng "Copyright's Empire: Why the Law Matters" 357.

copyright law establishes a proprietary right, analogous to other forms of private property, which makes it tradable and allows a market to develop.²⁵³

While it is the case that copyright restricts individual liberty which would otherwise be enjoyed under copy-privilege, it is suggested that, morally, this is no different to the restrictions imposed by property rights in respect of tangible objects.²⁵⁴ Copyright is simply an appropriation mechanism to encourage the creation of copyright works. Whereas appropriation of tangible property can be justified to address problems of scarcity of resources, and the quest for its optimal utilisation, no such issue arises with intangible creations. Rather, the concern which copyright seeks to address is how to best incentivise creative efforts.²⁵⁵ As we have seen in the previous chapter, the primary purpose of copyright cannot be to reward, nor is it to enrich, authors.²⁵⁶

In fact, some would go a step further and argue that the aim of copyright is not only to produce the optimal amount of copyright works, it also aims to ensure that the works are of the highest quality. This argument considers economic activity to take place at three, progressive levels: consumption, production and innovation. By restricting competition (or granting property rights) at one level, it encourages economic activity at the next level. Accordingly, "ownership of goods may be described as a restriction on competition at the level of consumption in favour of competition at the level of production, and intellectual and industrial property may be viewed as a restriction on competition at the level of production in favour of competition at the level of innovation."²⁵⁷ It is this dual purpose of intellectual property that explains the difference between the property right afforded by copyright

²⁵³ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1437; Trosow "The Illusive Search for Justificatory Theories: Copyright, Commodification and Capital" 228; Watt *Copyright and Economic Theory* 16.

²⁵⁴ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1422 and 1425.

²⁵⁵ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 28.

²⁵⁶ McJohn "The Paradoxes of Free Software" 42.

²⁵⁷ Spector "An Outline of a Theory Justifying Intellectual and Industrial Property Rights" 272.

and the property rights in tangible property; the property right afforded by copyright is of limited duration. The protection afforded at the level of production is intended to be just sufficient to encourage the desired level of innovation. Perpetual protection would inhibit innovation, rather than stimulating it.²⁵⁸

It is now generally accepted by economists that legal regulation in the form of copyright law overcomes the problems produced by the public-good nature of copyright works, and incentivises authors (and others) to dedicate resources to their creation.²⁵⁹ However, copyright protection is not a costless institution, and therefore its claimed benefits should be weighed up against the costs it imposes on society in order to determine whether it is socially beneficial. As stated above, unlike tangible property, the marginal cost of making a copyright work available to one more person is negligible (if not zero). It would, arguably, not be justifiable, from a social welfare perspective, to prevent the copying of copyright works — given the fact that they can be enjoyed by others at no (or negligible) cost — if it does not efficiently address the market failure faced by authors. But, as discussed, it is alleged that copying would be socially detrimental at a social level because it discourages the investment of resources in the production of copyright works. In other words, the costs of the proposed solution, which, *inter alia*, includes the prohibition of unrestricted use of copyright works, should not outweigh the benefits, particularly if it does not facilitate the emergence of a market and provide authors with the necessary incentives.²⁶⁰

The real issue is, therefore, whether copyright protection *is* socially efficient. Does it provide the ideal mechanism, not only for the production, but also, the dissemination of copyright works?²⁶¹ In the context of computer programs, this work will therefore consider what it is that copyright protects, and whether it strikes an appropriate balance between encouraging investment in production and promoting social welfare. Does copyright law leave sufficient room for development?

²⁵⁸ 272.

²⁵⁹ Reichman "Charting the Collapse of the Patent-Copyright Dichotomy: Premises for a Restructured International Intellectual Property System" 485-6.

²⁶⁰ Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 857-8.

²⁶¹ Watt *Copyright and Economic Theory* 1.

3 5 4 2 Prisoner's dilemma

As already mentioned, the second economic justification for copyright focuses on the harmful conduct of consumers and competitors in a free market in the absence of copyright protection, rather than directly focusing on the incentives for authors to create copyright works. Like the previous economic justification, it too concludes that the strategic behaviour of consumers and competitors result in underproduction of copyright works. Again, because of the recognised social benefits of copyright works, it is considered necessary to address such harmful behaviour to ensure the creation of copyright works. The two approaches could rightly be considered to merely be opposite side of the same coin: underproduction. However, there is still merit in considering the problem of underproduction from another perspective: it may provide greater insights into the nature of the problem, and it may provide an additional reason for such underproduction.²⁶² We will principally be concerned with the free-riding behaviour of commercial rivals in this case, and, for convenience, will use the publishing industry to illustrate the issues. As will be demonstrated, the lack of production is not simply because of the potential free-riding behaviour of others, it is because there is a rational strategy of free riding by *all* individuals.

Game theory analyses the strategic behaviour of individuals in society when trying to determine what would be their most advantageous course of action, knowing that other individuals are engaging in the same strategic behaviour. It can suggest a pattern of behaviour when individuals are constrained by, or face, specific rules (or in the absence of rule), which pattern of behaviour can be used to assess the efficacy or social desirability of such constraints.²⁶³ The earliest forms of copyright protection, which only protected a work in its primary market (and not derivative works), is said to have been based on the prisoner's dilemma model.²⁶⁴

²⁶² Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 868.

²⁶³ Farnsworth *The Legal Analyst: A Toolkit for Thinking About the Law* 100-1; Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 860.

²⁶⁴ The prisoner's dilemma concerns a hypothesised situation in which two suspects are questioned by the police about their involvement in a serious crime. These suspects are questioned separately, and are unable to communicate with each other. If both suspects refuse to cooperate (namely, confess to their involvement in the crime), the police will be unable to prove the most serious charges

Creative adaptations of a copyright work were not protected. Current copyright protection, which provides authors much wider protection than in their primary markets, is no longer comprehensively explained in terms of a prisoner's dilemma model.²⁶⁵

The problem of strategic behaviour is particularly apparent in the case of technical innovations, and it is argued that this is the primary reason for patent protection. For an individual innovator, as with any economic agent (a firm, or a country), seeking to increase its technology, it may be more efficient to simply copy the technology of another economic agent. By so copying the work of another economic agent, it avoids having to invest in costly research and development. This type of parasitic behaviour is, however, a rational course of action: not only can it be said to avoid unnecessary and inefficient duplication of effort, there is no guarantee that such investment will yield the desired result. If such investment does result in an innovation, other economic agents will simply copy it, given the fact that they are engaging in similar strategic behaviour. However, such a strategy, repeatedly playing itself out in society, will have a chilling effect on innovation if it is not addressed.²⁶⁶

In the case of copyright works, in general, the ease with which copies of such works can be produced creates a similar threat of strategic behaviour on the part of publishers if there is no copyright protection. For example, in the case of literary works, the first publisher of a work will necessarily incur (fixed) costs such as the payment of royalty fees to the author, editing, typographical layout and design, and marketing the work, which can be avoided by a subsequent publisher of such work.

and both will receive relatively minor punishments. The proposition that is put to each suspect is that if he cooperates, while the other suspect refuses to cooperate, he will go free but the other suspect will receive the maximum punishment on the most serious charges. If both cooperate, they will receive stiffer sentences than if both refused to cooperate but less than the maximum punishment. The dilemma a prisoner faces is that, personally, the most advantageous strategy is always to cooperate with the police, irrespective of what his co-accused does. Yet, both suspects, as a collective, would be better off if neither of them cooperated.

²⁶⁵ Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 865-6.

²⁶⁶ Watt *Copyright and Economic Theory* 9.

Significantly, the first publisher assumes the business risk of determining the commercial success of the work. Only once it is established that a work is a success would a free rider seek to profit by producing the work, which can be at a lower price than that charged by the original publisher because it avoids the associated fixed costs.²⁶⁷ If publishers are reluctant to produce copyright works, authors will suffer as a result of the reduced royalty fees they can earn and be discouraged from engaging in creative endeavours.

These situations in which creators (and innovators) face the prospect of such parasitic, competitive conduct are said to “generally conform to the dynamics of the prisoner's dilemma game.”²⁶⁸ The prisoner's dilemma describes situations in which the returns (“payoffs”) a rational individual will receive causes such an individual to make choices which leads to the participants, as a whole, being made worse off. As a group, it would be in their interests to cooperate but such cooperation is, for some reason, made difficult or is unlikely to occur. In the economic context this is considered to lead to wasteful or inefficient behaviour.²⁶⁹ Cooperation in relation to copyright works means that parties choose to create their own works, while engaging in free-riding behaviour equates to the rational, but socially harmful, conduct. In the parlance of game theory analysis, this latter position is referred to as “defection” — cheating.²⁷⁰

Competitors faced with a choice of whether to create their own copyright works (i.e. to cooperate and incur the associated costs) or to appropriate another's creation, engaging in low-cost copying and undercut the creator (on the assumption that the competitor had created the work and copying is permissible), will each defect and not invest in the creation of copyright works because of the prospect of

²⁶⁷ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 303; Hurt and Schuchman "The Economic Rationale of Copyright" 427.

²⁶⁸ Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 860; Mackaay "Economic Incentives in Markets for Information and Innovation" 882.

²⁶⁹ Farnsworth *The Legal Analyst: A Toolkit for Thinking About the Law* 100-1.

²⁷⁰ Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 863.

financial failure as a result of free riding by their competitors.²⁷¹ In this way, free riding behaviour — defection — becomes the dominant strategy, with the socially harmful consequence that not enough copyright works will be produced. Thus, it is claimed that, in the absence of copyright protection, the free-riding behaviour of competitors conforms to a multiple player version of the prisoner's dilemma.²⁷²

When situations exhibit the characteristics of the prisoner's dilemma game, the proposed solution is often legal intervention. In the case of copyright, it is considered necessary to counteract the "powerful incentives not to create."²⁷³ Legal regulation is considered to be the best mechanism to harness the gains from cooperation, which can be achieved by adjusting the payoffs which participants will receive. As indicated, a prisoner's dilemma arises because parties do not cooperate due to some impediment; it may be because they are unable to communicate, or that the other mechanisms usually employed to ensure mutual compliance, such as contract law, are not practicable in the circumstances. In the case of copyright works, mutual trust and cooperation could be achieved through contract: each party could agree not to copy the copyright works of another and undertake to pay penalties (royalties) in the event of a breach. However, the number of participants (and the threat posed by new competitors) makes such an option too costly and ineffective. This is another reason why the contractual approach, previously discussed, is unsuitable. Thus, legal regulation is able to "substitute for trust in situations too complex or dispersed for trust to arise."²⁷⁴

However, not every occurrence of a prisoner's dilemma situation requires legal regulation. In the case of copyright protection, some commentators suggest that it "is neither a necessary nor a sufficient basis for copyright protection."²⁷⁵ The public interest and normative concerns such as protecting free speech may outweigh the commercial interests of individuals and the perceived social benefit of more

²⁷¹ 866.

²⁷² Mackaay "Economic Incentives in Markets for Information and Innovation" 882.

²⁷³ Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 860.

²⁷⁴ Farnsworth *The Legal Analyst: A Toolkit for Thinking About the Law* 103.

²⁷⁵ Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 867.

copyright works.²⁷⁶ Also, new evidence suggests that there may be differences in responses when confronted with the same payoffs due to variations in individual personalities. Furthermore, in strategic situations which occur repeatedly, there may be cooperation without it being necessary to adjust the payoffs through legal regulation. Competitors in repeat games are likely to cooperate because of the threat of a tit-for-tat response: if you decide to be a copyist, your competitors will retaliate by copying any works you produce.²⁷⁷

3 5 5 Costs of copyright protection

As discussed, the economic argument suggests that if authors are not given legal protection in respect of their copyright works there is a problem of market failure; the free-riding behaviour of others will result in the underproduction of copyright works. However, any assertion that the grant of property rights to address such market failure is efficient must take into account the costs of such a measure. Accordingly, we will try to identify some of the costs associated with copyright protection. Although there is no empirical data available to quantify these costs (and the claimed benefits at this stage), it is still worthwhile identifying these costs in order to fully appreciate its impact. Furthermore, when resources and technologies become available in the future these elements can be quantified to verify whether the current policy of providing copyright protection is indeed socially beneficial. It is suggested, that this should be the real focus of research in relation to intellectual property rights.²⁷⁸

Some commentators are critical of copyright protection, claiming that it “is extremely costly” because, as we have already have seen, the public-good nature of copyright works means that they can be enjoyed by others without diminution of enjoyment, at no (or negligible) extra cost.²⁷⁹ Given that such further use does not

²⁷⁶ 867.

²⁷⁷ Farnsworth *The Legal Analyst: A Toolkit for Thinking About the Law* 101; Gordon "Asymmetric Market Failure and Prisoner's Dilemma in Intellectual Property" 867-8.

²⁷⁸ Boldrin and Levine *Against Intellectual Monopoly* 130.

²⁷⁹ Hettinger "Justifying Intellectual Property" 35.

cost anything, those who advocate restrictions on such use by way of property protection are said to have the burden of justification. Whereas property rights in physical property are required to ensure that the owner's ability to use his property is not disturbed, no justification is necessary in the case of copyright works.²⁸⁰ The latter fact is considered to render it "highly unlikely that any mechanism providing absolute protection would ever be socially optimal."²⁸¹ That is why copyright protection is of limited duration; arguably, it seeks to minimise the social cost of preventing unfettered access to copyright works.²⁸²

Copyright protection not only allows authors the possibility of earning greater, incentive-providing remuneration on their creations, it, ironically, increases the costs of creating copyright works. Depending on the scope of copyright protection, it may prevent use of certain elements contained in previous copyright works from being reused in subsequent creations. Authors may be required to expend resources to ensure that they avoid infringing other copyright works, or seek the necessary permissions to use the prohibited elements.²⁸³ Critics claim that the creation of similar, non-infringing copyright works is wasteful from a social perspective because the resources dedicated to the creation of such redundant works could be more beneficially used by improving the quality of existing copyright works.²⁸⁴ In other words, subsequent authors should not be concerned about whether they are infringing copyright but simply focus their efforts on improving existing works. However, copyright law, arguably, minimises these costs or the possibility of other copyright owners withholding permission for the use of their work. Copyright does not protect ideas or commonplace facts, so it leaves enough room for creativity. It is arguable that the creation of similar competitive works, which copyright law permits (rather than parasitic copying), has been responsible for the rate of innovation we have witnessed over the past 40 years, which may have offset any social costs

²⁸⁰ 35.

²⁸¹ Watt *Copyright and Economic Theory* 4.

²⁸² However, over time the period of protection has expanded. The last extension of the term of copyright protection from 70 to 90 years in the US pursuant to the US Copyright Term Extension Act 1998 has been severely criticised as serving no social benefit.

²⁸³ Lunney "Reexamining Copyright's Incentive-Access Paradigm" 495-6.

²⁸⁴ Boldrin and Levine *Against Intellectual Monopoly* 97.

associated with the creation of such works. Also, the fair dealing exceptions such as use for study, review, criticism, or reporting current events avoids the need for requesting permission in cases where the hold-out threat of a copyright owner may be most significant.²⁸⁵ The fair dealing exceptions are not considered as decreasing authors' incentives, and, if they do, these losses are considered to be more than offset by the social benefit of having these exceptions.²⁸⁶ In addition, copyright law, unlike patent law, does not prevent independent creation. Again, criticisms that copyright restricts individual freedom because it prevents particular expressions of ideas, which would be a social cost, is probably overstated. In any event, if such costs do exist, they are significantly reduced, if not eliminated, by the fair-dealing exceptions.²⁸⁷

The proprietary system established by copyright, as with any proprietary system, has an associated administrative cost as it necessarily "involves costs in defining the scope of the rights, detecting and preventing trespass, and in foreclosing particular productive opportunities that might be possible if the property system did not exist."²⁸⁸ The latter costs arise because society is deprived of the improvements which free riders may bring about. Imitators may increase efficiency through new innovations, or forcing the author of the copyright work to reduce its costs through innovation.²⁸⁹ It is not clear whether all these costs — institutional costs — outweigh the benefits of incentivising the production of copyright works. This cost-benefit analysis should be the focus of empirical research.²⁹⁰ However, it is necessary to distinguish the institutional costs related to copyright protection from the social welfare costs associated with the alleged monopoly character of copyright.²⁹¹

²⁸⁵ S 12 Copyright Act 98 of 1978.

²⁸⁶ Moore "A Lockean Theory of Intellectual Property" 98.

²⁸⁷ Hettinger "Justifying Intellectual Property" 35-6.

²⁸⁸ Kitch E "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 2000 *Vand L Rev* 53 1727 1732; Drahos *A Philosophy of Intellectual Property* 23.

²⁸⁹ Boldrin and Levine *Against Intellectual Monopoly* 146.

²⁹⁰ Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1741.

²⁹¹ 1731-2.

3 5 5 1 Copyright and monopolies

Arguably, the main criticism directed at copyright as an institution is that it grants an author a monopoly to produce and distribute his copyright work, and monopolies impose unjustifiable social costs, principally, the so-called “deadweight loss.”²⁹² It is fairly common for scholars to refer to copyright protection as the grant of “monopoly rights,” or words to that effect.²⁹³ This type of description is not confined to critics of copyright protection; it is even used by proponents of copyright protection and textbooks on the subject. When it is used by proponents of copyright protection it is claimed that such monopoly protection is justified because the social benefits of such protection outweigh its costs.²⁹⁴

The description of the rights afforded by copyright protection as a monopoly has deliberately been avoided in this work, preferring instead to refer to such rights as “property rights” or “exclusive rights.” It is more important to determine the extent of the institutional costs of copyright, and the preoccupation with characterising copyright protection as a monopoly has been unhelpful.²⁹⁵ As will be illustrated, to describe these rights as monopoly rights is a misnomer and there is no cogent reason why there is so much emphasis on monopoly analysis of copyright. The simplest explanation for the persistent assumption that intellectual property rights confer economic monopolies, particularly in literature dealing with the economic analysis of intellectual property, may be that term “monopoly” is employed in its colloquial sense, rather than in a technical economic sense of “the exclusive right to sell into a market without competition.”²⁹⁶ Colloquially, the term monopoly (or its cognates) is used to refer to the “exclusive or dominant possession of something.”

²⁹² Boldrin and Levine *Against Intellectual Monopoly* 9; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 22.

²⁹³ Deazley *Rethinking Copyright: History, Theory, Language* 143; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 5; Watt *Copyright and Economic Theory* 14.

²⁹⁴ Mankiw N *Principles of Microeconomics* 3ed (2004) 316.

²⁹⁵ Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1732.

²⁹⁶ 1735.

In the literature “monopoly” is often used as a synonym for “property.” The indiscriminate use of “monopoly” in relation to intellectual property rights makes it difficult to determine whether it is used in its colloquial sense of “property” or “exclusive right,” or whether it is being used in its technical economic sense.²⁹⁷

However, the description of copyright as a monopoly right is not simply the result of carelessness; it appears that it is sometimes used for effect, particularly by critics of copyright protection eager to provide examples of the social costs of copyright protection. An example of this is when broad statements are made about intellectual property rights without drawing a proper distinction between the nature of the different types of work included under the general category of intellectual property, with the consequence that the statements may be inappropriate to copyright protection. Consider the following statement by Boldrin and Levine: “Intellectual property is the “right” to monopolize an idea by telling other people how they may, or more often may not, use the copies they own.”²⁹⁸ It is trite that copyright does not protect ideas, but simply a particular expression of an idea. Even economics textbooks describe intellectual property, which would include copyright, as monopolies.²⁹⁹

3 5 5 1 1 Monopolies

Monopolies are generally disliked by economists and government regulation seeks to prevent them from being established.³⁰⁰ A monopoly exists when there is only

²⁹⁷ 1736.

²⁹⁸ Boldrin and Levine *Against Intellectual Monopoly* 123.

²⁹⁹ Mankiw *Principles of Microeconomics* 316; Parkin *Microeconomics* 301; Sloman *Economics* 167.

³⁰⁰ Mackaay "Economic Incentives in Markets for Information and Innovation" 887-8. Critics of neo-classical economics, like Schumpeter, following the Austrian school, have questioned the extent of the claimed social costs of monopolies, particular when considering the costs and practice of attempting to regulate monopolies. Monopolies (not those created artificially by legal regulation) emerge as a consequence of the competitive process, and results in dynamic efficiency as it encourages innovation. Competition is *for* the market, rather than *in* the market. The ability of monopolists to charge excessive prices is overstated because they are conscious of, and constrained by, the emergence of potential competitors. Any distortion of prices would only be temporary and it is

one seller of a good, and no close substitute for that good exists.³⁰¹ Monopolies are disliked, and discouraged, because they are considered to impose social costs as a result of, inter alia, consumers being charged higher prices for the monopoly good, the monopolist producing lower output than would be produced by a competitive producer, the creation of a deadweight loss (loss of social surplus), technical inefficiency and rent seeking.³⁰² The first two of these social costs are intuitively obvious. As a consequence of being the sole supplier of a good, a monopolist can substantially affect the price of the good, and is said to have market power. A monopolist is able to affect the market price (charge higher prices) by adjusting (reducing) its output and creating an artificial scarcity.³⁰³ Also, if the price of a monopoly good rises, consumers, constrained by their budgets and the lack of substitute goods, will be forced to reduce their demand for the good.³⁰⁴ This contrasts with a competitive market in which consumers can purchase the good from another seller should one seller raise his price, which serves to keep the demand (and price) constant.³⁰⁵ However, the issue of the deadweight loss requires further explanation, especially for non-economists.

Economic exchanges occur when there are benefits for both consumers and producers. In a competitive market, there will be consumers who value a good more than the price they pay for it. The aggregate of such differences is referred to as the “consumer surplus.” Similarly, there are producers whose costs are lower than the market price, and the aggregate of such differences is referred to as the “producer surplus.” The aggregate of the consumer surplus and the producer surplus is the social, or total, surplus. In the ideal depictions of competitive markets the consumer and producer surpluses are portrayed as being of equal magnitude. Under monopoly conditions, because of the higher prices paid by consumers, the consumer

not worth dedicating resources to secure short-term benefits for consumers. However, the empirical evidence has not supported the dynamic, innovative view of monopolists. Boldrin and Levine *Against Intellectual Monopoly* 169-71.

³⁰¹ Sloman *Economics* 166.

³⁰² Boldrin and Levine *Against Intellectual Monopoly* 9 and 87; Sloman *Economics* 169-70.

³⁰³ Mankiw *Principles of Microeconomics* 318; Sloman *Economics* 169.

³⁰⁴ Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1732.

³⁰⁵ 1732-3.

surplus is smaller as the monopolist is able to capture some of that benefit.³⁰⁶ The fact that the producer (monopolist's) surplus increases at the expense of the consumer surplus is not, economically considered important, because economics is not generally concerned with the distribution of wealth, only its maximisation. Economists are only concerned with efficiency, namely, the net aggregate benefits of a situation. In other words, they are only concerned with the magnitude of the social surplus, not how it is apportioned.³⁰⁷

What is of concern to economists is that only *some* of the lost consumer surplus is captured by the producer (monopolist). The portion of the consumer surplus which is "completely" lost — that is, not captured by the monopolist — is referred to as the "deadweight loss" or "welfare loss."³⁰⁸ In practice what the deadweight represents is an unmet consumer demand: the consumers who are prepared to pay more than the monopolist's marginal cost but less than the monopolist's price are denied the good. These mutually beneficial trades will take place in a competitive market, but not under monopolistic conditions.³⁰⁹ Neo-classical economists regard this situation as another case of market failure, which should be addressed.³¹⁰

Technical inefficiency, also referred to as X-inefficiency, is a further social cost, but is more difficult to quantify than the social costs already mentioned. As a result of the lack of competition a monopolist has less incentive to produce its goods in the most cost-efficient manner because it is able to pass on its higher costs to its consumers.³¹¹ Of course, if the monopolist does improve its efficiency, it can earn even higher supernormal profits.³¹² Rent-seeking refers to the efforts and resources

³⁰⁶ Harrison *Law and Economics in a Nutshell* 206.

³⁰⁷ Polinsky *An Introduction to Law and Economics* 7.

³⁰⁸ Harrison *Law and Economics in a Nutshell* 206.

³⁰⁹ Drahos *A Philosophy of Intellectual Property* 145; Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1733; Ng "Copyright's Empire: Why the Law Matters" 357-8.

³¹⁰ Mackaay "Economic Incentives in Markets for Information and Innovation" 887-8.

³¹¹ Boldrin and Levine *Against Intellectual Monopoly* 68; Sloman *Economics* 169.

³¹² Sloman *Economics* 169.

expended by a monopolist to maintain its monopoly. For example, monopolists engage in political lobbying to hold on to their privileged position. This is considered to be wasteful conduct, as these resources could be employed more productively, rather than being used to preserve a socially harmful monopoly.³¹³

3 5 5 1 2 Does copyright protection amount to a monopoly?

We will now investigate whether the grant of copyright to an author in respect of a copyright work gives the author a monopoly. If it does, it may still be justifiable to create a monopoly if the social benefits — increased production of copyright works — outweigh the costs associated with monopolies. Most supporters of copyright protection are willing to concede that copyright protection does give an author a monopoly because they consider the social benefits of copyright protection to be sufficient compensation.

The property rights created by copyright law are considered by some scholars as providing an author with a monopoly over the information contained in the copyright work. It is said to give the author market power over the protected work, and copies of such work, because others are prevented from producing identical works.³¹⁴ Accordingly, they consider that all the attendant social costs — particularly the deadweight loss — mentioned above will exist and that the social loss could be significant, particularly in cases where there is a large difference between the marginal cost and the price paid by consumers.³¹⁵ Consumers have to pay higher prices, and it raises the costs of competitors as they must pay for the privilege of using the copyright work. However, the fact that authors are able to appropriate a larger portion of the social surplus produced by their creations — at the expense of consumers and competitors — provides them with the necessary incentive to create

³¹³ Boldrin and Levine *Against Intellectual Monopoly* 3; Sloman *Economics* 170.

³¹⁴ Mankiw *Principles of Microeconomics* 316; O'Hare "Copyright: When is Monopoly Efficient?" 407.

³¹⁵ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 304-5; Lunney "Reexamining Copyright's Incentive-Access Paradigm" 517.

copyright works. This delivers society the desired level of copyright works, and, therefore, the costs are considered worthwhile.³¹⁶

The potential size of this deadweight loss, and the supranormal profits which such monopoly allows authors to earn, has led to claims that an author's market power should be reduced.³¹⁷ Too much protection for authors is also economically inefficient because it leads to an overproduction of copyright works.³¹⁸ The lure of potential supranormal profits would cause people to divert their resources into the creation of copyright works whereas those resources could be employed in a more socially beneficial manner. It is not just important that the creation of copyright works should be encouraged but that the correct persons should be incentivised to create such works.³¹⁹ A second consequence of increased market power is that it may restrict access to copyright works.³²⁰

The claims that copyright protection imposes significant social costs or amounts to the grant of a monopoly have been questioned.³²¹ First, any supposed monopoly as a consequence of copyright protection provides much less market power than patent protection.³²² Copyright protection does not prevent independent creation or the creation of other works using the ideas embodied in a copyright work.³²³ Not only is it arguable that the social costs imposed by copyright protection are "economically insignificant," it is possibly the case that copyright protection may increase competition because it encourages the creation of similar works — notwithstanding the fact that critics of copyright protection may regard the creation of

³¹⁶ Mankiw *Principles of Microeconomics* 316; Watt *Copyright and Economic Theory* 14.

³¹⁷ Lunney "Reexamining Copyright's Incentive-Access Paradigm" 517.

³¹⁸ Posner "Intellectual Property: The Law and Economics Approach" 65.

³¹⁹ O'Hare "Copyright: When is Monopoly Efficient?" 411.

³²⁰ Lunney "Reexamining Copyright's Incentive-Access Paradigm" 495.

³²¹ Sterk "Rhetoric and Reality in Copyright Law" 1205 fn 45.

³²² It is considered that the more limited period of patent protection is as a consequence of its greater potential to have a monopolistic effect. See Mackaay "Economic Incentives in Markets for Information and Innovation" 905.

³²³ Boldrin and Levine *Against Intellectual Monopoly* 97; Posner "Intellectual Property: The Law and Economics Approach" 68.

such similar works to be redundant and socially wasteful — because the market functions as a signal to other producers of the demand for such works.³²⁴

Second, it is claimed that copyright protection “rarely” confers monopoly power and the attendant social costs such as resource misallocation.³²⁵ As stated above, a monopolist is the sole seller of a product for which there are no close substitutes. It is therefore crucial to determine what the relevant market is and whether there are substitute goods before it can be concluded that a monopoly exists. The right of an author of a novel to prevent others from copying his work does not give such an author a monopoly over the market for literature, or works of fiction — not in the economic sense.³²⁶ A copyright owner, like other intellectual property rights owners, does not necessarily have market power.³²⁷ The copyright owner receives no more of a monopoly than any other property owner. The fact that some intellectual property rights are valuable, and can be said to provide incentives to their creators, does not imply that they constitute monopolies.

It may also be the case with tangible property that one piece of land is worth more than another, although they are in close proximity, because of its location.³²⁸ This difference *per se* would not warrant a description of the owner of the more valuable land as a monopolist; he is simply the owner of property rights.³²⁹ All property provides its owner with a measure of exclusivity and, therefore, in some (colloquial) sense, a “form of monopoly.” For example, the owner of land who refuses to sell his land, which frustrates a large property development, may be

³²⁴ Boldrin and Levine *Against Intellectual Monopoly* 97.

³²⁵ Landes and Posner “An Economic Analysis of Copyright Law” 361. In fact, it is claimed that “[t]he vast majority of intellectual property rights do not confer monopoly power in a relevant economic market.” (Lemley “Ex Ante versus Ex Post Justifications for Intellectual Property” 136 fn25)

³²⁶ Ng “Copyright’s Empire: Why the Law Matters” 345.

³²⁷ Other scholars, while conceding that the author of a novel does not control the market for printed literature, still insist that the author will have a monopoly for that particular novel. The relevant market cannot conceivably be cast any narrower. It would be the equivalent of saying that Toyota has a monopoly on manufacturing one of the models of car, for example, the Corolla. (See Deazley *Rethinking Copyright: History, Theory, Language* 164-5)

³²⁸ Mackaay “Economic Incentives in Markets for Information and Innovation” 904-5.

³²⁹ Kitch “Elementary and Persistent Errors in the Economic Analysis of Intellectual Property” 1736.

regarded by the developer as a monopolist.³³⁰ Any criticism that copyright protection amounts to the grant of unjustifiable monopolies must by implication be based on a criticism of any form of property right.³³¹ Moreover, unlike tangible property, “any person has the right to obtain [copyright protection] provided that their creation satisfies the criteria for protection.”³³²

Whether a copyright work gives its owner a monopoly is a “separate and distinct” matter to the property right in the work.³³³ Whether a copyright owner has market power, and the extent of such power, depends on two factors: the demand for the good, and the availability of (acceptable) substitutes.³³⁴ A copyright owner may have market power provided that there is sufficient demand for his good. The demand for copyright works is usually generated by “dictates of fashion, as moulded by advertising and other promotion, criticism, the reputation of the author’s previous works, the shortage of new material and other factors.”³³⁵ Given the nature of copyright works, these works *per se* do not create the demand.³³⁶

Although there are good substitutes for some — the minority of — copyright works, there are no good substitutes for others. If there were good substitutes for all copyright works, it would be socially wasteful for resources to be dedicated to the

³³⁰ Mackaay "Economic Incentives in Markets for Information and Innovation" 889.

³³¹ 905-6.

³³² 904-5.

³³³ Ng "Copyright's Empire: Why the Law Matters" 345.

³³⁴ Drahos *A Philosophy of Intellectual Property* 146; Mackaay "Economic Incentives in Markets for Information and Innovation" 889.

³³⁵ Cornish *Intellectual Property* 319-20. While it may generally be the case that intellectual property rights in individual creations do not confer monopoly rights, an economic monopoly can be created through holding multiple, related, rights. These multiple rights can be the result of the holder having created these rights or accumulation of the rights through licensing or assignments. (Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1739-40) While this is not an issue for copyright, it is considered particularly problematic in the case of patents. (Heller M *The Gridlock Economy: How Too Much Ownership Wrecks Markets, Stops Innovation, and Costs Lives* 1ed (2008))

³³⁶ Plant "The Economic Aspects of Copyright in Books" 171.

creation of such substitutes.³³⁷ Therefore, it is the case that copyright protection allows authors *some* market power to charge higher prices, above the marginal cost of production. If this was not the case, the economic argument of providing incentives to authors would be rendered pointless.³³⁸ The likelihood that good substitutable products are likely to emerge depends, to some degree, on the scope of protection enjoyed by copyright owners. This affects the extent of a copyright owner's possible market power because such market power would be proportional to the scope of copyright protection: the narrower the scope of copyright protection, the more other works can copy a copyright work.³³⁹ Also, the narrower the scope of copyright protection, the smaller will be the difference between the price a copyright owner can charge and the marginal cost, which means a smaller deadweight loss and smaller supranormal profits.³⁴⁰

Two additional remarks about costs and pricing used in support of claims of the monopolistic nature of copyright also need to be dispelled. The fact that the marginal costs of making copies of copyright works may be close to zero (whereas they are sold for significantly higher prices than those costs) does not by itself imply that a monopoly exists, and does not change matters.³⁴¹ It is not the marginal cost of making copies that is relevant; it is the marginal cost for *pricing* the particular copyright work, which includes *all* the costs — not just the marginal costs of making copies — associated with bringing the good to market.³⁴²

The existence of price discrimination in relation to copyright works is proffered as proof of the monopolistic nature of copyright protection. Price discrimination involves the business practice of a producer selling the same good at different prices to different customers.³⁴³ It is not theoretically possible in competitive markets

³³⁷ Sterk "Rhetoric and Reality in Copyright Law" 1205 fn 45.

³³⁸ Lemley "Ex Ante versus Ex Post Justifications for Intellectual Property" 136 fn 25; Sterk "Rhetoric and Reality in Copyright Law" 1205 fn 45.

³³⁹ Lunney "Reexamining Copyright's Incentive-Access Paradigm" 518-9.

³⁴⁰ 556-7.

³⁴¹ Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1736-7.

³⁴² 1737.

³⁴³ 1738.

because perfect substitute goods are always available from competitors at the competitive price.³⁴⁴ The practice of price discrimination allows producers to increase their revenues without necessarily increasing the quantity of the good sold.³⁴⁵ However, in the context of a monopoly, price discrimination is also seen as a good thing. There is less unmet demand when there is price discrimination because it allows lower-valued consumers an opportunity to also purchase the monopoly good at the price they are willing to pay, which may not have been possible if the monopolist did not use price discrimination. Thus, it reduces the social cost of a monopoly by reducing the size of the deadweight loss.³⁴⁶

The fact that copyright law does not permit perfect substitutes and price discrimination takes place raises the prospect that copyright protection results in a monopoly. Examples of this practice are book publishers releasing more expensive hardcover editions before the paperback editions and premier-viewings of films before general release.³⁴⁷ However, the fact that price discrimination takes place in relation to goods protected by copyright, but is absent — as it is not possible — in competitive markets, does not imply that they constitute monopolies or indicate that it is a flawed institution.³⁴⁸ The reality is that the economic model which best describes copyright works is monopolistic competition, not the monopoly model. In the case of monopolistic competition there are many firms (producers) but each firm produces a similar, differentiated product, and, therefore, has some degree of market power which allows price discrimination.³⁴⁹ The market power of a firm in monopolistic competition is constrained because competitors produce similar goods.

³⁴⁴ Boldrin and Levine *Against Intellectual Monopoly* 70.

³⁴⁵ Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1737; Landes and Posner "An Economic Analysis of Copyright Law" 328.

³⁴⁶ Boldrin and Levine *Against Intellectual Monopoly* 70; Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1736; Sloman *Economics* 197-201.

³⁴⁷ Cornish *Intellectual Property* 320; Landes and Posner "An Economic Analysis of Copyright Law" 328.

³⁴⁸ Cornish *Intellectual Property* 320; Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1737.

³⁴⁹ Sloman *Economics* 178 and 197-8.

As copyright only protects the expression of an idea, and not the idea itself, generally, competitors are not prevented “from creating works with the same functional characteristics, as evidenced, for example, by the numerous dictionaries available, by the many television shows, novels, and movies with similar themes and characteristics, or by the many competing software programs.”³⁵⁰ Accordingly, it is probably the case that “almost all copyrights” are not monopolies.³⁵¹ In fact, the most well-known, if not the only, instance of a copyright work conferring an economic monopoly involved a computer program: the Microsoft operating system.³⁵²

As is clear from the above, the likelihood that copyright protection of a computer program conferring an economic monopoly depends on, *inter alia*, whether there are substitutable products, which, in turn, depends on the scope of protection enjoyed by copyright owners of computer programs. The extent of a copyright owner’s market power is proportional to the scope of protection as it determines how closely another program can copy his copyright work.³⁵³ Given the nature of computer programs, we will examine the proposition that copyright leaves enough room for the creation of competing computer programs with the same functional characteristics. In the next chapter we will consider the extent of the copyright protection of computer programs, in particular the application of the idea-expression dichotomy. If copyright leaves insufficient room for the development of such competing computer programs, the economic costs of copyright protection may be significantly higher than in the case of other copyright works.

3 5 6 Critics of copyright protection

As we have seen, the economic justification for copyright is based on the premise that in the absence of such protection authors will not be able to realise a sufficient return on their creations to incentivise them to create copyright works at the socially desirable level. The reason for this is the intangible nature of copyright works, which

³⁵⁰ Kitch "Elementary and Persistent Errors in the Economic Analysis of Intellectual Property" 1730.

³⁵¹ 1734.

³⁵² 1731.

³⁵³ Lunney "Reexamining Copyright's Incentive-Access Paradigm" 518-9.

have a public-good quality, creates positive externalities, and results in free-riding activities. However, critics have queried this inevitable market failure suggested by advocates of copyright protection and argue that copyright protection may not always be required to encourage the creation of copyright works.

Critics claim that the effect of copyright protection may be to grant authors the ability to realise economic profits far exceeding those which would be earned in a competitive market, which imposes an unacceptable economic cost on society. Although it may be the case that, in the absence of intellectual property rights, creators may not earn as much as they do with such protection, society as a whole benefits more than the loss of the individual creators if there is no protection. The purpose of legal institutions should be to increase the benefits to consumers, on average, "not to make a few lucky people super wealthy."³⁵⁴ More importantly, it is suggested that there is no evidence that underproduction, due to insufficient incentives, as a result of market failure is inevitable in the absence of copyright protection.³⁵⁵

The treatment of the literary works of British authors in the United States during the 19th century is the paradigm case used to dispel the notion that copyright protection is essential for the optimal production of copyright works.³⁵⁶ British authors were receiving royalties from American publishers despite their works not being eligible for copyright protection in the US.³⁵⁷ In fact, the evidence suggests that during the latter half of the 19th century British authors often received larger royalty payments than they received from British publishers, where copyright protection existed.³⁵⁸ The American publishing industry, despite the absence of copyright protection, was certainly not a competitive market, and the ability of

³⁵⁴ Boldrin and Levine *Against Intellectual Monopoly* 125.

³⁵⁵ Lemley "Ex Ante versus Ex Post Justifications for Intellectual Property" 148.

³⁵⁶ Plant "The Economic Aspects of Copyright in Books" 172; Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 299; Hurt and Schuchman "The Economic Rationale of Copyright" 427.

³⁵⁷ For the greater part of the 19th century, the US did not extend copyright protection to foreign publications.

³⁵⁸ Plant "The Economic Aspects of Copyright in Books" 172.

publishers to charge prices above marginal costs, enabled them to remunerate authors with "handsome sums."³⁵⁹ There were four reasons why publishers were able to make economic profits. First, a publisher, despite a copier's lower production costs, would have a crucial advantage if it was the first to publish a book, and publishers paid British authors for the right of first publication in order to secure such advantage. Second, there was an understanding between the publishers that they would not copy each other's publications. Third, if any other person copied a publisher's publication, the publisher would engage in a campaign of predatory pricing, and release loss-making discounted "fighting editions" ("killer editions" or "retributive strike editions") and eliminate such rival. Fourth, American publishers charged much lower prices than their British counterparts – sometimes one-eighth of the price charged by British publishers. This strategy not only prevented the possibility of a (profitable) rival publisher emerging, it benefited the public while still being profitable enough to compensate authors.³⁶⁰

The first of these factors — the first-mover advantage — was probably the most significant reason that allowed authors to profitably exploit their creations. An author (or his publisher), possessing his original manuscript, as the first producer of direct copies had two advantages over subsequent producers of copies: the first producer of direct copies could take advantage of the fact that there would be a time lag before competing copies appeared, and thus satisfy the existing demand without any competition; and, he could also charge a premium for the direct copies as they would contain fewer errors than subsequent copies.³⁶¹ A matter of a few days lead time would have been decisive because of the speed at which the books were sold, particularly those of well-known authors. If the first publisher accurately estimated the potential demand for a publication and satisfied such demand, there would be no significant remaining market for a copier to profitably exploit. In fact, for much of the 20th century, those at the forefront of the fashion industry continued to exploit their lead time in this way; designers never resorted to relying on any form of intellectual property protection despite copies of new creations appearing within a relatively

³⁵⁹ 172-3.

³⁶⁰ 173.

³⁶¹ 171.

short time after its release. The short lead-time advantage of a designer was sufficient to allow the designer an adequate investment return.³⁶²

Having made a significant profit, the first publisher can continue to prevent market entry by a copier with the threat of releasing fighting editions, priced below the copier's costs.³⁶³ Even if unauthorised copies of a book should appear, a publisher might still be able to maintain sufficient market share, and possibly still charge higher prices through advertising: it could seek to differentiate its product from copies by indicating it is the "original" or "authorised" version.³⁶⁴ It is arguable that cheaper, poor-quality copies of a copyright work may constitute a distinct market as there will still be a significant number of consumers who will prefer to purchase the original good.³⁶⁵ Purchasers of the original could be enticed with promises with possible benefits like updates and preferential offers on future publications.³⁶⁶ There is therefore no reason why the first publisher, charging equivalent prices, should not be able to do better than a copier because of its reputation of producing a superior, original product, and having an established distribution channel.³⁶⁷ A successful literary or musical work involves much more than merely creating such work, and producing copies of it; "it must be bound and packaged into a marketable product, distributed, and placed on store shelves, all of which requires considerable time and effort."³⁶⁸

³⁶² Boldrin and Levine *Against Intellectual Monopoly* 59-60 and 137-44; Plant "The Economic Aspects of Copyright in Books" 172. Of course, the fashion industry did not make any significant use of killer editions.

³⁶³ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 300.

³⁶⁴ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1401.

³⁶⁵ Plant "The Economic Aspects of Copyright in Books" 175.

³⁶⁶ Hurt and Schuchman "The Economic Rationale of Copyright" 428-9.

³⁶⁷ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 300.

³⁶⁸ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 319.

The first-mover advantage and the threat of predatory pricing by an initial publisher ensures that copiers are unlikely to enter the market unless they can be assured of selling a sufficient number of copies in a relatively short period of time, or if the initial publisher is earning excessive profits.³⁶⁹ Also, it is claimed that the virtual absence of copiers of works that are no longer protected by copyright is proof of the fact that no copyright protection is required.³⁷⁰

While the US example mainly involved works of literary fiction, it is claimed that even in the case of books which require a greater investment to produce, such as textbooks or reference books, and which would require a greater number sales (which would presumably also take place over a longer period of time) to earn a sufficient return on such investment, it is still possible for publishers (and authors) to produce such works without copyright protection. A publisher could seek to protect itself from a copier emerging before it has earned a sufficient return by obtaining a sufficient number of advance orders, or such works could be subsidised through public funding.³⁷¹

Even if the facts concerning British authors and the US publishing industry during the 19th century are correct, the continued plausibility of the effectiveness of first-mover advantage, and the release of fighting editions, to provide authors with adequate returns, as being sufficient to incentivise authors, is doubtful. While it may be correct that copyright protection was probably unnecessary to secure authors an adequate return to incentivise the creation of copyright works during the 19th century (and for much of the 20th century), such protection has become necessary because of the significant development in technology.

If copyright seeks to prevent free riding, and the underproduction it causes, it logically becomes more important the cheaper copying becomes.³⁷² Copying

³⁶⁹ 318-19.

³⁷⁰ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 301.

³⁷¹ 302.

³⁷² Sterk "Rhetoric and Reality in Copyright Law" 1212.

technology has not only made copying cheaper, it has made it easier. Equally significant is the fact that the quality of copies which can be produced is of such a high standard that they are often indistinguishable from the original good to most observers. In the case of digital works, such as digitised books and computer programs, perfect copies are possible. While it may have been the case before that an original good could be considered to be a distinct product from its copies, this is no longer necessarily the case. In fact, it is probably meaningless to speak about copies and original goods in terms of the quality of the products. Expressed in economic jargon, there has been a “dramatic fall in the quality-adjusted cost of (and delay in) copying.”³⁷³

Although these advances benefit authors, by reducing the marginal costs of production and opening global markets, it also increases the effects of unauthorised copying on authors’ incentives. Because copying has become cheap, it has increased the difference between the prices a copier and an author are likely to charge. The fact that the copier does not incur any of the fixed costs associated with producing, and marketing, the copyright work, combined with the fact that it has become increasingly cheap and easy to copy goods, means that a copier will always be able to enter the market at a significantly lower price than the author. This makes it more difficult for an author to recoup his investment.³⁷⁴ It is the ease of copying, which technology enables, that causes underproduction and justifies copyright protection.³⁷⁵ In the copyright context, Boldrin and Levine are incorrect when they suggest that no copyright protection is required because copies are costly to generate and there will always be a limited number of copies in circulation.³⁷⁶

Also, and significantly, the speed at which high-quality copies can be produced has increased, which means that a copier’s good is likely to be competing

³⁷³ Posner "Intellectual Property: The Law and Economics Approach" 72.

³⁷⁴ Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 298-9; Posner "Intellectual Property: The Law and Economics Approach" 72.

³⁷⁵ Lunney "Reexamining Copyright's Incentive-Access Paradigm" 493.

³⁷⁶ Boldrin and Levine *Against Intellectual Monopoly* 128. They appear to later concede that the advent of computers and the Internet has meant that copies can be made instantly, at no cost, which may support the standard economic analysis described above (at 173).

with the original good within a much-shortened period of time. It will thus not necessarily be the case that a sufficiently large number of consumers will purchase the original good before the appearance of the copier's good, allowing an author to earn a reasonable return on its investment. Furthermore, consumers are likely to change their habits as a consequence of the effects of the copying technology: knowing that it is inevitable that a copier's (cheaper) good will be available shortly after the release of the original good, consumers (as rational utility maximisers) are likely to wait for the copier's good.³⁷⁷ Because of the prospect of diminished returns as a consequence of free-riding behaviour, authors will be deterred from making the investment to create and produce copyright works.

Needless to say, computer programs — the focus of this study — are at the cutting edge of the interaction between technology and copyright law. If technology has made the case for copyright protection of literary works (and other copyright works) more compelling, the case of computer programs warrants special attention. As creations which are digitised, they can be perfectly copied in a matter of seconds and be distributed over the Internet at virtually no cost. This ostensibly makes the case for copyright protection of computer programs more acute than that for copyright works such as literary works, but things may not be that dire or straight forward due to the nature of computer programs.

Computer programs, unlike other copyright works, can be made available without revealing the substance of their creation. Technology both enables easy copying of computer programs and provides ways of preventing copying, or making it costly for a copyist. Whether the use of technological methods of protecting computer programs obviates the need for copyright protection will not be addressed in this work, but it is suggested it is unlikely to be the case. Suffice to simply mention that, in the absence of copyright protection, authors will simply have the additional

³⁷⁷ Calandrillo "An Economic Analysis of Intellectual Property Rights: Justifications and Problems of Exclusive Rights, Incentives to Generate Information, and the Alternative of a Government-Run Reward System" 320-1.

costs of developing and implementing such technologies.³⁷⁸ Authors will have to ensure that their technologies are adequate in a rapidly-advancing area of development. In addition to the fact that these investments would probably be a wasteful, or inefficient, use of resources, these measures would result in restricting the flow of information, which is considered to be socially detrimental, and which copyright protection serves to encourage. Another, possibly more significant, social cost is fact that, in an attempt to give these technical measures more efficacy, breaches of these digital defences are usually made criminal offences, which not only adds significantly to the costs of administering such a system — probably far exceeding the costs of a system based on copyright law — but would also potentially compound the problem of the overloaded criminal justice systems in most jurisdictions. Cases will also have to be proved on the higher criminal standard of burden of proof. Anyone who acquires the computer code without overcoming a technological barrier will be free to use it, in the absence of the author having proprietary rights thereto or being able to rely on the common-law restrictions. It is questionable whether authors would find such a non-proprietary system, on its own, as providing a predictable pattern of behaviour by others and that it will give authors a sufficient level of comfort that they can internalise sufficient of the benefits of the works they have created. As we will see in Chapter 5 (*Open-source software*), there may also be innovative business models which can ensure that authors obtain a sufficient economic return without utilising the direct benefits which copyright protection affords authors. For example, computer programs can be sold together with the promise of customer support or product updates, which a copyist cannot cheaply replicate.³⁷⁹

The matter is further complicated by the seeming non-use of the legal protection available to the copyright holders of computer programs. Although it may appear counterintuitive, the emergence of copying technology can serve to increase the demand for original copies of copyright works like computer programs, rather

³⁷⁸ Zittrain J "Normative Principles for Evaluating Free and Proprietary Software" 2004 *U Chi L Rev* 71 (1) 265 276-7.

³⁷⁹ Gordon "An Inquiry into the Merits of Copyright: The Challenges of Consistency, Consent, and Encouragement Theory" 1401.

than cause a decline. Despite the enforcement of infringement by the state being very low, due to the high cost of infringement proceedings, the software industry has not responded as one would expect them. They have not sought to introduce technological protection measures to reduce the incidence of copying.³⁸⁰ A likely reason for this behaviour is that these producers benefit from consumers' ability to copy their product.³⁸¹

As is clear from what has been said, the economic justification for copyright protection of creative works generally seems to be convincing. However, as indicated, it would be more credible if this justification is shown to be valid in respect of specific types of copyright works. Copyright covers a wide variety of different types of work and the economic justification cannot be said to provide a plausible case for all types of copyright work. For example, the notion that copyright protection serves to incentivise the creation of architectural works has been described as "manifestly ridiculous",³⁸² and it is no different in the case of personal letters and diaries,³⁸³ or commercial advertising.³⁸⁴

The most valid criticism of the current system of copyright protection is that the protection goes far beyond incentivising the creation of copyright works.³⁸⁵ It protects types of work where there is, arguably, no incentive required for their production. Furthermore, the duration of the protection — particularly in the US and the EU — appears to go far beyond that which is considered economically necessary to incentivise production.³⁸⁶ The extension of the copyright term to 70 years from the death of the author has not led to an increased output of literary works.³⁸⁷

³⁸⁰ Palmer "Intellectual Property: A Non-Posnerian Law and Economics Approach" 297.

³⁸¹ 297-8.

³⁸² Sterk "Rhetoric and Reality in Copyright Law" 1197-8.

³⁸³ Samuelson "Should Economics Play a Role in Copyright Law and Policy?" 5.

³⁸⁴ Sterk "Rhetoric and Reality in Copyright Law" 1214.

³⁸⁵ 1213-4.

³⁸⁶ SM McJohn "The Paradoxes of Free Software" 2000 9 *Geo. Mason L. Rev.* 25 38; 1222.

³⁸⁷ Boldrin and Levine *Against Intellectual Monopoly* 99.

The current copyright policy of protecting a plethora of derivative works is also inconsistent with the incentive motive of copyright protection.³⁸⁸ There would be very few cases where the prospective earnings on derivative works were the principal motivation for creating the original work. This would presumably only be the case where the costs of creating the original work would be so high, and the anticipated returns on the original work were so low, that it would not allow the author to realise a return on his investment without the protection on the derivative works. An example of this is possibly a cinematograph film, as the original work, and the product merchandising that accompanies it. However, this is unlikely to be the case that where the original work was a literary work which is later turned into a screenplay.³⁸⁹

As already mentioned, too much protection may result in an overproduction, which is also socially harmful as those resources could be used in a more beneficial manner. In addition, such protection could inhibit optimal use of copyright works. The real issue is therefore to ensure that copyright protection is as efficient as it could possibly be.³⁹⁰ In this vein, the unique nature of computer programs means that the policy of affording such works copyright protection, particularly in light of the emergence of open-source software, requires further consideration.

3 6 Conclusion

As we have seen, the economic justification for copyright is based on the premise that in the absence of such protection authors will not be able to realise a sufficient return on their creations to incentivise them to create copyright works at the socially desirable level. The reason for this is the intangible nature of copyright works, which have a public-good quality, creates positive externalities, and results in free-riding activities. However, critics have queried this inevitable market failure suggested by advocates of copyright protection and argue that copyright protection may not always be required to encourage the creation of copyright works. The effect of copyright

³⁸⁸ Sterk "Rhetoric and Reality in Copyright Law" 1217.

³⁸⁹ 1215-6.

³⁹⁰ Hettinger "Justifying Intellectual Property" 49.

protection may be to grant authors the ability to realise economic profits exceeding those which would be earned in a competitive market. This imposes an unacceptable economic cost on society.

What economic analysis allows, which utilitarian theory does not, is a more analytical assessment of the social benefit of copyright protection. This work will therefore seek to apply such analysis to the protection of computer programs. We will proceed by considering the nature of copyright protection of computer programs and its effect on promoting the creation of such works.

Chapter 4: Scope of copyright protection of computer programs

“I am aware that a great deal of interest has been excited by [the scope of copyright protection] in the software industry. I was particularly interested in the development of the law in other countries, both within the EU and outside it... As I should have foreseen, the law is everywhere in a state of development, and the results differ from jurisdiction to jurisdiction. ... While I have read much of this material with interest it has not, in the end, provided me with assistance. The point has evidently vexed many judges and will no doubt vex many more.”¹

4 1 Introduction

As discussed in Chapter 3 (*Economic justification for copyright protection*), the economic justification for copyright protection is based on the premise that it is necessary to incentivise authors to create socially beneficial works. Copyright protection provides authors with such incentives by granting them certain privileges, which enable them to realise a sufficient return on their investment. However, the incentives provided by copyright law also impose costs on society, and it is necessary to ensure that such incentives are provided only to the extent necessary.² These social costs are not confined to higher prices paid by consumers for copyright-protected works or their overproduction: excessive protection may also stifle creativity and innovation.³ Creativity and innovation are incremental and cumulative in nature: past creations are the “inputs” or “building blocks” for future creations, and

¹ *Navitaire Inc. v easyJet Airline Company & Another* [2004] EWHC 1725 (Ch) 93.

² Boyle *The Public Domain: Enclosing the Commons of the Mind* 11; Stokes S "The Development of UK Software Copyright Law: From John Richardson Computers to Navitaire" 2005 *CTLR* 11 (4) 129 133.

³ Boyle *The Public Domain: Enclosing the Commons of the Mind* 35.

excessive copyright protection will raise the costs of future creations, or — even more socially detrimental and costly — inhibit progress.⁴

Given that copyright protection extends to a wide variety of works, it is more appropriate to consider the economic justification in respect of a specific type of copyright work because the economic justification cannot be said to provide an equally plausible case for all types of copyright work.⁵ The scope of copyright protection of computer programs is central to an assessment of the social costs of providing copyright protection to computer programs for the following reasons: it determines the extent to which others can produce substitutable or interoperable products; it affects the market power which the copyright owner can exercise; and, whether there is enough room for innovation. If the scope of copyright protection of computer programs results in copyright holders having too much market power, leaves insufficient room for development or imposes other social costs, and, if these social costs exceed the claimed benefits of providing incentives to authors, it would undermine the case in favour of such protection.⁶ A balance must be achieved whereby innovation can be achieved in the long term; it is easy to encourage innovation today by granting extensive protection, at the expensive of sacrificing further innovation.⁷ After all, the statutory protection provided to copyright works is not intended “to stifle, but rather to promote human ingenuity and industry.”⁸ The scope of copyright protection of computer programs is not only a matter of a great interest to the computer software industry, it is important to society as a whole due to our ever-increasing dependence on computerised systems. Tumbraegel and de

⁴ 40-1; Jones A "The Protection of Computer Programs Under TRIPS: The Subject Matter Issue" 1999 *J L & Inf Sci* 10 (1) 7 24.

⁵ For example, as indicated in Chapter 3 (*Economic justification for copyright protection*), the incentive argument cannot account for the copyright protection of architectural works. See Sterk "Rhetoric and Reality in Copyright Law" 1197-8.

⁶ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 736-7.

⁷ Jones "The Protection of Computer Programs Under TRIPS: The Subject Matter Issue" 24-5.

⁸ *Golden China TV Game Centre & Others v Nintendo Co Ltd* 1997 (1) SA 405 (A) 412.

Villiers neatly summarise the centrality of the scope of copyright protection as follows:⁹

“Any discussion of the scope of copyright protection inevitably involves each of the intellectual property law's twin objectives; namely that the law must encourage innovation and invention while simultaneously promoting the dissemination of ideas and fostering competition.”

As is clear from the quotation at the start of this chapter from the UK decision in the *Navitaire* case — which established the current position in UK copyright law relating to computer programs — the scope of copyright protection of computer programs is a matter that is unlikely to be definitively settled. This chapter will examine the scope of such protection of computer programs in the two leading jurisdictions, the US and UK, in order to get an accurate picture of what copyright protects. After a historical introduction to copyright protection of computer programs, and the legislative provisions in South Africa, the UK, and the US, there will be a detailed analysis of the landmark cases in the US and UK.¹⁰ The purpose of this analysis is to determine which elements of a computer program are protected by copyright, which should provide an indication of whether the protection afforded exceeds that which is necessary to incentivise the creation of computer programs.

However, before embarking on the legal analysis of copyright protection of computer programs, it is necessary to provide a description of computer programs, how they function, and how they are produced. Commentators have rightly bemoaned the fact that the level of understanding of computers and computer programs is so poor, despite their proliferation in society, and have attributed some of the problems relating to the copyright protection of computer programs to this lack of understanding.¹¹ It has been claimed that this lack of understanding has led to the

⁹ Tumbraegel K and de Villiers R "Copyright Protection for the Non Literal Elements of a Computer Program" 2004 *CTLR* 10 (2) 34 34.

¹⁰ As will be discussed below, there are no South African cases concerning non-literal copying of computer programs, and it is these cases which really define the extent of copyright protection.

¹¹ De Villiers R "Computer Programs and Copyright: The South African Perspective" 2006 *SALJ* 123 (2) 315 315; Hamilton M "Computer Science Concepts in Copyright Cases: The Path to a Coherent Law" 1997 *Harv J L & Tech* 10 239 245.

inappropriate use of well-known copyright concepts such as “structure” and “organisation” to computer programs.¹² Use of a concept like the structure of a computer program necessarily requires a court to consider the program at a particular level of abstraction. However, the structure of a computer program leaves much less choice for expression than creative works in human language, because a program must conform to strict syntactical and semantic criteria. If copyright protection is extended to the structure of expressions at the wrong level of abstraction (if at all appropriate to use such concept), it could result in broader protection than would be appropriate.¹³ It has also been claimed that over-protection, particularly in the early cases concerning computer programs, could be attributed due to a lack of technical understanding by the courts, which lead to courts being in “technological awe” and showing too much deference to the creators of computer programs. An understanding of the general nature of computer programs, and the basic concepts of computer science, will, thus, assist a proper analysis of the legal issues.¹⁴

4 2 Computer programs

A computer program is simply a set of ordered, unambiguous instructions to be performed by a computer.¹⁵ In fact, without computer programs computers are just complex collections of electrical circuitry. This definition of a computer program essentially corresponds with how “computer program” is defined in the South African¹⁶ and US¹⁷ copyright legislation.¹⁸ Although this work will regard the terms

¹² Hamilton "Computer Science Concepts in Copyright Cases: The Path to a Coherent Law" 240.

¹³ 273.

¹⁴ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 724.

¹⁵ White R *How Computers Work* 7ed (2004) 66. See also Appleman D *How Computer Programming Works* 1ed (2000) 3-5; Pistorius T and Visser C "The Copyright Amendment Act 125 of 1992 and Computer Programs: A Preliminary Overview" 1992 *SA Merc L J* 4 346 346; Kravetz P "Copyright Protection of Computer Programs" 1998 *J Pat & Trademark Off Soc'y* 80 41 44; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 727.

¹⁶ S 1 sv “computer program” SA Copyright Act.

¹⁷ S 101 Copyright Act 1976, Title 17 USC.

“computer program” and “computer software” as interchangeable, computer program is the protected category of copyright work, not computer software. Software generally refers to more than the computer program. Computer programs process data (input data) and produce output data, which data could, for example, consist of text or images.¹⁹ Often, some of this input data are stored in files associated with the computer program that processes the data. Computer software in the broad sense, thus, refers to the computer program and the associated stored data.²⁰ However, it is important to distinguish the computer program from the data, which are separately protected.²¹ For example, part of the input data which a computer program may process may consist of a series of artistic works, which may, in turn, be combined with sound to produce another copyright work, such as a cinematograph film. The artistic works and cinematograph film are protectable as distinct copyright works, and are not computer programs.²²

4 2 1 Computer code

Computers only process instructions in binary digits or “bits”: 0s and 1s. Accordingly, all instructions (as in the case of computer programs) or data to be processed must be reduced to binary form — strings of 0s and 1s.²³ Depending on

¹⁸ Neither the UK legislation (Copyright, Designs and Patents Act 1988), nor the EU Software Directive (Directive on the legal protection of computer programs 2009/24/EC) contain a definition of computer program.

¹⁹ Appleman *How Computer Programming Works* 21; White *How Computers Work* 66. (See also <http://www.differencebetween.net/technology/difference-between-software-and-program/> (accessed 21 November 2010).)

²⁰ Sometimes computer software is restrictively defined to correspond to the definition of “computer program” in the SA Copyright Act (Reynolds C and Tyman P *Principles of Computer Science* 1ed (2008) 3), while at other times it is even more extensively defined to also include any related documentation and operating manuals (Davidson D “Protecting Computer Software: A Comprehensive Analysis” 1983 *Jurimetrics J* 23 337 340-1).

²¹ De Villiers “Computer Programs and Copyright: The South African Perspective” 316.

²² Davidson “Protecting Computer Software: A Comprehensive Analysis” 373.

²³ Technically, computer programs are not converted directly into a file in binary form but go through a process of transformations, which finally gets processed as electrical impulses, corresponding to the 0s and 1s.

the physical design of a particular computer, instructions (or commands) specifying particular operations are communicated to the computer by specific patterns of bits. However, due to the practical difficulties of specifying computer instructions in binary form — which would involve laborious work as a sophisticated program would necessarily result in hundreds of instructions, and thousands of bits — more convenient tools were developed for programming computer programs. Programming languages were developed to allow programmers to develop computer programs in “high-level languages,” which are a mixture of rudimentary English words and algebraic instructions.²⁴ Because of the ease with which high-level languages can be understood and used by humans, they greatly facilitate the development of computer programs: they enable programmers to more easily construct and follow the logic of a computer program, and allow for speedier and more concise creation of computer instructions.²⁵ For example, programmers are able to provide useful, more easily-understood descriptive names to the different elements of a computer program, such as subroutines, modules, functions, procedures or variables.²⁶ Some of the more well-known high-level programming languages are Basic, Fortran, Cobol, C++, and Java.

²⁴ Banzaf J "Copyright Protection for Computer Programs" 1966 *Copyright L Symp* 14 118 157-8; Kravetz "Copyright Protection of Computer Programs" 45; Petzold C *Code: The Hidden Language of Computer Hardware and Software* 1ed (2000) 352-3. The use of these programming languages is made possible as a consequence of computer programs which help to translate them into the necessary binary form. Before the development of high-level languages, programmers had developed a more basic, low-level language — assembly language — which allowed programming using simple command words and hexadecimal code to represent individual computer commands. While assembly language is still useful because it produces computer programs which are smaller and requires less processing time, its use is limited. In any event, the legal analysis relating to computer programs developed in high-level languages should be equally applicable to programs developed in assembly language. See Appleman *How Computer Programming Works* 14; White *How Computers Work* 79.

²⁵ Davidson "Protecting Computer Software: A Comprehensive Analysis" 368; Petzold *Code: The Hidden Language of Computer Hardware and Software* 353.

²⁶ Davidson "Protecting Computer Software: A Comprehensive Analysis" 378. Subroutines, modules, functions or procedures are sets of instructions in a computer program which are executable as distinct units. They are sometimes referred to as sub-programs, and could be considered as independent computer programs. A complex computer program generally consists of a master program – the kernel – which coordinates the interaction of various subprograms. Variables are

The computer program written by a computer programmer in a high-level language is referred to as the “source code” of the program.²⁷ Although these high-level languages are comparatively easy to understand, they are still fairly cryptic and, therefore, programmers are also permitted to add notes in human language (referred to as “comments”), which serve to explain the various parts of the computer program and its internal logic. These comments serve as an *aide-memoire* to program developers and can be used by subsequent programmers who are required to work on the computer program. As computers only process bits, in order for the computer program to be executable it is necessary to convert the source code of the program into “object code” (also called “binary code,” “machine code,” “machine language,” or “executable code”).²⁸ This conversion of the source code to object code is performed by computer programs called compilers or interpreters.²⁹

As may already be evident, the source code of a computer program, together with its comments, is valuable to anyone seeking to establish how the program works as it is readily understandable by a suitably trained or skilled programmer. However, the source codes of computer programs are not required to use the programs, only the object codes. Therefore, the source codes are usually kept

essentially the data which are to be processed by a computer program. See Appleman *How Computer Programming Works* 19 and 59; White *How Computers Work* 80.

²⁷ Strictly speaking, source code is the computer code produced by the computer programmer, in whichever form, a high-level language or directly in binary form (object code). However, as programming is rarely done in object code, references to the source code of a computer program are generally to computer code in a high-level language.

²⁸ This is a simplification as object code and machine code are not, technically, the same thing. Object code, although closely resembling machine code (comprising bits), is not in a form which is directly executable and still needs further processing to convert it into machine code. For purposes of the legal analysis, object code and machine code can be regarded as equivalent, as is commonly the case in the literature relating to the copyright protection of computer programs.

²⁹ Appleman *How Computer Programming Works* 149. It is not necessary, from a legal perspective, to elaborate on the technical distinction between the interpretation and compilation of the source code of a computer program, suffice to say that most commercial programs are compiled. Also, the interpretation or compilation of source code, technically, converts source code into an intermediate language, and not directly into object code. However, this work will simply refer to compiled programs when referring to the conversion of source code to object code. See White *How Computers Work* 86.

confidential and the programs are distributed only in object code.³⁰ While the compilation of the source code into object code is a relatively simple process, the object code is not easily reversible (or “decompiled” in computer parlance) into source code.³¹ During the compilation process converting source code to object code, programming comments are ignored, thus, any decompilation will not yield the helpful comments which may have accompanied the source code. The compilation process also removes the descriptive names of functions, subroutines, procedures or variables, which are replaced with symbolic representations. Furthermore, the logical order of the source code may not be apparent from the object code, which is more concerned with the order of execution of the program, rather than its design logic.³² Thus, for anyone wanting to do more than use a computer program — for example, modify the program — for all practical purposes, the source code is required, as reconstructing it requires painstaking reverse-engineering.³³

Henceforth, the more general term “computer code” will be used when dealing with matters applicable to both the source code and object code of a computer program, and where, from a legal perspective, no distinction is required.

4 2 1 Development of computer programs

As stated above, a computer program is simply a set of ordered instructions to be performed by a computer. In fact, the only instructions which computers are able to

³⁰ McJohn "The Paradoxes of Free Software" 27-8; Nadan C "Open Source Licensing: Virus or virtue?" 2002 *Tex Intell Prop LJ* 10 349 351; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 728-9.

³¹ McJohn "The Paradoxes of Free Software" 27-8.

³² Davidson "Protecting Computer Software: A Comprehensive Analysis" 378. In fact, the compiled intermediate language is specifically designed to facilitate efficiency. It can be rearranged and optimised for efficiency, and in this manner, programs with different source codes can result in the same low-level machine code. As indicated above, the compilation process produces intermediate language, which is suitable for optimisation, and this is what decompilation of the object code will reconstruct — not the source code.

³³ McJohn "The Paradoxes of Free Software" 27.

execute are very simple, individual instructions.³⁴ A relatively simple task for humans, if required to be performed by a computer, must meticulously be broken down into several individual instructions.³⁵ This fact suggests that computers are rather unremarkable, and does not account for their ubiquity in society. However, the real value of computers, which accounts for their proliferation, is the fact that computers are able to carry out these instructions (and, thus, the particular task) at much greater speeds and accuracy than humans.

As will become clear, the development of a computer program involves several layers of elaboration and gradual refinement, moving from a general idea to a specific application.³⁶ Given the fact that a computer program can, for some purposes, be considered in layers of elaboration at various levels of abstraction, these levels of abstraction have been used to determine the scope of copyright protection for computer programs, to distinguish unprotectable ideas from protected expression, on the basis of the idea-expression dichotomy in cases of non-literal copying.³⁷ However, this analogy, which was used because these principles of copyright law were applied in relation to literary works such as fiction or poetry, should be used with extreme caution in the case of computer programs. In the case of fiction or poetry an author has greater room for individualised expression; the manner in which something is expressed in a work of fiction or poem says a great deal more about what is expressed (and its author), than in the case of a computer program. Hettinger sums up this situation in the case of fiction or poetry as follows: "In these mediums, more so than in others, *how* something is said is very much part of *what* is said (and vice versa)."³⁸

³⁴ The individual instructions can vary from computer to computer, and is known as the particular "instruction set."

³⁵ Appleman *How Computer Programming Works* 59. These individual instructions are limited to those which, ultimately, form part of the particular instruction set.

³⁶ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 729; White *How Computers Work* 76.

³⁷ Davidson "Protecting Computer Software: A Comprehensive Analysis" 379; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 731.

³⁸ Hettinger "Justifying Intellectual Property" 32.

The fact is that the type of creativity involved in creating software is more akin to that associated with an engineering project than artistic creativity. It is therefore no coincidence that the endeavour of conceptualising and designing computer programs is referred to as “software engineering.”³⁹ Although the development of a computer program will, invariably, not be a linear process, the development process can be considered to comprise three stages: conceptualisation, design, and implementation.⁴⁰

The first stage in the development of a computer program is the identification of the particular task required to be performed: the program’s function or purpose.⁴¹ During this initial conceptualisation phase an outline of the overall purpose (for example, the problem to be addressed) of the proposed program, and its functional specifications, are formulated.⁴² As indicated, computer programs process data, and in developing the conceptual outline of the proposed program much of the effort is dedicated to ensuring efficient data flow: decisions have to be made about the types of data required and to be processed, how and where such data will be input for processing, the required data outputs and their handling, and the corresponding interfaces.⁴³ Through this conceptualisation process the relevant problems are identified and proposed solutions are developed.

The second stage of the development process usually involves the outlining of the particular proposed solutions to the identified problems through the use of

³⁹ Davidson "Protecting Computer Software: A Comprehensive Analysis" 343.

⁴⁰ Jones "The Protection of Computer Programs Under TRIPS: The Subject Matter Issue" 15. The testing stage is sometimes considered to be a distinct, additional stage of development, but for our purposes it can be included within implementation stage.

⁴¹ Appleman *How Computer Programming Works* 159-63. This phase is also known as the “analysis” phase of the software development cycle. The development process described here is the commonly-used top-down design.

⁴² Davidson "Protecting Computer Software: A Comprehensive Analysis" 341; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 729-30.

⁴³ Jones "The Protection of Computer Programs Under TRIPS: The Subject Matter Issue" 15; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 729-30.

flowcharts (which are graphical organisational diagrams).⁴⁴ If computers could only perform a series of consecutive steps, their usefulness, despite the speed with which they are able to execute those instructions, would be severely limited. Their real utility derives from the fact that, depending on the input data, it is possible to specify different courses of action, each involving further processing through a set of instructions.⁴⁵ This has the consequence that the solution is broken down into a series of subprograms (subroutines, functions or modules), and flowcharts map the various alternative paths of data and the associated computational processes.⁴⁶ While there may be alternative methods of resolving the problems identified, the number of options are generally limited by efficiency constraints. How the data to be processed are organised and managed is key to the efficiency of a computer program; it is not all about faster computers.⁴⁷ The performance of a computer program can be optimised through efficient data handling and software architecture.⁴⁸ In fact, much of the skill and effort in the development of a computer program concerns the optimal arrangement of data, and the ordering and interaction of the various subroutines.⁴⁹

This second stage of development, the development of a flowchart, yields an outline of the various elements (subroutines, functions or modules) of, or programming tasks to be performed by, the computer program and the relationships between them, leading to an overall understanding of how the program will operate.⁵⁰ Each of these programming tasks will, in turn, be broken down into its

⁴⁴ Appleman *How Computer Programming Works* 162; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 729.

⁴⁵ Appleman *How Computer Programming Works* 63.

⁴⁶ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 729-30.

⁴⁷ In fact, optimal design seeks to ignore the processing speed of particular computers. The runtime complexity of algorithms are deliberately measured independent of any hardware considerations.

⁴⁸ Appleman *How Computer Programming Works* 75.

⁴⁹ Jones "The Protection of Computer Programs Under TRIPS: The Subject Matter Issue" 16.

⁵⁰ Appleman *How Computer Programming Works* 63; Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 341.

more detailed constituent computational steps to accomplish the particular task.⁵¹ A particular description of the steps to perform a task is called an algorithm.⁵² The smaller algorithms will, in turn, constitute the individual steps in progressively larger algorithms, until the specified function or purpose of the computer program is achieved. In other words, “[a] computer program is essentially an elaborate algorithm that goes through a series of steps to arrive at a specific outcome.”⁵³ Often, the algorithms are initially described in general terms using informal, English-like descriptions of their operations, called pseudocode.⁵⁴ The developmental material produced thus far is not in a form which can serve as the instructions capable of being processed by a computer.⁵⁵

In the final stage of the development process the various algorithms are converted into sets of instructions capable of being processed by a computer — computer code. This is generally done by producing the necessary source code using a high-level programming language, and this process is referred to as “coding.”⁵⁶ The choice of programming language depends on various factors: its suitability for the particular type of program; whether the resultant source code will need to be compiled or interpreted, as this impacts the development time and ease of debugging; the performance of the program will also be affected by whether the source code will be interpreted or compiled; and, whether the program will be required to operate on different computers.⁵⁷ If the coding has been done in source code, rather than object code, as previously explained, the source code then needs

⁵¹ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 729-30.

⁵² Appleman *How Computer Programming Works* 107.

⁵³ White *How Computers Work* 76.

⁵⁴ Appleman *How Computer Programming Works* 63.

⁵⁵ The functions will be decided at this stage, but the actual implementation (algorithms) used to perform the functions will be fully expanded in the next stage.

⁵⁶ Appleman *How Computer Programming Works* 164; Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 342; Jones "The Protection of Computer Programs Under TRIPS: The Subject Matter Issue" 16.

⁵⁷ Appleman *How Computer Programming Works* 153. Interpreted source code generally requires less development time and is easier to debug. If performance of the program is the primary concern, programming in assembly language, rather than a high-level language, would be preferable.

to be converted (compiled) to object code. Following the coding, and any necessary compilation, the computer program is tested to ensure that it functions correctly. The process of testing and fixing the computer code is called debugging.⁵⁸ In addition, a program is usually “documented.” This involves the creation of accompanying descriptive material to explain the program’s purpose, overall operation and features to subsequent users.⁵⁹ Even after commercial release, computer programs are periodically updated by the addition of features providing greater functionality or modifying existing functionality. These updated computer programs are then released as new versions of the program.

During the early days of software development, the third phase of development, implementation (in particular, coding), involved the most effort, time, and costs.⁶⁰ Since then, it appears that the second phase of development, the design of a program (which involves the creation of flowcharts and ensuring the optimisation of performance through appropriate data management and software architecture), requires the greatest skill, effort, and financial resources.⁶¹ While implementation may still be the most time-consuming phase of development, it is a menial task in comparison to the work required in the design phase of development.⁶² This is particularly the case if great effort has been expended in the design phase, which is advisable, and sufficient detailed guidance concerning the architecture, algorithms and data structures has been furnished to the programmers responsible for implementation.⁶³

⁵⁸ 159-60; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 730-1.

⁵⁹ Appleman *How Computer Programming Works* 159; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 730-1.

⁶⁰ Banzaf "Copyright Protection for Computer Programs" 152; Breyer "The Uneasy Case for Copyright: A Study of Copyright in Books, Photocopies and Computer Programs" 343.

⁶¹ Davidson "Protecting Computer Software: A Comprehensive Analysis" 379; Pistorius and Visser "The Copyright Amendment Act 125 of 1992 and Computer Programs: A Preliminary Overview" 349. The most skilled, or senior programmers, are generally involved in the design process. On the other hand, the task of coding is usually delegated to the most junior, or inexperienced, programmers, who are pejoratively referred to as “coding monkeys.”

⁶² Jones "The Protection of Computer Programs Under TRIPS: The Subject Matter Issue" 16.

⁶³ Davidson "Protecting Computer Software: A Comprehensive Analysis" 379.

There are two principal reasons why the implementation stage no longer requires the most effort, skill or costs. Since the early days of computing, processing speed and available memory have greatly increased, and this has led to the creation of more sophisticated and complex computer programs, incorporating, for example, greater functionality, high-resolution graphical elements and various peripheral devices. This has meant that consumers have become more demanding in their requirements, and the commercial success of a program often depends on its novel conceptualisation, or superior design. The other reason is that the task of coding and debugging has been greatly facilitated through the development of software to assist programmers in the coding tasks.

4 3 Evolution of copyright protection of computer programs

The US led the world in the development of computer science, or, more correctly, its potential for commercial exploitation.⁶⁴ In the first computers computer programs were integrated into their physical construction, and were provided as a service by their manufacturers as part of the supply of the computers.⁶⁵ This is not surprising as the costs of computers were almost prohibitive because they were purpose-built for their customers.⁶⁶ Gradually computers became general-purpose, programmable computers, and by the 1960s computer manufacturers realised that by developing and offering more computer programs it would increase the utility of their computers to prospective customers.⁶⁷ However, at this time, due to the cost of computers, end users still leased computers, which made the need for protection of computer programs largely unnecessary. In fact, customers were given the software at no cost to entice them to see the benefit of, and purchase, a computer. It was the sale of the hardware which was the source of profits. No particular value was attributed to the

⁶⁴ Murray A *Information Technology Law: The Law and Society* 1ed (2010) 183.

⁶⁵ Pistorius and Visser "The Copyright Amendment Act 125 of 1992 and Computer Programs: A Preliminary Overview" 346.

⁶⁶ Murray *Information Technology Law: The Law and Society* 183; Reynolds and Tyman *Principles of Computer Science* 11.

⁶⁷ Banzaf "Copyright Protection for Computer Programs" 124; Davidson "Protecting Computer Software: A Comprehensive Analysis" 349.

computer programs, and the first programmers often freely shared the programs they developed, which helped to gradually address the problem of a paucity of available software for computers.⁶⁸ As a consequence, the risk of unauthorised copying of computer programs was negligible because of the limited number of computers. The cost of computers severely restricted the opportunity for the use of computer programs; unauthorised copying of programs was fairly easily detectable because of the continued relationship with the lessor of the computer, in terms of the lease arrangements, who also provided the programs.⁶⁹

The next significant change in respect of computer programs was that computer users (that is, the customers of the computer manufacturers) started developing their own programs. Although individual manufacturers of computers tried to get these users to share these programs with other users of its computers, users — particularly the oil companies — were only willing to do so in respect of simple programs, and not those programs which gave them a competitive advantage. These companies wanted protection for the latter type of computer program.⁷⁰ In addition, there was also the emergence of an independent software industry, whose “products” were its computer programs. This development in the mid-1960s was encouraged when the US Department of Justice considered the “bundling” of hardware and software by IBM to be anti-competitive conduct, and threatened legal action.⁷¹ As these software developers’ business depended on the willingness of computer users to pay for the privilege of using their computer programs, they were also keen to keep their programs secret, and this led to the first calls for copyright protection in the US.⁷² In fact, the first option which was pursued by software developers to attempt to secure protection for their software was to claim patent protection. It was only after two unsuccessful cases claiming patent

⁶⁸ Potter S "Opening Up to Open Source" 2000 *Rich JL & Tech* 6 (5) 5.

⁶⁹ Banzaf "Copyright Protection for Computer Programs" 156.

⁷⁰ 165-6; Davidson "Protecting Computer Software: A Comprehensive Analysis" 349.

⁷¹ Murray *Information Technology Law: The Law and Society* 183; White *How Computers Work* 69.

⁷² Banzaf "Copyright Protection for Computer Programs" 166; Murray *Information Technology Law: The Law and Society* 183.

protection for software, and the failed attempt to secure *sui generis* protection (based on patent protection), that the copyright route was pursued.⁷³

In the absence of any express legislative recognition of copyright protection of computer programs, software developers, from the late 1960s until the late 1970s, protected their computer programs through contract; they asserted rights of ownership, ostensibly based on property law, and, granted licences to customers to use their programs.⁷⁴ These licences typically imposed obligations of confidentiality on the users, and limited the use of the software.⁷⁵ Individual negotiation of contracts was possible because the computer programs which were the subject of these agreements were purpose-built for the user, and the costs of contracting was a relatively small proportion of the totally value of the transaction. The problem with the contractual route was that individual contracting imposed greater, possibly prohibitive, transaction costs on licensing with the advent of general-use, “off-the-shelf” software, and, would not provide adequate protection because of the requirement of privity of contract.⁷⁶

During the mid-1970s the price of computer hardware started to drop considerably, and affordable, mass-produced computers changed the source of profits in the computing industry. Until then, it was the computer manufacturers that made huge profits on the sale of the hardware. With the decline in prices, these companies soon realised that a greater share of their future profits would be derived from the “sale” of computer software, and dedicated more resources to the

⁷³ Murray *Information Technology Law: The Law and Society* 184.

⁷⁴ Despite the absence of express legislative recognition, the first known instance of copyright protection of a computer program actually occurred in the US in 1964. At the time, the US had a registration requirement for copyright works, and the US Copyright Office considered computer programs to be copyrightable as “books.” See Banzaf “Copyright Protection for Computer Programs” 118 and 144-5.

⁷⁵ Bobko P “Open-Source Software and the Demise of Copyright” 2001 *Rutgers Comp & Tech LJ* 27 51 56; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 65; Potter “Opening Up to Open Source” 6.

⁷⁶ We have seen the subsequent acceptance of “shrink-wrap” or “click-wrap” licences, but the efficacy of these agreements to protect software developers without the existing copyright protection of computer programs would be severely limited.

production of computer programs. Not only would software become commoditised — by the production of general software applications, as opposed to the bespoke software that had been produced until then — it could serve to increase computer hardware sales if the available software could only be used on a particular manufacturer's computers. The value of such customer "lock-in" convinced the large computer manufacturers to also support claims for copyright protection of computer programs. Thus, the computer manufacturers joined the calls of software users who developed their own software, and software vendors, for protection of computer programs.⁷⁷

In 1976 the US Congress enacted new legislation, the Copyright Act 1976⁷⁸ ("US Copyright Act"), which comprehensively revised US copyright law and paved the way for the possible copyright protection of computer programs. The US Copyright Act's expanded definition of literary works in section 101, which included any "words, numbers, or other verbal or numerical symbols or indicia, regardless of the nature of the material objects, such as books, periodicals, manuscripts, phonorecords, film, tapes, disks, or cards, in which they are embodied," was intended to be broad enough to protect computer programs as literary works, should such extension of protection be considered appropriate. In fact, the US Copyright Act provided a place holder provision in the Act, section 117, which would contain the relevant provision once the issue of copyright protection of computer programs had been considered by the National Commission on New Technological Uses of Copyrighted Works ("CONTU"), which was appointed by the US Congress. Following CONTU's report, copyright protection was extended to computer programs when the US Copyright Act was amended by the 1980 Computer Software Copyright Act.⁷⁹ In doing so, the US became the first country to expressly provide for copyright protection of computer programs.⁸⁰

⁷⁷ Davidson "Protecting Computer Software: A Comprehensive Analysis" 359.

⁷⁸ Copyright Act 1976, Title 17 USC.

⁷⁹ Davidson "Protecting Computer Software: A Comprehensive Analysis" 363; Murray *Information Technology Law: The Law and Society* 185; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 731-2.

⁸⁰ Murray *Information Technology Law: The Law and Society* 185.

The decision to protect computer programs by way of copyright law has not been without its critics.⁸¹ Apart from the economic criticisms, some of the criticism has focused on the nature of computer programs. The reasons copyright protection of computer programs was considered appropriate were the following: source code resembles written text; the lower threshold requirements for protection; and, the lack of an administrative burden associated with a system which requires registration.⁸² However, critics have claimed that the apparent resemblance of computer programs — in particular, the computer code — to other literary works protected by copyright is more apparent than real.⁸³ The fact that computer code is readable by humans belies its true purpose; the primary function of computer code is to be executed by a computer in order to realise the purpose of the particular computer program.

What makes computer programs different to other forms of intangible property is that they cause computers to function in accordance with their instructions. Other forms of intellectual property, such as musical works or patents, do not have such a direct, and purposive (or literal, rather than literary) character. For example, a musical work does not, by itself, create music, and a patent does not create the patented item.⁸⁴ The computer code of a computer program is not just symbolic — like an architect's drawing is symbolic of the building to be constructed or a cake recipe in relation to the cake described — it is also mechanical in the sense that it functions in a direct manner. A computer program does not simply provide instructions for, or reveal, how a computer will work, it actually makes the computer work in the specified manner.⁸⁵

⁸¹ For example, even in one of the seminal cases in the copyright protection of computer program a reservation was expressed that copyright may not be the most appropriate form of protection for computer programs; patent protection, with its stricter requirements, may be more suitable (*Computer Associates Intl. Inc. v Altai Inc.* 712).

⁸² Murray *Information Technology Law: The Law and Society* 184.

⁸³ South Africa protects computer programs as a *sui generis* category of copyright work, rather than a literary work, but that, in itself, does not overcome the more general criticism that copyright protection is inappropriate.

⁸⁴ Davidson "Protecting Computer Software: A Comprehensive Analysis" 344.

⁸⁵ 345.

Therefore, it has been claimed, not without some justification, that copyright protection of computer programs was misplaced; computer programs “are effectively a cuckoo in the copyright nest.”⁸⁶ Although there may have been a more principled basis, or form, for protecting computer programs, the fact is that the choice of copyright protection emerged by default, rather than design, and it was based on pragmatism as copyright “proved flexible enough to accommodate new technology in the past.”⁸⁷ To a large degree, due to the emerging international trade in computer software, countries felt compelled to protect computer programs by way of copyright after this had been accepted in the US. Copyright protection was also attractive because of other pragmatic considerations: copyright law had well-developed international instruments, like the Berne Convention,⁸⁸ providing for a high degree of harmonisation.⁸⁹

Given that copyright protection of computer programs appeared to have been based on the fact that computer code resembled writing — its form, rather than based on its nature — it is not surprising that courts had to wrestle with the nature of computer programs to determine the appropriate scope of protection, as will become clear when the cases are considered.⁹⁰ The appropriate scope of copyright protection is central to the economic rationale of copyright law, which is to incentivise (stimulate) the creation of copyright works, no more. If the scope of protection is too broad, the incentivising goal will be undermined as such protection will limit access by others to the broader themes and concepts used to create such works by other authors, which would offset the social benefit of protecting such works. As will become clear, despite the different nature of computer programs, the courts, at first, incorrectly analogised computer programs with copyright works with which they were

⁸⁶ Gordon S "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 1998 *EIPR* 20 (1) 10 10. See also Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 728.

⁸⁷ Jones "The Protection of Computer Programs Under TRIPS: The Subject Matter Issue" 40.

⁸⁸ Berne Convention for the Protection of Literary and Artistic Works 1886.

⁸⁹ Derclaye E "Software Copyright Protection: Can Europe Learn from American Case Law? Part 1" 2000 *EIPR* 22 (1) 79.

⁹⁰ Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 10.

familiar, such as novels, resulting in the scope of protection being too broad. The problem of determining the appropriate scope of protection was, in part, made more difficult due to the fact that, as already mentioned, courts lacked an adequate understanding of the technical issues concerning the, relatively new field of computer science and its application.

4 4 Copyright protection of computer programs

We will now proceed to determine the scope of copyright protection of computer programs. As the focus of the legal analysis will be to determine the extent of copyright protection of computer programs, the other aspects of copyright protection, such as who is regarded as the author of a computer program, will not be considered. This work is not intended to be a detailed treatise on the law relating to all aspects of the copyright protection of computer programs.

Copyright legislation, as a general rule, does not determine the scope of copyright protection. The courts have been left with the task to define its scope. This has allowed the law to be dynamic: responding to the challenges brought about by rapid changes in technology and its impact on copyright doctrine. It is, therefore, not surprising that the CONTU report, which led to the first express legislative recognition of copyright protection of computer programs, recommended that the scope of protection should be determined by the courts.⁹¹ However, significantly, in relation to computer programs, the copyright legislation in all three jurisdictions under consideration has expressly provided for excluded subject matter or exceptions to the exclusive rights granted to the copyright holder. Accordingly, it is necessary to start with the relevant statutory provisions, as copyright protection is a statutory creation.

⁹¹ Pistorius T "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 1992 *De Jure* 25 (1) 166 166.

As far as the legislative analysis is concerned, our starting point will be the South African Copyright Act 1978⁹² (“SA Copyright Act”). The SA Copyright Act’s provisions will principally be contrasted with those of the UK Copyright, Designs and Patents Act (“UK CDPA”).⁹³ Besides the historical links between the South African legislation and the UK legislation, the other reason for focusing on this comparison (rather than with the US Copyright Act) is that the UK CDPA had to be harmonised with the EU Software Directive.⁹⁴ The EU Software Directive is the most recent multi-national instrument reflecting a broad consensus on the scope of copyright protection of computer programs. Also, as will become apparent during the course of this chapter, while it is true that the US cases led the way in determining the scope of copyright protection of computer programs, the most recent cases have been those decided in the UK, which have been significantly influenced by the EU Software Directive.⁹⁵

Following the consideration of the legislative provisions, we will consider the key cases which have determined the scope of copyright protection of computer programs. However, before considering the case law, two additional aspects of computer programs will be considered: the implications for copyright law as a consequence of their functional nature, and the protectability of the screen displays (or user interfaces) of computer programs. Although screen displays are not computer programs, and, thus, strictly not within the scope of this work, it is necessary to comment on the scope of copyright protection of user interfaces because of their importance to the commercial success of computer programs.

⁹² Copyright Act 98 of 1978.

⁹³ Copyright, Designs and Patents Act 1988.

⁹⁴ Directive on the legal protection of computer programs 2009/24/EC. The original directive was adopted on 14 May 1991 (Directive on the legal protection of computer programs 91/250/EEC), and was replaced by the current version, adopted on 23 April 2009, with effect from 25 May 2009. The two versions are substantively the same, as the later version was simply a consolidation of the earlier version and its amendments.

⁹⁵ See, for example, *Navitaire Inc. v easyJet Airline Company & Another* [2004] EWHC 1725 (Ch) 93 and *Nova Productions Ltd v Mazooma Games Ltd & Others* [2007] EWCA Civ 219 [27].

4 4 1 Statutory protection of computer programs

The general requirements for all copyright works in South Africa⁹⁶ are the following: they have to be original (that is, the result of the author's own efforts),⁹⁷ the work must be reduced to a material form,⁹⁸ and, the author of the work must a "qualified person"⁹⁹ at the time of its creation or there must have been a qualifying publication of the work.¹⁰⁰ Of the other general requirements relating to copyright protection in South Africa, it is only necessary to briefly mention those which deviate from the usual requirements in the case of computer programs. Similar to cinematograph films and sound recordings, the author of a computer program is the person who exercised control over the making of the computer program, rather than the person

⁹⁶ The substantive requirements for copyright protection in South Africa are materially the same as in the UK (Murray *Information Technology Law: The Law and Society* 186-9) and the US (Ebersöhn G "Protecting Copyright in Computer Games and Computer Software" 2005 *TSAR* 106 106; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 731-2; Neelakantan M and Armstrong A "Source Code, Object Code, and The Da Vinci Code: The Debate on Intellectual Property Protection for Software Programs" 2006 *The Computer & Internet Lawyer* 23 (10) 1 2). The only substantive difference between US copyright law, and UK (and SA) copyright law, is the lower standard of originality required in the UK and SA. In the UK and SA, for a work to qualify as original it is simply required that it must be a product of the author's own effort or skill – the so-called "sweat of the brow" standard of originality (Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 1" 15-6; Murray *Information Technology Law: The Law and Society* 187; De Villiers "Computer Programs and Copyright: The South African Perspective" 324). The lower UK standard of originality has also been accepted as the applicable standard under the EU Software Directive (Murray *Information Technology Law: The Law and Society* 188). The US, following the decision in *Feist Publications, Inc. v Rural Tel. Serv. Co.* 1991 113 L. Ed. 2d 358, requires that a copyright work exhibits a (minimal) degree of creativity for it to be considered original (Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 1" 15-6). Having said all this, originality is unlikely to ever be in issue in the case of computer programs, as any, but the most rudimentary computer programs, would qualify as original because "[g]enerally computer programs have little problem in being recognized as original, because of the effort expended in creating them (De Villiers "Computer Programs and Copyright: The South African Perspective" 324)."

⁹⁷ S 2(1) SA Copyright Act.

⁹⁸ S 2(2).

⁹⁹ S 3(1), as read with s 37.

¹⁰⁰ S 4, as read with s 1(5).

who created the work.¹⁰¹ Provided these requirements are satisfied, a computer program automatically enjoys copyright protection; there are no registration formalities required to obtain copyright protection of computer programs.

Although a computer program was considered as being eligible for copyright protection as a literary work as far back as 1981, it was not until 1992 that the SA Copyright Act expressly provided for the copyright protection of computer programs.¹⁰² Following the 1992 amendment to the SA Copyright Act pursuant to the Copyright Amendment Act (the “1992 Amendment Act”),¹⁰³ South Africa protects computer programs as a *sui generis* category of copyright work, and expressly excludes them from constituting either literary works or cinematograph films.¹⁰⁴ The specific exclusions were considered necessary to reverse the effects of previous cases.¹⁰⁵

4 4 1 1 Categorisation of computer programs

The decision to protect computer programs as a *sui generis* category of copyright work, and not as a form of literary work, has been criticised as being out of step with international practice.¹⁰⁶ Although the memorandum to the first draft bill which led to the 1992 Amendment Act suggested that the decision to protect computer programs as a *sui generis* category of copyright work was in conformity with the WIPO model

¹⁰¹ S 1(1) sv “author” para (i).

¹⁰² *Northern Office Microcomputers (Pty) Ltd & Others v Rosenstein* 1981 (4) SA 123 (C) 134.

¹⁰³ Copyright Amendment Act 125 of 1992, which came into operation on 10 July 1992.

¹⁰⁴ S 2(1)(i) SA Copyright Act. See definitions of “cinematograph film” and “literary work” in s 1.

¹⁰⁵ As stated above, in *Northern Office Microcomputers (Pty) Ltd & Others v Rosenstein* a computer program was considered to be protectable as a literary work. It is submitted, that prohibition of computer programs constituting cinematograph films was unnecessary. This exclusion was probably inserted to reverse the decision in *Golden China TV Game Centre & Others v Nintendo Co Ltd*. However, in that case, it was common cause that the computer (or video) games — that is, the sequence of “moving” graphic images — were not computer programs, although they were, effectively, created by computer programs (at 415).

¹⁰⁶ Pistorius T “The Copyright Protection of Computer Programs: Literary Works Shunned by the Proposed Bill” 1991 *De Rebus* (November) 833 833.

law, it does not indicate which WIPO model law. Neither the WIPO Model Provisions on the Protection of Computer Software (1978), nor the WIPO Draft Model Law on Copyright (1990), *required* that computer programs be protected as a *sui generis* category of copyright work.¹⁰⁷ South Africa's decision to protect computer programs as a *sui generis* category of copyright work makes it fairly unique as all the leading jurisdictions with computer software industries have opted for protection of computer programs as literary works.¹⁰⁸ Pistorius suggested that computer programs are not significantly different to other utilitarian literary works, and their functionality is, also, irrelevant.¹⁰⁹ It is submitted that computer programs are, indeed, significantly different from other literary works, as already discussed. In fact, it is arguable that, although jurisdictions like the US and the UK protect computer programs as literary works, computer programs are only nominally literary works; for all intents and purposes, computer programs in those jurisdictions are, in reality, a distinct category of copyright work.

As will be illustrated when considering the case law in the US and the UK, much of the problem in determining the appropriate scope of copyright protection of computer programs was attributable to the "uncritical" application of the copyright principles applicable to traditional literary works to computer programs.¹¹⁰ Contrary to Pistorius' suggestion, the courts have accepted that the problem of determining the appropriate scope of copyright protection presented by computer programs is "fundamentally different" from other literary works due to their functional character. In other words, computer programs do not fit comfortably within the copyright framework — let alone, being comparable to other literary works. Determining the appropriate scope of copyright protection of computer programs, from an economic perspective, requires a different calculus from other literary works — even other

¹⁰⁷ 833-4.

¹⁰⁸ Pistorius and Visser "The Copyright Amendment Act 125 of 1992 and Computer Programs: A Preliminary Overview" 348.

¹⁰⁹ Pistorius "The Copyright Protection of Computer Programs: Literary Works Shunned by the Proposed Bill" 833-4.

¹¹⁰ See, for example, *John Richardson Computers Ltd v Flanders (No. 2)* [1993] FSR 497 558-9 and *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95 130.

utilitarian literary works.¹¹¹ As already indicated, some commentators have considered computer programs to be cuckoos in the copyright nest.¹¹² Therefore, it is suggested that there may not be any significance that South Africa protects computer programs as a *sui generis* category of copyright work, while the US and the UK protect them as literary works; it is not doctrinally problematic to consider the US and UK case law because the case law in those jurisdictions indicates that computer programs are treated, *de facto*, as a separate category of copyright work. In fact, South Africa's decision to categorise computer programs as a *sui generis* type of copyright work is, arguably, doctrinally more acceptable as it reflects the *de facto* position in the US and the UK. It is further submitted that the protection of computer programs as a *sui generis* category of copyright work is in compliance with South Africa's obligations, as a member of the World Trade Organisation, and signatory to the General Agreement on Tariffs and Trades ("GATT"), pursuant to Article 10 of the Agreement on Trade-Related Aspects of Intellectual Property Rights ("TRIPS"), Annexure 1C of GATT. Article 10 of TRIPS requires that computer programs be protected as literary works as defined in the Berne Convention. The definition of "literary and artistic works" in the Berne Convention has a very wide meaning, and includes musical works, dramatic works and cinematograph films. Although most jurisdictions protect some of these works as distinct categories, it is commonly accepted that this still complies with the requirements of the Berne Convention.¹¹³ Therefore, in principle, protecting computer programs as a distinct category of copyright work should comply with Article 10(1) as the intention is, arguably, simply that the various works included within the definition of literary work should be protected to the same extent or in the same manner as traditional literary works.

¹¹¹ *Lotus Development Corp. v Borland International Inc.* 1995 49 F.3d 807 819-20.

¹¹² Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 10. See also Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 728.

¹¹³ For example, in the UK all three types of work are protected as distinct categories, whereas dramatic works are protected as literary works in South Africa.

4 4 1 2 Preparatory design material

Although South Africa protects computer programs as a *sui generis* category of copyright work, this does not prevent the preparatory design material — for example, the program specifications and flowcharts — relating to the creation of a computer program being protected as distinct literary (or artistic) works.¹¹⁴ As a consequence of the way in which the SA Copyright Act defines “computer program,”¹¹⁵ it is only the computer code, which is capable of being executable by a computer, that is protectable as a computer program. This does not mean that if there are errors (or “bugs”) in a computer program, which may mean that it sometimes does not produce the correct results, that it does not qualify for protection.¹¹⁶ No complex computer program will be error-free.

Significantly, in terms of Article 1(1) of the EU Software Directive, the preparatory design material of a computer program is also included as part of the copyright protection of the computer program. In other words, the preparatory design material and the computer program are protected as one work. Thus, unlike the current position in South Africa, the position in the UK is that the preparatory design material of a computer program is protected as a computer program, and not a distinct form of literary work.¹¹⁷ However, there is no indication at what stage the preparatory design material will be considered to be a computer program. Recital 7 of the EU Software Directive does not provide any clarification as it merely provides that the preparatory design material will qualify for protection if it can result in a computer program at later stage. Does the preparatory design material need to be so detailed that all that remains to be done is that the implementation phase (the coding and testing) needs to be completed? To protect only the barest outlines of the conceptualisation of a computer program, although it could — eventually —

¹¹⁴ S 1(1) sv SA Copyright Act “computer program,” “literary work,” and “artistic work.” See Dean O “Protection of Computer Programs by Copyright in South Africa” 1995 *Stell LR* 6 (1) 86 87.

¹¹⁵ S 1(1) defines “computer program” as “a set of instructions fixed or stored in any manner and which, when used directly or indirectly in a computer, directs its operation to bring about a result.”

¹¹⁶ *Haupt t/a Soft Copy v Brewers Marketing Intelligence (Pty) Ltd & Others* 470.

¹¹⁷ *Nova Productions Ltd v Mazooma Games Ltd & Others* [27].

result in a computer program, would amount to protecting an idea of a computer program, rather than its particular expression.

As discussed above, while the implementation phase may be time-consuming, when compared to the design phase of the software development process, it is a relatively menial task. Given the economic value attached to a thorough design phase, it should be protected. Whether the current position under South African law provides sufficient protection to preparatory design material depends on whether converting the literary (or artistic) work into a computer program constitutes an “adaptation” of the copyright work.¹¹⁸ The definition of adaptation is non-exhaustive and, on the basis of the economic justification for copyright law, implementation of preparatory design materials should constitute copyright infringement.

However, Pistorius suggests that, although the flow charts relating to the design of a computer program may be protected as literary works, if such works are directly turned into a computer program (that is, converted to computer code), no copyright infringement will have taken place because there is no objective similarity between the flowcharts and the computer program. The flow charts and the computer program are entirely different expressions; the resultant computer program is not an adaptation of the flow charts, although the flow charts form the basis of the computer program, and may account for most of the development time. The creation of the computer program will merely have used the idea embodied in the flowcharts, rather than the particular expression.¹¹⁹

In order, to avoid any uncertainty concerning the protectability of the computer program described in preparatory design materials, it is suggested that the definition of “adaptation” or “computer program” be amended to expressly provide the necessary protection for such material. As indicated, the relevant amendment should require that the preparatory design material be sufficiently detailed to avoid

¹¹⁸ S 1(1) SA Copyright Actsv “adaptation” paras (a) and (c).

¹¹⁹ Pistorius "The Copyright Protection of Computer Programs: Literary Works Shunned by the Proposed Bill" 835.

protecting a bare idea. Also, the fact that the Directive protects a computer program and its preparatory design material as one work means that the copyright will vest in the same author(s), and avoids complications which could occur should the copyright in a computer program and its preparatory design material vest in different authors.¹²⁰

4 4 2 Scope of copyright protection

We will now consider the scope of copyright protection of the actual computer program, that is, the “coded” version of the computer program. The scope of copyright protection of a copyright work, such as a computer program, depends on the restricted acts¹²¹ reserved exclusively for the author, and the permitted exceptions¹²² to such restricted acts. For example, the most significant economic rights given to the author of a computer program are the exclusive right to reproduce the computer program (that is, make copies thereof), make an adaptation of the program, and let or hire copies of the computer program. These rights are granted for a period of fifty years from when the computer program is first published or is made available to the public.¹²³ While it is the case that if computer programs had been protected as literary works in South Africa, computer programs may have enjoyed a longer period of protection — the life of the author plus fifty years — this is not economically significant. The period over which computer programs have a commercial value is much shorter than fifty years.

Before considering the case law relating to copyright infringement — which concerns breaches of the restricted acts reserved exclusively for the author — we will first consider the express statutory exceptions to copyright protection. Although this approach subverts the orthodox order of copyright analysis applied in infringement cases, it makes more sense when trying to gain an overall impression of the scope of copyright protection of computer programs to first consider the exceptions. The reason why this subverts the orthodox order of copyright analysis

¹²⁰ *Nova Productions Ltd v Mazooma Games Ltd & Others* [28].

¹²¹ S 11B SA Copyright Act.

¹²² S 19B.

¹²³ S 3(2)(b).

applied in infringement cases is that the exceptions are only considered once it has been established that copyright infringement had taken place; they are a defence to a claim of copyright infringement. In other words, the exceptions have no application in the absence of copyright infringement. The reason it makes more sense to consider the exceptions first is that third parties, when considering, for example, whether to develop a computer program similar to another program, may wish to refer to these exceptions in order to determine what would be considered to be non-infringing conduct. These exceptions are, thus, useful for potential competitors when considering whether they are permitted to develop a substitute, competitive computer programs. Competitors would want their product to be as close as possible to a perfect substitute to a successful product, if not superior.

4 4 2 1 Statutory exceptions

The privileges which copyright grants to authors are subject to limitations which allow others to use copyright works in certain circumstances. These permitted uses would, in the absence of these provisions, constitute copyright infringement. The permitted uses, or limitations, are referred to as the “fair-dealing” exceptions.¹²⁴ Specific exceptions apply in respect of each category of copyright work, and the most well-known exceptions are those applicable to literary (or artistic) works: the right to use the works for research or private study, or for personal or private use; for criticism or review; or, for reporting current events.¹²⁵ There are various policy reasons that have been proffered for these limitations, for example: the need for advancement of knowledge and innovation; that freedom of expression should not be stifled; or, the public need for information.

In the US, the ambit of the permissible acts (fair use) fuels a continuing debate about the basis of intellectual property rights, and its relation to the public

¹²⁴ In the US, these exceptions are referred to as the “fair use” doctrine. In contrast to the position in South Africa and the UK, the US has a more open-ended exception. Although the US statutory provision (s 107 US Copyright Act) allows for the uses permitted in South Africa and the UK, it is also allows other uses, provided the stated factors are satisfied.

¹²⁵ S 12(1) SA Copyright Act. See also ss 29, 30(1) and 30(2) UK CDPA.

domain (or the commons).¹²⁶ For some, intellectual property rights are the *exception* to the public domain: the purpose of intellectual property law is, paradoxically, to increase the size of the public domain. Intellectual property rights are only permissible to the extent that they incentivise creation and enlarge the public domain.¹²⁷ According to this view, which is based on a particular interpretation of the US constitutional provision which authorises the US Congress to create copyright,¹²⁸ fair use is not the exception to the property rights granted to authors; there is no need for its justification.¹²⁹

Again, economic analysis can provide valuable insights into the need or the benefits of the fair-dealing exceptions. From an economic perspective, fair-dealing exceptions should apply where the costs of gaining the author's permission for a third party seeking to use the copyright work are so disproportionate to the expected benefits of using the copyright work (or, a substantial portion thereof) that the third party does not bother to seek the necessary permission (and abandons its intentions to use the work). What makes this situation socially wasteful is that the copyright work will not be used in situations where the author would have granted permission, if requested, as the proposed use does not affect the author's market for the copyright work.¹³⁰ In other words, "requiring permission would impose a transaction cost with no offsetting benefit."¹³¹

¹²⁶ The public domain is the material that can be used by any person, either because it is not protected intellectual property law (because such protection has expired or was never capable of being protected as such) or its use is permissible as an exception to the protection afforded (for example, the fair-dealing exceptions). Although "public domain" and "commons" are often interchangeable terms, "commons" can have a more restricted mean; "commons" something refers to material usable by a particular group (rather than by any person), or material which can be used subject to certain restrictions. See Boyle *The Public Domain: Enclosing the Commons of the Mind* 38-9.

¹²⁷ 50.

¹²⁸ Article 1, Section 8 US Constitution.

¹²⁹ Boyle *The Public Domain: Enclosing the Commons of the Mind* 108.

¹³⁰ Landes and Posner "An Economic Analysis of Copyright Law" 357.

¹³¹ Posner "Intellectual Property: The Law and Economics Approach" 63-4.

For example, the fair-dealing exceptions applicable to literary works mentioned above generally comply with this economic rationale. Although at first glance one would think that, for example, an author of a book would not be happy to give consent to a critic to quote from his work, such consent makes sense in the publishing industry. Publishers would generally consent (or require authors to consent) to such use, if permission was sought, because such criticisms provide free marketing and may increase the demand for the work.¹³² Also, because books or films are experience goods, rather than inspection goods, consumers are assisted by, and require, accurate reviews. Although some reviews may be unfavourable, publishers consider it, overall, to be in their best interest to, *ex ante*, permit reviews because a system of publisher-approved reviews would not benefit publishers because it would lack credibility.¹³³

As South Africa protects computer programs as a *sui generis* category of copyright work, and not as a literary (or artistic) works, the three well-known fair-dealing exceptions are not applicable to computer programs. As will be discussed, the substantive fair dealing exceptions applicable to computer programs in South Africa differ significantly from those in the UK. This is not simply due to the fact that the UK protects computer programs as literary works, whereas South Africa protects them as *sui generis* copyright works. While it is the case that the UK protects computer programs as literary works, the private study and research fair-dealing exceptions generally applicable to literary works are, effectively, excluded in the case of computer programs.¹³⁴ The UK CDPA introduced a number of specific fair-dealing exceptions, including those for private study and research, relating to computer programs, which go far wider than those in South Africa.¹³⁵

¹³² Landes and Posner "An Economic Analysis of Copyright Law" 358-9.

¹³³ 359.

¹³⁴ S 29(4) and s 29(4A) UK CDPA. The criticism, review or reporting fair-dealing exceptions are not of any significance in the case of computer programs.

¹³⁵ The specific fair-dealing exceptions relating to computer programs in the US (s 117 US Copyright Act), while not as detailed as those in the UK, are also wider than the SA provisions. A lawful user may make a back-up copy of a computer program, or decompile and modify it to enable use. In addition, there is also an express right of resale of a program, and its modification, unless the author refuses consent. It is for this reason that the use of computer programs are usually only allowed by

The UK fair-dealing exceptions provide four permissible rights to lawful users: the right to make back-up copies of a computer program, decompile a program, modify a program to remedy errors, and to study and test a program.¹³⁶ These rights are intended to facilitate the use of computer programs, and allow sufficient room for software development.¹³⁷ Other than the right to modify a program to remedy errors, these rights of lawful users cannot be contractually excluded.¹³⁸ As this work focuses on whether copyright provides the necessary incentives for the production of computer programs, without stifling innovation, the exceptions, other than the right to make back-up copies,¹³⁹ are more important as they possibly impact software development.

In terms of section 50B of the UK CDPA a lawful user is entitled to decompile a computer program for certain purposes, and is entitled to copy the program for purpose of decompilation.¹⁴⁰ The right of decompilation is solely for purposes of allowing the development of interoperable software, that is, software that can work either with the decompiled program or another program.¹⁴¹ From an economic perspective, this is important because it seeks to prevent a software manufacturer which has market power using its dominant position to prevent competitors from entering the market. For example, in the absence of such a provision, Microsoft could prevent others from developing rival word-processing programs to its Microsoft

way of licence, rather than through a sale. Interestingly, the US Copyright Act allows a purchaser to install multiple copies, which may materially affect the business model of the author as it is usually based on a per-computer basis. As already stated, the more general fair-dealing exception in the US (s 106) is also used in more varied circumstances. For example, it is accepted that the use of a computer program for teaching, research, or scholarship will not constitute copyright infringement. Davidson "Protecting Computer Software: A Comprehensive Analysis" 383-4; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 732-3.

¹³⁶ Ss 50A-50C UK CDPA.

¹³⁷ Murray *Information Technology Law: The Law and Society* 210.

¹³⁸ Ss 50A(3), 50B(4) and 50BA(2) UK CDPA.

¹³⁹ S 50A .

¹⁴⁰ As described above, decompilation attempts to convert the object code back to its humanly-readable source code

¹⁴¹ S 50B(2) UK CDPA.

Word application as it would be necessary for competitors to determine the essential characteristics of its file extensions¹⁴² or access content protected by its digital rights management system. If Microsoft's file extensions are revealed competitors are able to develop word-processing programs that allow users to create documents which are compatible with Microsoft Word. Similarly, documents created in Microsoft Word should be accessible and editable by users of the new word-processing program.¹⁴³

However, the decompilation right is subject to conditions, which seek to prevent a competitor from simply decompiling a computer program and using the decompilation as an "unfair" shortcut to producing a competitive, substitute computer program. For example, the decompilation right does not assist a potential competitor who seeks to develop a substitute computer program by simply copying the source code of the decompiled program. Section 50B(3)(d) expressly prohibits the decompilation of a computer program for purposes of creating "a program which is substantially similar in its expression to the program decompiled or to do any act restricted by copyright." The decompiled code may also not be used to study the operation of a computer program in order to determine how it functions; it is to be used strictly for purposes of ensuring interoperability.¹⁴⁴ In order to avoid its computer program being the subject of prying for purposes other than ensuring interoperability, section 50B(3)(a) gives authors the right to prevent decompilation of their programs. If the necessary information to develop an interoperable computer program is readily available, the decompilation right does not exist. This is precisely what proprietary-software developers chose to do; they make the specifications for interoperability — the application programming interface (API) — with their computer programs publicly available.

Although seemingly superfluous, section 50BA expressly provides that a lawful user of a computer program has the right to study "the functioning of the program in order to determine the ideas and principles which underlie any element of the program if he does so while performing any of the acts of loading, displaying,

¹⁴² The types of files created by the Microsoft Word program, for example, the ".doc" and ".docx"

¹⁴³ Murray *Information Technology Law: The Law and Society* 211.

¹⁴⁴ S 50B(2) read with s 50B(3)(b) UK CDPA.

running, transmitting or storing the program which he is entitled to do.” As will be discussed below, this provision, to some extent, supports the narrow protection developed in the English cases, culminating in the *Navitaire* case.¹⁴⁵ It is submitted that its real purpose is to emphasise the fact that under UK copyright law, while a computer program cannot be copied by decompiling it (and copying its source code or directly studying its construction), it is entirely permissible to reverse engineer the functionality of a program by observing its operation.

In that sense, the combined effect of sections 50B and 50BA of the UK CDPA is comparable to the permissible reverse engineering of three-dimensional utilitarian articles based on artistic works, which were produced for the public by an industrial process.¹⁴⁶ The permissible reverse engineering of three-dimensional utilitarian articles has been of significant economic importance, as it benefits consumers by allowing the production of cheap spare parts for a range of utilitarian, mass-produced articles. In the absence of this exception, the production of such spare parts would have been preventable as infringing the artistic works (the design drawings or the prototypes) on which they were based, and would allow the manufacturer to be a monopolist in respect of these articles.

Thus, the economic essence of sections 50B and 50BA of the UK CDPA is that reverse engineering is permitted provided that the subsequent producer of an equivalent program has gone through the expense and effort of producing such program from observing the functioning of the computer program. It is not permitted to produce an equivalent program by engaging in shortcuts such as simply using the decompiled object code. However, it is submitted that this limited right of decompilation provides excessive protection for computer programs. Decompiling the object code of a computer program does not yield directly usable source code of a computer program. To produce the source code for an equivalent program still requires significant effort and skill. Thus, allowing decompilation does not amount to allowing a competitor the equivalent of producing a competitive program from the

¹⁴⁵ Murray *Information Technology Law: The Law and Society* 211.

¹⁴⁶ S 15(3A) SA Copyright Act and s 51 UK CDPA.

original blueprint for the program, similar to having the design drawing or prototype of a three-dimensional utilitarian article.¹⁴⁷

The provision of an unfettered decompilation right is, therefore, preferable as it encourages innovation and the dissemination of ideas. In contrast to the position in the UK, US courts have interpreted the fair use doctrine as providing a general decompilation right. It is permissible for anyone, even a competitor of the author of a computer program, to decompile a program in order to determine how it functions. Thus, US copyright law gives competitors an unfettered right to produce competitive substitute programs, provided they are prepared to undertake the necessary effort, and incur the expense of reverse engineering.¹⁴⁸

Briefly, the final permitted act under the UK CDPA, unless this has contractually been excluded, is the right of a lawful user to make necessary modifications to a computer program in order to use it, including for purposes of error correction.¹⁴⁹ Following the decision in *Mars UK Ltd v Teknowledge Ltd*,¹⁵⁰ the scope of the right to correct errors has been construed more narrowly than previously considered to be the case. Changes to software brought about by environmental changes, such as desired additional functionality or improvements, will not be considered as permissible error correction.¹⁵¹

In contrast with the UK's quite detailed fair-dealing provisions relating to computer programs, South Africa provides only a very limited exception to the lawful user of a computer program to make a back-up copy of a program.¹⁵² Even this limited right which the SA Copyright Act provides has been criticised as being narrower than the corresponding provision in the UK CDPA: "Section 19B(2) allows

¹⁴⁷ The regime permitting reverse engineering of three-dimensional utilitarian articles under the UK CDPA is broader than under the SA Copyright Act. Unlike the position in South Africa, section 51(1) of the UK CDPA permits the use of the original design documents by a competitor.

¹⁴⁸ Boyle *The Public Domain: Enclosing the Commons of the Mind* 166.

¹⁴⁹ UK CDPAS 50C.

¹⁵⁰ *Mars UK Ltd v Teknowledge Ltd* [1999] EWHC 226 (Pat).

¹⁵¹ Murray *Information Technology Law: The Law and Society* 212.

¹⁵² S 19B SA Copyright Act.

the making of back-up copies for private and personal purposes only, whereas s 50A has no such limitation.”¹⁵³

Thus, simply on the basis of the express statutory provisions, the scope of copyright protection afforded to computer programs under the UK CDPA is considerably narrower than that provided under the SA Copyright Act. This narrower scope of protection of computer programs is deliberate: the UK provisions “are clearly designed to stimulate competition and further development and to prevent unwarranted monopolies.”¹⁵⁴ Similarly, the US courts have interpreted the more open-ended fair-use provisions in an even broader manner than the UK provisions, and, thus, provide even narrower protection to computer programs. Until the recent enactment of the Digital Millennium Copyright Act,¹⁵⁵ the US courts have tended to use the fair-use doctrine to prevent perceived anti-competitive behaviour.¹⁵⁶ For example, as indicated, the fair-use provisions in the US have been interpreted as permitting an unfettered decompilation right, which includes the right to determine the functioning of a computer program where there is a legitimate purpose, such as error correction or developing a competitive substitute program.¹⁵⁷ Accordingly, it is submitted that South Africa appears to provide excessive copyright protection for computer programs, and the exceptions identified in the US and UK should be incorporated in the SA Copyright Act.

4 4 2 2 Copyright implications of the functional nature of computer programs

As the functional nature of computer programs impacts both cases involving literal and non-literal infringement, it would be convenient, at this stage, to consider the challenges posed to copyright law by functional copyright works such as computer

¹⁵³ De Villiers "Computer Programs and Copyright: The South African Perspective" 327.

¹⁵⁴ 327.

¹⁵⁵ Digital Millennium Copyright Act 112 Stat. 2860 (1998). The US DMCA amended the US Copyright Act, introducing, among other things, provisions which criminalise the circumvention of technological protection systems used to protect copyright works.

¹⁵⁶ Boyle *The Public Domain: Enclosing the Commons of the Mind* 120.

¹⁵⁷ De Villiers "Computer Programs and Copyright: The South African Perspective" 327.

programs. The functional nature of computer programs necessitates a careful assessment of what exactly the courts are asked to protect: the assessment of whether a substantial part of a computer program has been copied should identify — and disregard — any unprotectable elements, and give the appropriate weight to those elements which are entitled to only limited (or “thin”) copyright protection. For example, expressions of commonplace ideas receive limited protection in the sense that they will only be infringed if exactly copied.¹⁵⁸

Non-functional copyright works, like fictional literary works, are purer expressions of an author’s creative mind: other than the fact that a literary work may make use of general plot lines, themes, literary techniques, or stock characters, authors are not constrained by functional considerations. In contrast to fictional literary works, computer programs with a similar function (or addressing a particular problem) will — because of their functional nature — necessarily exhibit a greater degree of similarity. Thus, due to the fact that computer programs will invariably have to conform to technical requirements, and employ standard techniques and common expressions, a greater degree of similarity may be required before a finding of substantial similarity can be sustained.¹⁵⁹ In this sense, copyright protection of computer programs may be required to be more limited. For example in *Lotus Development Corp. v Borland International Inc.* it was stated that the functional nature of computer programs does not prevent them from being copyrightable, but it does change how they should be assessed in terms of copyright doctrine.¹⁶⁰

De Villiers states that, unlike the US courts, the UK and South African courts have not drawn a proper distinction between functional works — such as computer programs — and other works, with the result that they are more likely to protect ideas, rather than their particular expression.¹⁶¹ While this may be a fair comment of the South African cases which have dealt with alleged copyright infringement of

¹⁵⁸ *Galago Publishers (Pty) Ltd & Another v Erasmus* 1989 (1) SA 276 (A) 284.

¹⁵⁹ Banzaf "Copyright Protection for Computer Programs" 154-5; Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 169.

¹⁶⁰ *Lotus Development Corp. v Borland International Inc.* 819.

¹⁶¹ De Villiers "Computer Programs and Copyright: The South African Perspective" 332.

computer programs, it is submitted that the *Navitaire* case represented a sea-change in UK copyright law relating to computer programs, and that his comment in relation to the UK position is incorrect.¹⁶² In any event, even before the *Navitaire* decision, UK copyright law (and, by extension, South African law) has — contrary to the claim in the *IBCOS* case — generally distinguished functional and non-functional works when considering what the appropriate level of copyright protection should be.¹⁶³ UK courts have, as far back as the 19th century, sought to deny affording inappropriate copyright protection to functional works. This was done by either denying that the alleged copyright infringement had occurred (that is, providing thin copyright protection) or denying the existence of copyright in a functional work.

In *Kenrick v Lawrence*, the plaintiff alleged copyright infringement of its illustration of a hand holding a pencil, and placing a cross on a ballot paper.¹⁶⁴ The illustration had no artistic merit and was functional: its purpose was to instruct illiterate voters how to record their vote. It was considered to be the most effective manner of educating illiterate voters how to vote, and the defendant made use of this novel idea to create a similar illustration.¹⁶⁵ The court held that copyright does not protect the idea of the subject matter of the illustration, even if the idea was the plaintiff's creation.¹⁶⁶ Given the simplistic, functional nature of the illustration, it would only be infringed if the defendant produced an almost identical copy. There was very little room left for anyone to treat the subject matter of the illustration in a substantially different manner.¹⁶⁷ Significantly, the court held that the scope and kind of copyright protection which would be extended depended on the character of the drawing; the nature of the drawing meant that the copyright will be of an “extremely limited character.”¹⁶⁸ The value of the drawing did not lie in its artistic or aesthetic

¹⁶² It is not clear why the de Villiers article did not refer to the *Navitaire* case, which appears to have been published by the time of its publication. Perhaps the article had already been submitted for publication at the time the judgment was published.

¹⁶³ *IBCOS Computers Ltd & Another v Barclays Highland Finance Ltd & Others* [1994] FSR 275 291.

¹⁶⁴ *Kenrick & Co v Lawrence & Co* (1890) LR 25 QBD 99.

¹⁶⁵ 99-100.

¹⁶⁶ 100-1.

¹⁶⁷ 102-3.

¹⁶⁸ 104.

appeal.¹⁶⁹ A critical factor in the court's deliberations was the economic monopoly that would result if the plaintiff were allowed the exclusive right to "practically the only mode of instructing the illiterate voter how to record his vote," given the duration of copyright protection.¹⁷⁰ Accordingly, the plaintiff failed in its claim.¹⁷¹

Similarly, the plaintiff in *Hollinrake v Truswell* sought to claim copyright protection in a printed sleeve chart, and alleged that the defendant had infringed his copyright.¹⁷² The printed sleeve chart included words and figures, and its purpose was to accurately measure the correct proportions of the inner, and outer, parts of a sleeve. It greatly simplified the calculations that would otherwise have been necessary to obtain the correct proportions.¹⁷³ The court held that the words and figures on the sleeve did not constitute a literary work because they were not capable of having an existence distinct from the sleeve on which it was printed.¹⁷⁴ A literary work is intended to provide information (and instruction), or pleasure, in the form of literary enjoyment.¹⁷⁵ The words and figures were not merely directions for the use of the sleeve chart, they were an integral and inseparable part of the sleeve chart, as a measuring apparatus.¹⁷⁶ As the printed sleeve chart was a measuring tool or apparatus — "a mechanical contrivance" — it was not protectable by copyright.¹⁷⁷ The court held that copyright did not protect a method of measuring: protection "does not extend to ideas, or schemes, or systems, or methods; it is confined to their expression; and if their expression is not copied the copyright is not infringed."¹⁷⁸

¹⁶⁹ 105.

¹⁷⁰ 101. Concern was also expressed about the possible distortionary effect on democracy and the consequent political implications.

¹⁷¹ 107.

¹⁷² *Hollinrake v Truswell* [1894] 3 Ch 420.

¹⁷³ 423-4.

¹⁷⁴ 424-5.

¹⁷⁵ 428.

¹⁷⁶ 424-5.

¹⁷⁷ 426 and 428.

¹⁷⁸ 427.

The exceptions listed in the above quotation from the *Hollinrake* case reflects the subject matter excluded from US copyright law pursuant to section 102(b) of the US Copyright Act, which is simply a codification of the common law.¹⁷⁹ Accordingly, section 102(b) of the US Copyright Act, and the distinction between functional and non-functional copyright works, does not reflect a substantive difference between US copyright law, on the one hand, and UK and South African copyright law, on the other hand.¹⁸⁰

4 4 2 2 1 Idea-expression dichotomy

One area in which the functional nature of computer programs causes problems is when trying to distinguish ideas from their expression. These problems arise particularly when a court has to consider allegations of non-literal copying. The idea-expression dichotomy is a fundamental doctrine of copyright law. Copyright does not protect ideas; only the expressions of ideas are protected. This is a crucial distinction between copyright law and patent law. Patent law protects a novel, inventive idea, and grants the patent holder the exclusive right to exploit the protected idea. Copyright, for example, does not prohibit the implementation of a disclosed process or procedure. However, the copying of the literal text describing such process or procedure may constitute copyright infringement.¹⁸¹

Other than a cursory statement that copyright does not protect ideas or information,¹⁸² the South African cases dealing with copyright infringement of computer programs have not sought to adequately apply this principle to distinguish

¹⁷⁹ *Lotus Development Corp. v Borland International Inc.* 816-7; *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1234. Section 102(b) provides as follows: "In no case does copyright protection for an original work of authorship extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work."

¹⁸⁰ The *Hollinrake* case has been cited without reservation in two South African cases (*Kalamazoo Division (Pty) Ltd v Gay & Others* 1978 (2) SA 184 (C) 188-9; *Waylite Diary CC v First National Bank Ltd* 651), and so has the *Kenrick* case (*Klep Valves (Pty) Ltd v Saunders Valve Co Ltd* 8).

¹⁸¹ Hamilton "Computer Science Concepts in Copyright Cases: The Path to a Coherent Law" 243.

¹⁸² *Northern Office Microcomputers (Pty) Ltd & Others v Rosenstein* 129.

the unprotectable elements from any protected expression. This may be due to various factors: the way in which the cases were presented in court; the paucity of cases involving alleged copyright infringement of computer programs; and, the fact that, as yet, there have been no cases in which non-literal copying has been alleged. Until the *Navitaire* case, the UK courts, too, have avoided direct consideration of the idea-expression in copyright infringement cases involving computer programs. Given that, prior to the *Navitaire* case, there were opportunities to consider the doctrine in the context of the copyright protection of computer programs — which were rejected — this failure was regrettable.¹⁸³ It is submitted that this failure was as a consequence of a stubborn reluctance on the part of the UK courts to engage with the idea-expression dichotomy in the context of computer programs, which amounted to a form of jurisprudential chauvinism. The UK courts did not want to be viewed as simply following the path being blazed by the US courts concerning the copyright protection of computer programs.¹⁸⁴

In contrast to the South African and UK courts, the US courts have, for some considerable time, been vigilant in trying to ensure that copyright protection of functional works, such as computer programs, receive the appropriate level of protection.¹⁸⁵ It is claimed that the US courts have more actively sought to apply the idea-expression dichotomy than their UK counterparts because of its express statutory basis in the US.¹⁸⁶ This is an unsatisfactory explanation, and seeks differences, without their being a distinction. It is trite, in all the jurisdictions under consideration, that copyright does not protect ideas. The statutory provision in the US simply codified the well-established, common-law, idea-expression dichotomy.¹⁸⁷

¹⁸³ Arnold R "Infringement of Copyright in Computer Software by Non-textual Copying: First Decision at Trial by an English Court" 1993 *EIPR* 15 (7) 250 253.

¹⁸⁴ See, for example, *IBCOS Computers Ltd & Another v Barclays Highland Finance Ltd & Others*, which will be discussed below.

¹⁸⁵ De Villiers "Computer Programs and Copyright: The South African Perspective" 332.

¹⁸⁶ Arnold "Infringement of Copyright in Computer Software by Non-textual Copying: First Decision at Trial by an English Court" 253.

¹⁸⁷ *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1234. In any event, the idea-dichotomy has been included in TRIPS agreement (Article 9), which is binding on all three countries under

Therefore, the statutory embodiment of this principle does not provide an adequate explanation for its disproportional development, and application, in the US. In fact, the *locus classicus* in US copyright law, routinely used to illustrate the idea-expression dichotomy, *Baker v Selden*,¹⁸⁸ pre-dates the US Copyright Act by almost a century. The US courts have, since then, sought to develop rules to give expression to this copyright doctrine, spawning ancillary principles — such as the merger doctrine and *scènes à faire* — to distinguish unprotected subject matter from protectable expression. In any event, pursuant to Article 1(2) of the EU Software Directive, the UK courts are now compelled to recognise the distinction between ideas and expressions in relation to the copyright protection of computer programs.¹⁸⁹

It is submitted that the US courts have, traditionally, not shied away from the idea-expression dichotomy because they have been more acutely aware of the economic effects of copyright law, and its social purpose. For example, in the *Whelan* case — the first important case concerning the appropriate level of copyright protection for non-literal elements of a computer program — the purpose, and importance, of the idea-expression doctrine in copyright law was made clear, while it was conceded that the doctrine was notoriously difficult to apply.¹⁹⁰

“[P]recisely because the line between idea and expression is elusive, we must pay particular attention to the pragmatic considerations that underlie the distinction and copyright law generally. In this regard, we must remember that the purpose of the copyright law is to create the most efficient and productive balance between protection (incentive) and dissemination of information, to promote learning, culture and development.”

The fact that copyright doctrine refuses protection for ideas is incongruous with the notion that the justification for copyright protection is based on an author’s natural rights or reward for creation. It is indeed paradoxical that the more socially

consideration, and in the EU Software Directive (Article 1(2) EU Software Directive), which is binding on the UK.

¹⁸⁸ *Baker v Selden* 1879 101 U.S. 99.

¹⁸⁹ *Navitaire Inc. v easyJet Airline Company & Another* [86] and [89].

¹⁹⁰ *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1235.

valuable scientific or functional works, despite the effort which may have been expended in their creation, are denied any significant form of protection or provide any great reward for their creators by way of copyright protection. For example, the inventor of a new search algorithm which allows for more efficient website searches, would not be able to prevent others from using the idea contained within it, once it has been disclosed. All the creator would be entitled to is — extremely thin — copyright protection for his particular description of the algorithm, but not the particular method or other explanations of the algorithm. On the other hand, the author of a fictitious work, arguably, receives greater protection. The author of a work of fiction about a boy attending a boarding school for wizards can prevent another person copying a substantial part of the literal text, using similar characters with the same names, having the same book title, or following the detailed plot of the book.

The seemingly absurd situation of providing more copyright protection to aesthetic works than to more socially beneficial scientific or functional works is, however, explicable in terms of the economic justification for copyright law. Creation and innovation are incremental processes: they rely on previous creations, which serve as their building blocks or source material. If the scope of copyright protection is too broad, it will adversely affect future production of copyright works because of the increased transaction costs. Authors of new works would have to do one, or a combination, of the following things: to engage in the costly exercise of constantly seeking out and requesting permission from the authors of previous works which they have relied upon; engage in the unproductive (and socially wasteful) exercise of disguising their copying; or, develop costly workarounds to avoid allegations of copyright infringement. If they want to avoid these costs, they would be confined to using material which is in the public domain. Because of the increased fixed costs associated with creating new works caused by excessive copyright protection, there will be a lower production of new works. In other words, by not protecting ideas — only their particular expression — and permitting free use of commonplace elements (or construing certain elements to be commonplace), copyright law seeks to reduce the costs of creating new works, and, thus, encourages their creation.¹⁹¹ Given the

¹⁹¹ Landes and Posner "An Economic Analysis of Copyright Law" 360-1.

social value of functional works, leaving adequate room for their creation is socially desirable.

Naturally, the prospect of excessive copyright protection suits existing copyright owners, who are able to extract handsome returns for authorising use of their works: one man's increased fixed costs, is another man's rent-seeking royalty payment. However, authors are, as a general rule, involved in a continuous series of creative endeavours; they tend not to be one-off creators. As such, they will find themselves in both the position of enjoying, and being potentially inhibited by, large, rent-seeking royalty payments as a consequence of excessive copyright protection. This realisation on the part of authors would result in them considering it optimal to, *ex ante*, limit copyright protection. In other words, if copyright law provides excessive copyright protection, authors will come to an agreement amongst themselves not to enforce their rights in situations corresponding to the accepted idea-expression dichotomy developed by the common law.¹⁹² Landes and Posner sum up this position as follows:¹⁹³

“[The] various doctrines of copyright law, such as the distinction between idea and expression and the fair use doctrine, can be understood as attempts to promote economic efficiency by balancing the effect of greater copyright protection — in encouraging the creation of new works by reducing copying — against the effect of less protection — in encouraging the creation of new works by reducing the cost of creating them.”

This explains why, seemingly paradoxically, socially-valuable scientific or functional works do not receive more extensive protection. In contrast, to fictional (aesthetic) creations, the building blocks of scientific or functional works, because of their utility, would result in greater social costs, if protected to the same extent as fictional creations. Moreover, their utility would mean that they would probably have been independently created within a relatively short time of their initial creation. In other words, excessive copyright protection would lead to socially wasteful duplicate investments in creating similar works, because such a system would, effectively,

¹⁹² 332-3; Posner "Intellectual Property: The Law and Economics Approach" 64-5.

¹⁹³ Landes and Posner "An Economic Analysis of Copyright Law" 333.

allow one person — the first author — to appropriate the benefits of this cumulative social investment.¹⁹⁴ Of course, while it is true that copyright does not preclude independent creations, this will not prevent the institution of socially costly actions claiming copyright infringement where two works are substantially similar. If copyright protection is too broad, litigation is likely because functional works will, by their nature, result in a considerable degree of similarity, which may, *prima facie*, give the impression that there has been copying. Competitors would, given a chance, engage in rent-seeking litigation because successful copyright infringement claims will give them a significant advantage. Even the mere threat of litigation could have a chilling effect on the production of such copyright works. By allowing free use of ideas, general concepts and other unprotectable elements embodied in copyright works, competition is encouraged by copyright as it “foster[s] a built-in process of “reverse-engineering” that enables many independently created and copyrightable works to cluster around common themes or ideas.”¹⁹⁵

Although it is clear that the idea-expression distinction has been established in copyright law because greater freedom to use ideas leads to greater social utility,¹⁹⁶ this does not make the task of separating ideas from their expression easy.¹⁹⁷ For example, the court in *Lotus Development Corp v Paperback Software Intl*¹⁹⁸ referred to the idea-expression doctrine as a “riddle” because of the difficulty involved in its application. It is no exaggeration to state that it has never been, and will never be, possible to give any precise description of the boundary line between ideas and their expression.¹⁹⁹ The determination of what will be regarded as protectable expression “may depend on the type of idea being expressed, the

¹⁹⁴ Posner "Intellectual Property: The Law and Economics Approach" 64-5.

¹⁹⁵ Reichman "Charting the Collapse of the Patent-Copyright Dichotomy: Premises for a Restructured International Intellectual Property System" 494.

¹⁹⁶ Moore "A Lockean Theory of Intellectual Property" 75.

¹⁹⁷ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 724-5.

¹⁹⁸ *Lotus Development Corp. v Paperback Software Intl.* 1990 740 F. Supp. 37 58.

¹⁹⁹ Green L "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" 1992 *Fordham Ent Media & Intell Prop L F* 3 89 [11].

medium of expression, and even the value of the idea to society.”²⁰⁰ The separation of protectable expressions from unprotectable ideas involves the identification of a series of abstractions: at one extreme the abstraction may be of such a high level that it merely describes the general nature of the copyright work, and, at the other extreme, there is simply the specific expression. A court has to determine the specific protectable abstraction between these two extremes.²⁰¹ The difficulties presented by the application of the idea-expression doctrine to traditional copyright works, such as literary or artistic works, are compounded when it has to be applied to computer programs. Computer programs are both functional and expressive, and “ideas are closely intermingled with the expression thereof.”²⁰² Much of the case law concerning alleged non-literal infringement of computer programs has centred on the issue of trying to distinguish unprotectable ideas (or elements) from protectable expression.

The courts have tended to follow a subjective, intuitive, ad hoc approach to distinguish unprotectable elements from protectable expression.²⁰³ This makes it difficult to predict which elements of a copyright work will be protected. It is only when a court has determined which elements constitute unprotectable ideas, following a claim of copyright infringement, that there can be clarity about the dividing line distinguishing ideas and expression.²⁰⁴ Given the difficulty in separating ideas from expression, and the lack of an objective basis to make this distinction, a sound theoretical basis is required to make the application of the idea-expression doctrine more predictable. It is submitted that the determining factor should be

²⁰⁰ Banzaf "Copyright Protection for Computer Programs" 148-9.

²⁰¹ Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 170.

²⁰² Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 35.

²⁰³ Green "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" [11]; Lunney "Reexamining Copyright's Incentive-Access Paradigm" 560-1; Ng "Copyright's Empire: Why the Law Matters" 374; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 724-5.

²⁰⁴ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 737.

based on the economic justification for copyright protection, and, thus, the economic effect of permitting, or prohibiting, use of a particular element — striking a balance between protection and competition: providing sufficient incentives to authors, while ensuring a sufficient degree of freedom exists for independent creation, and lawful competition.²⁰⁵ Thus, from this perspective, it is arguable that there is no *a priori* distinction between ideas and expression; “idea” and “expression” are simply labels that courts should apply in a manner that best fulfills copyright's objectives.”²⁰⁶

4 4 2 2 2 Concepts related to the idea-expression doctrine

The courts in the US have given substance to the idea-expression doctrine by seeking to develop rules by which to determine whether elements are so integrally related to a particular idea that they are unprotectable. Given a particular idea, the use of some elements may be the obvious, practical consequence of implementing such idea, or it may be a standard technique for doing so.²⁰⁷ The US courts have developed two related concepts to the idea-expression doctrine: the “merger” doctrine, and the “*scènes à faire*” doctrine. Although these doctrines are, theoretically, ancillary to the idea-expression doctrine in the sense that their application requires an identification of a particular idea, there will inevitably be a reappraisal of the identified idea. Through the application of these ancillary doctrines, a court may be able to better assess whether the level of abstraction at which it has characterised a particular idea is appropriate; that its characterisation of an idea does not award a person a monopoly, or create other anti-competitive effects.

The merger doctrine (also referred to as the “idea-expression identity exception”) provides that where there is only a limited number of ways in which a

²⁰⁵ Green "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" [4]; Landes and Posner "An Economic Analysis of Copyright Law" 352; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 724-5.

²⁰⁶ Lunney G "Lotus v. Borland: Copyright and Computer Programs" 1996 *Tul L Rev* 70 2397 2424.

²⁰⁷ 2401-2.

particular idea can be expressed, the idea and its expression can be said to have merged. In these circumstances, the particular expression, like the idea, is unprotectable.²⁰⁸ According to the *scènes à faire* doctrine, copyright protection is not extended to two types of expression: first, if the expression is a standard or common method of expressing a particular idea; or, second, if the expression is unavoidable as it is dictated by external factors.²⁰⁹

4 4 3 User interfaces of computer programs

Before considering the case law relating to copyright infringement of computer programs, it is necessary to briefly discuss the user interfaces of computer programs. The term user interface (also referred to the “UI” or the “look and feel” of a computer program) is used to refer to the screen displays or appearance the running software presents to the user, and how the user interacts with the program.²¹⁰ User interfaces typically consist of a combination of text, graphic images or icons, and various menu commands through which users can interact with the computer program.²¹¹ The screen displays are part of the output data of a computer program, and, as such, the product (or result) of the program. A computer “program's aim is to produce a result. But the result is not the program.”²¹² Thus, a screen display is not a computer program as defined; that is, it is not a set of

²⁰⁸ Kravetz "Copyright Protection of Computer Programs" 50; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 741; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 36.

²⁰⁹ De Villiers "Computer Programs and Copyright: The South African Perspective" 334; Ebersöhn "Protecting Copyright in Computer Games and Computer Software" 107; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 36.

²¹⁰ *Navitaire Inc. v easyJet Airline Company & Another* [2]. This could include the invisible, physical electrical impulses created by users' actions like switching a computer on, and mouse clicks. Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 1" 11-2.

²¹¹ Bordoloi B, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 1996 *Information & Management* 30 211 211; Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 12. Where the user interface consists primarily of visual graphic elements it is referred to as a “graphical user interface” or “GUI.”

²¹² Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 1" 12.

ordered, unambiguous instructions to be performed by a computer. Although distinct from the underlying computer program, it has been accepted in all three jurisdictions that screen displays may be protectable as separate copyright works, such as a literary works, artistic works or cinematograph films, depending on their visual appearance.²¹³

The reality is that for most users of computer programs, the programs' user interfaces are what they consider to be computer programs. This is probably the reason why, in the past, courts have not always drawn a proper distinction between the user interface of a computer program (that is, its output) and the actual computer program. In cases involving alleged copyright infringement of computer programs, similarities in the user interfaces have, in the past, wrongly been used as a shortcut to support a finding of copyright infringement of the underlying computer program.²¹⁴

²¹³ Derclaye E "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 2000 *EIPR* 22 (2) 5661-5; Ebersöhn "Protecting Copyright in Computer Games and Computer Software" 114; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 39; De Villiers "Computer Programs and Copyright: The South African Perspective" 318; Smith L "Whether Copyright Protects the Graphic User Interface of a Computer Programme" 2011 *CTLR* 17 (3) 70 70-1. For example, a video game — generated by a computer program — was held to constitute a cinematograph film (*Golden China TV Game Centre & Others v Nintendo Co Ltd* 414), and the user interface of an accounting application was protectable as a literary work (*Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd and Another* (1991) 399 JOC (T) 408-9). Similarly, the US courts have, for example, held that the user interface could constitute an audiovisual work (*Computer Associates Intl. Inc. v Altai Inc.* 703), and in the UK that it could be an artistic work or film (*John Richardson Computers Ltd v Flanders (No. 2)* 527). There have been suggestions that user interfaces should not be protected as copyright works but should be protected as trade marks, patents, trade dress protection, or by way of new *sui generis* protection (Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 61-2). However, as user interfaces are not computer programs, no detailed analysis of the appropriate form of protection will be considered in this work.

²¹⁴ De Villiers "Computer Programs and Copyright: The South African Perspective" 333; Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 805; Kravetz "Copyright Protection of Computer Programs" 55; Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 180; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 754 and 758. For example, see *Lotus Development Corp. v Paperback Software Intl.*

Replication of the screen displays of a computer program has been held to constitute a form of non-literal copyright infringement.²¹⁵ The error in this approach becomes apparent when it is realised that different computer programs can produce the same results or screen displays; similar user interfaces may be achieved by two independently produced computer programs. This does not exclude the possibility that similarities in user interfaces may be of some probative value, providing indirect evidence of infringement in the underlying computer program.²¹⁶

While the concept of “look and feel” may sensibly be applied to establish copyright infringement in relation to creative works like greeting cards or board games, it is not as useful when seeking to establish copyright infringement in the case of computer programs, particular in cases involving alleged non-literal copying.²¹⁷ Therefore, it is important when comparing two computer programs, following allegations of copyright infringement, to consider the actual underlying programs that *produced* the results, rather than simply the output of the programs.²¹⁸ This distinction between a computer program’s user interface and the underlying program is now generally recognised, and accepted. For example, the European Court of Justice recently held that a graphical user interface does not constitute a form of expression of a computer program within the meaning of article 1(2) of the EU Software Directive, and, therefore, the copyright in the computer program does

²¹⁵ Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 214; Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 62; Kravetz "Copyright Protection of Computer Programs" 42; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 39. For example, it is certain arguable that the court, while acknowledging the distinction between the computer program and the user interface, placed too much emphasis on the similarities in user interfaces in *John Richardson Computers Ltd v Flanders (No. 2)* .

²¹⁶ *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1244.

²¹⁷ Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 177.

²¹⁸ *John Richardson Computers Ltd v Flanders (No. 2)* 522. See also Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 12; Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 175; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 34.

not protect its user interface; the user interface is not protectable as a computer program.²¹⁹

The user interfaces of computer programs, similar to the underlying computer programs, may be more functional in nature than may initially be apparent; they are generally designed to facilitate the use of the computer programs, and their various features. Evidential support for the contention of their general functional, and not expressive, nature is the fact that computer programs are usually accompanied by detailed instruction manuals to assist users in how to use the various features of the program.²²⁰ The level of assistance which a new user of a computer program requires is a good indicator of the extent to which a user interface is functional, rather than expressive, and extent of copyright protection is should be afforded.²²¹

A computer program's commercial successful is, to a large extent, dependent on the appeal of its user interface, rather than the quality of the computer code which creates it. Successful computer programs tend to have user interfaces which are appealing to users and easy to follow, and are colloquially referred to as "user friendly."²²² This makes the design of user interfaces commercially valuable intellectual creations, and, unsurprisingly, have been focus of a number of actions concerning computer programs.²²³

²¹⁹ Smith "Whether Copyright Protects the Graphic User Interface of a Computer Programme" 70-1. *Bezpenostní softwarová asociace - Svaz softwarové ochrany v Ministerstvo kultury 2010 Case C-393/09*.

²²⁰ Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 12.

²²¹ Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 60.

²²² Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 212; Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 175; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 34-5.

²²³ Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 212; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 34-5.

However, providing excessive protection for these aspects of computer programs “could have detrimental effects on competition and innovation.”²²⁴ In fact, some scholars consider the protection of user interfaces to be contrary to public policy and economically wasteful.²²⁵ The rationale for such claims is the fact that users are required to devote time and effort in familiarising themselves with the user interface of a particular computer program. This investment by users causes them to be “locked-in” to a computer program because switching to an alternative program, with a different user interface, will necessarily have cost implications for users.²²⁶ For example, if computer users have become acquainted with the features of commonly-used applications software like spreadsheets, these features should be considered to form part of the public domain. To require other software developers to create substantially different user interfaces would be socially wasteful; in addition to the increased developmental costs, software users will have to invest their time (and money) in learning how to use these new interfaces. In fact, it is argued that to allow user interfaces to be mimicked is essential for the development of competitive software applications. Other software developers are not able to compete effectively if they cannot offer users an interface which is similar to that already used.²²⁷

Another important fact that should be borne in mind when considering the scope of copyright protection of computer programs is that application software tend to create “network effects” (or “network externalities”).²²⁸ Network effects exist when

²²⁴ Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 176.

²²⁵ 176.

²²⁶ Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 212; De Villiers "Computer Programs and Copyright: The South African Perspective" 318.

²²⁷ Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 176.

²²⁸ Boyle *The Public Domain: Enclosing the Commons of the Mind* 165. “Application software” (or “application programs”) is a collective term for computer programs which are developed to serve a particular utilitarian purpose, or address a particular problem. Examples of application software are word-processing programs like MS Word and WordPerfect, of spreadsheet programs like MS Excel and Lotus 1-2-3. With the growth of the Internet, it is more than application software that give rise to network effects. For example, the ability to play online computer games against players from all

a consumer's choice of a particular product will not only depend on the features of the particular program, but also on how many other people use it. The simplest example of network effects is the acquisition of a telephone. There is not much point in acquiring a telephone if most of your associates or other contacts do not have a telephone. Similarly, the more users of a particular computer program there are, the greater the utility a user will derive, and more likely he will be to choose (if the user can be considered to have any choice at all) the program. There would be very little utility (and actual choice) in using a spreadsheet program which produced documents in a format that could not be accessed by most other computer users. Network effects result in the emergence of single standard. In these circumstances, if the producer of the most popular program is not to have a monopoly over the particular type of application program, other software developers should be allowed to develop compatible computer programs which employ the prevailing standard.²²⁹

If the scope of copyright protection is too extensive, a firm that develops a popular user interface (or other popular feature, such as the format of the files created) which establishes itself as the market leader would be able to eliminate the emergence of substitute products with a similar user interface through well-timed copyright infringement actions. Excessive copyright protection of user interfaces would, thus, prevent the development, and improvement, of socially beneficial standardised and compatible user interfaces.²³⁰

As a consequence of the abovementioned economic effects of user interfaces, it is submitted that any copyright protection afforded to user interfaces of

corners of the globe, and social networking, have given rise to network effects in a wider variety of software.

²²⁹ 165; Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 11; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 72; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 753-4.

²³⁰ Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 11-2; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 72; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 36.

a functional nature — whether as literary works, artistic works or cinematograph films — should not be excessive. In the case of alleged infringement of functional user interfaces, some sort of excising (or filtration) process — similar to that applied in cases involving infringement of computer programs — should be employed to determine whether a substantial part has been copied. Again, those elements dictated by function, are commonplace in the design of user interfaces, or which would amount to protecting an idea rather than its particular expression, ought not to be protected by copyright. The ancillary rules such as the merger doctrine and *scènes à faire* could also assist to distinguish unprotected subject matter from protectable expression, and ensure that the scope of protection is not too excessive to prevent the development of standardised and compatible user interfaces.²³¹

Again, the US courts were the first to recognise the potentially functional nature of user interfaces, and the economic consequences of excessive protection. There are examples of this type of analysis in US cases which sought to apply the common law principles, such as the idea-expression doctrine, and the economic analysis, to ensure that the level of protection for user interfaces was not excessive.²³² For example, if it was not for the thin copyright protection afforded to user interfaces, the now widely-used graphical user interfaces — employing graphic icons which users can click or drag to perform operations such as opening computer programs or delete items — would only have been available on the Apple operating platforms.²³³ The use of such graphic icons had an intuitive appeal and obviated the need for users to learn strings of textual commands to perform the equivalent tasks, which was both time-consuming to use and made computers less appealing to a wider audience. These graphic icons were functional and analogous to “the visual

²³¹ Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 36.

²³² *Apple Computer Inc. v Microsoft Corp.* 1992 799 F. Supp. 1006 (confirmed on appeal, *Apple Computer Inc. v Microsoft Corp.* 1994 35 F.3d 1435); *Engineering Dynamics Inc. v Structural Software Inc.* 1994 26 F.3d 1335; *Productivity Software Intl Inc. v Healthcare Technologies Inc.* 1995 U.S. Dist. LEXIS 10381. See also Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 60-1; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 36.

²³³ *Apple Computer Inc. v Microsoft Corp.* 1992 799 F. Supp. 1006.

displays and user commands of the dashboard, steering wheel, gear shift, brakes, clutch and accelerator [which] serve as the user interface of an automobile.”²³⁴

The court, while acknowledging the difficulty in separating protectable from unprotectable elements of a user interface, clearly recognised the benefits of standardisation and the development of a more competitive market (with consequential benefits for consumers) by providing thin copyright protection, and restricting infringement to cases of virtual identity:²³⁵

“But overly inclusive copyright protection can produce its own negative effects by inhibiting the adoption of compatible standards (and reducing so-called "network externalities"). Such standards in a graphical user interface would enlarge the market for computers by making it easier to learn how to use them. Striking the balance between these considerations, especially in a new and rapidly changing medium such as computer screen displays, represents a most ambitious enterprise.”

In the US, the courts have held functional user interfaces to be unprotectable by copyright as they constituted a “method of operation,” which is excluded from copyright protection pursuant to section 102(b) of the US Copyright Act. Thus, in the US, if the screen display is considered to be a method of operation, it will not be protected by copyright, whether as a literary, artistic or other kind of copyright work. An application of this US principle will be illustrated when the case of *Lotus Development Corp. v Borland International Inc.* is considered below.²³⁶

Following the *Navitaire* case, the UK courts have adopted a similarly restrictive view of the copyright protection granted to functional user interfaces. In the *Navitaire* case the text-based screen displays, were considered to be literary works, but due to their rudimentary, functional nature, they were considered to be unprotectable. The court held that protecting such screen displays would essentially amount to protecting the ideas which underlie the user interfaces, which is expressly excluded from protection by Article 1(2) of the Software Directive. The text-based

²³⁴ *Apple Computer Inc. v Microsoft Corp.* 1023.

²³⁵ 1025.

²³⁶ *Lotus Development Corp. v Borland International Inc.* 1995 49 F.3d 807. See also *Mitek Holdings Inc. v Arce Engineering Co. Inc.* 1996 89 F.3d 1548.

screen displays were simply the means by which the data was displayed to users, which was the purpose of the computer program.²³⁷ In contrast, the graphic-based screens were protectable as artistic works as the arrangement of relatively simple basic elements or icons involved sufficient skill and labour.²³⁸ However, the UK courts are no longer prepared to simply accept that graphic-based user interfaces of computer games — which were previously accepted to be more expressive than functional (or commonplace) in nature — will enjoy a significant level of copyright protection as artistic works or cinematograph films.²³⁹ The recent *Nova Productions* case in the UK, discussed below, reflects the latter position, and UK courts will now also be more circumspect in respect of the scope of copyright protection afforded to user interfaces of a graphic nature.²⁴⁰

Thus, in the US and UK, functional user interface elements will either be considered as unprotectable as a method of operation, or receive thin copyright protection. The consequence of this policy will be to deny copyright protection to many aspects of a computer program's user interface. Copyright protection will be limited to the non-functional aspects of user interfaces, according to the usual rules relating to literary works, artistic works, or cinematograph films. This would include possible protection for the particular selection and arrangement of the various elements, which would, in isolation, be unprotectable.²⁴¹

Although the South African copyright legislation does not have an equivalent provision to section 102(b) of the US Copyright Act, it is submitted that the US (and UK) practice of limiting (if not excluding) copyright protection for functional works is advisable if it encourages socially beneficial innovation. As illustrated, above, the exceptions listed in section 102(b) of the US Copyright Act are simply a codification of recognised common-law doctrine in the UK and South Africa. Thus, it is hoped that when the South African courts are again seized with a case like *Pastel Software*

²³⁷ *Navitaire Inc. v easyJet Airline Company & Another* [96].

²³⁸ [98].

²³⁹ Ebersöhn "Protecting Copyright in Computer Games and Computer Software" 111-2.

²⁴⁰ *Nova Productions Ltd v Mazooma Games Ltd & Others* .

²⁴¹ Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 65; Ebersöhn "Protecting Copyright in Computer Games and Computer Software" 111-2.

(Pty) Ltd v Pink Software (Pty) Ltd,²⁴² it will engage in a more thorough analysis of what elements of a user interface are protected.

The applicant, Pastel Software (Pty) Ltd (“Pastel”), applied for an interdict, on an urgent basis, seeking to prevent the first respondent, Pink Software (Pty) Ltd (“Pink”), from infringing its copyright in its computer program.²⁴³ Pastel alleged that Pink’s proposed software produced screen displays which were, apart from differences in shading and other unimportant features, identical to Pastel’s screen displays, containing the same essential information and having the same basic format.²⁴⁴ It was accepted that Pink did not have access to Pastel’s source code.²⁴⁵

However, most significantly, there was the suggestion that the screen displays were an indistinguishable part of the underlying computer program, and were regarded as “reproductions” of the program. The court held that infringement may result by reproducing the screen display designs, which were considered to be literary works, even if Pink had no access to the source code and did not copy any part of it.²⁴⁶ Pink could not produce a computer program which intentionally produced screen displays resembling those of Pastel.²⁴⁷ The court, in a cursory manner and without any proper analysis of the visual elements, dismissed suggestions that the Pastel screen displays were merely the result of fundamental accounting principles or concepts. It considered the arrangement of the screen displays as a product of skill or effort, constituting a protectable compilation.²⁴⁸

²⁴² *Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd and Another* (1991) 399 JOC (T). The issues were probably not considered in sufficient detail because the matter was considered as part of an urgent application for an interdict. Also, this was a very early case, and there was not a sufficient degree of understanding of the issues involved.

²⁴³ The discussion of the case is confined to issues concerning the scope of copyright protection of computer programs, and does not, for example, relate to other aspects of the case, such as the breach of contract and unlawful competition.

²⁴⁴ *Pastel Software (Pty) Ltd v Pink Software (Pty) Ltd and Another* 403.

²⁴⁵ 406.

²⁴⁶ 409-10.

²⁴⁷ 410.

²⁴⁸ 410.

At the time, the *Pastel* case was described as the “the first tentative step on the ‘look and feel’ road when the court issued an interdict restraining the respondent from infringing the applicant’s copyright in the screen display of its program.”²⁴⁹ As discussed, it is important, not only to draw a proper distinction between the user interface, and the underlying computer program, but also to recognise the functional nature of user interfaces in order to avoid provided excessive copyright protection.

4 4 4 Infringement cases

We now turn to determine the scope of copyright protection of computer programs through a consideration of the case law. The cases which have considered the scope of copyright protection invariably involved the alleged infringement of a computer program. As already indicated, copyright grants an author the exclusive right to perform the listed restricted acts, subject to the permitted fair-dealing exceptions. The specific restricted acts which have been the subject of infringement, and required determinations of the scope of copyright protection, are the right to reproduce a computer program (that is, make copies thereof), or the right to make an adaptation thereof.²⁵⁰ Infringement by way of copying will take place if there is sufficient objective similarity between the alleged infringing computer program and the original program, and there is a causal connection between the original computer program and the creation of the alleged infringing program.²⁵¹ As a preliminary point, it is important to bear in mind that copyright infringement does not require that the unauthorised restricted act, such as copying of the protected work (in our case, a computer program), be performed in respect of the entire copyrighted work; it is sufficient if such act has been done in respect of any substantial part of the work.²⁵²

²⁴⁹ Pistorius and Visser "The Copyright Amendment Act 125 of 1992 and Computer Programs: A Preliminary Overview" 350.

²⁵⁰ S 11B SA Copyright Act. The equivalent provisions setting out the exclusive rights granted to an author of a computer program in the UK and the US are set out in section 16 (UK CDPA) and section 107 (US Copyright Act), respectively.

²⁵¹ *Galago Publishers (Pty) Ltd & Another v Erasmus* 280.

²⁵² S 1(2A) SA Copyright Act. Similarly, the doing of an unauthorised restricted act in respect any substantial part of copyright work will also constitute copyright infringement (s 16(3) UK CDPA). The

Thus, not all forms of copying constitute copyright infringement; the copying of an insignificant or trivial part of a copyright work will not result in copyright infringement. The fact that copyright law requires that a substantial part of a copyright work be copied before an infringement action can succeed, rather than any similarity, can also be viewed as an aspect of fair dealing.²⁵³

At this point it is sensible to distinguish two types of infringement cases: cases involving literal (or textual) copying, and those involving non-literal (or non-textual) copying. Literal copying involves the verbatim copying of a program's computer code, or any substantial part thereof. Identifying literal copying of computer code is comparatively easy.²⁵⁴ In order to detect unauthorised copying of their computer code, computer programmers often "fingerprint" their computer code by inserting redundant (or dummy) code, programming idiosyncrasies, or individualised programming comments.²⁵⁵ Someone who slavishly copies computer code will tend not to notice these fingerprints, or will generally be too sloppy to remove all of them. In fact, sometimes literal copying can be detected without the use of deliberate fingerprinting of the computer code, and it is revealed simply because of the level of flagrant copying. For example, in the *SAS Institute* case, the court accepted that there was evidence of literal copying because, *inter alia*, the name "SAS" appeared in at least 145 separate lines of the defendant's source code, despite attempts by the defendant to remove all such references.²⁵⁶

US equivalent is "improper appropriation," which is the requirement that a material portion of the copyright work must have been copied. In such determination will disregard the copying of facts, general ideas, and unoriginal expression. See LaFrance M *Copyright Law: In a nutshell* 2ed (2011) 284-5.

²⁵³ Landes and Posner "An Economic Analysis of Copyright Law" 360-1.

²⁵⁴ Hamilton "Computer Science Concepts in Copyright Cases: The Path to a Coherent Law" 249.

²⁵⁵ Davidson "Protecting Computer Software: A Comprehensive Analysis" 381 and 412. The insertion of inconspicuous inaccuracies or fictitious information in factual copyright works to prove copying had previously been used in works like maps, dictionaries, and directories (Banzaf "Copyright Protection for Computer Programs" 156-7).

²⁵⁶ *SAS Institute Inc. v S&H Computer Systems, Inc.* 1985 605 F. Supp. 816 822-3.

The reason for drawing a distinction between literal and non-literal copying is that, as a general rule, the cases concerning literal copying are not very illuminating about the scope of copyright protection of computer programs. This is, no doubt, also true about other copyright works, when the equivalent of the literal copying of computer code is alleged. In other words, while the unauthorised copying of entire computer programs — piracy — may clearly have a significant economic effect on the incentives of software developers, this type of infringement, while obviously constituting copyright infringement, tells us nothing about the scope of copyright protection of computer programs, and will, therefore, not be considered in the following legal analysis. Similarly, the literal copying of a substantial part of a computer program, whilst constituting copyright infringement, is also not very instructive about the scope of copyright protection computer programs. Accordingly, simply for completeness, this chapter will briefly deal with the alleged literal copying of a substantial part of a computer program.

By far the more interesting are those cases concerning non-literal copying, and the determination of whether any substantial part of a computer program has been copied. As will be illustrated, this has required the courts to grapple with the nature of computer programs, in order to ensure that their protection does not extend beyond incentivising their creation.

4 4 4 1 Literal infringement

As stated, literal copying involves the verbatim copying of a program's computer code, or any substantial part thereof. For purposes of this work, literal copying will include those cases where computer code has been copied and only colourable alterations have been made to disguise the copying, or where a computer program has been translated into a different programming language. The SA Copyright Act defines the "adaptation" of a computer program as, *inter alia*, producing a version of the program in a different programming language or code, or providing the program

in a different medium.²⁵⁷ As stated above, making an adaptation of a computer program is one of the restricted acts reserved for the author.²⁵⁸

It is trite that the unauthorised literal copying of an entire copyright work, including a computer program, or a substantial part thereof, will constitute copyright infringement. The only interesting issue to be found in cases concerning literal copying, in so far as the scope of copyright protection is concerned, is what constitutes a substantial part of a computer program. There are no guidelines in the legislation of any of the three jurisdictions under consideration to indicate what would constitute a substantial part of a computer program, leaving it to the courts to determine when a substantial part of a program has been copied. In short, it is a question of fact and degree, with the emphasis on the quality of the copied portion, rather than its quantity.²⁵⁹

For example, in the *Haupt* case, the court confirmed that the assessment of whether a substantial part of the computer code of a computer program was copied is qualitative rather than quantitative, and found that the copying of 63 lines out of several thousand lines of source code constituted the taking of a substantial part of the plaintiff's computer program.²⁶⁰ It was considered to be a substantial part of the plaintiff's program because it was difficult to write, and was, therefore, a valuable part of the program.²⁶¹ Similarly, in the UK decision in the *Cantor Fitzgerald*²⁶² case, the copying of relatively small portions of the plaintiff's source code — no more than

²⁵⁷ S 1(1) SA Copyright Actsv "adaptation." The definition of adaptation is similar in the UK, except that no express mention is made about a change of medium (s 21(4) UK CDPA). The US equivalent is a "derivative work" (s 101 US Copyright Actsv "derivative work"), but there is no example of what specifically would be considered to be a derivative work of a computer program.

²⁵⁸ S 11B SA Copyright Act.

²⁵⁹ Dean "Protection of Computer Programs by Copyright in South Africa" 91.

²⁶⁰ *Haupt t/a Soft Copy v Brewers Marketing Intelligence (Pty) Ltd & Others* 475.

²⁶¹ 475-6. The court uses the phrase "valuable ingredient," which may relate to more than its economic value. As will be illustrated, if the phrase was intended to refer to the fact that the copied portion of the computer code was essential to the functioning of the computer program, or that it was repeatedly used in its execution, it is submitted that this was incorrect, and out of step with the calculus of substantiality in the US and UK.

²⁶² *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95.

four percent of the source code — was held to constitute the taking of a substantial part of the plaintiff's computer program. Although the portions copied were short, they were valuable because they were used in important modules of the program.²⁶³

However, even in cases of literal copying, the assessment of the substantiality of the copied portion must take into consideration the nature of computer programs, and the functional character of computer code. As indicated, computer instructions must conform to the strict syntactical and semantic criteria of the chosen programming language if they are to be executed. In this sense, every portion of the computer code of a computer program is critical to its operation. This, however, does not mean that every part can be considered a substantial part of a computer program for purposes of copyright law. Similarly, substantiality does not depend on the extent to which a particular portion of the source code is used. Moreover, although there may be differences between programming languages, there are still significant similarities, and they all rely on the arrangement of Boolean operations.²⁶⁴ Whether the particular portion taken constitutes a substantial portion of the copyrighted program should depend on the skill and labour involved in its creation.²⁶⁵

In the *Computer Associates* case, the court “filtered out” the following unprotected elements of the computer program: those dictated by efficiency or external factors, and those taken from the public domain.²⁶⁶ Although the *Computer Associates* case involved a case of non-literal copying, it was subsequently accepted that a similar filtration process was also applicable in cases concerning literal

²⁶³ 122.

²⁶⁴ Appleman *How Computer Programming Works* 37. Boolean logic involves a determination of the truth values of a sequence of operations (“and” (conjunction), “or” (disjunction), and “not” (negation)) applied to statements which can have one of two values, “true” (1) or “false” (0).

²⁶⁵ Murray *Information Technology Law: The Law and Society* 196. Similarly, our courts have accepted that a computer program is original, and, therefore, eligible for copyright protection if its creation requires skill, judgment, or labour (*Haupt t/a Soft Copy v Brewers Marketing Intelligence (Pty) Ltd & Others* 473).

²⁶⁶ *Computer Associates Intl. Inc. v Altai Inc.* 706.

copying.²⁶⁷ As the *Computer Associates* case will be analysed in considerable detail when dealing with the issue of non-literal infringement, it is simply necessary to state at this juncture that the filtration step is important due to the functional nature of computer programs. For example, those elements dictated by function, or which would amount to protecting an idea rather than its particular expression, ought not to be protected by copyright.

It is, therefore, surprising that none of the South African cases which have involved alleged copyright infringement of a computer program have even considered that some kind of filtering or excising process was necessary.

4 4 4 2 Non-literal infringement

Non-literal (non-textual or non-code) copying is not a term of art, and there have been various definitions of what constitute the non-literal components of a computer program.²⁶⁸ For example, in the *Navitaire* case, the court adopted a very narrow definition of non-literal copying: that it comprised those instances of alleged copyright infringement where there had been no access to the computer code.²⁶⁹ This would exclude a situation where a subsequent computer programmer had access to the computer code of the original computer program, and copied aspects of the original program without reproducing the computer code.²⁷⁰ Also, given the range of cases that will be considered in this section, the *Navitaire* case's characterisation of non-literal copying is too narrow. For purposes of this work, non-literal copying will be defined as any alleged copyright infringement which is not literal copying. For convenience, this means any alleged copyright infringement that does not involve the literal copying of a program's computer code (or any substantial part thereof),

²⁶⁷ Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 60. See *Gates Rubber v Bando Chemical Industries* 1993 9 F. 3d 823; *Bateman v Mnemonics* 1996 79 F.3d 1532.

²⁶⁸ Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 214.

²⁶⁹ *Navitaire Inc. v easyJet Airline Company & Another* [113].

²⁷⁰ Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 58.

does not involve only colourable alterations to disguise such verbatim copying, or a translation of a program into another programming language.

The potential for non-literal copyright infringement claims may be greater than first imagined. For example, software written for one operating system, such as Microsoft's *Vista*, may need to be rewritten for another operating system like Apple's *Leopard*. A rewriting exercise may also be motivated by the termination (or prospective termination) of an agreement between a software vendor and a customer, and the customer thus seeks to develop substantively similar replacement software.²⁷¹ This is precisely what happened in the *Navitaire* case,²⁷² to be discussed later.

Although it is trite that copyright does not protect ideas, only their expression, this rule, like other general legal rules, conceals its complexity.²⁷³ Copyright law has been faced with issues of non-literal copying in other contexts, such as fictional works, and developed the concept of the idea-expression dichotomy. For example, copyright protection is not confined to the exact words of a literary work like a novel. If copyright protection was limited to literal copying, copyright protection would provide an author too little protection against a person who skillfully paraphrases his work. It would, for example, allow a plagiarist to avoid liability by making immaterial variations to the copied work. Copyright protection, therefore, necessarily has to protect more than just the literal text (or translation) of a copyright work.²⁷⁴ This approach has been recognised by the courts: copying that paraphrases, or loosely

²⁷¹ Murray *Information Technology Law: The Law and Society* 190.

²⁷² *Navitaire Inc. v easyJet Airline Company & Another*.

²⁷³ For example, the issue of whether a person has given physical expression to his ideas has presented particular challenges in determining whether a work has been co-authored. At the extremes, a person can author a work by dictating it to a scribe, or, at the other end of the spectrum, a person may merely verbally express an idea which another then, as author, embodies in a written form. There is a grey area between these two extremes in which a sufficient contribution of detailed ideas and guidance by a person, as part of a collaborative effort, could result that person being considered to be a co-author, without having been responsible for the physical expression of the copyright work. See *Peter-Ross v Ramesar and Another* 2008 (4) SA 168 (C) 176.

²⁷⁴ Banzaf "Copyright Protection for Computer Programs" 148-9; Hamilton "Computer Science Concepts in Copyright Cases: The Path to a Coherent Law" 244.

paraphrases, rather than takes the verbatim expression of the computer code of a computer program can constitute copyright infringement.²⁷⁵ Conversely, although computer programs require protection against more than just literal copying (or translation), the protection should not be so broad as would protect the underlying ideas, or inhibit future creative endeavours by others.²⁷⁶ However, the extent to which paraphrasing would constitute copyright infringement should be more restricted in the case of computer programs than in respect of other types of copyright work, due to the functional nature of programs.²⁷⁷

While cases of non-literal infringement involving fictional literary works have presented challenges to courts, those difficulties are of a greater order of magnitude in the case of computer programs. In the case of fictional literary works, it is comparatively easy to identify the unprotectable elements such as *scènes à faire*, the basic plot, stock characters and theme, in order to establish whether any other non-literal protectable expression has been appropriated.²⁷⁸ As illustrated above, due to the functional nature of computer programs there may be a number of elements which ought not to be protected. As such, not every instance of similarity will be relevant to an assessment of whether copyright in a computer program has been infringed. For example, the mere fact that two programs, with the same purpose, are written in the same programming language will necessarily lead to the possibility of a similarity. The structure of the particular programming language will influence the logic and design of the program.²⁷⁹

The functional nature of programs and the technical environment complicates any assessment of whether there has been non-literal infringement, and, as will become apparent, the determination of the appropriate level of protection has developed gradually through a series of (often controversial and criticised) US and

²⁷⁵ *Lotus Development Corp. v Borland International Inc.* 814.

²⁷⁶ Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 169.

²⁷⁷ Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 12.

²⁷⁸ Hamilton "Computer Science Concepts in Copyright Cases: The Path to a Coherent Law" 249.

²⁷⁹ Davidson "Protecting Computer Software: A Comprehensive Analysis" 377.

UK decisions. The cases of non-literal copyright infringement of computer programs have, arguably, proved to be the most complex faced by copyright law, as will be illustrated when considering the cases analysed below. They have provided courts with greater challenges than those presented by other types of copyright work, and have required a forensic examination of copyright's idea-expression dichotomy.²⁸⁰ Briefly put, the courts had to determine which non-literal elements (if any) of a computer program constitute its protectable expression. In order to deal with the difficulty in determining whether a substantial part of a computer program had been copied, alternative tests were developed to determine whether infringement had taken place. The development of these tests was largely a consequence of a greater understanding and appreciation of the nature of computer programs.

As will be illustrated, in both the US and the UK, the cases involving non-literal copyright infringement of computer program show a gradually narrowing of the protection afforded to computer programs. In each of the jurisdictions, the protection initially afforded to computer programs was broad, providing too much protection. In the early cases the courts' analysis was primarily influenced by an analogy between a computer program and non-functional works such as novels, and the law applicable to protecting to the latter type of work, without an adequate appreciation of the nature of computer programs. This approach considered the development of a computer program as the product of "pure creativity," rather than as a functional work constrained by the particular problem to be addressed, and the technical means and requirements of writing computer code.²⁸¹ A typical example of this form of analysis by analogy is the search for the "structure, sequence, and organisation" of a computer program. This broad protection afforded to computer programs was expanded, culminating in *Lotus Development Corp. v Paperback Software Intl.*,²⁸² which provided protection to a computer program's user interface, or "look and feel,"

²⁸⁰ Arnold "Infringement of Copyright in Computer Software by Non-textual Copying: First Decision at Trial by an English Court" 250.

²⁸¹ Green "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" [1].

²⁸² *Lotus Development Corp. v Paperback Software Intl.* . The protectability of the user interface of the Lotus 1-2-3 spreadsheet program was also the subject of the case which reversed this trend, *Lotus Development Corp. v Borland International Inc.* , which will be discussed below.

as one of the protected elements of a computer program.²⁸³ As discussed above, a computer program's user interface is distinct from the computer program, and is not a computer program, as defined.

Following strong criticism of the courts' initial attempts to determine the appropriate scope of copyright protection of computer programs, the subsequent cases reduced the elements considered to be protectable expression.²⁸⁴ This narrower scope of copyright protection of computer programs was considered to be appropriate as it would promote development and innovation. The broader copyright protection forced software developers to devote costly resources to constantly find new methods of achieving the same results.²⁸⁵ Copyright protection was, thus, considered to go further than providing necessary incentives for program developers.

While not all of the cases which will be analysed in the following section involved non-literal copying, the *obiter* statements concerning non-literal copying made in these cases represented sea-changes in the scope of copyright protection of computer programs, which influenced subsequent cases. Also, the analysis is confined to a consideration of US and UK case law as there have been no reported cases in South Africa which have dealt with, or provided instructive comment on, the issue of non-literal copyright infringement, and the scope of copyright protection, of computer programs.

4 4 4 2 1 US case law

The three US cases which will be considered are: *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.*;²⁸⁶ *Computer Associates Intl. Inc. v Altai Inc.*;²⁸⁷ and, *Lotus Development Corp. v Borland International Inc.*²⁸⁸

²⁸³ T Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 1999 *Utah L. Rev.* 797 805.

²⁸⁴ Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 37.

²⁸⁵ Bobko "Open-Source Software and the Demise of Copyright" 69-70.

²⁸⁶ *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1986 797 F.2d 1222.

(a) Whelan Associates Inc. v Jaslow Dental Laboratory Inc.

In this case the court had to consider the scope of copyright protection of a computer program: in particular, it had to determine, for the first time, whether the non-literal copying of the structure of a computer program constituted copyright infringement or whether copyright protection was confined to the literal computer code.²⁸⁹

The appellant, Jaslow Dental Laboratory Inc. ("Jaslow Lab"), was a manufacturer of dental prosthetics and devices. In order to facilitate the bookkeeping and administrative tasks peculiar to its business, occasioned by the need to manage the orders it received and its inventory, Jaslow Lab (represented by Rand Jaslow) hired the Strohl Systems Group Inc. ("Strohl"), a software development company, to develop a computer program to satisfy its needs. In terms of an agreement between the parties, Strohl owned the copyright in the program it developed for Jaslow Lab, and Strohl was also entitled to market the program to other dental laboratories. Jaslow Lab would receive a 10% royalty on all such sales.²⁹⁰

The computer program which Strohl developed, Dentalab, was written in a programming language known as EDL (Event Driven Language) because it was designed to operate on an IBM Series One computer. Following completion of the Dentalab program, the programmer at Strohl who developed it, Elaine Whelan, formed Whelan Associates Inc. ("Whelan Associates"). Whelan Associates acquired Strohl's interest in the Dentalab program.²⁹¹ Subsequently, Rand Jaslow, with the assistance of another computer programmer, then developed a similar program,

²⁸⁷ *Computer Associates Intl. Inc. v Altai Inc.* 1992 982 F.2d 693.

²⁸⁸ *Lotus Development Corp. v Borland International Inc.* 1995 49 F.3d 807.

²⁸⁹ *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1224. This work will only discuss the aspects of the case relating to the scope of copyright protection, and, for example, will not address the proprietary claims relating to the Dentalab program. Also, the court used the terms "structure," "sequence," and "organisation" as synonyms, and used these terms interchangeably, but for purposes of this analysis of the case only the term "structure" will be used.

²⁹⁰ 1225.

²⁹¹ 1226.

Dentcom, in the BASIC programming language, which was suitable for cheaper IBM PC computers. Whelan Associates claimed that Dentcom infringed its copyright in its Dentalab program.²⁹²

The court *a quo* held that the Dentcom program was not independently created. It further held that, despite the fact that the Dentcom program was written in a different programming language from that in which Dentalab was written, and was not a mere translation of the Dentalab program, the Dentcom program infringed the copyright in the Dentalab program because its structure was substantially similar to that of the Dentalab program. The court *a quo*, therefore, awarded Whelan Associates damages for these copyright infringements, and enjoined the sale of the Dentcom program.²⁹³ It was this decision that was the subject of the appeal.

As there had been no finding, or allegation, of any copying of the computer code (although the defendants had access to the Dentalab program), the court had to address the defendants' contention that copyright protection does not extend to the non-literal elements such as the structure of a computer program. In other words, they contended that non-literal copying of the structure of a computer program cannot be the basis for a finding of substantial similarity, and, thus, copyright infringement, as the court *a quo* had found.²⁹⁴ The defendants argued that while it is true that non-literal copying of other literary works can result in substantial similarity, this principle should not be extended by analogy to computer programs.²⁹⁵

²⁹² 1226-7.

²⁹³ 1228-9.

²⁹⁴ 1232-4. In US copyright law, the expression "substantially similar" (also referred to as "probative similarity") appears to be shorthand for whether the allegedly infringing work had copied part of the copyright work, rather than a comparison in the passing off or trade mark sense. Where there is no direct evidence of copying, copying may be established by showing that the defendant had access to the copyright work, and that there is substantial similarity between the copyright work and the allegedly infringing work. If copying has been established, the plaintiff must establish that a substantial part of the copyright work has been copied (referred to as "improper appropriation" in US law). See Green "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" [3] and LaFrance *Copyright Law: In a nutshell* 282-5.

²⁹⁵ *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1234. For example, it was accepted that the non-literal copying of the plot or plot devices of a play or book can constitute copyright

They argued that the structure of a computer program was simply an unprotectable idea, rather than the expression of an idea. The court then set about establishing the rule for distinguishing an unprotectable idea from its expression in computer programs.²⁹⁶

Decision

Whether two works are substantially similar is judged qualitatively and not quantitatively.²⁹⁷ A computer program, like other copyright works, has some steps which are more important than others, and, therefore, assessments of substantial similarity cannot be made on a mechanical basis. It is necessary to determine whether the most important elements of the two programs are similar.²⁹⁸

The idea-expression dichotomy in copyright law had its basis in the purpose of the copyright law: to strike an efficient balance between incentivising the creation of copyright works, on the one hand, and the dissemination of information, and the promotion of learning, culture, development and competition, on the other hand.²⁹⁹ Although it is generally difficult to distinguish the unprotectable idea from the protectable expression, in the case of a utilitarian (or functional) work the elusive dividing line depends on the purpose (or function) of such work.³⁰⁰ Simply put, the purpose of a utilitarian work would be the work's idea, and everything that is not necessary to that purpose or function would be part of the expression of the idea. Thus, where there is more than one way in which the purpose can be achieved, the particular means chosen would not be necessary for such purpose, and will be regarded as protectable expression.³⁰¹ The copyright doctrines which limit the protectable

infringement (*Nichols v Universal Pictures Corp.* 1930 45 F.2d 119; *Sheldon v Metro-Goldwyn Pictures Corp.* 1936 81 F.2d 49; *Twentieth Century-Fox Film Corp. v MCA Inc.* 1983 715 F.2d 1327).

²⁹⁶ *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1235.

²⁹⁷ 1245.

²⁹⁸ 1246.

²⁹⁹ 1235.

³⁰⁰ 1235-6. It is more difficult, if not impossible, to determine the purpose or function of other copyright works such as works of literature or "non-functional" visual representations (1238).

³⁰¹ 1236.

elements, such as *scènes à faire* and the facts incorporated in factual copyright works, are similarly based on the aforesaid purpose of copyright law. Anything that is necessary for the purpose or function of a work would be unprotectable (and considered part of such a work's idea), otherwise it would give the first author of such a work a patent-like monopoly over such work.³⁰²

The court considered its characterisation of what constituted copyrightable expression as being consistent with the notion that the idea-expression distinction is based on the premise that copyright law has to provide appropriate incentives for creation of copyright works, while allowing sufficient room for competition. Given that most of the costs incurred in the development of a program relate to the design of its structure and logic, it is necessary to extend copyright protection to such non-literal elements such as the structure of a program in order to provide programmers with the appropriate incentives to create such works.³⁰³

The court rejected the economic argument for restricting copyright protection to the literal elements of a computer program. It had been submitted on behalf of the defendants that due to the complexity of computer programs, and the interdependency of the various elements, from an economic perspective, the copying of a computer program almost invariably requires literal copying. Merely copying its structure would still require a competitor to incur a similar amount of effort and costs as that incurred by the author of the original computer program, and a competitor should not be prevented from embarking on such a project. The court rejected this argument for two reasons. First, allowing a competitor to use the structure of the original program would give the competitor a significant advantage, as it is costly to develop. Second, the level of effort involved in copying a copyright work is irrelevant; the issue in an infringement case is whether the author's expression had been copied.³⁰⁴

³⁰² 1236-7.

³⁰³ 1237.

³⁰⁴ 1237.

The court also rejected the argument that the concept of structure in computer programs was too vague to be useful in copyright cases. It conceded there was difficulty in its application to computer programs but ease of application should not be determinative of whether the concept should be used.³⁰⁵ The court also rejected the argument that the progress in computer programming was quantitatively different to that in other areas of science or the arts, and, therefore, copyright law should allow the reuse of comparatively more elements of a computer program, as they are required as building blocks for further progress of the field.³⁰⁶

The court defined the purpose of the Dentalab program as the efficient management of the business operations of a dental laboratory. Given that there were other computer programs with a similarly purpose, with different structures and designs, the particular detailed structure of the program was not essential to its function, and constituted protectable expression of that idea. The court accepted the court *a quo*'s characterisation that "[t]he 'expression of the idea' in a software computer program is the manner in which the program operates, controls and regulates the computer in receiving, assembling, calculating, retaining, correlating, and producing useful information either on a screen, print-out or by audio communication."³⁰⁷

As a data file structure (how the data is stored and arranged) resembles the layout of a blank form, both may be protectable by copyright if their design involved sufficient innovation that the specific information they contain and the manner in which the information is arranged was informative. The Dentalab file structure was sufficiently innovative because there were other programs which used different file structures, and, therefore the particular file structure was not required. Thus, the Dentalab file structure was a protectable expression.³⁰⁸ Although Whelan Associates did not allege copyright infringement with respect to the user interface,

³⁰⁵ 1237-8.

³⁰⁶ 1238.

³⁰⁷ 1239.

³⁰⁸ 1242-3.

the court held that they were protectable as distinct audiovisual copyright works.³⁰⁹ Although the user interface was not a computer program, the similarity of the user interfaces could serve as indirect, inferential evidence of infringement of the underlying computer program. The screen output is produced by the computer program and, therefore, of some probative value.³¹⁰

There was sufficient evidence of substantial similarity between the data file structures of the programs, screen outputs and two key subroutines (invoicing accounts, and end-of-day and end-of-month procedures) to support a finding of infringement.³¹¹

Comment and criticism

The court expressly identified the purpose of copyright law as incentivising the creation of copyright works, while seeking to strike an efficient balance with other social goals: the dissemination of information, and the promotion of learning, culture, development and competitions.³¹² However, critics indicated that the court did not strike the appropriate balance, and that the scope of copyright protection it afforded to a computer program was far too broad. Instead of using the idea-expression dichotomy to limit the protection afforded to an author, the doctrine was inappropriately used to provide excessive copyright protection for computer programs.³¹³

Equating the idea of a computer program with its overall purpose was simplistic, and lacked a principled basis for distinguishing ideas from protectable expression; it was too subjective and arbitrary. It depended on the court's description of what it defined as the program's purpose or objective. Defining the purpose of the program becomes critical, and, possibly determinative of an

³⁰⁹ "Audiovisual works" correspond to cinematograph films under the SA Copyright Act.

³¹⁰ *Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1244.

³¹¹ 1246-8.

³¹² 1235.

³¹³ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 747.

infringement action. By defining a program's idea as its purpose, and everything that was not necessary to that purpose as part of the protectable expression, it favoured an expansive notion of what constitutes protectable expression.³¹⁴ The court failed to appreciate that a computer program may contain several ideas, and their expression, at different levels. Computer programs are generally constructed by the combination of various sub-routines, each of which may be considered as a distinct computer program with their own idea and expression. This requires a more sophisticated approach to identify what constitutes protectable, expressive material.³¹⁵

It was suggested that the reason for the excessive copyright protection which the court afforded was a consequence of its failure to appreciate the functional nature of computer programs, and the technical aspects of developing software. While it is correct that there may be a number of ways in which the function — expressed at its most basic or abstract level — of a computer program can be expressed, this does not mean that each of such alternatives are of equal merit. Computer programs are not pure creative works like fictional literary works, and their development is — to a very significant degree — dictated by the technical constraints, and efficiency considerations, such as the need to manage data flow: how the data will be stored and processed.³¹⁶ The failure to appreciate this qualitative difference meant that the court assessed the computer program in the same manner as it would a fictional literary work, referring to a concept such as the “structure” of a computer program. However, this concept is not apposite to

³¹⁴ Arnold "Infringement of Copyright in Computer Software by Non-textual Copying: First Decision at Trial by an English Court" 252; Green "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" [5]; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 748.

³¹⁵ Arnold "Infringement of Copyright in Computer Software by Non-textual Copying: First Decision at Trial by an English Court" 252; Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 217; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 36-7.

³¹⁶ Green "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" [1]; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 755; Murray *Information Technology Law: The Law and Society* 199.

computer programs.³¹⁷ The various subroutines of a computer program and their interaction are determined by their functional importance, not the kind of creativity associated with formulating the structure of a work of literary fiction.³¹⁸

By ignoring the technical aspects of a computer program, too many aspects of a computer program were protected, which inhibited the development of other computer programs. Progress in such a technical field is incremental, and excessive protection prevented such an incremental, cumulative process from being realised. For example, as a consequence of the *Whelan* decision, another software developer could be prevented from reverse engineering a program, and using the same processes and methods of data management in a program with a similar function, and possibly also in a program with a completely different function.³¹⁹ This approach gives the author of a computer program a patent-like monopoly.³²⁰ Program developers were, consequently, required to devote, and waste, costly resources to deal with the same technical issues in order to avoid infringing copyright in the earlier program; they would, metaphorically, be required to reinvent the wheel to deal with recurring functional requirements. These additional costs would mean that some program developers would abandon their efforts to develop useful computer programs because they would consider it economically unviable, resulting in an inefficient allocation of resources. This harms consumers as there would be fewer available computer programs, and consumers would be required to pay higher prices for those which have been developed.³²¹

³¹⁷ Hamilton "Computer Science Concepts in Copyright Cases: The Path to a Coherent Law" 240.

³¹⁸ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 177.

³¹⁹ Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 747-8. The position could have been different if the court defined the idea of the program as the ordering of data flow in a computer program for the *efficient* management of a dental laboratory. Under this definition, the techniques of data management employed would have been an inseparable part of the unprotectable idea.

³²⁰ Bobko "Open-Source Software and the Demise of Copyright" 72.

³²¹ 69-72; Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 217; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 755; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 36-7.

In short, under the *Whelan* approach too many functional aspects of a computer program would be protected by copyright. This over-broad protection paved the way for the subsequent expansion of copyright protection of computer programs, culminating in the protection of a program's user interface as their replication constituted a form of non-literal copying.³²²

(b) Computer Associates Intl. Inc. v Altai Inc.

The *Computer Associates* case also required a determination of whether, and to what extent, the non-literal elements of a computer program are protected by copyright.³²³ Computer Associates Intl. Inc. ("CA") and Altai Inc. ("Altai") were both computer software companies. CA produced CA-SCHEDULER, a job-scheduling program. A job-scheduling program prioritises and manages the various tasks to be performed by a computer. Computer programs, including a job-scheduling program, are written to operate on a specific operating system. What made the CA-SCHEDULER unusual was that it contained a sub-program, ADAPTER, which allowed the CA-SCHEDULER to operate on different operating systems.³²⁴

Altai also produced a job-scheduling program, OSCAR, which included a compatibility component similar to CA's ADAPTER. Altai conceded that its first version of OSCAR, known as OSCAR 3.4, infringed CA's copyright as it copied 30% of CA's ADAPTER sub-program. Altai then proceeded to rewrite the portions of the OSCAR program which had been copied, using a new team of programmers to avoid

³²² De Villiers "Computer Programs and Copyright: The South African Perspective" 333; Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 805; Kravetz "Copyright Protection of Computer Programs" 55; Pistorius "The Copyright Protection of Computer Programs in the United States of America: The Second Generation Questions (Part 2)" 180; Spivak "Does Form Follow Function? The Idea/Expression Dichotomy in Copyright Protection of Computer Software" 754 and 758. For example, see *Lotus Development Corp. v Paperback Software Intl.*

³²³ *Computer Associates Intl. Inc. v Altai Inc.* 696. This work will only discuss the aspects of the case relating to the scope of copyright protection, and, for example, will not address the claim that Altai had misappropriated CA's trade secrets.

³²⁴ 698-9.

any possible claims of copyright infringement.³²⁵ However, CA claimed that the new version of Altai's OSCAR program, OSCAR 3.5, also infringed its copyright in the CA-SCHEDULER program because it remained substantially similar to the structure of its ADAPTER program despite the fact that it was accepted that there was no literal copying of CA's ADAPTER when it created OSCAR 3.5.³²⁶

As it was assumed that Altai had access to CA's ADAPTER computer code, the only issue the court had to determine was whether Altai's OSCAR 3.5 was substantially similar to CA's ADAPTER.³²⁷

Decision

The court held that in order to determine the scope of protection of the non-literal structure of a computer program it was necessary to use the idea-expression doctrine, while conceding the difficulty in distinguishing ideas from expressions.³²⁸ The problem of distinguishing ideas from expressions was compounded in the case of utilitarian works like computer programs. Compared to aesthetic works, which are not process orientated, computer programs involve both creative expression and technical expression. The use of technical art, instructions, or methods to achieve a particular purpose (or function) expressed in a work, or matter necessarily incidental thereto, does not constitute copyright infringement. It made no difference if the methods or instructions are directed at a human or a computer.³²⁹ Thus, those elements of a computer program necessarily incidental to its function or purpose are unprotectable.³³⁰

The court rejected the approach of the court in *Whelan Associates*, which distinguished the idea of a computer program from its expression with reference to its ultimate function or purpose, which it considered to be its idea. It held that there

³²⁵ 700.

³²⁶ 702. There was also a claim that Altai had misappropriated CA's trade secrets.

³²⁷ 701.

³²⁸ 702-4.

³²⁹ 704.

³³⁰ 705.

was no *a priori*, single principle which can be applied to distinguish unprotectable ideas from protectable expression. Instead, a three-step procedure, utilising the copyright doctrines such as merger, *scènes à faire*, and public domain, should be used to ascertain if computer programs are substantially similar. A court should first break down the copyrighted program into its constituent structural parts. Each of these parts must then be analysed to filter out the unprotectable elements (associated ideas, those ideas dictated by efficiency or external factors, and public domain elements) to determine the protectable kernel (the “golden nugget”) of the program. This protected expression must then be compared to structure of the allegedly infringing work to determine if they are substantially similar.³³¹ This three-step procedure became known as the AFC test: an abbreviation of the three sequential steps — abstraction, filtration, and comparison.

The court stated that the abstraction test, the first step in the suggested procedure, conformed with the traditional approach employed when attempting to distinguish unprotectable ideas from protectable expression in the case of fictional literary works such as novels and plays.³³² This conceptual approach, when applied to computer programs, required its assessment in increasingly general or abstract terms, identifying the various levels of abstraction in the structure of the program, starting with the computer code (the lowest level of abstraction) and proceeding with more general abstractions until one ends with the program’s function or purpose (the highest level of abstraction). At the lowest and highest levels of abstraction the structure of a computer program is trivial; at the lowest level it can simply be regarded as individual computer instructions, while at the highest level it will simply be the function of the computer program.³³³

At each level of abstraction a determination had to be made about whether the structural elements at that level are unprotectable because they amounted to ideas, were dictated by considerations of efficiency, were required by external factors, or taken from the public domain. Through this process of filtration the

³³¹ 706.

³³² 706-7.

³³³ 707.

protectable core, if any, of the computer program will be identified, and, in turn, the scope of the plaintiff's copyright protection.³³⁴ The merger doctrine emerged as a consequence of a particular expression being necessarily incidental to the idea expressed, resulting in the idea and its expression being inseparable.³³⁵ If copyright protection was afforded to such expressions, it would amount to giving the copyright owner a monopoly in the idea. This process was applicable to the structural aspects of a computer program, and its textual expressions. This was particularly the case with aspects determined by considerations of efficiency. There was also possibly a more pragmatic procedural reason for refusing copyright in efficient structural aspects: the computing industry was constantly striving for efficiency and it is likely that the same solutions will be arrived at independently.³³⁶ Thus, the existence of similar, efficient structures may just as likely be the result of independent creation as copying.³³⁷

Similarly, the *scènes à faire* doctrine, which denies copyright protection to certain common features or devices one would expect to find in particular literary works, could be applied to the analysis of computer programs to filter out standard techniques dictated by extrinsic considerations.³³⁸ For example, a computer program may be constrained by the particular computer on which it was intended to operate, other programs it had to interact with, or industry standards or practices.³³⁹ Material in the public domain would similarly be excluded from protection as such material was free for use by others.³⁴⁰

Following the filtration of the non-protectable elements, a determination had to be made whether any aspect of the remaining protectable expression (the golden nugget), if any, had been copied by the defendant, and the relative importance of the

³³⁴ 707.

³³⁵ 707-8.

³³⁶ 708.

³³⁷ 709.

³³⁸ 709.

³³⁹ 709-10.

³⁴⁰ 710.

copied portion with respect to the plaintiff's overall program.³⁴¹ This ensured that the scope of copyright protection provided sufficient incentives for software developers to create socially beneficial works, while not unduly stifling competition. The court held that this was in accordance with the fundamental principles on which copyright law was based.³⁴² It also ensured "that non-protectable technical expression remains in the public domain for others to use freely as building blocks in their own work."³⁴³

Interestingly, while conceding that creating preparatory design material such as flow charts may involve substantial effort, the court held that this material was not protected by the copyright in the computer program. The level of effort did not, *per se*, mean that the product was eligible for copyright protection.³⁴⁴ Also, although the decision was not concerned with the protection of the user interface, the court indicated that the user interface constituted an audiovisual work, distinct from the underlying computer program.³⁴⁵ This remark was probably intended to reverse earlier cases which had extended the idea of protecting the non-literal elements of a computer program to include a program's user interface.³⁴⁶

The court held that, following the filtration process, OSCAR contained no protectable expression.³⁴⁷

³⁴¹ 710.

³⁴² 711.

³⁴³ 721.

³⁴⁴ 711. This contrasts with the current position under the EU Software Directive, which protects the preparatory design material as part of the copyright protection in the computer program, as discussed above. It also contrasts with the *Whelan Associates* decision which — to a large extent — based its decision to extend copyright to the non-literal elements of a computer program on the fact that it was costly to design the structure and logic of a program (*Whelan Associates Inc. v Jaslow Dental Laboratory Inc.* 1237).

³⁴⁵ *Computer Associates Intl. Inc. v Altai Inc.* 703.

³⁴⁶ For example, see *Lotus Development Corp. v Paperback Software Intl.* .

³⁴⁷ *Computer Associates Intl. Inc. v Altai Inc.* 714-5.

Comment and criticism

The *Computer Associates* decision has, on the one hand, been described as providing a clear and easy test to assess the copyrightability of the various elements of computer programs,³⁴⁸ and, on the other hand, as the “one of the most complex judicial rulings in this field.”³⁴⁹ What is generally accepted is that it was the first case which adopted a narrow approach to the copyright protection of computer programs, as it started the reverse of the broad protection which had been afforded to computer programs until then — even extending to the “look and feel” of a program — which broad scope of protection had started with the *Whelan* case.³⁵⁰

According to the *Computer Associates* case, instead of comparing the respective programs in their entirety, it was necessary to identify the protectable elements in the original program, following a process of excising non-copyrightable elements.³⁵¹ Whereas the *Whelan* case characterised the development of computer programs as primarily the result of creative expression, rather than technical expression, the *Computer Associates* case appeared to adopt the reverse position. Critics of the *Computer Associates* decision were of the opinion that the application of the AFC test motivated the court to identify too many elements as unprotectable; it was claimed that it gave disproportionate importance to technical considerations such as efficiency and functionality in design of computer program, and considerations of the public domain.³⁵²

Critics claimed that the court, in its application of the abstraction step failed to regard the overall structure of the program as a level of abstraction that may have protectable elements, which was the basis of the protection in the *Whelan* case. The

³⁴⁸ Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 58; LaFrance *Copyright Law: In a nutshell* 288.

³⁴⁹ Murray *Information Technology Law: The Law and Society* 200.

³⁵⁰ Bobko "Open-Source Software and the Demise of Copyright" 70; Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 218-9.

³⁵¹ Bobko "Open-Source Software and the Demise of Copyright" 70; Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 37.

³⁵² CaseNote "Computer Associates International, Inc. v Altai, Inc." 1992-3 *Harv L Rev* 106 510 512-3.

structure of a program was considered to unprotectable as a process or method.³⁵³ By failing to adequately consider a computer program in its entirety — and only looking at it at the level of the constituent parts as a consequence of the AFC test — it was submitted that insufficient (or no) protection was afforded to the considerable effort and skill involved in designing the optimal architecture for a computer program, and for a computer program as a compilation of various smaller programs.³⁵⁴ However, the advantage of the *Computer Associates* approach is that it avoids the issue of trying to determine the appropriate level of abstraction at which a computer program should be protected. In other words, it avoids the problem of having to determine whether a particular level of abstraction constitutes an abstract idea, or protectable expression.³⁵⁵ Although the AFC test creates the possibility that there may be protectable expression at various levels of abstraction, critics of the AFC test indicate that some abstractions of a computer program will not yield any protectable elements. The impression that the AFC test had created, and which would not necessarily be the case, was that it would yield some protectable expression, and, if there had been unauthorised use of a substantial portion thereof, it would constitute copyright infringement.³⁵⁶

In addition, the court's application of the filtration step in relation to computer programs was criticised as crude. It was submitted that once a computer program has been created it is very difficult for a court to separate functional elements from expressive elements which may warrant protection. The reason for this is that it is very easy to suggest a functional or efficiency reason for a particular element after the fact. After all, computer code is necessarily functional as it determines the specific instructions to be performed by the computer. However, it was claimed that in constructing a computer program there is still enough room for creative expression, which should be identified and protected by copyright. As a consequence of such crude application of copyright law to computer programs there

³⁵³ Green "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" [8-9].

³⁵⁴ Bobko "Open-Source Software and the Demise of Copyright" 73.

³⁵⁵ Lunney "Lotus v. Borland: Copyright and Computer Programs" 2404.

³⁵⁶ Murray *Information Technology Law: The Law and Society* 202.

was a danger that too many elements of a computer program will be considered to be unprotectable. Copyright rules such as the merger doctrine or *scènes à faire* should, therefore, be applied with caution to computer programs.³⁵⁷

Critics claimed that the consequence of the new, narrower copyright protection afforded to computer programs would discourage the innovation in programming techniques because there would be insufficient incentives for software developers. The approach of the court in *Computer Associates* meant that innovative programming techniques, which increase the efficiency of computer programs, would generally be unprotected because these elements will be regarded as functional. It was even suggested that this would, perversely, mean that programmers will prefer more inefficient, idiosyncratic programming techniques, because they were more likely to be protected by copyright.³⁵⁸ However, there was no evidence that any of these retrograde processes, or reduced production of new computer programs, resulted from the thin copyright protection which the courts started granting to computer programs following the *Computer Associates* decision.

(c) Lotus Development Corp. v Borland International Inc.

In *Lotus Development Corp. v Borland International Inc.* the court had to decide whether a computer program menu command hierarchy was copyrightable subject matter. More specifically, it had to decide whether Lotus Development Corporation ("Lotus") had copyright in the menu command hierarchy of its Lotus 1-2-3 spreadsheet computer program, and whether it was infringed by Borland International Inc. ("Borland") in two of its Quattro spreadsheet programs.³⁵⁹ The Lotus 1-2-3 computer program was a spreadsheet program that enabled users to

³⁵⁷ CaseNote "Computer Associates International, Inc. v Altai, Inc." 512-4; Green "Copyright Protection and Computer Programs: Identifying Creative Expression in a Computer Program's Nonliteral Elements" [9-11].

³⁵⁸ Bordoloi, et al. "Copyrighting computer software: The "Look and Feel" Controversy and Beyond" 219; Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 62-3.

³⁵⁹ *Lotus Development Corp. v Borland International Inc.* 809.

perform accounting functions. Users manipulated and controlled the program via a series of menu commands, such as “Copy,” “Print,” and “Quit.” They could choose commands from its menu structure (or menu tree) either by highlighting them on the screen or by typing the first letter of the desired command.³⁶⁰ In addition, the Lotus 1-2-3 computer program allowed users to create shortcuts for the execution of commands, called “macros.” These macros allowed a user to execute a series of commands with a single, user-created, macro keystroke.³⁶¹

Borland’s Quattro programs allowed users to chose a user interface, the “Lotus Emulation Interface,” which “virtually identically” replicated the display of the Lotus 1-2-3 menu structure. In its replication of the Lotus 1-2-3 menu structure, Borland had not copied any of Lotus’ underlying computer code. The replication of the Lotus 1-2-3 menu structure was deliberate; it was intended to minimise any problems caused by a lack of familiarity with the Quattro programs which new users who had previously used Lotus 1-2-3 may experience.³⁶² In summary judgment proceedings, the district court found Borland’s Quattro programs to have infringed Lotus’ menu commands and its structure because there were other ways of implementing menu commands and their structure.³⁶³

Borland then removed the Lotus Emulation Interface from its Quattro programs. While the modified versions of the Quattro programs no longer displayed the Lotus 1-2-3 command menus to users, users were still able to use some of the Lotus 1-2-3 macros as a result of the “Key Reader” feature which was retained in the Quattro programs. While the Key Reader did not use the full names of the Lotus 1-2-3 command names but only the first letter of each command, the district court again considered it to have infringed the Lotus 1-2-3 menu command structure.³⁶⁴

³⁶⁰ 809.

³⁶¹ 809-10.

³⁶² 810.

³⁶³ 811-2.

³⁶⁴ 812.

Borland appealed on the basis that the Lotus 1-2-3 menu command hierarchy was not copyrightable as it was a system, method of operation, process, or procedure, which are not copyrightable pursuant to section 102(b) of the US Copyright Act 1976.³⁶⁵ There were two unusual aspects in the case. First, it is seldom in a copyright-infringement case that a defendant admits to copying material, and Borland admitted to copying the Lotus 1-2-3 menu command hierarchy. Second, no other element of the user interface relating to the menu command hierarchy, such as the screen display was alleged to have been infringed.³⁶⁶ Thus, the appeal solely concerned the copyrightability of the menu command hierarchy used to operate the computer program.³⁶⁷ The alleged copying of the menu command hierarchy was considered to involve literal copying, and the issue was whether the menu command hierarchy was copyrightable.³⁶⁸ However, the court did make significant general comments concerning the scope of copyright protection, which would be applicable to cases of literal and non-literal copying.

Decision

The court, *per* Judge Stahl, stated that in cases of alleged non-literal copying it was necessary to determine whether the similarities are the result of the fact that the two works merely shared the same underlying idea or whether the similarities are a consequence of the defendant having copied the plaintiff's expression.³⁶⁹ The court appeared to tacitly approve the *Computer Associates* test for distinguishing protectable expression from unprotected ideas in cases concerning non-literal copying, but not for cases involving literal copying.³⁷⁰

³⁶⁵ 812.

³⁶⁶ 813.

³⁶⁷ 814.

³⁶⁸ 814-5.

³⁶⁹ 814.

³⁷⁰ 814. However, as indicated above, in subsequent cases it was accepted that the AFC test was also applicable in cases of literal copying. See *Gates Rubber v Bando Chemical Industries* ; *Bateman v Mnemonics* .

The court considered the Lotus menu command hierarchy to be a “method of operation,” and, therefore, did not consider whether it was also uncopyrightable as a “system, process, or procedure.” The statutory expression “method of operation” used in section 102(b) refers to the means by which a person operates something, whether it be a car, a food processor, or a computer. It was irrelevant whether there were other methods of operation; all methods of operation were unprotectable. The menu command hierarchy was not explanatory, it was what users used to operate, and interact with, the Lotus 1-2-3 program.³⁷¹ The mere fact that specific words were used as commands did not make the menu protectable as the “expression” of an abstract “method of operation” because the specific words became part of the method of operation, like the buttons (not simply the labels on such buttons) on a video cassette recorder.³⁷² It may have been possible for Lotus to design a user interface in which the command terms were merely labels, but it had not done so.³⁷³

The menu command hierarchy was intended to be learnt and used by users, and, therefore, was more analogous to the common law notion that using a method or art obtained from a literary work is not protected by copyright. The “method of operation” exclusion in s 102(b) was simply a codification of this common-law principle.³⁷⁴ The Lotus menu command hierarchy served as the basis for Lotus 1-2-3 macros, and as the Lotus menu command hierarchy was a “method of operation,” the Key Reader’s use of the macros did not constitute copyright infringement.³⁷⁵

In contrast, the screen displays, unlike the menu command hierarchy, were not required to operate the Lotus 1-2-3 program and, therefore, they do not amount to a “method of operation.” As such, the screen displays were therefore protectable by copyright.³⁷⁶ Similarly, because the same menu command hierarchy can be

³⁷¹ *Lotus Development Corp. v Borland International Inc.* 815.

³⁷² 816-7.

³⁷³ 817.

³⁷⁴ 816-7.

³⁷⁵ 818. This seems to be the implication of the judgment.

³⁷⁶ 815-6.

achieved through different computer programs, the *computer code* generating the menu command hierarchy was not an unprotectable method of operation.³⁷⁷

Interestingly, Judge Boudin, who concurred with Judge Stahl, made some important observations concerning the rationale for copyright protection and what the appropriate scope of copyright protection of computer programs should be to fulfil that rationale. The judge stated that the goal of copyright law, and its associated doctrines, was to incentivise (stimulate) the creation of copyright works, and, thus, it should not unduly limit access by others to the broader themes and concepts used to create such works by authors. Providing over-broad copyright protection to literary works, other than computer programs, only results in a small additional social cost. However, computer programs are fundamentally different from other literary works as they are instrumental in nature in that they are intended to bring about a particular result. In this respect they resemble objects of mechanical utility, which are generally protected by patent law. Although the functional nature of computer programs did not prevent computer programs from being copyrightable, it did change how they should be assessed in terms of copyright doctrine.³⁷⁸ Although copyright law has a statutory basis, its scope has painstakingly been developed by the courts.³⁷⁹

While the economic incentive argument for protecting computer programs may be stronger than in comparison with other literary works, overprotection may also result in greater social costs, particularly if innovative, efficient solutions are highly valued. Requiring other software developers to create new command menus was socially inefficient: while it could be considered to protect the investment made by authors of existing menus, it disregarded the social cost caused by users having to learn new systems.³⁸⁰ For example, the QWERTY keyboards could be regarded

³⁷⁷ 816.

³⁷⁸ 819.

³⁷⁹ 820.

³⁸⁰ 819.

as a menu of letters which was not protected because it was socially wasteful for people to have to learn different keyboard layouts.³⁸¹

Judge Boudin held that Borland only copied the Lotus 1-2-3 menu command hierarchy to accommodate users who had previously become accustomed to that menu command hierarchy, and allowed those users to use their own, previously-created macros. It was unlikely that the ability to use the Lotus 1-2-3 menu would have been the reason users preferred the Quattro programs; it was likely that they chose the Quattro programs for their other features.³⁸² There was also the possibility that if Borland was not allowed to copy the Lotus 1-2-3 menu command hierarchy that users who invested the time and effort to become accustomed to that menu, and created macros, would be locked in to the Lotus program. The users' investment could lead to Lotus 1-2-3 being the "standard" for electronic spreadsheets and in Lotus having a monopoly of the electronic spreadsheet market, not because it was a better program or because it represented better value. Lotus could, thus, in this way, benefit from the investment made by users, rather than its own investment. Lotus had already realised significant returns as the first mover in the market, and, if the Borland produced a better product it should have the opportunity to earn a return on its investment.³⁸³

Judge Boudin held that it was clear that Borland should succeed; it was simply the basis that had to be determined. While it was certainly arguable that the menu was a method of operation, the copying of the menu may also have been permitted in terms of the fair use doctrine.³⁸⁴ The problem with the latter approach was that its application was unpredictable, and, thus, costly and time consuming to determine when such use would be considered permissible.³⁸⁵

³⁸¹ 820.

³⁸² 820.

³⁸³ 821.

³⁸⁴ 821.

³⁸⁵ 821-2.

Comment and criticism

The *Lotus* decision marked the peak of the narrow scope of copyright protection of computer programs in the US. Commentators have claimed that following the *Lotus* decision, “virtually every nonliteral element of a computer program can be considered to be a ‘method of operation.’”³⁸⁶ The cumulative effect of the *Computer Associates* and *Lotus* decisions was that the look and feel, or user interface, of a computer program would, as a general rule, no longer be protected, and neither would its functional elements such as menu command hierarchies.³⁸⁷ Unlike the previous decisions, the court in the *Lotus* case did not seek to directly apply the idea-expression doctrine to determine whether the menu command system amounted to a protectable expression.³⁸⁸ It chose instead to use the statutory exceptions based on the idea-expression doctrine.

Critics suggested that the court’s analogy that the visual menu command system constituted a method of operation, similar to the buttons (not simply the labels) on a video cassette recorder, was not particularly convincing.³⁸⁹ If the user interface had been implemented slightly differently and displayed a “button” with a label of the command term, which a user could “click,” the command term would have been more like the labels on the buttons of a VCR, and, thus, possibly copyrightable.³⁹⁰ However, others have suggested that, while the *Lotus* decision may not be logically sound, it was the right decision from an economic perspective. Economically, the assessment of whether copyright should protect a particular element of a computer program should depend on whether its use by competitors will give them an unfair advantage. *In casu*, the use of Lotus 1-2-3 menu command

³⁸⁶ Kravetz "Copyright Protection of Computer Programs" 43.

³⁸⁷ Murray *Information Technology Law: The Law and Society* 215.

³⁸⁸ Kravetz "Copyright Protection of Computer Programs" 62.

³⁸⁹ 62. However, these critics accept that the non-visual use of the command terms in the Key Reader did constitute a method of operation. If a user wanted to use the macros he had previously created while using the Lotus 1-2-3 program, it was necessary that the Key Reader use the precise Lotus 1-2-3 command terms.

³⁹⁰ 64-5.

structure did not give Lotus' competitors such an unfair advantage.³⁹¹ From this perspective, Judge Boudin's suggestion that the use of the menu command hierarchy may have been permitted in terms of the fair use doctrine is, doctrinally, a more cogent reason for the court's decision.

Moreover, although the court considered user interfaces to be protectable by copyright, as they were not a method of operation, the concern was expressed that future courts were more likely to consider screen displays to be a method of operation. For example, the fact that a user may need to navigate to various parts of a screen display to interact with a computer program may render user interfaces unprotectable as a method of operation. It would mean that, in the future, most aspects of a user interface would be considered to be unprotectable, restricting protection to a small number of aesthetic features, and the literal computer code.³⁹²

As will be illustrated, the *Computer Associates* case's narrow characterisation of the scope of copyright protection of computer programs, and the *Lotus* case's examination of the protectability of elements of the user interface, is consistent with the current position in the UK.

4 4 4 2 2 UK case law

There has been a similar development in the UK to that in the US: there was a shift from initially providing broad protection to much narrower copyright protection to computer programs. Given the historical connections, and similarities, between South African and UK copyright law, the UK case law concerning the scope of copyright protection of computer programs is particularly persuasive and instructive. As indicated above, there are two further reasons for our interest in the UK case law. First, although the US was the first jurisdiction to consider the challenges posed to copyright law when applied to computer programs, the most recent developments concerning the scope of protection have occurred in the UK. Second, because UK

³⁹¹ Lunney "Lotus v. Borland: Copyright and Computer Programs" 2397 and 2434-5.

³⁹² Kravetz "Copyright Protection of Computer Programs" 66.

copyright law has had to be harmonised with the EU Software Directive,³⁹³ its law is more representative of the appropriate level of copyright protection afforded to computer programs. The EU Software Directive represents the consensus position on copyright protection of computer programs across the member states of the European Union.

The five UK cases which will be considered are: *John Richardson Computers Ltd v Flanders (No. 2)*,³⁹⁴ *IBCOS Computers Ltd v Barclays Highland Finance Ltd*,³⁹⁵ *Cantor Fitzgerald International v Tradition (UK) Ltd*,³⁹⁶ *Navitaire Inc v easyJet Co*,³⁹⁷ and *Nova Productions Ltd v Mazooma Games Ltd*.³⁹⁸

(a) John Richardson Computers Ltd v Flanders (No. 2)

In this, the first case of its kind to proceed to a full hearing in the UK, the court had to consider what the appropriate approach should be in cases involving an alleged copyright infringement but where there was no allegation that the computer code had been copied.³⁹⁹ The plaintiff, John Richardson Computers Limited (“JRC”), and the second defendant, Chemtec Limited (“Chemtec”), were software companies and each of them produced and marketed computer programs which could be used by pharmacists in the labelling of dispensed drugs and control of stock levels.⁴⁰⁰ JRC had developed a computer program for pharmacists in the United Kingdom which operated on the Video Genie computer (the “Video Genie program”), and then

³⁹³ EU Software Directive.

³⁹⁴ *John Richardson Computers Ltd v Flanders (No. 2)* [1993] FSR 497.

³⁹⁵ *IBCOS Computers Ltd & Another v Barclays Highland Finance Ltd & Others* [1994] FSR 275.

³⁹⁶ *Cantor Fitzgerald International v Tradition (UK) Ltd* [2000] RPC 95.

³⁹⁷ *Navitaire Inc. v easyJet Co. & Anor.* [2004] EWHC 1725 (Ch).

³⁹⁸ *Nova Productions Ltd v Mazooma Games Ltd & Others* [2007] EWCA Civ 219.

³⁹⁹ *John Richardson Computers Ltd v Flanders (No. 2)* 515. The discussion of the case is confined to issues concerning the scope of copyright protection of computer program, and does not, for example, relate to other aspects of the case, such as proprietary claims to the copyright in the copyright work.

⁴⁰⁰ 502.

employed Timothy Flanders (“Flanders”) to write a program for the BBC computer (the “BBC program”) with the same “look and feel” as the Video Genie program.⁴⁰¹

A modified version of the BBC program was then created for pharmacists in the Republic of Ireland.⁴⁰² After leaving JRC’s employment, Flanders acted as a consultant to JRC, and continued to improve the BBC program.⁴⁰³ However, Flanders also developed a new program for pharmacists in the Republic of Ireland which would operate on IBM PCs (or compatible computers), which was sold under the name “Pharm-Assist.”⁴⁰⁴ He then modified the Pharm-Assist program for use in the United Kingdom, and formed Chemtec, the second defendant, to market this program (“Chemtec program”).⁴⁰⁵

JRC alleged that the Chemtec program infringed its copyright in the BBC program, but there was no allegation of literal copying of any substantial parts of the computer code of the BBC program. Instead, JRC alleged that the defendants had taken the general scheme of the BBC program, similar to the appropriation of the plot of a novel.⁴⁰⁶

Decision

The court held that it was clear that copyright infringement of computer programs can occur without literal copying of computer code. For example, the unauthorised translation of the computer code of a computer program, or a substantial part it, into a different language would constitute copyright infringement as such translation would amount to an “adaptation,” which is an act reserved for the copyright owner.⁴⁰⁷

⁴⁰¹ 505-6.

⁴⁰² 507.

⁴⁰³ 508.

⁴⁰⁴ 511.

⁴⁰⁵ 514.

⁴⁰⁶ 519.

⁴⁰⁷ 519. For purposes of this work, such an adaptation of a computer program is still regarded as literal copying.

As different computer programs could produce the same results, when comparing two computer programs, it was important to consider the actual programs rather than what they do.⁴⁰⁸ However, the fact that two programs produce the same results could give rise to an inference that such similarity may have been the result of copyright infringement.⁴⁰⁹ The screen display of a program is the product or result of the program. While the particular screen display was not a literary work, the screen display was possibly protectable as an artistic work or film. However, there was no allegation by the plaintiff that the Chemtec program infringed the screen display in the BBC program.⁴¹⁰

The court held that if the results of a computer program were replicated through a process of reverse engineering by observing its operation, the resultant new computer program would probably not constitute copyright infringement as the creator of the new program would have simply taken the idea embodied in the first program. In such cases of reverse engineering — which was not the situation *in casu* — the result would have been achieved by the latter programmer's own efforts, and he cannot be considered to have taken any unfair advantage of the labour, skill and effort which went into the creation of the first program.⁴¹¹

However, the position was different if the defendant had access to the plaintiff's computer program. As in the United States, English copyright law, too, does not extend copyright protection to ideas, only to the expression of ideas.⁴¹² The court considered the facts of this case to be similar to those in the *Computer Associates* case as both cases involved the alleged non-literal copying of the structure of the plaintiff's computer program.⁴¹³ It considered the approach in cases of non-literal infringement set out in *Computer Associates* to be generally consistent with English law.⁴¹⁴ However, the court considered that the appropriate approach

⁴⁰⁸ 522.

⁴⁰⁹ 523.

⁴¹⁰ 527.

⁴¹¹ 523.

⁴¹² 523.

⁴¹³ 524.

⁴¹⁴ 526-7.

should be to first determine whether the plaintiff's computer program, as a whole, was copyrightable, rather than trying to identify the core protectable expression. If it was found to be copyrightable, it then had to be determined whether any similarity attributable to copying found in the defendant's program amounted to the copying of a substantial part of the plaintiff's program. Only when making an assessment of whether the copied portion constituted a substantial part of the plaintiff's program — which required an assessment of the originality of the plaintiff's program and the separation of an idea from its expression — should a similar approach to that used in the *Computer Associates* be used.⁴¹⁵

In its comparison of the two computer programs, to determine the extent of the similarities, the court chose to focus on three (user interface) aspects of the Chemtec program: the stock control system, the dose codes and the main menu. One of the two stock control systems in the Chemtec program was the same as in the BBC program.⁴¹⁶ The dose codes (which was a list of the drugs, possible usage directions and warnings, and which was considered to be protectable as a compilation) in the Chemtec program was sufficiently similar to that used in the BBC program to infer that they had been copied.⁴¹⁷ However, as far the main menu was concerned, there was no relevant similarity between the two computer programs. The similarities in the main menu could be attributed to either similarity in idea (or concept), rather than expression, or standard methods of operation.⁴¹⁸

However, due to the similarities that did exist between the programs, as a whole, it was necessary to determine whether these similarities were the result of copying.⁴¹⁹ To establish whether there was copying it was necessary to consider three issues. First, it was necessary to determine the process by which Flanders wrote the Chemtec program. Second, whether inferences could properly be drawn from the surrounding circumstances. Third, whether, based on the evidence of the

⁴¹⁵ 527.

⁴¹⁶ 540.

⁴¹⁷ 540-1.

⁴¹⁸ 542.

⁴¹⁹ 542-3.

development process and the surrounding circumstances, the nature of similarities allowed for proper inferences to be drawn.⁴²⁰

The court held that the evidence concerning the development of the Pharm-Assist program, which was the basis of the Chemtec program, was indicative of the writing of a new program rather than the copying or adaptation of the BBC program.⁴²¹ Flanders did not have access to the BBC program's source code, and neither did he have access to a working version of the BBC program, while developing the Pharm-Assist program. The similarities in the main routines between the programs were the result of his knowledge of the BBC program, given that he was instrumental in its development.⁴²² Two surrounding circumstances — although atypical — were also considered not to infer copying of the BBC program by Flanders. First, the fact that he had not produced any programming notes, flow charts or similar documentation in the development of the Pharm-Assist and Chemtec programs, while unconventional, were not unusual.⁴²³ Second, the fact that he did not fully exploit the superior capabilities of the IBM computer did not mean that he had simply copied the inefficient BBC program; this was done to facilitate the use of the Pharm-Assist and Chemtec programs on less sophisticated computers.⁴²⁴

Although Flanders had not deliberately copied the BBC program, because of his intimate knowledge of the BBC program, it was still possible that he may have unconsciously or unintentionally copied a substantial part of the BBC program and infringed the copyright therein. In determining whether the similarities are substantial, it was necessary to consider the copied portions as a whole to determine if they constituted — qualitatively rather than quantitatively — substantial portions of the BBC program.⁴²⁵ The application of the filtration step described in the *CA* case

⁴²⁰ 543.

⁴²¹ 543.

⁴²² 545.

⁴²³ 547.

⁴²⁴ 547.

⁴²⁵ 548.

could assist in determining substantiality, although the court admitted to not fully understanding its operation.⁴²⁶

Given the fact that the similarities were the result of copying, it was necessary to determine whether the various instances of similarity constituted the taking of a substantial part of the copyright work (that is, the BBC program).⁴²⁷ The court held that while some aspects of a program may not constitute a substantial part in isolation, considered together they may indicate the copying of a substantial part.⁴²⁸ While it was the case that in respect of literary works which are compilations, the copying of a sufficiently large number of items from such works may amount to copyright infringement (while the individual items may not be protected by copyright), this principle may not be appropriate in the case of computer programs. In the case of computer programs the design of the individual components were more important, and involved greater effort than simply the selection of components.⁴²⁹ *In casu*, the court held that the copying that took place was limited to fairly minor copyright infringements.⁴³⁰

Comment and criticism

The court considered the test proposed in the US case of *Computer Associates* to be compatible with English law in cases of non-literal copying, but it considered the AFC test to be applicable only after a preliminary — more traditional — comparison between the original work and the alleged infringing work.⁴³¹ It would apply the AFC steps if it was found that there were objective similarities between the two computer programs, and that such similarities were as a consequence of copying the original program. The AFC test would, thus, simply be used to determine whether the copied portions constituted the taking of a substantial part of the original program.⁴³² This, it

⁴²⁶ 549.

⁴²⁷ 549-557.

⁴²⁸ 558.

⁴²⁹ 558-9.

⁴³⁰ 559.

⁴³¹ Murray *Information Technology Law: The Law and Society* 203.

⁴³² 203-4.

is submitted, was really no distinction at all as the AFC test in *Computer Associates* was, arguably, also only used when trying to determine if the two computer programs are substantially similar.⁴³³

However, the court appeared to only pay lip service to the AFC test. The court's assessment of the two computer programs was rather superficial. It focused on the user interfaces of the programs, rather than the underlying computer programs.⁴³⁴ Despite drawing a distinction between a computer program and its user interface, the court proceeded to describe the user interfaces of the two computer programs in a great amount of detail, and used the respective interfaces to conclude that there were similarities between the two programs. There was even a suggestion that similarities not due to copying may, in combination with the copying of substantial parts of the program, indicate copying of a substantial part to a greater extent.⁴³⁵ This cannot be correct; similarities that are not a consequence of copying cannot, some how, bolster a case of copyright infringement.

(b) IBCOS Computers Ltd v Barclays Highland Finance Ltd

Although this case concerned an alleged instance of literal copying, the court made some comments on the appropriateness of the AFC test in English law. Ibcos Computers Ltd ("Ibcos") was the owner of the copyright in a computer program called ADS (which was an abbreviation for "Agricultural Dealer System") which could be used by agricultural dealers. Ibcos alleged that the Unicorn computer program marketed by Barclays Highland Finance Ltd ("Highland") infringed its copyright in the ADS program. Both the ADS and Unicorn computer programs were essentially created by the same computer programmer, Mr Poole.⁴³⁶

⁴³³ *Computer Associates Intl. Inc. v Altai Inc.* 707-8.

⁴³⁴ Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 64.

⁴³⁵ *John Richardson Computers Ltd v Flanders (No. 2)* 558.

⁴³⁶ *IBCOS Computers Ltd & Another v Barclays Highland Finance Ltd & Others* 278-84

Decision

The court held that in cases involving alleged copyright infringement the UK CDPA required a plaintiff to establish four issues, in the following order. First, there had to be a determination of the work or works in which the plaintiff claims copyright. Second, it had to be established whether each such work was “original.” Third, it had to be determined whether the relevant work was copied. Last, a determination had to be made whether a substantial part of the work was copied.⁴³⁷ Accordingly, the court proceeded to analyse the merits of the alleged claim in this order.

It held that both the individual programs comprising the ADS program, and the ADS program as a whole, were copyright works. The ADS program, as a whole, being composed of various interrelated programs, routines and sub-routines, could be categorised as a compilation — a program of programs — as it was original, given the fact that its creation required a substantial amount of skill, labour and judgment.⁴³⁸ Unlike other compilations, it is more difficult to simply add more code to a computer program; it is more complex because additional computer code might affect its operation, and interaction with the other parts of the program have to be ensured.⁴³⁹ The compilation of the various ADS programs constituted a copyright work in its own right because it involved considerable skill and effort to put together.⁴⁴⁰ The consequence of the computer program as a whole being protected by copyright is that its overall structure and design features must, similarly, be protected, and not just the literal computer code.⁴⁴¹

On the issue of whether a work is original, the court indicated that care had to be taken when seeking to apply the following two principles. First, it was sometimes suggested that, in relation to functional works, if a function could only be achieved in one or a limited number of ways in expressing an idea, there could be no copyright in

⁴³⁷ 289.

⁴³⁸ 289.

⁴³⁹ 287.

⁴⁴⁰ 304.

⁴⁴¹ 292-3.

the relevant expression.⁴⁴² There was no basis for distinguishing between functional and other works. As discussed above, it is submitted that the court was incorrect that UK copyright law did not draw a distinction between functional and non-functional works. The appropriateness of this principle depended on a proper assessment of what is meant by “idea” in the specific situation. While it was true that copyright cannot protect any sort of general principle or idea, the detailed expression thereof can properly be considered as protected by copyright. It was a matter of degree whether the expression is sufficiently detailed, and, therefore, protected. Second, the principle that there is no copyright in ideas, which is related to the previous principle, had often led to confusion.⁴⁴³ This principle was sometimes raised in determinations of whether copyright subsisted in a work (that is, was there a “work,” or was it original), or whether there had been an infringement of a (substantial part) copyright work.⁴⁴⁴ While the court did not elaborate further, the suggestion, again, was that it was a matter of degree whether the particular expression was sufficiently detailed to be protected or a substantial part had been copied.

Copyright infringement can only occur if there was copying, which is a question of fact. In the absence of direct evidence of copying, a plaintiff could prove copying by showing that there were sufficient similarities between the allegedly infringing work and its own, and that the defendant had access to its work.⁴⁴⁵ This assessment of similarity had to involve all aspects of both works — important and unimportant.⁴⁴⁶ The defendant could refute allegations of copying by providing alternative explanations for the similarities, for example: that the similarities between the works were the result of their mutual reliance on the work of a third party; material in the public domain; or, *functional* necessity.⁴⁴⁷ The similarities may also

⁴⁴² 290.

⁴⁴³ 291.

⁴⁴⁴ 291-2.

⁴⁴⁵ 296.

⁴⁴⁶ 297.

⁴⁴⁷ 296-7. The court's attitude to the protectability of functional aspects, and the usefulness of US case law, will be discussed below.

be attributable to the style of a particular programmer, who may have been involved in the development of both programs.⁴⁴⁸

Given the similarities between the works, the court held that there was an “overwhelming” inference of copying. The similarities included the presence of portions of computer code from the ADS program in the Unicorn program, which were redundant in the Unicorn program, specious differences in names of file records, and common spelling mistakes in the comments and headings in both works.⁴⁴⁹ However, the fact that there has been copying does not necessarily mean that a substantial part of the copyright work has been taken.⁴⁵⁰

Unlike other copyright works, when dealing with the alleged infringement of a computer program it was not easy to make an assessment of whether a substantial part of the work had been copied without the assistance of expert evidence.⁴⁵¹ There was evidence of substantial literal copying of the ADS program, which was not adequately accounted for by the defendant.⁴⁵² The level of similarities was so significant that a mere mechanical comparison of the two programs was sufficient to draw a conclusion that a substantial part of the ADS program had been copied. However, it was suggested that a proper comparison should, ideally, include an assessment of the structural similarities, and that trivial similarities should be distinguished from more significant ones.⁴⁵³ The specific arrangement of the ADS program (which, as a whole, was a compilation) was copied, which was a substantial part of the ADS program.⁴⁵⁴ Also, but for the copying, it would not have been possible for the Unicorn program to be developed in the short time period in which that was done.⁴⁵⁵

⁴⁴⁸ 303.

⁴⁴⁹ 297-300.

⁴⁵⁰ 301.

⁴⁵¹ 301.

⁴⁵² 303-4.

⁴⁵³ 305-6.

⁴⁵⁴ 304.

⁴⁵⁵ 303-4.

Interestingly, the court held that if the file transfer programs had been reversed engineered, which would have allowed users to transfer data from the ADS system to the Unicorn system, it would not have constituted copyright infringement. However, using the actual file record layouts of the ADS program resulted in copyright infringement.⁴⁵⁶

In summary, the court held that the determination of whether a substantial part of a computer program had been copied was best determined on a simple value judgment by the court; it was a question of degree whether the skill, labour and judgment of another had been appropriated. It was unnecessary to resort to complicated analysis employed in the *Computer Associates* case. The court in *John Richardson Computers* was, however, correct in its finding that non-literal aspects of a computer program, like its general structure and design features, were protected.⁴⁵⁷ The arrangement of a program may involve a considerable degree of skill, labour and judgment, and it may constitute a substantial part of the program as a whole.⁴⁵⁸

Comment and criticism

The most interesting aspect of the case was the court's "should we, shouldn't we" attitude to using US case law. Although suggesting earlier in the judgment that US case law could be of assistance when determining whether a substantial part of a computer program had been copied,⁴⁵⁹ the court later stated that American case law was not of much assistance when distinguishing unprotected ideas from protectable expression.⁴⁶⁰ The court held that US case law should not be relied upon to determine if copyright subsists in a work because US copyright law, unlike UK law, sought to deny affording copyright protection to functional works. This was done by

⁴⁵⁶ 313.

⁴⁵⁷ 302.

⁴⁵⁸ 303.

⁴⁵⁹ 292 and 305-6.

⁴⁶⁰ 301-2.

either denying the existence of copyright in a functional work or denying that there was infringement in its copying.⁴⁶¹

It is submitted that the court overstated the differences between UK and US copyright law. For example, as stated above, the court itself was prepared to exclude *functional* aspects of the program when determining whether there were similarities between the two programs.⁴⁶² Also as already indicated, the court's rather irrational reluctance to be influenced by US case law concerning the scope of copyright protection of computer programs indicates a form of jurisprudential chauvinism, and lacked a rational basis. This opinion is confirmed by the fact that subsequent UK cases have, following the US position, similarly narrowed the protection afforded to computer programs as a consequence of a better appreciation of the functional nature of computer programs. Furthermore, the distinction which the court sought to establish between UK and US copyright law — that in the US ideas were not protected, whereas in the UK a *detailed* idea was protected — amounted to sophistry.⁴⁶³

Critics have indicated that the court's insistence on following its traditional, simplistic approach in evaluating copyright infringement cases involving computer programs would lead to excessive protection of computer programs, particularly its non-literal elements.⁴⁶⁴ It was, for example, suggested that according to the court's approach, it would have protected the menu command system of the Lotus 1-2-3 spreadsheet program, contrary to the US decision in *Lotus Development Corp. v Borland International Inc.*⁴⁶⁵ This excessive protection was also contrary to the EU Software Directive, which had been implemented in the UK pursuant to the Copyright (Computer Programs) Regulations 1992. According to the Directive, the ideas

⁴⁶¹ 292.

⁴⁶² 296-7.

⁴⁶³ 291.

⁴⁶⁴ Tumbraegel and de Villiers "Copyright Protection for the Non Literal Elements of a Computer Program" 41.

⁴⁶⁵ Gordon "The Very Idea! Why Copyright Law is an Inappropriate Way to Protect Computer Programs" 12-3.

underlying a computer program or its user interfaces were not protected by the copyright in computer programs.⁴⁶⁶

(c) Cantor Fitzgerald International v Tradition (UK) Ltd

Although the case of *Cantor Fitzgerald International v Tradition (UK) Ltd* also concerned alleged literal copying, it displays a greater appreciation of the qualitative difference between computer programs and other types of copyright work. Both Cantor Fitzgerald International (“CFI”) and Tradition (UK) Ltd (“Tradition”) carried on business as inter-dealer brokers (IDBs) in bonds in London.⁴⁶⁷ CFI claimed that the copyright in certain of its computer programs forming part of its bond-broking system had been infringed by Tradition.⁴⁶⁸

Tradition had hired a number of former employees of CFI who had an intimate knowledge of CFI’s bond-broking system to develop its own bond-broking system. The computer program developed for Tradition was written in the same programming language as that of the CFI bond-broking system, called VAX BASIC, and it operated on the same types of computers as the CFI system. CFI claimed that Tradition could not have developed its bond-broking system in the short time that it did without copying the source code from its system.⁴⁶⁹ After Tradition discovered that parts of its system had indeed been developed by copying CFI’s source code (as the programmers had a copy of CFI’s system), it appointed an expert to determine the extent of the copying. Tradition’s expert concluded that about 2 per cent of CFI’s code was copied (which was accepted by the court),⁴⁷⁰ and that similarities at the “architectural” level could be attributed to the fact that both systems were written by

⁴⁶⁶ 13.

⁴⁶⁷ *Cantor Fitzgerald International v Tradition (UK) Ltd* 100.

⁴⁶⁸ 100-1. The discussion of the case is confined to issues concerning the scope of copyright protection of computer program, and does not, for example, relate to other aspects of the case, such as the breach of confidence joint tortfeasorship liability claims.

⁴⁶⁹ 101.

⁴⁷⁰ 128.

the same programmers.⁴⁷¹ CFI contended that the copying was more extensive. It asserted that a substantial part of each of 35 modules (out of 363 modules) comprising the “Front Office system” portion of its bond-broking system had been copied.⁴⁷²

Decision

The court approved the traditional, four-step approach adopted in *IBCOS* as correct when dealing with cases involving alleged copyright infringement. However, the court held that *in casu* there was an important interrelationship between two of the steps identified in the *IBCOS* case: whether the particular work was original (the prerequisite for the subsistence of copyright (second step)) and whether a substantial part of the work had been copied (the prerequisite for infringement (final step)). Computer programs are significantly different to other literary works, which are intended to convey meaning to humans. Accordingly, the principles applicable to other literary works should not simply be applied to computer programs.⁴⁷³

No syntactic or semantic errors are permitted in computer programs if they are to operate in the desired manner. For this reason, every portion of a computer program can be considered to be a substantial part.⁴⁷⁴ However, this approach of considering portions of the computer code at too granular a level would be too simplistic, and inappropriate. In the determination of whether a substantial part of a copyright work has been copied, copyright seeks to protect the relevant skill and labour expended by the author in creating that type of work. The closest analogy in the field of literary copyright to the type of skill and labour involved in creating a computer program are compilations.⁴⁷⁵ The assessment of whether the portion alleged to have been copied constituted a substantial part of the copyright work was qualitative, rather than quantitative.⁴⁷⁶ Whether a specific portion of a program,

⁴⁷¹ 102.

⁴⁷² 103.

⁴⁷³ 130.

⁴⁷⁴ 130.

⁴⁷⁵ 131.

⁴⁷⁶ 134.

which is alleged to have been copied, constituted a substantial part depends on the skill and labour expended in its design and coding; it was not determined by whether the system would work without the code; or by the amount of use the system made of the code.⁴⁷⁷

The court held that it was well established that copyright infringement of a literary work, such as a novel or play, may occur if the plot was used, while none of the specific expression was taken. Similarly, the architecture of a computer program — the overall structure of the program and its sequence of operations — may be protectable if it involved a substantial amount of the programmer's skill, labour and judgment.⁴⁷⁸ However, CFI did not allege copying at the level of abstraction relating to the architecture of the CFI program. Most of the modules in the program were individually compiled, rather than forming part of a larger suite of modules. The similarities in the modules of the CFI program and Tradition program could be attributed to extraneous matters such as the availability and skill of programmers, convenience of debugging and maintenance, rather than the functional aspects of the program as a whole. These extraneous considerations meant that the individual modules were not the result of the exercise of the result of substantial skill and labour. Accordingly, the similarities in the individual modules cannot be said to constitute the taking of a substantial part of the modules.⁴⁷⁹

The mere fact that the source code of CFI's computer program was loaded onto Tradition's computer constituted copyright infringement of the CFI program.⁴⁸⁰ More importantly, given that the programmers had a copy of the CFI program — a working system — they were willing to use it in order to ensure that they did not fail in their efforts to produce a new system for Tradition.⁴⁸¹ The programmers worked very hard to produce a new system, and did not use the copy of the CFI program for copying *per se*. However, most significantly, they resorted to using the copy of the

⁴⁷⁷ 135.

⁴⁷⁸ 134.

⁴⁷⁹ 135.

⁴⁸⁰ 103.

⁴⁸¹ 112.

CFI program when they ran into difficulties or needed to make the relevant portion fit.⁴⁸² Although these copied portions copied were quite small, they were used in important modules.⁴⁸³

Comment and criticism

While the *Cantor Fitzgerald* case ostensibly supported the UK courts' traditional approach to assessing cases of copyright infringement involving computer programs, there was a greater recognition of the functional nature of computer programs and the challenges this posed to conventional copyright analysis. In other words, the *Cantor Fitzgerald* case suggested that the court was now more willing to excise functional aspects from copyright protection, or give those aspects thin copyright protection, similar to the approach of the US courts.⁴⁸⁴ However, there appeared to be a greater willingness to protect non-literal aspects of a computer program like its structure, based on an erroneous analogy with fictional literary works.

(d) Navitaire Inc v easyJet Airline Company

The *Navitaire* case has proved to be a watershed in defining the scope of copyright protection of computer programs in the UK. Unlike the previous cases, the facts of this case more closely resembled the facts of the *John Richardson Computers* case as it directly concerned allegations of non-literal copying of a computer program.⁴⁸⁵ The case concerned the alleged infringement of the claimant's ("Navitaire") software for a "ticketless" airline booking system called OpenRes.⁴⁸⁶ A ticketless airline booking system depends upon giving a passenger a reference number for a

⁴⁸² 119-20.

⁴⁸³ 122.

⁴⁸⁴ Derclaye "Software Copyright Protection: Can Europe Learn from American Case Law? Part 2" 64.

⁴⁸⁵ *Navitaire Inc. v easyJet Airline Company & Another* [2]. The discussion of the case is confined to issues concerning the scope of copyright protection of computer program, and does not, for example, relate to other aspects of the case, such as the claims of unlawful copying relating to the OpenRes databases, which contained details of flights and passenger details.

⁴⁸⁶ [1].

particular booking, which is capable of being referenced at the airport of departure, and every airport along the itinerary, from a central database.⁴⁸⁷ It was claimed that a similar system developed for easyJet Airline Company (“easyJet”) by the second defendant, BulletProof Technologies Inc. (“BulletProof”), called eRes, infringed the copyright in the OpenRes system.⁴⁸⁸ Navitaire did not allege that easyJet or BulletProof had access to the source code of its OpenRes system.⁴⁸⁹

EasyJet had used the OpenRes system and wanted a new booking system. However, it wanted the new booking system to have the same user interface as that of the OpenRes system. BulletProof, with easyJet’s cooperation, managed to produce a replica booking system, without copying the underlying computer code of the OpenRes system.⁴⁹⁰ The similarity of the eRes system to that of OpenRes system extended to three aspects. First, the overall “look and feel” of the operation of the OpenRes system was replicated: its user interface. Second, the eRes system allowed users to use the same individual commands to achieve specific results as in the OpenRes system.⁴⁹¹ However, the eRes system did not use all the available individual commands in the OpenRes system, only those required by its business.⁴⁹² Third, the ways in which some of the results were displayed were the same.⁴⁹³ The second and third aspects were considered as specific aspects of the user interface (that is, the first aspect). In addition, it was alleged that the copyright in the web interface of the OpenRes system, provided by a different computer program, TakeFlight, was also infringed.⁴⁹⁴

⁴⁸⁷ [185]

⁴⁸⁸ [1].

⁴⁸⁹ [2].

⁴⁹⁰ [2].

⁴⁹¹ [3].

⁴⁹² [4].

⁴⁹³ [3].

⁴⁹⁴ [6].

Decision

General user interface

Navitaire did not allege copying of the underlying computer code but rather that the eRes system implemented a very similar user interface.⁴⁹⁵ The court considered the first, more general, aspect as distinct from the other two specific allegations concerning the user interface. It was alleged that the overall similarity in the user functionality of the OpenRes and eRes systems amounted to non-textual copying of the OpenRes system; that the “business logic” of the OpenRes system had been appropriated.⁴⁹⁶ In this more general claim of copyright infringement, it was claimed that the protectability of the command codes had to be considered together with the other aspects of the user interface, like the screen layouts, because the OpenRes system was structured so that each successive command was entered in response to what was displayed, which in turn was a consequence of a response to a previous command.⁴⁹⁷ This appropriation was claimed to be analogous to copyright infringement involving the taking of a plot of another author’s novel or play.⁴⁹⁸

The court held that despite the similarities in the appearance of the two systems to users, the underlying processes by which the two systems operated were different.⁴⁹⁹ Because a computer (along with its computer program) is a deterministic machine, it was possible to identify the specific responses to various inputs, and to replicate such behaviour by writing another appropriate program. In essence, Navitaire contended that the writing of such a second program infringed the copyright in the source code of the first program.⁵⁰⁰ However, it was clear that easyJet and BulletProof had no access to the source code of the OpenRes system, and that there were differences in the programming languages, computer code and architecture between the OpenRes and eRes systems. The court also did not

⁴⁹⁵ [65].

⁴⁹⁶ [73] and [108].

⁴⁹⁷ [54-5].

⁴⁹⁸ [73] and [108].

⁴⁹⁹ [110].

⁵⁰⁰ [112].

consider the eRes computer code to be a translation or adaptation of the OpenRes code.⁵⁰¹

The court accepted that, when developing business software, part of the skill and labour expended in its development relates to systems analysis or the production of functional specifications. This effort in the development process could be avoided, or minimised, by a subsequent developer who studied or used the first program.⁵⁰² While it was true that the eRes system was developed after an examination of the OpenRes system, the development of the OpenRes system itself had not followed the “full” development process because it was, similarly, based on experiences on how other booking systems operated. Furthermore, the court held that the OpenRes system was not unique, and could not be distinguished from the manner in which other booking systems operated.⁵⁰³

If Navitaire were going to succeed in this claim, they needed to show that, at some level of abstraction, the defendants copied something (other than the command set and the screen displays) that was not inherent in the nature of the business function to be performed by the software. Based on the fact that computer programs are protected as literary works, Navitaire sought to draw an analogy between the function of a computer program and the plot of a fictional literary work.⁵⁰⁴ However, the court held that the analogy with a plot was a poor one because in this case the alleged copyist did not have access to the copyright work, the computer code.⁵⁰⁵ In any event, the notion that the overall functioning of a computer was analogous to, and protectable in a manner similar to, the plot of a novel, was incorrect. Unlike the plot of a novel, the user interface was not part of the work itself as the same result could be achieved by different computer programs, involving no copying.⁵⁰⁶

⁵⁰¹ [113].

⁵⁰² [114-5].

⁵⁰³ [116].

⁵⁰⁴ [118].

⁵⁰⁵ [125].

⁵⁰⁶ [94].

In the case of computer programs, it was possible for two completely different programs to produce identical results, at *any* level of abstraction. Computer programs do not have themes, events, plots or narrative flows; they are process driven in order to achieve a particular outcome. There was no discernible business logic which could be identified from the computer code of a computer program.⁵⁰⁷ A more appropriate analogy to what easyJet and BulletProof did was producing a pudding without ever having seen its recipe, which would not infringe the copyright in the recipe, as a literary work.⁵⁰⁸

The court — rather unnecessarily — still considered it appropriate to support the view expressed in the *IBCOS* case, that US copyright law was different to UK law: US law drew a distinction between ideas and expression, and did not provide protection to functional works.⁵⁰⁹ However, the court was forced to acknowledge that, even if this was historically correct, the position had now changed: copyright protection should not be extended to the functional aspects of a computer program, such as the user interface. Although this necessarily required drawing a line between idea and expression in a particular place, which may be regarded as providing too little protection for a particular expression, this was in accordance with the EU Software Directive.⁵¹⁰

Relying on Lord Hoffmann's speech in *Designers' Guild*,⁵¹¹ the court stated that the idea-expression distinction applies in two types of situations. First, a copyright work which describes a system, concept or invention was not infringed by the use of that which was described. Second, a particular idea incorporated in a work (or aspects thereof) may not be protected because it may not be original, or so commonplace that it does not constitute a substantial part of the work. This assessment necessarily depended on a particular level of abstraction, and an assessment of the skill and labour involved in that aspect of the work.⁵¹² The court

⁵⁰⁷ [125].

⁵⁰⁸ [127].

⁵⁰⁹ [91].

⁵¹⁰ [94].

⁵¹¹ *Designer's Guild Ltd v Russell Williams Textiles Ltd* [2000] 1 WLR 2416.

⁵¹² *Navitaire Inc. v easyJet Airline Company & Another* [128].

held that the OpenRes system, as a whole, lacked substantiality and its overall functioning was not the result of relevant skill and effort: its inputs and outputs were in a form expected from a computer program carrying out that particular business function. Thus, the claim for non-literal copying failed.⁵¹³

This position was considered to be consistent with the policy of the EU Software Directive to exclude both computer languages and the underlying ideas of the interfaces from protection. If protection were extended to the “business logic” or overall function of a computer program, the provisions of the Directive could be circumvented. In any event, it would not have been appropriate to extend copyright protection to “business logic.”⁵¹⁴

Specific user interface claims

As stated above, the claimant also alleged that two specific aspects of the user interface had been infringed: the literal command names entered by users, and the screen displays.⁵¹⁵

Command names

There were two types of command names, simple and complex. The simple commands (or “individual commands”) were organised in command sets in which each set started with a particular prefix, for example, “NP” for notepad. A prefix could be followed by optional suffixes which would cause specific operations to be performed. The complex commands were also organised in sets, with each set starting with a particular prefix (command character), for example, “A” for seat availability. These commands had a syntax in that they could be followed by one or more arguments in a particular order. The purpose of these complex commands was to allow the user to extract, or change, the necessary data elements. For example, “A” followed by abbreviations of the date and airport gave the user the

⁵¹³ [129].

⁵¹⁴ [130].

⁵¹⁵ [25].

details of flights leaving that airport on the designated day and the number of seats available. Thus, the complex command “A13JUNLTNAMS” would check the seat availability for flights on 13 June from Luton (LTN) in England to Amsterdam (AMS).⁵¹⁶

Crucially, the way in which the user command names were processed (“parsed”) depended on how the program was written.⁵¹⁷ The complex commands were generated by the users, and did not exist in the OpenRes source code although the program recognised the relevant syntax.⁵¹⁸ In the OpenRes system, the user commands did not form part of the computer code: the computer code did not contain any text corresponding to the commands in the forms pleaded. What the program did was process the user commands in portions, following a certain logic, rather than expressly recognise these commands as entered by the user in the computer code.⁵¹⁹ The eRes system, on the other hand, *did* have these commands in its computer code, as it processed them differently to the OpenRes system.⁵²⁰

Although it was possible to write the program in a way that the command names and their syntax formed part of the source code, the court held that it would not have resulted in the complex command names (and syntax) being protectable.⁵²¹ The commands (and their syntax) were a form of programming language created by the OpenRes program, which, pursuant to Recital 14 of the EU Software Directive, was unprotectable.⁵²² To protect the command names would, to some extent, result in protecting the ideas underlying the commands, and not just a particular expression.⁵²³ Article 1(2) of the EU Software Directive, contrary to what was stated

⁵¹⁶ [26].

⁵¹⁷ [29].

⁵¹⁸ [83].

⁵¹⁹ [29-37].

⁵²⁰ [35].

⁵²¹ [86].

⁵²² [88] and [92].

⁵²³ [86].

in the *IBCOS* case, required the English courts to recognise the distinction between ideas and expressions.⁵²⁴

Further, it was alleged that the collection of the command names, as a whole, was protected as a compilation, and that each of the commands (individual commands and complex commands) were also individually protected by copyright.⁵²⁵ The individual simple command words or letters, based on the *ratio* in *Exxon Corp v Exxon Insurance Consultants International Ltd*,⁵²⁶ did not have the necessary qualities to qualify as copyright works.⁵²⁷ The command names were common, and the OpenRes system was influenced by those used in other reservation systems.⁵²⁸ Although there were differences between the reservation systems, the commands were essentially determined by the users' need to perform certain functions.⁵²⁹ Similarly, the complex command names were not copyright works.⁵³⁰

The court also did not consider the command names to be protectable as a compilation because it simply comprised an *ad hoc* collection.⁵³¹ Although the creation of the individual command codes did not require much skill or effort, the skill and judgment that went into specifying the command codes (and sub-commands) in general was more than negligible.⁵³² However, the commands would only be protectable as a compilation if the collection constituted a whole that was more than the sum of its parts, and this would have been the case if the assembly of the parts into the whole was inspired by some governing criterion. There was no evidence of a systematic designing process.⁵³³

⁵²⁴ [86] and [89].

⁵²⁵ [73].

⁵²⁶ *Exxon Corp v Exxon Insurance Consultants International Ltd* [1982] RPC 69.

⁵²⁷ *Navitaire Inc. v easyJet Airline Company & Another* [80].

⁵²⁸ [40].

⁵²⁹ [41-2].

⁵³⁰ [83].

⁵³¹ [92].

⁵³² [47] and [53].

⁵³³ [51].

To be protectable as a compilation, it was necessary that actual skill and effort be expended in designing the compilation.⁵³⁴ There was little evidence that the OpenRes command set was the result of a systematic design process, and there was no discernible overall structure to the command codes.⁵³⁵ Thus, the fact that the commands formed particular sets was considered to be of no consequence.⁵³⁶

Screen displays

It was claimed that the particular screen layouts of the OpenRes user interface were protectable as literary or artistic works, which had been recorded in the computer code, and were, thus, protected by copyright. It was alleged that the layouts of particular screen displays of the eRes system had been copied from the OpenRes system, and, thus, infringed Navitaire's copyright in these screen layouts. This claim included the alleged copying of detailed designs on certain of the buttons forming part of the more graphical user interface ("GUI"), the GUI screens.⁵³⁷

The court held that the layouts of the corresponding screen displays in the OpenRes and eRes systems, which were part of the respective user interfaces, differed in the degree of similarity.⁵³⁸ The screen displays used by call centre operatives, or airline booking clerks, were mainly text-based, rather than displaying complex graphics.⁵³⁹ These text-based screen displays were properly viewed as tables, and, therefore, literary works, rather than artistic works. Furthermore, due to their rudimentary, functional nature, the text-based screen displays were unprotectable. Protecting such screen displays would essentially amount to protecting the ideas which underlie the user interfaces, which was expressly excluded from protection pursuant to Article 1(2) of the EU Software Directive. The text-based screen displays were simply the means by which the data was displayed

⁵³⁴ [92].

⁵³⁵ [41-2] and [51].

⁵³⁶ [45].

⁵³⁷ [26] and [71].

⁵³⁸ [95].

⁵³⁹ [28].

to users, which was the purpose of the computer program.⁵⁴⁰ Although, the design of the layouts of the screen displays involved *some* skill and effort, their implementation largely depended on how the programmers coded the system, rather than as a consequence of aesthetic considerations.⁵⁴¹

The GUI screens were, however, protectable as artistic works as the arrangement of relatively simple basic elements or icons involved sufficient skill and labour.⁵⁴² Unlike the literary works forming part of the user interface, the EU Software Directive did not prevent artistic works from being protectable as part of the user interface.⁵⁴³ The copying of the GUI screens infringed Navitaire's copyright because the graphic icons in the eRes system were identical copies.⁵⁴⁴

Takeflight

As indicated above, there was a separate claim alleging that the copyright in the web interface of the OpenRes system, provided by a distinct computer program, TakeFlight, was also infringed.⁵⁴⁵ Whereas the OpenRes system was used by employees (call centre operatives and airline booking clerks) of easyJet, the TakeFlight program allowed Internet users to interact with the reservation system, via an API (Application Programming Interface) provided by one of the program modules, and book their own tickets.⁵⁴⁶ First, it was claimed that, in breach of its licence, easyJet copied and modified the source code of the TakeFlight program for the following purposes: fixing bugs; allowing for the display of promotions; allowing for foreign language interfaces; creating a website host (or "skin"); and, using the program for another legal entity in the easyJet group.⁵⁴⁷ Second, the equivalent program developed for the eRes system, easyJet.com (or NIBS ("New Internet

⁵⁴⁰ [96].

⁵⁴¹ [59].

⁵⁴² [98].

⁵⁴³ [97].

⁵⁴⁴ [99].

⁵⁴⁵ [6].

⁵⁴⁶ [132].

⁵⁴⁷ [6].

Booking System”)), was also alleged to amount to non-literal copying of the software by producing a user interface having the same “look and feel” as TakeFlight. Significantly, in this instance, easyJet did have access to the source code of the TakeFlight program.⁵⁴⁸ However, there was no allegation that easyJet actually copied the source code of the TakeFlight program.⁵⁴⁹

In relation to the breach of licence claim, it was accepted that the TakeFlight program was not particularly well written, and it did not allow for the degree of customisation easyJet required for its purposes, such as publicising special offers and allowing different language options. This meant that easyJet needed to access and modify the source code to effect the necessary customisation. However, such modification constituted copyright infringement unless Navitaire agreed, or acquiesced, to such modifications.⁵⁵⁰ There was no such agreement with Navitaire and there was no reliance by easyJet on any acquiescence by Navitaire.⁵⁵¹ Accordingly, Navitaire was entitled to relief in respect of the unauthorised modifications, in breach of the licence.⁵⁵²

The basis of the complaint of non-literal copying was the contention that the computer code of the TakeFlight program implemented a “five-step” booking process, and that copying that booking process amounted to the taking of a substantial part of the computer program.⁵⁵³ However, the court held that there was no basis for a claim of non-literal copying. The five steps — ask for available flights, select flight, display details and price of selected flight, inviting booking, and pay and confirm booking — were in the form of a dialogue, similar to that which would be followed by a call centre agent. As these steps were obvious in a booking process, they did not amount to a substantial part of the TakeFlight program. This was particularly the case given the fact that the Takeflight source code was not even looked at when the easyJet.com program was written. In addition, the various

⁵⁴⁸ [6] and [143].

⁵⁴⁹ [136].

⁵⁵⁰ [142-3].

⁵⁵¹ [148].

⁵⁵² [149].

⁵⁵³ [137].

features of the user interface, such as scrolling lists, drop down lists, radio buttons and the like, were widely used, and there were differences between the user interfaces.⁵⁵⁴

Comment and criticism

Commentators have, correctly, suggested that the *Navitaire* decision reflects the recognition that the purpose of the copyright protection of computer programs is to incentivise their creation, not to stifle new creation. This rationale is reflected in the EU Software Directive, which excludes protection of ideas and principles which underlie any element of a program like its logic, algorithms, programming languages or interfaces. This ensures that there is a sufficiently large public domain for other authors. The idea-expression dichotomy also means that functional aspects will not be protected where these have been independently replicated.⁵⁵⁵

The most important claim concerned the protectability of the business logic associated with the overall look and feel of the OpenRes system, which was directly emulated by the eRes system. As far as end users were concerned, the OpenRes and the eRes systems were functionally interchangeable, providing the same user experience and producing the same results.⁵⁵⁶ Although the look and feel of a computer program may be the consequence of the effort expended in its design and creation, the court did not consider it to be protectable.⁵⁵⁷ None of the following features of a computer program are protected by copyright: the business logic; or, the functionality of the program like the manner in which a computer program requires a user to input data, the manner in which the output is displayed, or the records created by a computer program.⁵⁵⁸ In no sense can reverse engineering the functionality of a computer program be considered to amount to copyright

⁵⁵⁴ [140].

⁵⁵⁵ Stokes "The Development of UK Software Copyright Law: From John Richardson Computers to *Navitaire*" 133.

⁵⁵⁶ Murray *Information Technology Law: The Law and Society* 206.

⁵⁵⁷ 206-7.

⁵⁵⁸ *Navitaire Inc. v easyJet Co. & Anor.* 2004 [2004] EWHC 1725 (Ch) [129]-[130].

infringement.⁵⁵⁹ Thus, other than for the detailed graphic elements of the user interface (or GUI), not much else of a computer program's user interface will be protected. However, it is important to emphasise the fact that these graphic elements of a computer program are protected as artistic works, and not as part of the protection afforded to the underlying computer program.⁵⁶⁰

Not only was the comparatively thin copyright protection for computer programs, following the *Navitaire* decision, considered to have struck the appropriate balance between providing the necessary incentives and a sufficiently large public domain, it has been described as the "gold standard" test in the UK for cases of non-literal copyright infringement of computer programs.⁵⁶¹

(e) Nova Productions Ltd v Mazooma Games Ltd

The thin copyright protection for computer programs advocated in the *Navitaire* case was confirmed in *Nova Productions Ltd v Mazooma Games Ltd*.⁵⁶² What makes the *Nova Productions* case interesting is that it indicates that there will now also be thin protection for the user interface in the UK (which, as discussed, is not protected as a computer program but is a distinct copyright work). The claimant, Nova Productions Ltd ("Nova"), instituted copyright infringement actions against the defendants (Mazooma Games Ltd ("Mazooma") and Bell Fruit Games Ltd ("Bell Fruit")) alleging that the defendants' computer games infringed the copyright in its computer game.⁵⁶³ All three computer games were based on the cue sport pool.⁵⁶⁴ Nova's game was called "Pocket Money," Mazooma's "Jackpot Pool," and Bell-Fruit's "Trick Shot."⁵⁶⁵

⁵⁵⁹ [127].

⁵⁶⁰ Heritage M and Jones P "The End of "Look and Feel" and the Invasion of the Little Green Men? UK Copyright and Patent Protection for Software after 2005" 2006 *CLR* 12 (3) 67 69.

⁵⁶¹ Murray *Information Technology Law: The Law and Society* 209; Stokes "The Development of UK Software Copyright Law: From John Richardson Computers to Navitaire" 133.

⁵⁶² *Nova Productions Ltd v Mazooma Games Ltd & Others* [2007] EWCA Civ 219.

⁵⁶³ *Nova Productions Ltd v Mazooma Games Ltd & Others* [1].

⁵⁶⁴ [6].

⁵⁶⁵ [1].

Nova alleged infringement in three specific types of copyright works: the graphics and frames generated by the computer game, as artistic works; the game as a dramatic work; and, the computer program and the design notes, as literary works.⁵⁶⁶ In addition to the three specific claims of copyright infringement, there was an allegation that Nova's copyright in Pocket Money was infringed at a more general level; that it was the inspiration for the other two computer games.⁵⁶⁷ There was no allegation that the defendants had access to the source code of the claimant's game.⁵⁶⁸

Decision

Graphics and frames as artistic works

The individual freeze-frame screen graphics, stored in the memory of a computer, are "graphic works," and, thus, artistic works, within the meaning of the UK CDPA. As the appearance of the programs were very different, there was no substantial copying of the claimant's copyright work.⁵⁶⁹ The visual appearance and user experience of the three computer games were very different.⁵⁷⁰ While there were similar features in the programs, these similarities were not the result of copying but were either attributable to being commonplace in other pool games or games design, or as the result of being an obvious way to implement a commonplace idea. This explained the similar features such as the use of a "power meter," which allowed the user to select the level of force for a shot, "sight lines" to indicate the direction of a shot, and showing the pool table in plan view.⁵⁷¹ In any event, proof of copying itself is not sufficient for a successful copyright infringement claim.⁵⁷² These features, or the particular combination of these features, did not constitute a substantial part of the claimant's work. Even if such elements were copied, they did not constitute the

⁵⁶⁶ [2].

⁵⁶⁷ [44].

⁵⁶⁸ [7].

⁵⁶⁹ [12].

⁵⁷⁰ [5].

⁵⁷¹ [7].

⁵⁷² [26].

taking of a substantial part of the claimant's artistic work. At best for the claimant, the features of its game influenced the appearance of the other two games.⁵⁷³

Game as dramatic work (film)

The claimant also tried to claim artistic copyright protection in a series of images depicting the movement of the cue action.⁵⁷⁴ This was rejected by the court because a series of graphic works creating an illusion of movement was considered not to constitute a distinct copyright work; they were only protected as individual graphic works.⁵⁷⁵ Only moving images are protected by copyright as films.⁵⁷⁶

Computer program and the design notes

Following the coming into effect of the EU Software Directive, the protection of a computer program, and its preparatory design material, as literary works, had to be in accordance with the Directive.⁵⁷⁷ The Directive protects a computer program and its preparatory design material as one work, unlike what is suggested by the text of the UK CDPA. If this was not the case, it could lead to complications should the copyright in a computer program and its preparatory design material vest in two

⁵⁷³ [8].

⁵⁷⁴ [13].

⁵⁷⁵ [16].

⁵⁷⁶ [17]. It is submitted that the reasoning of the court is erroneous. Even films are in fact a series of still images. The approach of the South African (*Golden China TV Game Centre & Others v Nintendo Co Ltd* 1997 (1) SA 405 (A)) and US (*Atari Inc. v Amusement World Inc.* 1981 547 F. Supp 222; *Electronics Inc v Kaufman* 1982 669 F.2nd 352; *Midway Mfg Co v Strohon* 1983 564 F.Supp 741) courts is doctrinally more acceptable. There have been subsequent US cases that — at the time broad copyright protection was extended to computer programs — incorrectly held that the copyright infringement in the audiovisual display was also an infringement in the underlying computer program, as its embodiment (*M Kramer Mfg Co Inc v Andrews* 1986 783 F.2nd 421; *Digital Communications Association Inc v Softklone Distributing Corp* 1987 659 F.Supp 448), and, then, that similarity in the audiovisual displays was as a consequence of copyright infringement in the computer program (*Broderbund Software Inc. v Unison World Inc.* 1987 648 F.Supp 1127).

⁵⁷⁷ *Nova Productions Ltd v Mazooma Games Ltd & Others* [27].

persons.⁵⁷⁸ Similarly, the UK CDPA had to be construed in a manner consistent with TRIPS, because the ECJ held that EU legislation, which is binding on the UK, must be interpreted in accordance with TRIPS.⁵⁷⁹

Given the fact that there was no copying of the claimant's source code, the claimant faced a "formidable objection" to its claim of copyright infringement because of Article 1(2), and recitals 13 and 15, of the EU Software Directive. These provisions repeated the "well-known" distinction between an idea and its individual expression, recognised all over the world.⁵⁸⁰ This position was also recognised in Article 9(2) of TRIPS.⁵⁸¹

The idea of what a program should do, such as the idea of the cue pulsing with the power meter, had nothing to do with nature of the work — the computer program. The nature of a computer program involves the necessary logical coding to function properly, and this is only "faintly related" to what the program is intended to do. Thus, what the program was intended to do, or even a combination of things, was simply an idea, which was unprotectable. The idea-expression distinction applies to computer programs, as it did to other copyright works. This was not to deny that these unprotectable ideas involved skill; however, copyright does not protect all forms of skill.⁵⁸² The skill of generating the aspects claimed to have been infringed, such as the idea of the cue pulsing with the power meter, had very little to do with the skill and effort necessary to program the computer game.⁵⁸³

The unprotectable elements of a computer program are not limited to the "building blocks" of computer programs, such as logic, algorithms and programming languages.⁵⁸⁴ The court was further convinced that the concept of the cue pulsing with the power meter was not protectable because it was an element (i.e. idea)

⁵⁷⁸ [28].

⁵⁷⁹ [37].

⁵⁸⁰ [31].

⁵⁸¹ [38].

⁵⁸² [35].

⁵⁸³ [44].

⁵⁸⁴ [36].

which could be used by other pool or snooker computer games.⁵⁸⁵ Thus, the allegation that the claimant's copyright in its computer program (as a literary work) was infringed at the general level that it was the inspiration for the other two computer games was dismissed because it did not constitute a substantial part of the claimant's work.⁵⁸⁶

The claimant's case in *Navitaire* was stronger than the present claimant's case, yet it was unsuccessful.⁵⁸⁷ The EU Software Directive makes it clear that the ideas incorporated in computer programs (which includes their preparatory design material) are not protected.⁵⁸⁸ What is not permitted is for another to copy the specific expression of those ideas or functions which have been reduced to a material form, as a literary work. Others are free to use the ideas or functions.⁵⁸⁹ Thus, as in *Navitaire*, others are free to develop a program which emulates another program if the later program has not copied the computer code of the first or any of its graphic elements (artistic works).⁵⁹⁰ In other words, the rules of a game are not protected, only its graphics.⁵⁹¹

The court held that while this position may be considered as providing no effective protection for game developers, the fact is that most, if not all, copyright works are influenced and derived from other works, and it is important that copyright protection encourages competition by not stifling the creation of works which are actually very different.⁵⁹² If general ideas are protected, copyright would be an instrument of oppression rather than act as an incentive for creation, which is its purpose.⁵⁹³

⁵⁸⁵ [43].

⁵⁸⁶ [44].

⁵⁸⁷ [46].

⁵⁸⁸ [50].

⁵⁸⁹ [51].

⁵⁹⁰ [52].

⁵⁹¹ [54].

⁵⁹² [54].

⁵⁹³ [55].

Comment and criticism

Apart from the poor analysis of whether a computer game can constitute a cinematograph film, the *Nova Productions* decision reflects the thin protection currently afforded to computer programs. The court explicitly provided the rationale for this scope of protection: the concern was that any more extensive protection would stifle competition. It considered this narrower scope of copyright protection of computer programs to be consistent with the economic rationale for copyright protection. Interestingly, this narrower scope of protection was considered to be appropriate even in the case of computer games. Given that computer games are not utilitarian works, unlike application software, there was, arguably, less danger of consumers being locked in to a particular program. However, even in the case of computer games, the fact that many games are now (and will increasingly be) played online — players connecting with each other over the Internet — this creates network effects, and, thus, the narrow scope of copyright protection of user interfaces of computer games, as with other types of software, is appropriate.

4 5 Conclusion

This chapter has explored the changing scope of copyright protection of computer programs in two of the leading jurisdictions in the field of software development, the US and UK (Europe). As illustrated, in both jurisdictions, determining the appropriate scope of protection has proved to be anything but straightforward. What copyright law protects is determined by the law, guided by the policy of providing such protection: “there is no naturally existing core or essence of a work or invention that the law simply discovers.”⁵⁹⁴

The earliest cases gave a broad protection to computer programs, which eventually extended to the “look and feel” of computer programs. This over-broad protection was, arguably, attributable to an inadequate understanding of the nature

⁵⁹⁴ Sherman and Bently *The Making of Modern Intellectual Property Law: The British Experience, 1760 - 1911* 57.

of computer programs (and their development), and a lack of appreciation of the economic implications of such broad protection. However, in both jurisdictions there has been a significant narrowing of the scope of copyright protections afforded to computer programs.

The courts in the UK and US recognised the functional nature of computer programs, and the need to ensure that copyright protection — while providing software developers with the requisite incentive — promotes the dissemination of ideas and does stifle competition. This required a more earnest attempt to consider the application of the idea-expression distinction. While the US courts were more willing to consider the implications for copyright law (such as the idea-expression doctrine) as a consequence of the functional nature of computer programs, the UK courts took longer to accept this position. In both jurisdictions, the current protection provided by copyright to computer programs is narrower than that afforded to copyright works like fictional literary works. If someone has not seen the source code or the object code, it will not have had access to the protectable expression of the program. Such a person would be free to attempt to replicate the program from observing the input/output formats and the accompanying user manuals (that is, the external attributes) as they are unlikely to reveal more than the general design of the program (its internal attributes).⁵⁹⁵ The most recent decision of the European Court of Justice confirmed the approach in the *Navitaire* case that it is permissible to emulate the functionality of computer program, including compatibility with its data file formats, by simply observing its operation.⁵⁹⁶

Starting at the highest level of abstraction, the case law indicates that, at present, copyright law does not protect the conceptualisation, design and business logic embodied in a computer program. It also does not protect the structure, sequence or organisation of a computer program, as these concepts — based on the analogy with fictional literary works — are inappropriate in the context of computer programs. At the level of computer code, copyright law does not protect any elements of a computer program dictated by function (or purpose), technical (or

⁵⁹⁵ Davidson "Protecting Computer Software: A Comprehensive Analysis" 380.

⁵⁹⁶ *SAS Institute Inc v World Programming Ltd* 2012 Case C-406/10.

external) constraints or efficiency considerations. Elements of a computer program may also be excluded from protection on the basis that they constitute standard or obvious programming techniques (or methods), or are commonplace expressions.

In making specific judgments of whether a particular element is unprotected, courts should be guided by the idea-expression doctrine and its role in fostering the economic goal of copyright protection; is an adequate balance being struck between providing sufficient incentives to authors, while ensuring a sufficient degree of freedom exists for other independent creations, and competition. The current narrow standard of protection afforded to computer programs in the US and UK still appears to be sufficient to protect an author's investment in creating a program. Although the current level of protection essentially only prevents mechanical, or slavish, copying of computer programs as non-literal infringement of a computer program has effectively been rejected by the courts, this limited right to prevent piracy or slavish literal copying, combined with the first-mover advantage, is sufficient to ensure that a third party does not gain an unfair advantage over the author of the original program.

More extensive copyright protection would damage social welfare as it would prevent the development of competing substitute computer programs, and, thus, higher prices for consumers. Social welfare could be further harmed by being locked-in to outdated software if switching to more efficient software is costly for consumers as a consequence of having to invest in retraining and convert legacy material. Thus, the narrow protection gives competitors the necessary comfort that developing more innovative, competitive substitute programs will not infringe copyright. This means that a similar functional analysis of user interfaces is required. As illustrated, apart from the fact that US and UK courts now draw a proper distinction between a user interface and the underlying computer program, they have, similarly, provided narrower copyright protection to user interfaces as they have recognised their functional nature. Although user interfaces are protectable as literary and artistic works, the level of protection should not be the same as that afforded to such works outside the software context.

In addition to valuable assistance which the US and UK case law can provide South Africa courts when next faced with having to determine the scope of copyright protection of computer program, it is still necessary that the SA Copyright Act be amended to provide for some much needed exceptions to copyright protection of computer programs. Without these exceptions, acts which are necessary to facilitate the use of computer programs, and allow sufficient room for software development, are prevented. The UK fair-dealing exceptions provide four permissible rights for lawful users: the right to make back-up copies of a computer program, decompile a program, modify a program to remedy errors, and to study and test a program.⁵⁹⁷ However, the decompilation right should probably be an absolute right, as in the US. Also, in order to avoid any uncertainty concerning the protectability of the preparatory design materials, it is suggested that the definition of “adaptation” or “computer program” be amended to expressly provide the necessary protection. As indicated, the relevant amendment should require that the preparatory design material be sufficiently detailed to avoid protecting a bare idea.

Other than for the term of copyright protection of computer programs — which is excessive given the commercial life of software — it is submitted that the current scope of copyright protection of computer programs does not appear to be excessive. It certainly does not appear to have inhibited innovation and the creation of new computer programs, which is evident from the size of the software industry.

⁵⁹⁷ Ss 50A-50C UK CDPA.

Chapter 5: Open-source software

“The intuitions of the late twentieth-century American resist the idea that thousands of volunteers could collaborate on a complex economic project. It certainly should not be that these volunteers will beat the largest and best-financed business enterprises in the world at their own game. And yet, this is precisely what is happening in the software industry.”¹

5 1 Introduction

In Chapter 4 (*Scope of copyright protection of computer programs*) the analysis of the scope of copyright protection of computer programs suggested that, other than for the term of copyright protection, the current scope of copyright protection of computer programs in the UK and the US does not appear to be excessive.² There is no indication that the current scope of copyright protection inhibits innovation and the creation of new, competitive computer programs. However, that fact by itself does not provide an adequate justification for copyright protection of computer programs. While it is important, from a social welfare perspective, that the scope of copyright protection of computer programs is not excessive, it does not provide adequate justification for copyright protection of computer programs. There is still the preliminary issue of whether copyright protection of computer programs is necessary to *incentivise* its production, as suggested by the economic rationale for copyright protection. As the quotation at the start of this chapter suggests — which describes development process of open-source software — sophisticated software

¹ Benkler Y "Coase's Penguin, or, Linux and "The Nature of the Firm"" 2002 *Yale LJ* 112 (3) 369 371.

² In South Africa, there is a dearth of case law on the issue of the scope of copyright protection of computer programs, but it is suggested that our courts will follow a similar approach to that in the US and the UK. However, as discussed in the previous chapter, SA does need to introduce some much-needed fair-dealing exceptions to copyright protection of computer programs: the right to make back-up copies of a computer program, decompile a program, modify a program to remedy errors, and to study and test a program.

appears is apparently being developed without the type of direct financial incentives which copyright law considers necessary to encourage such development.³

As will be discussed below, although open-source software as a matter of practice preceded the specific licensing regime which is the focus of this chapter, it is no longer confined to idealistic or academic programmers. The software developers producing sophisticated open-source software now number in their tens of thousands, and are no longer confined to special-interest users (“hackers,” “geeks” or “techies”) or fringe groups.⁴ Open-source software is now being developed by public companies listed on stock exchanges, like Red Hat and Sun Microsystems (recently acquired by Oracle Corporation), and the estimated collective investment in open-source software development in 2010 exceeded \$40 billion.⁵ This investment has not been unrewarded as the projected revenue from open-source software in 2011 was estimated to be \$170 billion, which clearly represents a healthy return on investment.⁶

The types of open-source software currently available — downloadable for free from the Internet — is truly impressive and reflects the growth in open-source software development already referred to. Open-source software is now responsible for some of the most critical functions in our networked society, namely, the infrastructure of the Internet and World Wide Web. While most people have heard of the open-source operating system Linux, or one of its variants such as Ubuntu Linux, open-source software has, for example, has been developed for web browsers (Netscape Navigator and Mozilla Firefox), a widely-used e-mail server program (Sendmail), application software such as OpenOffice from Sun Microsystems, which

³ While it is grammatically more correct to refer to “open-source software,” it is now common to omit the hyphen in the compound modifier “open-source,” and simply refer to “open source software.”

⁴ Schiff A "The Economics of Open Source Software: A Survey of the Early Literature" 2002 *Review of Network Economics* 1 (1) 66 66.

⁵ Ghosh R "Open Source Software: Economics, Innovation, Law and Policy" 2010 *WIPOJ* 2 (1) 82 82.

⁶ Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1272.

includes a word-processing and spreadsheet programs, and the most-widely used web-server software, Apache.⁷

Open-source software's growing market share of the software market has, unsurprisingly, had a significant impact on software firms whose business model is based on the direct financial rewards, by charging for the access to their products, which copyright protection enables them to do. Software developed by firms who chose to use the exclusive rights afforded by copyright, and restrict access to their software (in particular, its source code), is called "proprietary software."⁸ The fact that the adoption of open-source software has been supported by the governments of countries, such as the US and Brazil, has meant that it has also become a political matter.⁹ It has angered developers of proprietary software, and none have been as vocal as the Microsoft Corporation, whose executives have railed against the phenomenon of open-source software, describing it as un-American because it undermines intellectual property rights, and "a cancer" which would be terminal for the software industry.¹⁰

It is not surprising that the commercial success of firms that have invested in, or based their business model on, open-source software, and, thus, spurned the

⁷ Gomulkiewicz R "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B" 1999 *Hous L Rev* 36 179 183; Lerner J and Tirole J "The Economics of Technology Sharing: Open Source and Beyond" 2005 *Journal of Economic Perspectives* 19 (2) 99 100; Maher M "Open Source Software: The Success of an Alternative Intellectual Property Incentive Program" 2000 *Fordham Intell Prop Media & Ent L J* 10 619 621; Nikulainen K "Open Source Software: Why is it Here and Will it Stick Around?" 2004 *SCRIPTed* 1 (1) 136 149; Potter "Opening Up to Open Source" 2; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 67-8. Web server software is used by computers which host (make available) web pages to users through the Internet.

⁸ Mann R "Commercializing Open Source Software: Do Property Rights Still Matter?" 2006 *Harv JL & Tech* 20 1 1-2. As will be discussed below, to describe the latter type of software as "proprietary software" to distinguish it from open-source software is misleading as the basis of open-source software licensing is also reliance on the proprietary rights afforded by copyright protection. It is more appropriate to distinguish between "open-source" and "closed source" software.

⁹ Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 371.

¹⁰ Miller "Allchin's Folly: Exploding Some Myths About Open Source Software" 491-2.

direct financial benefit which proprietary control afforded by copyright protection enables a copyright holder to earn, has also led economists to find the phenomenon worth analysing.¹¹ From a legal perspective, the emergence of open-source software, and its current scale, suggests that we examine this phenomenon, and, if necessary, reappraise the correctness of the economic justification for copyright protection of computer programs. Open-source software developers appear to shun the most basic economic right which copyright protection affords them as copyright holders: to recover their development costs and earn a profit by charging others for access to their software. In this, economic sense, open-source software development “represents the antitheses of a proprietary technology strategy.”¹²

In this chapter we will look at the phenomenon of open-source software: what it is; a brief history of its emergence; an analysis of its nature; and, the motivations for its creation. As stated above, the primary purpose of this chapter is to determine whether the emergence of open-source software does indeed undermine the economic-incentive rationale for copyright protection of computer programs. In the process we will also consider whether the emergence of open-source software is as detrimental to the institution of copyright protection as claimed by critics of open-source software.

5 2 What is open-source software?

Although this work focuses on “open-source software” when considering the central issue of the justification for copyright protection of computer programs, as will be illustrated, it must be borne in mind that this description is really an umbrella term which is general enough to encapsulate the various types of software licences being

¹¹ Bitzer J, et al. "Intrinsic Motivation in Open Source Software Development" 2007 *Journal of Comparative Economics* 35 160 160-1.

¹² West J "How Open is Open Enough? Melding Proprietary and Open Source Platform Strategies" 2003 *Research Policy* 32 1259 1264.

considered, or their lowest common denominator, if that metaphor is more helpful.¹³ As discussed in Chapter 4 it is common for software to be written in a high-level programming language, such as Java or Python, which is a mixture of rudimentary English words and algebraic instructions. This form of the computer program is referred to as the “source code” of the computer program, and is used because of the ease with which it can be understood by humans, leading to speedier development. However, as computers only process, binary digits, or bits — strings of 0s and 1s — source code is converted into executable “object code.” Because only the object code is required to use a computer program, proprietary software is usually distributed only in object code.

As the source code of a computer program is valuable to anyone seeking to establish how a program works, because it is readily understandable by a suitably-trained or skilled programmer, proprietary-software developers seek to keep the source code confidential.¹⁴ In addition to only distributing their software in object code, developers of proprietary software also seek to enhance protection of their software contractually by prohibiting a licensee from accessing and using the source code, to the extent permitted by law.¹⁵ When referring to proprietary software in this work, the assumption will be that the software is mass-market software, and not bespoke software. In the case of bespoke software, the licensor (software

¹³ It has been claimed that term “open-source” was first used in 1998 when Netscape released the source code for its browser software (Taylor M ““Open Source” and “Free” Software” 2005 *CTLR* 11 (3) 97 97).

¹⁴ As indicated in Chapter 4, reversing the object code into source code (or “decompiled” in computer parlance) is not simply process. During the conversion process from source code to object code, programming comments are ignored; thus, any decompilation will not yield the helpful comments which may have accompanied the source code. The conversion process also removes the descriptive names of functions, subroutines, procedures or variables, which are replaced with symbolic representations. Furthermore, the logical order of the source code may not be apparent from the object code, which is more concerned with the order of execution of the program, rather than its design logic. See Horne N “Open Source Software Licensing: Using Copyright Law to Encourage Free Use” 2001 *Ga St U L Rev* 17 863 865; Stromdale C “How Open is Open Source?” 2006 *CTLR* 12 (7) 223 223.

¹⁵ Rehm R “Navigating the Open Source Minefield: What’s a business to do?” 2009 *Wake Forest Intell Prop LJ* 10 289 289-90.

developer) and licensee can make specific arrangements concerning access to the source code.¹⁶ However, it is important to note that by only releasing the object code of its software the proprietor is simply using a technical device to prevent its software being replicated by a competitor. Legally, there is no significance whether software is distributed in source code or object code.¹⁷ The copyright in a computer program gives the author of the computer program the exclusive right to, amongst other things, reproduce the computer program (that is, make copies thereof), make an adaptation of the program, and let or hire copies of the computer program. Thus, any of these acts, if unauthorised, in relation to software constitutes copyright infringement.

Although there is no precise definition of “open-source software,” the following general definition, which satisfies the requirements of the Open Source Definition (“OSD”) produced by the Open Source Initiative (“OSI”), and is the generally-accepted definition of open-source software, will suffice for the purposes of this work.¹⁸ Open-source software is software that is publicly available in source-code form, and where the accompanying licence permits the recipient (licensee), on a non-discriminatory basis, to use (and redistribute) the software, and to modify the

¹⁶ Where proprietary software developers do make the source code of their software available, the access is usually subject to very restrictive conditions. A typical example of the latter is the deposit of the source code with a third party, referred to as an escrow agent, who is permitted to release the source code to the licensee in certain circumstances. For example, the escrow agent may be permitted to release the source code to the licensee if the licensor refuses to maintain the software, or is unable to do so due to insolvency.

¹⁷ Zittrain "Normative Principles for Evaluating Free and Proprietary Software" 271-2.

¹⁸ Scrimshaw W and Harris M "Open Source Software: An Overview of the Main Legal and Commercial Implications of its Use" 2005 *CTLR* 11 (7) 222 222-3; Stern A and Lee R "Open Source Licensing" 2008 *Practising Law Institute* 950 252 273-4. The OSI is a non-profit organisation, founded in 1998, which evaluates software licences in terms of the OSD, and certifies them as OSD compliant (“OSI Certified”) if they satisfy the OSD. The OSD certification provides a convenient method for software developers to ascertain whether software is open-source. See Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1279; McJohn "The Paradoxes of Free Software" 33; Rychlicki T "GPLv3: New Software Licence and New Axiology of Intellectual Property Law" 2008 *EIPR* 30 (6) 232 233; Zittrain "Normative Principles for Evaluating Free and Proprietary Software" 275-6).

software and distribute the modified software in source-code form.¹⁹ Thus, the “source” in open-source software is a reference to the source code of the software, and “open” refers to the requirement that access to the source code (and related freedoms, such as the right to redistribute and modify the source code) be freely available.²⁰ While this definition will suffice for purposes of the legal and economic analysis of this study, and, unless otherwise stated, should be borne in mind whenever there is a reference to “open-source software” in this work, general definitions inevitably do not reveal the subtleties and distinctions between various manifestations of the defined subject matter. The most significant of these distinctions is that between open-source software and “free software.” However, before considering this distinction and analysing the nature of open-source software in more detail, a brief history of its development will be necessary.

5 3 History of open-source software

Although open-source software development as a recognised concept, and the associated movement, emerged in 1985, the practice of sharing source code has existed since computer programming was in its infancy in the 1950s and 1960s.²¹ As indicated in Chapter 4, the pioneering work in computer science (and development of the Internet) principally took place in the United States of America in

¹⁹ Lee J "New Perspectives on Public Goods Production: Policy Implications of Open Source Software" 2006 *Vand J Ent & Tech L* 9 45 49; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 66.

²⁰ Dusollier "Open Source and Copyleft: Authorship Reconsidered?" 283; Gomulkiewicz "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B" 180-1; Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 864; Stromdale "How Open is Open Source?" 223.

²¹ Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1275; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 87-8; Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 864; Lerner J and Tirole J "Some Simple Economics of Open Source" 2002 *Journal of Industrial Economics* 50 (2) 197 200; Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 10-1; Meeker H "Origins and Development of Open Source and GPL Licensing" 2008 *CTLR* 14 (2) 41 41; Taylor "'Open Source" and "Free" Software" 97.

academic institutions, notably the University of California at Berkeley and the Massachusetts Institute of Technology, and in the corporate research facilities of monopolies such as AT&T's Bell Laboratories and Xerox's Palo Alto Research Centre, where researchers had a level of autonomy comparable to those in academic institutions.²² In addition, there was a committed group of amateur computer enthusiasts — hackers²³ — who co-operated with the former two groups, and similarly engaged in pioneering work.²⁴ During these pioneering days, the economic potential of software (and computing generally) was not fully appreciated, and the members of these communities were spurred on by curiosity and the desire to find solutions to identified problems in order to advance their field of interest. In this milieu, collaboration and sharing of knowledge, and source code, via the ARPAnet (the predecessor of the Internet), was the norm. This was the so-called "hacker ethic" that prevailed.²⁵

As discussed in Chapter 4, at the dawn of the computer industry, software was not considered to be a distinct commodity but was considered as a means by which computer manufacturers could sell their hardware. With the declining costs in the computing industry, and the development of personal computers, computers became ubiquitous and software became a distinct commodity. In fact, software companies were soon more profitable than hardware manufacturers. This

²² Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1275; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 101.

²³ Unlike the current, pejorative sense of "hacker," it initially referred to an ingenious, resourceful programmer, and the term "cracker" was used to refer to those who used their talents to cause harm. See Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 24; de Laat P "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 2005 *Research Policy* 34 1511 1518; Reynolds and Tyman *Principles of Computer Science* 176-7.

²⁴ Nikulainen "Open Source Software: Why is it Here and Will it Stick Around?" 137.

²⁵ Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1275; de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1518; Kogut B and Metiu A "Open-source Software Development and Distributed Innovation" 2001 *Oxf Rev Econ Policy* 17 (2) 248 250-1; Taylor "'Open Source" and "Free" Software" 97; Gomulkiewicz "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B" 182-3; Nikulainen "Open Source Software: Why is it Here and Will it Stick Around?" 137.

development signalled the end of the era of collaboration and sharing of software source code between programmers; the new producers of commercial, mass-market software, and firms that produced their own bespoke software (which they perceived as giving them an advantage over competitors), now sought legal protection for their software and insisted on confidentiality.²⁶ The emergence of the commercial software industry — supported by copyright — and the “taking private” of software source code, and the resultant lack of sharing, angered members of the pioneering computing community, particularly those who were still imbued with the hacker ethic. However, the straw that broke the camel’s back was the resultant proprietary claim by the AT&T company in the Unix operating system software.²⁷

UNIX was a widely-used and respected operating system, which was developed in the 1970s and 1980s by AT&T employees at its Bell Laboratories, with the assistance of members of the wider community of academics, researchers and hackers. Importantly, the Unix source code was made freely available to anyone.²⁸ The reason why Unix was not a proprietary, commercial product was a consequence of the legal restrictions that had been placed on AT&T as a company. AT&T was a monopoly phone company, and, because of its monopoly position, it was prevented from earning anything from its non-phone related activities following a judicial decree. As a consequence of this liberal licensing policy of the Unix operating system, a large amount of effort was expended in developing various versions of the Unix operating system, the most well-known being BSD Unix, developed at the University of California at Berkeley. Subsequently, in the early 1980s, the AT&T company was broken up, and, freed from the legal restrictions, the company now sought to charge for its version of Unix, on the traditional proprietary-software business model.²⁹

²⁶ Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1275; de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1513; Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 103; Taylor ""Open Source" and "Free" Software" 97.

²⁷ Dusollier "Open Source and Copyleft: Authorship Reconsidered?" 284.

²⁸ Sometimes a nominal licence fee of one dollar was payable.

²⁹ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1518; Henley M and Kemp R "Open Source Software: An introduction" 2008 *Comp Law & Security Rep* 24

Although there were members of the programming community, imbued with the hacker ethic, who considered the emerging trend of proprietary software development antithetical to the belief that the source code of software should be freely accessible, one person, Richard Stallman, is universally credited as the father of open-source software as presently understood. Stallman was a programmer at MIT's Artificial Intelligence Laboratory, who resigned from his job in 1984 to pursue his commitment to the belief that software source code should be freely accessible, and that anyone should have the right to disseminate or modify the source code. This commitment took the form of a project, GNU ("GNU's Not UNIX"),³⁰ which enlisted the help of volunteers to develop a new operating system which would be compatible with Unix, but licensed on very different terms. To this end, Stallman formed the Free Software Foundation ("FSF"), a non-profit organisation, in 1985 to further the project for the new operating system and to organise collaborative software development on a more formal basis. By 1994, after the incorporation of Linus Torvald's contribution — the Linux³¹ kernel — which was the product of a similar collaborative project, the GNU Project resulted in the GNU/Linux operating system (commonly referred to as simply "Linux").³²

77 78; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 101; Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 10-1; Meeker "Origins and Development of Open Source and GPL Licensing" 41.

³⁰ It is pronounced "guh-noo," and is a recursive acronym and hacker's pun.

³¹ "Linux" is simply a combination of "Linus" and "Unix."

³² Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 12 and 23-34; de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1518; Carver B "Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses" 2005 *Berkeley Tech LJ* 20 443 444-6; Dusollier "Open Source and Copyleft: Authorship Reconsidered?" 282-4; Henley and Kemp "Open Source Software: An introduction" 78; Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 809; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 101-2; Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 11; McGowan "Legal Implications of Open-Source Software" 260-1; Meeker "Origins and Development of Open Source and GPL Licensing" 41; Nikulainen "Open Source Software: Why is it Here and Will it Stick Around?" 138; Rychlicki "GPLv3: New Software Licence and New Axiology of Intellectual Property Law" 232; Taylor "'Open Source' and 'Free' Software" 97; West "How Open is Open Enough? Melding Proprietary and Open Source Platform Strategies" 1265; Zittrain "Normative Principles for Evaluating Free and Proprietary Software" 268.

The real reason why Stallman's GNU Project was seminal to the open-source software movement was not the software it produced, rather it was the innovative licence under which such software was made available. Stallman created the General Public License ("GPL"), the first version of which was released in 1989, and reflected his belief that software source code should be freely accessible to all, giving users the freedom to redistribute such source code or modify it. Because of Stallman's insistence that software source code should always be freely available, the GPL prevents any source code licensed under its terms ("GPL'd software") being "taken private" by its inclusion in proprietary software. In other words, the concern was that the author of a derivative work of an open-source computer program could claim copyright protection in such derivative work, to the extent that it contained original material, and, thus, exclude others from using it by asserting his proprietary rights.³³ The mechanism by which the GPL achieves this goal of preventing such proprietary claims in derivative works is the inclusion of an obligation on the licensee of GPL'd software to also make any derivative software thereof available on the same licence terms. This is the so-called "copyleft" provision or obligation.³⁴ Stallman coined the term "free software" for software licensed on this basis, and considered such licensing to be ethically important.³⁵ The FSF also developed its own definition by which software could be assessed as whether it could be considered to be free software, its Free Software Definition ("FSD").³⁶ Although some of the open-source licence terms relevant to this study will be considered in greater detail later, it should simply be noted at this stage that the copyleft obligation (which will be discussed in greater detail below) is the most controversial aspect of

³³ Miller "Allchin's Folly: Exploding Some Myths About Open Source Software" 495.

³⁴ The term "copyleft" being obviously intended as pun on the term "copyright." The GNU website states that "[t]he "left" in "copyleft" is not a reference to the verb "to leave" — only to the direction which is the inverse of "right" (<http://www.gnu.org/copyleft/> (accessed 18 February 2012))." See also Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 877-8.

³⁵ Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 28-41; Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 11; McGowan "Legal Implications of Open-Source Software" 260-1; Nadan "Open Source Licensing: Virus or virtue?" 353; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 101-2; West "How Open is Open Enough? Melding Proprietary and Open Source Platform Strategies" 1265; Zittrain "Normative Principles for Evaluating Free and Proprietary Software" 268.

³⁶ The FSD is accessible at <http://www.gnu.org/philosophy/free-sw.html> (accessed 16 January 2012).

the GPL, and, as will be shown below, makes it, paradoxically, the most restrictive of the open-source software licences. However, rather curiously, the FSD does not require that a free-software licence include a copyleft obligation.

Stallman's free software was the genesis of open-source software.³⁷ In fact, the term "open-source software" only emerged in 1997, and, ironically, was coined as part of a deliberate attempt to distinguish it from free software.³⁸ The additional, copyleft obligation on licensees, which requires them to make any derivative software available in source-code form, was, and continues to be, the most contentious aspect of the GPL. Although a number of programmers shared Stallman's calls for accessible software source code, there was a concern that the restrictive nature of free software, as championed by Stallman, would discourage wide-scale adoption of the GPL. Stallman's position was considered to be antagonistic to both commercial software companies, and intellectual property protection.³⁹ For Stallman the question of free access to software source code was tantamount to an article of faith, or ideology, while for others like the OSI it was altogether more prosaic and pragmatic: it was simply considered to be a superior economic, organisational, method of software development in comparison to traditional forms of proprietary-software development. Open-source development is considered to deliver better designed, and more reliable, software, which is also more speedily produced. Thus, the OSD (and, as mentioned, neither does the FSD) does not require the inclusion of a copyleft obligation as part of its criteria for open-source software.⁴⁰ Software licences which contain the copyleft provision are

³⁷ Nadan "Open Source Licensing: Virus or virtue?" 353.

³⁸ Stern and Lee "Open Source Licensing" 273-4.

³⁹ Taylor "'Open Source' and 'Free' Software" 97.

⁴⁰ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1516 fn 1; Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 35-6; Nikulainen "Open Source Software: Why is it Here and Will it Stick Around?" 139; Carver "Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses" 449-50 and 453-4; Henley and Kemp "Open Source Software: An introduction" 78; Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 798-9; Kennedy D "A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 2001 *St Louis U Pub L Rev* 20 345 348-9; Nadan "Open Source Licensing: Virus or virtue?" 353-5; Rychlicki "GPLv3: New Software Licence and New Axiology of Intellectual Property Law" 233; Schiff "The Economics of Open Source Software: A Survey

referred to as “copyleft licences,” “restrictive licences,” “reciprocal licences” or “full licences” whereas open-source software licences which do not have such an obligation are categorised as “permissive licences,” “academic licences” or “limited licences.”⁴¹

Thus, having regard to the definition of open-source software adopted for purposes of this work, in paragraph 5.2, it should be noted that there is no copyleft requirement.⁴² Because the FSD also does not require software to be “copylefted” before it can be considered to be “free,” free software is not necessarily synonymous with copyleft software.⁴³ However, the flagship free-software licence, the GPL, is a copyleft licence, and most discussions relating to free software focus on the GPL. It is important to be aware of this distinction between free software that includes the copyleft obligation (“copyleft software”) and other open-source software, because of its significance, which will be analysed in greater detail. Copyleft software, like open-source software, is also software that is distributed in source-code form, and both forms of licence allow the licensee to redistribute it in that form or to modify it. However, copylefted software also obliges the licensee of the software to make all derivative software available on the same terms. In other words, while open-source software permits modifications of the software by the licensee, and even permits the licensee to distribute derivative software in source-code form, there is no *obligation* on the licensee to make derivative software available in source-code form on the same licence terms. Open-source software, in its most permissive sense, permits the “privatisation” of open-source computer code when it has been modified, that is, it permits the licensee to create derivative proprietary software. In other words, whereas all free software will satisfy the definition of open-source software as set out in paragraph 5.2, not all open-source software will be copyleft software. As a

of the Early Literature” 72; Stern and Lee “Open Source Licensing” 273; West “How Open is Open Enough? Melding Proprietary and Open Source Platform Strategies” 1265.

⁴¹ de Laat “Copyright or Copyleft? An Analysis of Property Regimes for Software Development” 1518; Lee “New Perspectives on Public Goods Production: Policy Implications of Open Source Software” 52; Stromdale “How Open is Open Source?” 224-5.

⁴² The Open-source Definition also does not require software to be copylefted. See Kennedy “A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture” 357.

⁴³ Nadan “Open Source Licensing: Virus or virtue?” 357-8.

consequence of the way this work has defined open-source software, free software is simply a subset of open-source software, a kind of special case; therefore, any statements or analysis in relation to open-source software generally should be equally applicable to free software, unless otherwise stated.⁴⁴ In turn, copyleft software is a subset of free software, and, therefore, any statements or analysis concerning open-source software should, again, be equally applicable to copyleft software, unless otherwise stated.⁴⁵ Having said this, in so far as any distinctions will be drawn within open-source software, it will primarily be the distinction between copyleft software and non-copyleft software.

While the early volunteers to the open-source movement may have been enthusiastic and committed to the production of open-source software, the initial outputs were disappointing. The crucial factor which changed this was the widespread diffusion of the Internet, which facilitated the distribution of computer code, as this could now be done at zero marginal cost, and it enabled the collaboration and coordination of individual efforts on a scale (and at such low cost) previously not possible. In fact, the diffusion of the Internet also transformed the open-source movement from a being a merely American phenomenon to make it a worldwide phenomenon. The scale of open-source software development was also boosted by the emergence of more liberal, non-copyleft licences. This, more liberal, approach to licensing, encouraged the participation of commercial software firms. It, therefore, should come as no surprise that since the GNU Project, there have been numerous open-source software projects.⁴⁶

⁴⁴ Sometimes the term "FOSS" (Free and open-source software) or "FLOSS" (Free-libre and open-source software) is used to refer to analysis applicable to both free software and open-source software. However, as a consequence of the way open-source software has been defined, it is unnecessary to introduce an additional term.

⁴⁵ Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1278; McGowan "Legal Implications of Open-Source Software" 254.

⁴⁶ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1518; Gomulkiewicz "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B" 182-5; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 80; Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 799; Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 864; Kennedy "A Primer On Open

5 4 Other distinguishing features of open-source software

Before considering open-source licences generally, and the specific implications of copyleft provisions, it is necessary to clarify some of the features of open-source software, which distinguish it from other types of software. This will assist to clear up some popular misconceptions, and encourage the use of appropriate terminology. Arguably, the most common, and material, misconception concerning open-source software is that it is software that has been contributed to the public domain (or is copyright-free), that is, free from any copyright restrictions on its use or distribution. Open-source software is not software that has been placed in the public domain, and, therefore, non-proprietary, as it has sometimes been claimed to be.⁴⁷ This is an easy mistake to make for people who are unfamiliar with copyright law, given its resemblance to public domain material. As will be illustrated in more detail in the following section, open-source software does not amount to a removal, surrender or abandonment of the proprietary rights afforded by copyright to an author.⁴⁸ In fact, it is rather ironic that the more ideologically motivated and restrictive copyleft licences are more reliant on the existence and retention of authors' proprietary rights.

The defining, or common, feature of open-source software licences is that they permit public access to the source code, and permit a licensee to use the software, modify it and redistribute the original (or modified) software in source-code form. While these rights afforded to licensees extend well beyond those typically

Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 348-9; Lerner and Tirole "Some Simple Economics of Open Source" 200-2; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 102; Maher "Open Source Software: The Success of an Alternative Intellectual Property Incentive Program" 642; McGowan "Legal Implications of Open-Source Software" 267-8.

⁴⁷ See Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 3; Kogut and Metiu "Open-source Software Development and Distributed Innovation" 249; McJohn "The Paradoxes of Free Software" 28; Stromdale "How Open is Open Source?" 223.

⁴⁸ Henley and Kemp "Open Source Software: An introduction" 84; Kennedy "A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 357-8; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 102; Scrimshaw and Harris "Open Source Software: An Overview of the Main Legal and Commercial Implications of its Use" 227.

associated with proprietary software, these open-source licences are also based on authors' proprietary rights.⁴⁹ It is important to note that the generous grants of rights pursuant to open-source licences are subject to the restrictions (conditions or obligations) imposed by the licence on licensees, and breaches of the licence are enforceable because the proprietary, and associated, rights are retained by their author. If software has been contributed to the public domain, because its author has waived his proprietary rights therein, others would be entitled to use it in any manner they saw fit.⁵⁰ Open-source software, therefore, does not constitute a waiver or abandonment by an author of his proprietary rights in such software and its contribution to the public domain, but the author simply chooses to exercise those rights in a different manner: it, too, is, therefore, from a legal perspective, proprietary software.⁵¹ The difference is that in the case of "conventional" proprietary software, its author uses the proprietary rights afforded by copyright to earn a direct financial reward in the form of a licence fee in exchange for authorising the use of the software, which contrasts with open-source software. It is therefore, strictly speaking, a misnomer to draw a distinction between "proprietary software" and open-source software, as this work does. However, it is common practice to refer to software which is only made available for use at a fee, or which is distributed without revealing its source code, as proprietary software. It may be more appropriate to distinguish between "open-source" and "closed-source" software.⁵²

⁴⁹ Kennedy "A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 357-8; McJohn "The Paradoxes of Free Software" 28.

⁵⁰ DM Kennedy "A Primer On Open-source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 2001 *20 St. Louis U. Pub. L. Rev.* 345 357-8.

⁵¹ Dusollier "Open Source and Copyleft: Authorship Reconsidered?" 286; Miller "Allchin's Folly: Exploding Some Myths About Open Source Software" 497. Miller's statement was made in respect of the GPL, but it generally applies to all open-source software.

⁵² Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 1-2; Meeker "Origins and Development of Open Source and GPL Licensing" 42; Stern and Lee "Open Source Licensing" 274. It would also be inappropriate to distinguish between "commercial software" and open-source software. As will be discussed below, there are examples of commercially successful software firms whose business model is based on open-source model, and, as such, open-source software can be regarded as commercial software. However, as will become clear, open-source software is characterised by more than just the release of the source code; users are also given the

It is also necessary to distinguish open-source software from “freeware” and “shareware” software. Freeware and shareware is software that is made available free of charge, but it does not qualify as open-source software as the source code is generally not made available to the licensee. Such software tends to be made available as a promotional device to encourage potential customers to purchase related software. The producer of the freeware or shareware tends to offer it as a “standard” version, on a restricted basis, such as for non-commercial use only, or on a trial basis, hoping that users would be prepared to pay for its “premium” product.⁵³

As is apparent from the distinction drawn between open-source software, and freeware or shareware, whether software is distributed free of charge is not definitive of whether it qualifies as open-source software. In fact, the use of the “free,” as in “free software,” for the kind of open-source software which Stallman champions appears to have generated a significant amount of criticism from some members of the open-source community, and is regarded as one of the reasons for the creation of the OSI and the coining of the alternative, more general, term “open-source software.” This has resulted in the open-source community being divided between those who produce free software and the remainder who produce open-source software.⁵⁴ For Stallman, access to the source code was not a question of costs; it was the right of a user to access the source code which was paramount. Stallman was adamant that free software was the more appropriate term, as he gave primacy to the freedom of users. There is nothing preventing a software proprietor from charging for a copy of his software, provided that the licensee obtained a copy of the source code, and the freedom to modify and redistribute such software.⁵⁵ Having said that, Stallman also believes that copyright protection of computer programs

right to use and modify the software. It is possible for the source code to be published but the author retaining all the proprietary rights to such computer code.

⁵³ Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 30; Kennedy "A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 358; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 102; Stromdale "How Open is Open Source?" 223.

⁵⁴ Nadan "Open Source Licensing: Virus or virtue?" 353.

⁵⁵ The FSF expressly states that it is permissible to charge for copies of free software (<http://www.gnu.org/philosophy/free-sw.html> (accessed 16 January 2012)).

results in users having to pay higher prices for software without the freedoms to access, use and redistribute the source code, which increases the costs of software production, maintenance and improvement.⁵⁶ The much-quoted aphorism Stallman used to convey his message, and the meaning of “free” in this context, was that it should be used in the same sense as “free speech, not free beer.” In other words, “free” in this context is intended to mean free as in *libre*, not *gratis*.⁵⁷ Stallman is contemptuous of licensees who use software licensed under non-copyleft licences to create derivative, proprietary software, as he regards them as only being interested in open-source software as in “free beer,” and not “free speech.”⁵⁸

Stallman’s critics claimed that the use of “free” created the impression that the open-source movement was antagonistic towards commercial software firms, which made such firms reluctant to participate in open-source development. From a public-relations perspective, the use of “free” was regarded as being too closely associated with the issue of costs: software firms and investors did not appreciate the subtle distinctions between freedoms and cost-free software.⁵⁹ It has been claimed that the term “open-source software,” as opposed “free software,” led to a greater acceptance of open-source development of software.⁶⁰ As has been indicated above, whereas Stallman and other members of the FSF regard free access to software source code as an article of faith, or ideology, the OSI simply considers open-source development to be a superior method of software development to the

⁵⁶ Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 810.

⁵⁷ Carver "Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses" 450; Kennedy "A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 347 and 359; McJohn "The Paradoxes of Free Software" 32; Meeker "Origins and Development of Open Source and GPL Licensing" 42; Nadan "Open Source Licensing: Virus or virtue?" 353; Taylor "'Open Source' and 'Free' Software" 97; Zittrain "Normative Principles for Evaluating Free and Proprietary Software" 271. See also <http://www.gnu.org/philosophy/free-sw.html> (accessed 16 January 2012).

⁵⁸ Hill "Fragmenting the Copyleft Movement: The Public Will Not Prevail" 799.

⁵⁹ Carver "Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses" 449; Kennedy "A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 355.

⁶⁰ Potter "Opening Up to Open Source" 17.

traditional forms of proprietary software development, and simply seeks to encourage its adoption.

This emphasis on nomenclature, and the alleged resultant marketing benefits, is fatuous as it elevates form over substance. An inevitable consequence of the freedoms Stallman insists should accompany free software, and those which do accompany open-source software, is that a software proprietor of such software is unable to charge users a licence fee for using its software. If everyone is granted the right to use and redistribute the source code of the software, users would have no incentive to pay for the right to use it. It would not be in any particular user's interest to pay the licence fee; a user would simply seek to obtain the software from another user and free ride off the investment of such other user who has acquired the software, or cooperate with others to pay one licence fee and to freely share it amongst themselves.⁶¹ Either way, the author is unlikely to earn a sufficient return in the form of licence fee in respect of free software, or open-source software. Another reason why the proprietor of open-source software is unable to charge a fee for its use is that it may have a demotivating effect on other computer programmers who contribute to its development. They would resent that their efforts are being so directly appropriated for gain, without them sharing in such proceeds.⁶²

In so far as a software proprietor wishes to charge users a licence fee for using its software, there is no substantive difference between free software or open-source software. Both types of software licence result in a software proprietor being unable to charge licensees a fee for permission to use its software. This is not to deny the substantive, restrictive nature of copyleft provisions in free software licences such as the GPL, which are not included in other open-source software licences; however, this distinguishing factor between free software and open-source software does not change the fact that a proprietor of neither type of software is able

⁶¹ Gomulkiewicz "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B" 187; McGowan "Legal Implications of Open-Source Software" 244; Reddy H "Jacobsen v. Katzer: The Federal Circuit Weighs in on the Enforceability of Free and Open Source Software Licenses" 2009 *Berkeley Tech LJ* 24 299 304.

⁶² de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1524.

to charge a licence fee. In fact, as will be discussed later, the business models of software firms who invest in free software or open-source software do not differ: they have to rely on revenue streams other than the charging of fees for use of software, such as the provision of consulting services or training.⁶³ Thus, while the motivations of those who produce free software may differ from those who produce open-source software, economically, both forms of licensing stand in contrast to proprietary software, as the latter allows for software proprietors to charge for the use of their software. In other words, there is no essential economic distinction between free software and open-source software.⁶⁴

5 5 Open-source licences

As already indicated, open-source software is not software that has been contributed to the public domain, but it is software which utilises the proprietary rights afforded by copyright and is licensed on terms which distinguish it from proprietary software. In this section the nature of open-source licences will be examined and analysed. Given the liberal attitude of members of the open-source community in relation to the issue of access to the source code of their products, it is necessary to understand why open-source software is released under software licences rather than simply contributing such software to the public domain? The distinguishing terms in open-source software licences will be considered, in order to establish their legal significance, and how they achieve the goals of the open-source community. In particular, we are interested in the effect of such licensing on the incentive rationale for copyright protection of computer programs.

The OSI lists more than 60 software licences which satisfy the OSD, and, consequently, software licensed under any of those licences is considered to be

⁶³ Gomulkiewicz "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B" 187; Kennedy "A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 347; West "How Open is Open Enough? Melding Proprietary and Open Source Platform Strategies" 1265.

⁶⁴ McGowan "Legal Implications of Open-Source Software" 245.

open-source software.⁶⁵ This work will not consider the terms of each of these licences, or even undertake a detailed analysis of the terms of a specific licence. A detailed analysis of the specific terms of open-source licences is not required for purposes of this work, which is concerned with the economic impact and rationale associated with open-source software, in order to reflect on the current policy of providing copyright protection for computer programs. This, of course, is not to discount the dangers inherent in discussing a phenomenon in general terms, in any field of enquiry, where there are differences in the various manifestations of the phenomenon, or, indeed, whether a particular variant forms part of the particular subject matter.⁶⁶ However, given the nature of the enquiry of this work, the problems of generalisation are, for all intents and purposes, eliminated because these licences are considered at a particularly high level of abstraction: their implications for the supposed rationale for the copyright protection of computer programs.

The licence that will be used to illustrate the issues, to the extent necessary, will be the GPL, but other open-source licences will also be considered when required. Besides the fact that the GPL was the first open-source licence, there is another good reason for choosing the GPL. The GPL is, by a considerable margin, the most widely-used open-source licence: over 48% of the open-source software currently licensed has been released under the GPL licence, which is at least four times more than that of the next most popular open-source licence, the MIT Licence.⁶⁷ It is rather curious to see that the GPL, which is a copyleft licence, is still

⁶⁵ <http://www.opensource.org/licenses/alphabetical> (accessed 12 January 2012). This is based on the combination of GPL versions 2 and 3. Some of the other open-source licences are only used by their authors in relation to their own software. Bruce Perens, of the OSI, has acknowledged that the OSI's certification program had the, unfortunate, unintended consequence that there has been the proliferation of open-source licences. See de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1520

⁶⁶ Given the number of open-source licences and the differences between such licences, when faced with a particular issue concerning an open-source licence, it is, obviously, necessary to refer to the terms of the specific licence in order to determine its legal effect. Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1281-2; Henley and Kemp "Open Source Software: An introduction" 79; Scrimshaw and Harris "Open Source Software: An Overview of the Main Legal and Commercial Implications of its Use" 222.

⁶⁷ <http://osrc.blackducksoftware.com/data/licenses/index.php> (accessed 12 January 2012).

the most popular open-source licence, despite the fact that its “free software” characterisation was criticised as being unattractive to, and antagonistic towards, software firms, as earlier discussed. In fact, it was claimed that despite Stallman’s idealism, most people would simply be attracted by open-source software as “free beer” and not participate in his greater ethical campaign of free access to software, therefore, the GPL will be unattractive to future participants. However, as the data indicates, the GPL is still the licence-of-choice for the open-source community. This fact means that it has attracted a significant amount of attention.

Although we have already noted that open-source licences permit public access to the software source code, and give licensees the right to use, modify and redistribute the software, there are so many different licences that ascertaining whether a particular licence is an open-source licence can be time consuming. The OSD, and the associated certification, has provided a useful solution to this problem.⁶⁸ It is, thus, instructive to consider the specific requirements of the OSD,⁶⁹ which, as noted, is a generally-accepted definition of open-source software.⁷⁰ The OSD stipulates ten criteria before software can be considered to be open-source software, in addition to the requirement that the source code must be accessible. First, if the licensed software has been incorporated as a component of other software, the licence must not prevent the distribution of such other software or require payment to allow such distribution. Second, access to the source code is, of course, central to open-source software: the software must be distributed in source-code form, or it must be easily accessible. If a fee is charged for access to the source code, it should not exceed the reasonable costs of reproducing it. It is important that the source code which is made available is the means by which the software is modified; in other words, the software’s source code must not be obfuscated in any way. In addition, the licensee must be given the right to redistribute the source code, in that form or as compiled code. Third, the licensee

⁶⁸ SM McJohn “The Paradoxes of Free Software” 2000 9 *Geo. Mason L. Rev.* 25 33.

⁶⁹ The Open-source Definition (version 1.9) can be accessed on the website of the Open-source Initiative at <http://www.opensource.org/docs/osd> (accessed 12 January 2012).

⁷⁰ de Laat “Copyright or Copyleft? An Analysis of Property Regimes for Software Development” 1517-8.

must be allowed to modify the software or create derivative works, and must have the right — but not the obligation — to licence such derivative works under the same licence as the original software. This is the crucial difference between open-source software and free software licences, like the GPL, as the latter include the copyleft provision: a licensee is obliged to licence derivative works under the same licence as the original software.⁷¹ Fourth, the licence may exclude the right of a licensee to distribute the modified software in source-code form, provided that the licensee is given the right to release the source code of its modifications, and thereby allow others to achieve the same result as the modified software. The purpose of this exception is to preserve the integrity of the original software, and thereby preserve the reputation of its author. Similarly, the licence may require that derivative works must carry a different name or version number from that of the original software. As will be discussed later, the reputational reward which is derived from participation in open-source development is an important factor when considering authors' incentives to create such software, so it is not surprising that specific exclusions have been created to maintain an author's connection with his creation. Fifth and sixth, the software must be licensed on a non-discriminatory basis, and, therefore, the licence should not limit its use to specific persons or for specific purposes, for example, non-profit organisations or for non-commercial use only. The purpose of this requirement is to attract the widest group of contributors as possible. As will be discussed later, it is submitted that although restrictive, copyleft licences, like the GPL, are formally non-discriminatory, they, arguably, discourage participation by some contributors. Seventh, the rights granted by the licence must automatically be extended to third parties to whom the software is distributed. The purpose of this requirement is to prevent a licensee from inhibiting the wider distribution of the software, and, thereby the participation of other potential contributors, by imposing restrictions on third parties to whom it distributes the software. Eighth, again, the further distribution of the software may not be restricted by limiting it to a particular distribution, for example, its inclusion in a specific product or package. The rights afforded by the licence must also be extended to third parties, if the software has been extracted from such product and distributed to such third parties without the product in which the original software was incorporated. Ninth, the licence must not

⁷¹ McGowan "Legal Implications of Open-Source Software" 254.

require that other software, which a licensee distributes together with the licensed software, be licensed on the same terms as the licence or place any other restrictions on such other licence. Last, the licence must be technologically neutral, which simply means that the rights afforded must not be made conditional on a particular form of acceptance by the licensee, such as confirming acceptance by means of a click-wrap contract.

Given the fact that the GPL is also a free-software licence, as well as OSD compliant, it is necessary to also briefly consider the requirements of the FSD. As the FSF's approach to open-source software is more principled than that of the OSI, its requirements are stated in more broad terms.⁷² According to the FSD, software will be considered to be free if there are four associated freedoms granted to licensees of the software.⁷³ First, licensees must have the freedom to run the program for any purpose. Second, licensees must be given access to the source code of the software, and have the freedom to learn how it works and modify it. Third, licensees must have the freedom to redistribute copies of the software. Last, licensees must have the freedom to distribute their derivative works in source-code form.

Although the FSF and the OSI differ in their motivations for promoting open-source software, with the FSF approaching the issue from an ethical viewpoint and the OSI being altogether more pragmatic, regarding it as a more efficient form of software development, the four freedoms of the FSD are consistent with that of the OSD.⁷⁴ The practical effect of both sets of requirements is the same: licensees must have the right to use, redistribute, modify the licensed software (which necessarily requires access to the source code), and to distribute derivative works of the licensed software.⁷⁵ This is the principal reason why, as has been noted before, we do not have to be considered with the finer distinctions between free software and

⁷² Nadan "Open Source Licensing: Virus or virtue?" 357.

⁷³ <http://www.gnu.org/philosophy/free-sw.html> (accessed 16 January 2012).

⁷⁴ Nadan "Open Source Licensing: Virus or virtue?" 357.

⁷⁵ Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 877-8; Nikulainen "Open Source Software: Why is it Here and Will it Stick Around?" 139.

open-source software as there is no significant economic distinction between software licences which satisfy the requirements of either the OSD or FSD.

Having considered the rights which software licences are required to grant licensees before they can qualify as open-source software, it is also necessary to consider some of the obligations placed on licensees by such licences, most notably the copyleft obligation. However, before doing so it is necessary to understand why open-source software was, and is, released under software licences rather than simply contributed to the public domain.

5 5 1 Copyright hacked

As mentioned earlier, open-source software is not software contributed to the public domain, which is a common misconception. In fact, since the start of open-source as a movement, with Stallman's establishment of the FSF, open-source software has been deliberately copyrighted.⁷⁶ It is instructive to see why, despite his ethical position that software should be free of restrictions that were being imposed on proprietary software, the open-source software community chooses to utilise the proprietary licensing model made possible by copyright, rather than disclaiming those rights. However, as will be illustrated, and as already hinted at, the open-source community, particularly, the free-software community, used copyright in a different manner to that in which it was previously used.

5 5 1 1 Why license and not contribute software to the public domain?

The development of open-source licensing, as noted earlier, was motivated by the resentment felt by members of the pioneering hacking community, like Richard Stallman, towards the emergence of proprietary software — made possible by copyright protection. It is claimed that it is a testament to the ingenuity of the hacking mentality how the open-source community hacked the law to reverse this

⁷⁶ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1521.

perceived undesirable development, using the “weight” of the law against itself — a form of “institutional jujitsu.”⁷⁷ Although the ethically-minded members of the open-source movement preferred that no proprietary rights exist in software, their response was to use copyright and contract law to arrest, if not reverse, the privatisation of computer code.⁷⁸ These individuals sought to limit the copyright protection enjoyed by authors of computer programs, using a private solution, contract or software licensing, which relies on the entitlements, or exclusive rights, that copyright law provides authors to control the exploitation of their copyright works.⁷⁹

Whereas the consequence of the default regime of copyright — and which default regime is essentially retained by proprietary software developers — is to create an “all rights reserved” situation,⁸⁰ they would use open-source licences to create a software commons to permit public access to software.⁸¹ Open-source licensing has, in general terms, been pithily described as placing “restrictions on restrictions.”⁸² The liberal licensing policy grants users a non-exclusive licence, with transferable rights, obviating the need for persons seeking to perform any of the acts restricted by copyright in respect of an open-source computer program from having to obtain seek consent from its author, and in return for such rights users agree to comply with a few conditions.⁸³ As a consequence of this licensed-by-default

⁷⁷ Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 446; Lerner and Tirole "Some Simple Economics of Open Source" 201; McJohn "The Paradoxes of Free Software" 35.

⁷⁸ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1522.

⁷⁹ Dusollier "Open Source and Copyleft: Authorship Reconsidered?" 286-7; Goss "Codifying a Commons: Copyright, Copyleft, and the Creative Commons Project" 975; Miller "Allchin's Folly: Exploding Some Myths About Open Source Software" 497; Moore "A Lockean Theory of Intellectual Property" 91.

⁸⁰ Boyle *The Public Domain: Enclosing the Commons of the Mind* 181. Copyright, by default, gives the author the right to authorise use of his work, for example, the right to reproduce the work, adapt it, or perform it in public. This right vests automatically, as there are no formal requirements.

⁸¹ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1522.

⁸² McJohn "The Paradoxes of Free Software" 42.

⁸³ Goss "Codifying a Commons: Copyright, Copyleft, and the Creative Commons Project" 977-8. Although this characterisation was stated in respect of a Creative Commons licence, the same principle applies in respect of open-source licences. See also McGowan "Legal Implications of Open-

position adopted by the open-source licensor, users avoid the transaction costs associated with having to seek permission for using the software, and they do not have to pay any licence fees for permission to use the software.⁸⁴ This form of licensing avoids the loss in social welfare caused by traditional copyright, where the burden of such transaction costs result in copyright works not being used at the socially desirable level, creating a deadweight loss. Importantly, failure to comply with the conditions imposed by open-source licences not only constitutes a breach of contract, it also results in the user's conduct infringing the copyright in the licensed work as the exploitation of the work is then unauthorised.⁸⁵

It is important to appreciate the difference between a commons and the public domain in order to understand why the latter was considered as inappropriate, particularly for those in the free-software community. Where material forms part of the public domain, such material is available to all to use it as they deem fit: there are no proprietary rights in relation to public-domain material and no rules governing its use. The problem with donating material to the public domain is that such material can be used by others, without permission or restriction, to create new, proprietary copyright works, which new works are not also part of the public domain, unless their authors have decided to similarly contribute them to the public domain.⁸⁶ For persons committed to the free-source movement, permitting the creation of such proprietary works, which leverages on the works of others, amounts to an unconscionable exploitation of the efforts of others. The ingenious hack which Stallman and the free-source community developed was to use copyright law,

Source Software" 287; Reddy "Jacobsen v. Katzer: The Federal Circuit Weighs in on the Enforceability of Free and Open Source Software Licenses" 308.

⁸⁴ Dusollier S "The Master's Tools v. The Master's House: Creative Commons v. Copyright" 2006 *Colum JL & Arts* 29 271 280-1; McJohn "The Paradoxes of Free Software" 43. Although Dusollier's point was made in respect of the Creative Commons, the same principle applies to open-source software.

⁸⁵ *Jacobsen v Katzer* 2008 535 F.3d 1373 1382. See also Dusollier "Open Source and Copyleft: Authorship Reconsidered?" 286-7; Henley M "Jacobsen v Katzer and Kamind Associates – an English legal perspective" 2009 *IFOSS L Rev* 1 (1) 41 42-3; Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1273-4.

⁸⁶ Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 102; Potter "Opening Up to Open Source" 58; Stern and Lee "Open Source Licensing" 274.

software licensing and the copyleft provision, to prevent development of such proprietary software based on free software.⁸⁷ The software licence would be used to create a software commons, rather than contributing the work to the public domain.

A commons — similarly to the public domain — is also an open-access regime but, in contrast to the public domain, it is a legal regime, which in the case of open-source software is based on property rights afforded by copyright. Participation in the software commons created by copyleft licensing, such as the GPL, makes participation conditional on the promotion of the communal interest.⁸⁸ Pursuant to the terms of the licence, licensees agree that any modified or derivative works will be available on the same terms as the original software. This does not reject the notion of self-interest, as individuals are free to benefit from their participation in the commons, but such benefit cannot be withheld from the other participants in the commons.⁸⁹ By ensuring that derivative works also form part of the commons, copyleft “creates a virtuous cycle: each addition builds on the commons and is returned to it.”⁹⁰ Boyle describes the importance of copyright to open-source licensing, and its novel use of imposing the copyleft obligation, as follows:⁹¹

“The copyright over the software was the “hook” that allowed software engineers to create a license that gave free access and the right to modify and required future programmers to keep offering those freedoms. Without the copyright, those features of the license would not have been enforceable.”

⁸⁷ Nadan "Open Source Licensing: Virus or virtue?" 357-8; Nikulainen "Open Source Software: Why is it Here and Will it Stick Around?" 138.

⁸⁸ Although it could be argued that permissive licences are not conditional in this sense, as they permit the creation of proprietary, derivative software, it does not change the economic analysis. As indicated below, all open-source licensing results in the creation of a public good.

⁸⁹ Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 208 and 219; Stern and Lee "Open Source Licensing" 274.

⁹⁰ Boyle *The Public Domain: Enclosing the Commons of the Mind* 167.

⁹¹ 167.

In other words, the copyleft licensing regime creates a conservancy,⁹² or “regulated” public domain,⁹³ which prevents the kind of defection, or appropriation of benefits, which would be possible if software were simply contributed to the public domain. If the source code was simply contributed to the public domain, open-source software development would simply amount to an honour system, rather than the significant phenomenon it has developed into.⁹⁴ In this way, copyleft licensing ensures a greater flow of information than if software had simply been contributed to the public domain, and certainly more than that produced by proprietary software. Even non-copyleft open-source software produces a greater flow of information than proprietary software, but probably only marginally more than that if the software is simply contributed to the public domain.⁹⁵ McGowan describes this hack of the copyright system in the following, flattering, manner:⁹⁶

“The licenses, and the GNU GPL in particular, represent an elegant use of contractual terms and property rights to create social conditions in which software is produced on a model of openness rather than exclusion.”

It is, of course, rather ironic that the open-source community relies on copyright law (and contract) to counter the alleged deleterious effect on software development which they believe to be a consequence of, inter alia, copyright protection, and the resultant development of proprietary software. The “virtuous cycle” which members of the free-software movement seek to establish would not be possible if the copyleft provisions are not legally enforceable: others could simply use available open-source software and create closed proprietary software.⁹⁷ In fact, for a considerable period after its emergence there was speculation about the sustainability of the open-source movement’s licensing paradigm because of the fear that open-source licences, particularly the obligations they imposed (like the copyleft

⁹² Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 446.

⁹³ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1521.

⁹⁴ Gomulkiewicz "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B" 186.

⁹⁵ McGowan "Legal Implications of Open-Source Software" 273.

⁹⁶ 243.

⁹⁷ Boyle *The Public Domain: Enclosing the Commons of the Mind* 167.

obligation) would not be legally enforceable.⁹⁸ It is only following the decision in *Jacobsen v Katzer*⁹⁹ that there has been some assurance the terms of open-source licences are enforceable.¹⁰⁰ Jacobsen alleged that Katzer had infringed the copyright in his software for model-train enthusiasts as Katzer had developed similar proprietary software, which copied portions of Jacobsen's software, and failed to adhere to the terms of the licence. In particular, it was claimed that Katzer had failed to attribute authorship to Jacobsen, failed to copy and restate the copyright notices as in the original computer program, and to describe the changes which had been effected to the computer code, as required by the licence.¹⁰¹ The court held the contravention of these terms (or conditions) meant that the scope of the licence was exceeded, and that such actions were, accordingly, unauthorised by Jacobsen as the copyright holder.¹⁰²

The reliance of open-source licensing on copyright has meant that it has attracted considerable criticism, because of its questionable theoretical position. It is claimed that instead of open-source licensing undermining arguments for copyright protection, it actually serves to reinforce arguments for proprietary protection of software; rather than being indicative of its inappropriateness, open-source licensing may only serve to entrench the proprietary nature of copyright, and the centrality of the author, whose consent is required if his works are to be used.¹⁰³ Even the perceived transaction-costs problem concerning the requirement to seek necessary authorisations to use computer programs, and the supposed resultant deadweight loss are, arguably, amply addressed by the proprietary nature of copyright, as it

⁹⁸ Bobko "Open-Source Software and the Demise of Copyright" 81-2.

⁹⁹ *Jacobsen v Katzer* 2008 535 F.3d 1373.

¹⁰⁰ Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1273-4; Henley "Jacobsen v Katzer and Kamind Associates – an English legal perspective" 42-3; Reddy "Jacobsen v. Katzer: The Federal Circuit Weighs in on the Enforceability of Free and Open Source Software Licenses" 301; Rehm "Navigating the Open Source Minefield: What's a business to do?" 310-1.

¹⁰¹ *Jacobsen v Katzer* 1376.

¹⁰² 1382.

¹⁰³ Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 211; Dusollier "The Master's Tools v. The Master's House: Creative Commons v. Copyright" 280-1; McJohn "The Paradoxes of Free Software" 42-3; Miller "Allchin's Folly: Exploding Some Myths About Open Source Software" 502; Nikulainen "Open Source Software: Why is it Here and Will it Stick Around?" 149.

enabled open-source licensing. In other words, the emergence of open-source software, it is claimed, serves as proof that the proprietary nature of copyright protection enables a market-based mechanism, like open-source licensing, to emerge to address instances of market failure.¹⁰⁴ Because of copyright's centrality to open-source software, which forms the basis for its licences, it is said the open-source software "lives or dies on copyright law."¹⁰⁵

These criticisms are particularly damaging to the position adopted by members in the open-source community who are morally opposed to copyright protection of computer programs, yet support open-source licensing. A metaphor that has been borrowed from the feminist struggle to highlight this paradoxical attack by such ethically-minded opponents of copyright protection — particularly proponents of restrictive, copyleft licensing — is that "the master's tools will never dismantle the master's house."¹⁰⁶ Westkamp summarises this paradoxical position in a less dramatic tone, as follows:¹⁰⁷

"Although open-source models utilise copyright protection to protract a binding effect of licensing agreements, reliance on copyright is at odds with its provisions restricting the owner's powers for more overarching public policy concerns, such as consumer protection and market transparency."

Supporters of open-source software are aware of the theoretical criticisms, and many who oppose copyright protection accept this contradictory position; they choose to engage in the open-source community on the more pragmatic basis that it is "a second best to the politically unattainable eradication of nearly all existing

¹⁰⁴ McJohn "The Paradoxes of Free Software" 43-4.

¹⁰⁵ Maher "Open Source Software: The Success of an Alternative Intellectual Property Incentive Program" 637-8. See also Bobko "Open-Source Software and the Demise of Copyright" 81-2; Gomulkiewicz "How Copyleft Uses License Rights to Succeed in the Open Source Software Revolution and the Implications for Article 2B" 182.

¹⁰⁶ Dusollier "The Master's Tools v. The Master's House: Creative Commons v. Copyright" 272-3.

¹⁰⁷ Westkamp G "The Limits of Open Source: Lawful User Rights, Exhaustion and Co-existence with Copyright Law" 2008 *IPQ* 1 14 14.

available proprietary rights in software.”¹⁰⁸ Richard Stallman could not be clearer about the fact that he has chosen to rely on software licensing to protect his idealist goal of spreading freedom and cooperation when he states:¹⁰⁹

“If you want to accomplish something in the world, idealism is not enough—you need to choose a method that works to achieve the goal. In other words, you need to be “pragmatic.””

Stallman would also be the first to acknowledge the complete dependency of copyleft licensing, and open-source licensing generally, on copyright law, as the FSF explicitly states that without copyright law it would be “impossible.”¹¹⁰ However, these idealists still hope that, despite this paradoxical position that they have adopted, open-source licensing may yet undermine the institution of copyright, which they regard as having expanded beyond its legitimate role of incentivising creation, because of lobbying by the copyright industry. In other words, open-source software will demonstrate that the copyright industry’s constant call for increased protection is not a *sine qua non* for creative endeavour.¹¹¹ The above theoretical criticisms are, of course, less effective against those supporters of open-source software who do not seek to abolish copyright, but simply believe “that copyright law can be sufficiently adapted to build a sharing economy, a more competitive marketplace, and more humane democratic culture,”¹¹² or those who support open-source development on pragmatic considerations, such as its advantages as a form of software development.

It would, however, for purposes of this work, be a rather crude form of criticism of open-source software to simply state that it amounts to nothing other than

¹⁰⁸ Zittrain "Normative Principles for Evaluating Free and Proprietary Software" 266. See also Bobko P "Linux and General Public Licenses: Can Copyright Keep “Open Source” Software Free?" 2000 *AIPLA QJ* 28 81 83.

¹⁰⁹ <http://www.gnu.org/philosophy/pragmatic.html> (accessed 17 February 2012).

¹¹⁰ <http://www.gnu.org/copyleft/> (accessed 18 February 2012).

¹¹¹ Dusollier "The Master's Tools v. The Master's House: Creative Commons v. Copyright" 286. Although the point was made in respect of the Creative Commons, the same principle applies to open-source software.

¹¹² Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 225.

cost-free proprietary software, because it is based on copyright and contract. Similarly, it is too disingenuous to simply characterise open-source licensing as being the same as proprietary-software licensing, but merely involving different license terms.¹¹³ The fact that open-source software utilises copyright protection does not mean that the copyright retained by open-source authors provides them with the types of direct incentives which are said to justify copyright protection, and which, accordingly, motivates developers of proprietary software, as is sometimes wrongly claimed.¹¹⁴ Open-source licensees are, for all intents and purposes, granted all the economically-significant exclusive rights which copyright affords an author, for example, the right to authorise use of, copying, distributing and modifying, the software. Copyright grants these exclusive rights to authors because it is assumed that by charging others to perform any of such acts, authors will have the necessary incentives to create such works. This is not to suggest that all, or even most, open-source developers are altruistic and do not seek any form of reward for their efforts. As will be illustrated below, the conditions which are imposed on licensees of open-source software suggest that they may serve to provide many of their authors with other, indirect, incentives.¹¹⁵ The point is that it is easy to fixate on the copyright basis of open-source licences; however, it is necessary to appreciate the substantive difference in the manner in which open-source software is distributed to users (namely, in source-code form) and the range of *activities* they enable.¹¹⁶ As discussed in Chapter 3, copyright's "all-rights-reserved" default regime, establishes proprietary rights which serve to eliminate free riding, and incentivises authors to create copyright works as others are required to obtain authors' permission (usually against the payment of a fee) to engage in activities such as using, reproducing or adapting their works. This is, after all, the economic rationale for copyright

¹¹³ McGowan "Legal Implications of Open-Source Software" 272.

¹¹⁴ See, for example, Mustonen M "Copyleft: The Economics of Linux and other Open Source Software" 2003 *Information Economics and Policy* 15 99 101.

¹¹⁵ McGowan "Legal Implications of Open-Source Software" 245.

¹¹⁶ Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 167; Miller "Allchin's Folly: Exploding Some Myths About Open Source Software" 496; Rehm "Navigating the Open Source Minefield: What's a business to do?" 291 and 312.

protection. Proprietary software, thus, utilises this exclusionary mechanism for direct reward.¹¹⁷

In contrast to proprietary software, open-source authors use the proprietary rights conferred by copyright to open access to their works, rather than seeking the type of direct economic reward made possible as a consequence of the proprietary rights granted to authors by copyright.¹¹⁸ The proprietary rights retained by open-source authors are simply held in reserve “to enforce a regime of “free” copying, modification, and distribution” if the norms of the open-source community involved in its creation, as embodied in the particular licence, are threatened by the conduct of others.¹¹⁹ In this way, open-source licensing, arguably, seeks to “re-establish” software’s public-good nature, and makes it a public resource. What is, however, less debatable is that the consequence of this liberal licensing is that all open-source licensing (whether in the form of restrictive (copyleft) licences or permissive licences) is, in economic terms, seemingly more analagous to the position that would prevail if such software had simply been contributed to the public domain: it results in the creation of a public good.¹²⁰ As will be recalled from the economic analysis of the rationale for copyright protection, the production of a public good poses specific problems in terms of providing the necessary incentives for their creation. The positive externalities of public goods and the free-riding behaviour of others will cause the economic value of such a good to be eroded because its producer is unable to secure a sufficient return on its investment, which results in market failure and leads to the underproduction of the public good. Accordingly, the mere fact that

¹¹⁷ McGowan "Legal Implications of Open-Source Software" 273.

¹¹⁸ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1521 and 1530; Lee "New Perspectives on Public Goods Production: Policy Implications of Open Source Software" 50; McGowan "Legal Implications of Open-Source Software" 273.

¹¹⁹ McGowan "Legal Implications of Open-Source Software" 242 and 273.

¹²⁰ Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 90. Permissive, non-copyleft, open-source licences do, of course, allow licensees the freedom to use the licensed software to produce derivative works as proprietary software, and in the production of such new works the usual incentive rationale for copyright protection applies. However, this does not change the fact the author of the original open-source software, which is the focus of this work, produces such software without similar incentives. There is no difference in the incentive structure of open-source software produced under restrictive (copyleft) licences or permissive licences.

both proprietary software and open-source software are based on copyright protection does not imply that “copyright is vital to the incentives of copyleft programmers,” as has been claimed.¹²¹ Copyright protection is vital, and justified, if authors require, and rely on, the kinds of incentive made possible by the exclusionary proprietary rights afforded by copyright. This is not the case if authors, as in the case of open-source software, jettison the kind of exclusionary rights (and concomitant direct rewards) which copyright affords authors.

Thus, it will, therefore, simply not be appropriate to dismiss open-source licensing as just another form of proprietary licensing. Unless it is possible to distinguish open-source software from proprietary software in a way that accounts for the fact that open-source software development produces high-quality software without their authors seemingly requiring the direct incentives demanded by proprietary-software authors — which is, after all, the alleged rationale for copyright protection of computer programs — open-source software strikes at the very rationale for copyright protection of computer programs. Before considering the kinds of incentives which motivate developers of open-source software, it is necessary to also consider some of the obligations or restrictions present in open-source licences because, as will be discussed below, some of these conditions support the incentives which encourage the development of open-source software.

5 5 2 Open-source licence obligations

As discussed above, open-source software licensing grants users generous non-exclusive licences, with transferable rights, but in return for such rights users agree to comply with a few conditions. We will now consider some of the common conditions that are included in open-source licences as these conditions may be indicative of some of the incentives which developers may have to create open-source software, and their effects on social welfare. Some of the obligations or restrictions contained in open-source licences are not typically found in proprietary-

¹²¹ See Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 101.

software licences.¹²² As already noted above, open-source licences tend to be categorised by the conditions imposed on licensees, rather than the rights that are granted. For example, whether a particular open-source licence contains a copyleft obligation serves as the distinguishing feature according to which it is categorised as either a copyleft (or restrictive) licence, or as an academic (or permissive) licence.¹²³ Apart from the copyleft obligation, some of the common conditions that will be considered are the following requirements: that licensees make appropriate attribution of the software to the author, and include the original copyright notices in subsequent distributions of the software; that licensees are prevented from imposing restrictions on the subsequent distribution of the software; and, that modified versions of the software are clearly distinguished from the original software or that licensees refrain from distributing modified versions.¹²⁴ Also, while strictly not conditions, warranty disclaimers are generally included.¹²⁵ Because these warranty disclaimers also potentially affect developers' incentives to create open-source software, they will also briefly be considered. Although the issue of incentives for open-source developers will be considered shortly, it is worthwhile noting at this stage that these requirements are all principally concerned with facilitating the developer's distribution of the open-source software, and, arguably, the continued recognition of his authorship.¹²⁶

¹²² Kubelka A and Fawcett M "No Free Beer - Practice Tips for Open Source Licensing" 2006 *Santa Clara Computer & High Tech LJ* 22 797 810-1.

¹²³ Rehm "Navigating the Open Source Minefield: What's a business to do?" 303.

¹²⁴ Kubelka and Fawcett "No Free Beer - Practice Tips for Open Source Licensing" 813-4; Meeker "Origins and Development of Open Source and GPL Licensing" 42; Reddy "Jacobsen v. Katzer: The Federal Circuit Weighs in on the Enforceability of Free and Open Source Software Licenses" 308; Stern and Lee "Open Source Licensing" 285-6.

¹²⁵ Meeker "Origins and Development of Open Source and GPL Licensing" 42; Stern and Lee "Open Source Licensing" 285.

¹²⁶ Kubelka and Fawcett "No Free Beer - Practice Tips for Open Source Licensing" 813-4; Stern and Lee "Open Source Licensing" 285-6.

5 5 2 1 Attribution and reputation

While much commentary on open-source software concerns the copyleft obligation, it is submitted that if the incentives for open-source software development are to be properly understood, the obligations imposed on licensees concerning attribution of the software to its author, and related matters, are very instructive. While the nature of the copyleft obligations, and its implications, will be considered below, the copyleft obligation *per se* is more representative of the ideological approach to software development, as characterised by people such as Richard Stallman and the FSF. In contrast, when it comes to matters of attribution of the open-source software to its author, it is a requirement that is stipulated by even the most permissive licences.¹²⁷ Such requirement, while couched as a contractual obligation, from a legal perspective, merely amounts to a confirmation, or acknowledgement, of an author's moral right of paternity, which is a right already afforded to an author by copyright law.¹²⁸

For example, the permissive BSD Unix licence requires that the licensee, when distributing the source code, retain the copyright notice, which indicates the name of the program's author.¹²⁹ Similarly, the GPL requires that when a licensee distributes the licensed program's source code the licensee must conspicuously publish the copyright notice, which would contain details of its author.¹³⁰ In this way, developers of open-source software, who are keen to enhance their reputations signal their abilities to potential employers, perpetuate their association with their creations.¹³¹ A licence such as the GPL ensures that not only is attribution of the software to its author emphasised, false attribution is also discouraged. False attribution is combatted by the requirement that a licensee prominently identify its modifications to the software in subsequent distributions.¹³² The open-source

¹²⁷ McJohn "The Paradoxes of Free Software" 34.

¹²⁸ S 20 SA Copyright Act.

¹²⁹ <http://www.opensource.org/licenses/bsd-license.php> (accessed 12 February 2012).

¹³⁰ Clause 4 of the GPL, <http://www.gnu.org/licenses/gpl-3.0.html> (accessed 12 February 2012).

¹³¹ de Laet "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1522.

¹³² Clause 5(a) of the GPL, <http://www.gnu.org/licenses/gpl-3.0.html> (accessed 12 February 2012).

licence can require that such notification is given by obliging a licensee to assign a different version number to any derivative work, or that modifications to the source code are separately distributed.¹³³ In this way, the GPL ensures that an open-source author is given the appropriate recognition for his efforts, by not having other persons' modifications wrongly ascribed to him.¹³⁴ Some open-source licences also seek to perpetuate the reputation of the author in respect of works derived from the open-source software, by requiring that licensees acknowledge the contribution of the authors of the open-source software in such derivative works.¹³⁵ This requirement appears to be a distinct requirement from the copyleft obligation; the aim of the copyleft obligation is to ensure that derivative works are also licensed on the same liberal terms as the original software, and not *per se* with giving the author of the original software credit for his contribution to the derivative work.

These requirements of open-source licences thus serve to protect, and, arguably, enhance the reputations of authors of open-source software within the software-development community. In this context, an author's moral right of paternity (or attribution) may be more than a simple acknowledgement, or confirmation, of an author's paternity right by open-source licences; the paternity right is transformed into a potentially incentive-producing right in itself. In other words, an author's moral, paternity right — although not a property right — is explicitly utilised by open-source licences, to, arguably, serve a distinctly (indirect) economic function.¹³⁶ By relying on the paternity right, which advances the

¹³³ Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 873.

¹³⁴ 873; McJohn "The Paradoxes of Free Software" 34.

¹³⁵ Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 873.

¹³⁶ In contrast, an author's moral right of integrity, which gives an author the right to prevent unauthorised changes which are prejudicial to its honour or reputation, would for similar economic reasons, be unlikely to be relied upon by an author of open-source software. As indicated, a defining requirement in open-source licences, in addition to the access to the source code of a computer program, is the related freedoms, such as the right to redistribute and modify the source code. An author who seeks to restrict the subsequent use of the source code, based on, potentially, subjective considerations, not only restricts its ability to derive indirect economic benefit from it being reused, it may also, depending on the nature of the restriction, mean that such software can, for all intents and purposes, no longer be regarded as open-source software. Interestingly, the UK's Copyright, Designs and Patents Act 1988, in any event, excludes the author's moral right of integrity in the case of

reputation of the authors of open-source software, the terms of open-source licensing serve a trademark-like function; by requiring that authors are given the credit for their creations, the licences are a badge of origin, indicating that the software originates from a particular author.¹³⁷ Support for this badge-of-origin function of open-source licences is the fact that some authors of open-source software prohibit licensees from using their names in relation to derivative works in a manner which can be construed as an endorsement of any derivative works.¹³⁸ Some authors of open-source software also seek to enhance their reputations by ensuring that their creations enjoy the widest possible circulation. They, therefore, seek to prohibit licensees from restricting circulation of the original work and any derivative works — by limiting use to certain individuals or groups, or for specific uses — and require that such works be similarly distributed on a non-discriminatory basis.¹³⁹

5 5 2 2 Disclaimer of warranty

As noted above, although the warranty disclaimers and limitations of liability which are commonly found in open-source licences are not strictly conditions, they do, to some extent, provide authors of open-source software with incentives to create such software. For example, the GPL provides that the open-source software is provided on an “as is” (or *voetstoots*) basis, and, unless specifically otherwise agreed in writing by the parties, the licensor provides no warranties concerning quality or

computer programs and computer-generated works (section 81(2)). In South Africa, which has not excluded the integrity right in respect of computer programs, an author of open-source software could, therefore, possibly object to a derivative work on the basis of its moral right of integrity. There may, however, be an arguable case that the author of open-source software — given the liberal terms of the licence and the fact that the paternity right is expressly relied upon — has impliedly waived its moral right of integrity.

¹³⁷ McJohn "The Paradoxes of Free Software" 34. Both the paternity right and the integrity right are concerned with an author's reputation. The paternity right allows an author the ability to enhance its reputation, and is, therefore, serves a positive purpose. On the other hand, the integrity right has a defensive purpose because it assists an author to preserve its reputation, where necessary.

¹³⁸ Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 873.

¹³⁹ 876.

performance, to the extent permitted by law. It is expressly provided that the licensee assumes all risk of any loss or damage in connection with the use of such software.¹⁴⁰ Similarly, the GPL excludes all liability on the part of the author of open-source software, to the extent permitted by law, for any loss or damage which a user may suffer as a consequence of using the open-source software, unless such liability has been accepted by the author in writing.¹⁴¹

There does not appear to be any case law indicating the extent to which the disclaimer of warranties or the limitations of liability of the kind included in open-source licences, like the GPL, are valid and enforceable. It seems obvious that authors of open-source software would be less willing to dedicate their efforts to the development of open-source software if open-source licences did not provide them with these protections, or if these provisions are found to be ineffective.¹⁴² In fact, it has been suggested that open-source authors may seek to rely on additional licence provisions, such as a specific choice of law or choice of venue, in order to ensure that these clauses are given their full intended effect.¹⁴³ It is submitted that the extent of open-source software development will be materially affected should cases arise in which liability is imposed on the authors of open-source software. A significant number of open-source authors would probably not consider the risk of liability to be outweighed by the benefit of enhancing their programming reputations by releasing open-source software, as they currently do.

It is, therefore, not too improbable to suggest that a significant number of computer programmers are only prepared to enhance their reputations by engaging in open-source development because they have passed the risk of what they produce onto the users of such software.¹⁴⁴ In other words, should liability be imposed on authors of open-source software for defects which such software may contain, a significant number of software programmers will abandon open-source

¹⁴⁰ Clause 15 of the GPL, <http://www.gnu.org/licenses/gpl-3.0.html> (accessed 17 February 2012).

¹⁴¹ Clause 16 of the GPL, <http://www.gnu.org/licenses/gpl-3.0.html> (accessed 17 February 2012).

¹⁴² Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 875 and 888-9.

¹⁴³ 875-6.

¹⁴⁴ McJohn "The Paradoxes of Free Software" 34.

development and focus their efforts on the development of proprietary software. Of course, even proprietary software developers also routinely seek to exclude any warranties that the software will work or perform to a certain standard,¹⁴⁵ but, to the extent that warranties cannot be excluded or are given, the proprietary-software business model allows the author to charge a fee for its use, and a portion of such fee can be said to represent the risk of potential liability. Moreover, even if there is no legal obligation on a proprietary-software developer to accept liability, because of reputational considerations, it will always be in its interests to address any defects as soon as possible, and possibly also compensate users for losses suffered. The open-source licensing model simply does not allow the author of open-source software to spread the risks to which he is exposed in the same way as a proprietary-software developer as a result of making his software available to others.¹⁴⁶

5 5 2 3 Copyleft obligation

Although the copyleft obligation contained in open-source licences, such as the GPL, has already been mentioned, it is necessary to consider this obligation more closely as it appears to be the most-commonly referred to aspect of open-source licensing. As noted above, it, for example, serves as a distinguishing factor to categorise open-source licences as either restrictive, or permissive (academic) licences. Also, as previously mentioned, the copyleft obligation in an open-source licence, such as clause 5 of the GPL, obliges licensees, should they distribute derivative works (or adaptations) of the licensed open-source software, to also licence, and make available, such derivative works (adaptations) on the same licensing terms. It is,

¹⁴⁵ Potter "Opening Up to Open Source" 79.

¹⁴⁶ Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 33.; McJohn "The Paradoxes of Free Software" 34. It may be the case that commercial firms in open-source software development will be under similar reputational pressures, but they will not have the direct revenues, a portion of which would, otherwise, be allocated to such risks, to cover potential liability. Also, Of course, the possibility exists that software programmers who continue to produce open-source software, despite the fact that they may be liable for defects in their software, would command even greater recognition than under the present system of no liability. The fact that a programmer is prepared to accept the risk for defect performance, without the ability to spread his risks, could serve as a strong signal to the market of his confidence in his abilities.

therefore, critical to establish whether distribution of a derivative work is taking place, because the obligation only applies if there is distribution; there are no restrictions on the use and modification of copyleft software if it is not being distributed.¹⁴⁷

It is noteworthy that the FSD does not require the inclusion of the copyleft obligation for a software licence to be FSD-compliant.¹⁴⁸ The copyleft obligation is in addition to, and distinct from, the FSD's principal claims that the source code of computer programs should be accessible and free to use and modify.¹⁴⁹ It may, at first, seem rather peculiar that the FSF, as the body responsible for promoting and maintaining the GPL, which is the most prominent example of a copyleft licence, and is considered as advancing Stallman's beliefs concerning the freedoms that should accompany software, does not require the inclusion of a copyleft obligation.¹⁵⁰ The FSF simply regards the copyleft obligation, like its reliance on copyright law generally, as a means by which the desired freedoms can be realised.¹⁵¹ As previously indicated, the purpose of the copyleft obligation is to prevent open-source software being used to develop proprietary software, and, by requiring licensees to license derivative works on the same terms as the copyleft licence, it helps to create a software commons from which anyone can benefit.¹⁵² If licensees do not also make their improvements to open-source software available for others to use, they deprive the public from the benefits of such improvements, which the programmer of the open-source software may have intended to, or hoped would, happen.¹⁵³

Stallman suggests that the fact that the GPL obliges licensees to also contribute their derivative works to this software commons, and preventing them from developing proprietary software derived from the open-source software, serves

¹⁴⁷ Meeker "Origins and Development of Open Source and GPL Licensing" 43.

¹⁴⁸ <http://www.gnu.org/philosophy/free-sw.html> (accessed 16 January 2012).

¹⁴⁹ Carver "Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses" 453-4.

¹⁵⁰ Rychlicki "GPLv3: New Software Licence and New Axiology of Intellectual Property Law" 233.

¹⁵¹ <http://www.gnu.org/copyleft/copyleft.html> (accessed 16 January 2012).

¹⁵² <http://www.gnu.org/licenses/gpl-faq.html#GPLRequireSourcePostedPublic> (accessed 17 February 2012). See also Zittrain "Normative Principles for Evaluating Free and Proprietary Software" 279.

¹⁵³ Azzi "CPR: How Jacobsen v. Katzer Resuscitated the Open Source Movement" 1277.

as an incentive for software authors to participate in open-source development. Some open-source authors are loathe to see others making money based on their efforts, by creating proprietary software, and will only do so if they receive assurances that this will not be the case. This is what the copyleft obligation does.¹⁵⁴ In other words, the copyleft obligation protects an open-source software author from facing competition from a free-riding rival who has used the work of the former by producing low-cost competitive software.¹⁵⁵ Importantly, the copyleft obligation also reinforces the desire of open-source authors to be recognised (and reap the associated reputational, and signalling, rewards) through their creations by way of the required attribution of their works, as the copyleft obligation will also perpetuate the required copyright notices.¹⁵⁶ It has been suggested that the undoubted preference for the GPL over any other open-source licence — as noted above, it is the most widely-used open-source software licence by some margin — gives credence to the contention that authors of open-source software resent the possibility that another person may seek to develop proprietary software based on their efforts.¹⁵⁷

The copyleft obligation also has a more pragmatic consequence, which may, of itself, encourage participation in open-source software development. If licensees are required to contribute their modifications, enhancements or bug-fixes back to the software commons created by the open-source community, the efficiency advantages of open-source software development as a form of software development will be realised, and be self-evident to prospective open-source

¹⁵⁴ <http://www.gnu.org/philosophy/pragmatic.html> (accessed 17 February 2012).

¹⁵⁵ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 90; Nadan "Open Source Licensing: Virus or virtue?" 358-9.

¹⁵⁶ Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 101-2; Reddy "Jacobsen v. Katzer: The Federal Circuit Weighs in on the Enforceability of Free and Open Source Software Licenses" 305-6.

¹⁵⁷ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1521.

software developers.¹⁵⁸ This is an important consideration from an economic perspective as the inclusion of a copyleft obligation in software licences, arguably, has the effect of reducing the costs of producing, or improving, software, which contributes to improving social welfare. However, it seems unlikely that the costs of software production will ever be reduced to such an extent that production costs will be trifling, and that software developers would no longer consider it worthwhile to seek any form of direct remuneration for their creative efforts.¹⁵⁹

The software commons made possible by copyleft provisions has been described in less flattering terms by its critics, who have preferred to describe copyleft licences by the pejorative label of “viral licences.”¹⁶⁰ The hostility towards the copyleft obligation is as a consequence of its automatic binding nature; it does not give the licensee a choice to distribute derivative works on a conventional proprietary basis — or even on a non-copyleft open-source licence basis — because such works are “infected” by the GPL licence terms.¹⁶¹ This infection cannot be cured: it creates an endless chain of publicly-available source code because “[o]nce

¹⁵⁸ Dusollier "The Master's Tools v. The Master's House: Creative Commons v. Copyright" 275; Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 874. Although proprietary software is also made available to outsiders to test it for bugs — beta testing — these third parties do not have access to the source code. In contrast, open-source software allows participants access to the source code itself, which speeds up the development process, as they are not simply restricted to reporting problems but are able to fix problems and improve the source code (Lerner J and Tirole J "The Open Source Movement: Key Research Questions" 2001 *European Economic Review* 45 819 822).

¹⁵⁹ Of course, it is possible that in the future most computer software will be computer-generated works, but this would simply move the analysis one level up to the authors of these software-generating computer programs, and the incentives they would require to create such computer programs.

¹⁶⁰ Boyle *The Public Domain: Enclosing the Commons of the Mind* 186; Miller "Allchin's Folly: Exploding Some Myths About Open Source Software" 501-2. It has been claimed that the pejorative term “viral” may have been coined by Microsoft to discredit the emergence of open-source software (de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1518 fn 4).

¹⁶¹ Lee "New Perspectives on Public Goods Production: Policy Implications of Open Source Software" 51-2.

code has been GPL-ed, it remains so forever.”¹⁶² From the perspective of a proprietary-software developer, the effect of the copyleft obligation is completely disproportionate in its effect; it lacks fairness as the proprietary-software developer has to, effectively, abandon the proprietary rights afforded by copyright in any derivative works if he uses any copyleft software in such software. This, it is claimed, is not a case of a *quid pro quo*, but rather a *quodque pro quo*.¹⁶³ The copyleft obligation, thus, has the effect of expropriating the rights of subsequent software authors if they use copyleft software.

The very real, and practical, problem for developers of proprietary software is the ubiquity of open-source software, and the dangers inherent to their businesses if copyleft computer code has been included in their computer code, due to its viral, and incurable, character. This dilemma has been succinctly described as follows:¹⁶⁴

“Open-source Software is an important part of any development process today. Not only are the economics compelling, one cannot eschew open-source software *in toto* and expect to attract and retain top development talent. In addition, many developers feel that they can trust open-source software, because of its transparency. Most developers will use open-source software anyway, so it is far better to acknowledge the presence and importance of open-source and make sure your development community does the same.”

Developers of proprietary software need to be vigilant that individual computer programmers do not include copylefted computer code, resulting in the new computer program having to be made available on the same licensing terms, and destroying the business case (and the associated financial investment) for developing the particular software on a proprietary-software basis. This concern about the potentially value-destroying consequence of including copylefted computer

¹⁶² de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1518-9.

¹⁶³ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 90. The Latin expression "*quodque pro quo*" can be translated as the giving of everything for something.

¹⁶⁴ Blankenship C and Baxter J "What's Keeping Corporate Counsel Awake at Night?" 2010 *Practising Law Institute* 997 921 931.

code has meant that software developers must now dedicate resources to regularly audit the software they develop in order to ensure that copylefted computer code has not inadvertently been included in their software. It is a situation which they simply cannot afford to occur, as its financial implications may be too much to bear.¹⁶⁵ For example, companies who incorporate third-party software into their own software require providers of such software to warrant that it does not include any open-source software.¹⁶⁶ In addition, copyleft obligations create particularly thorny problems if copylefted computer code is combined with third-party source code. The licence terms of copyleft software precludes a software developer from using it in conjunction with proprietary software obtained from third parties, because of the incompatibility of the licence terms. As the copyleft provision requires the derivative work to be released on the same licence terms, it will result in infringement of other proprietary works which may also have been used in the creation of the particular software.¹⁶⁷

The cost of the additional audit process, to prevent the loss of proprietary rights — and the concomitant economic value of the resultant software — or the possible infringement of the proprietary rights in third-party software that may also have been included in the development of proprietary software, is significant. In fact, there are now software companies, such as Black Duck Software,¹⁶⁸ who provide specialist software which enables companies to effectively manage and audit their software-developing processes for open-source related issues, particularly those caused by copyleft software. This is not to deny that copyleft software does make a positive contribution to social welfare, because concerns about copyleft software only increase the costs of production if the derivative work will be distributed to others. If licensees will not be distributing their derivative works, they are given all the necessary freedoms to use open-source software — whether copyleft or non-

¹⁶⁵ Lee "New Perspectives on Public Goods Production: Policy Implications of Open Source Software" 52.

¹⁶⁶ Stern and Lee "Open Source Licensing" 268.

¹⁶⁷ Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 107.

¹⁶⁸ <http://www.blackducksoftware.com/> (accessed 24 February 2012).

copyleft software — as they may require.¹⁶⁹ Without empirical evidence, it is difficult to state whether copyleft software leads to an overall increase in social welfare, given the significant cost burden it imposes on developers of proprietary software which is intended for distribution because of its ability to expropriate the rights of such, and other, authors' works.¹⁷⁰

In addition to the additional auditing costs, where developers of proprietary software are aware that they may have used copyleft software, these developers may also need to dedicate resources to design their software in ways which preclude claims that it has been infected by copyleft software. Whether a software program can be considered to be a derivative work which has been distributed in breach of a copyleft obligation depends on the way in which such program has been designed, and the type of interaction with the copyleft software. There is a range of possibilities: at one extreme it may simply be the case that the copyleft software and the proprietary software are distributed on the same storage medium, without there being any other interactions. It is accepted that this would not constitute the proprietary software being regarded as a derivative work of the copyleft software. At the other extreme of the spectrum, the new software may include the computer code of the copyleft software, in which case it would be difficult to argue that the new computer program was not a derivative work. In between these two extremes, software developers have attempted to design their proprietary software in a manner that it will be regarded as non-derivative works, while still leveraging off useful open-source software.¹⁷¹ Importantly, from an efficiency perspective, it seems that the copyleft obligation has the consequence that software design may be sub-optimal because proprietary-software developers have to contrive ways to avoid its effects.¹⁷² Also, it is obvious that this use of human resources to find ways to avoid copyleft obligations does not contribute to social welfare.

¹⁶⁹ Lee "New Perspectives on Public Goods Production: Policy Implications of Open Source Software" 92-3; Stern and Lee "Open Source Licensing" 282-3.

¹⁷⁰ Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 111-2.

¹⁷¹ Stern and Lee "Open Source Licensing" 283-4.

¹⁷² For example, the copyleft program can be kept in a distinct directory, known as a library, which is then used by the proprietary program. A library is a collection of subprograms, also known as

Of course, the above value-destroying or inefficiency effects are only an issue in relation to the inclusion of copyleft software in a derivative work. Software developers are free to use open-source software which has been available under permissive licences in the development of proprietary software. These software licences are agnostic towards the purposes for which such software may be used, that is, whether it be proprietary software, or open-source software. It would, after all, be foolish for software developers not to exploit such open-source software as it is often of a high quality, and could significantly reduce their development costs.¹⁷³ Again, there is, naturally, a fair amount of irony that non-copyleft open-source licences appear to embody a greater quality of freedom than copyleft licences, despite Stallman's contention that "[c]opyleft is a general method for making a program (or other work) free."¹⁷⁴ By not imposing any obligations on licensees to make their derivative works available to the public, non-copyleft licences actually restrict the freedoms of licensees to a significantly lesser degree — and, arguably, make a greater contribution to social welfare — than copyleft licences. The gist of non-copyleft licences on the issue of derivative works — in contrast to copyleft licences — is to "basically say, here is the software, do whatever you want with it, it is not our problem."¹⁷⁵ Other commentators have also made similar observations; for example, Stromdale, correctly, submits that the non-copyleft BSD licence provides the greatest freedom on a scale of openness of software licences, and not the GPL.¹⁷⁶ Simply put, the inclusion of the copyleft obligation in licences means that

functions or subroutines, which is required by the main program of which they form part. In order to avoid the application of the copyleft obligation, it is considered advisable that such separate program only be invoked when actually required (at runtime) by the proprietary program. This is called dynamic linking. The alternative, static linking, which involves the compilation of the copyleft program and the proprietary program before runtime, is considered to be potentially problematic. See Carver "Share and Share Alike: Understanding and Enforcing Open Source and Free Software Licenses" 458-9; Henley and Kemp "Open Source Software: An introduction" 82; Stern and Lee "Open Source Licensing" 283-4.

¹⁷³ Anonymous 2011 *Seven Best Practices for Managing Software Intellectual Property in an Open Source World 2*; Stern and Lee "Open Source Licensing" 283-4.

¹⁷⁴ <http://www.gnu.org/copyleft/> (accessed 18 February 2012).

¹⁷⁵ Meeker "Origins and Development of Open Source and GPL Licensing" 42.

¹⁷⁶ Stromdale "How Open is Open Source?" 225. See also Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 38-9.

such licences discriminate against third-party developers of proprietary software as they are unable to use (or efficiently use) such software to create derivative works.¹⁷⁷ Copyleft licences result in the creation of fewer derivative works than if the licensed works had been released under permissive licences or contributed to the public domain.¹⁷⁸

While there has been considerable commentary on the nature and effect of the copyleft obligation, as indicated in paragraph 5.4 (*Other distinguishing features of open-source software*), and its contribution to social welfare, there is no difference between copyleft and permissive open-source licences in terms of the economic incentives faced by software programmers when deciding to *create* open-source software as copylefted software or non-copylefted software.¹⁷⁹ Both copylefted and non-copylefted software results in their authors being unable to charge licensees a fee for permission to use their software, which typically would allow them the possibility to realise a sufficient return on their investment. Thus, in terms of *incentives*, from an economic perspective, the differentiation of open-source licences as copylefted or non-copylefted licences is a difference without distinction. However, the net contribution to social welfare of copyleft software is something that needs to be empirically ascertained: on the positive side is the fact that the software commons which is constituted by its operation reduces the costs of producing, or improving, software, particularly software which will not be distributed to third parties; while on the negative side, it imposes significant additional developing costs on proprietary-software developers, who have to ensure that their creations are not infected by copyleft computer code. However, this latter cost is not strictly an additional cost of software production simply imposed by copyleft licences; developers of proprietary

¹⁷⁷ Horne "Open Source Software Licensing: Using Copyright Law to Encourage Free Use" 873.

¹⁷⁸ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 90; Miller "Allchin's Folly: Exploding Some Myths About Open Source Software" 500.

¹⁷⁹ Of course, as already indicated, open-source developers may resent the fact that others may seek to create proprietary software based on their creative works, and, therefore, chose to licence their software on a copyleft basis, rather than using a permissive licence. However, this does not address the issue of why they would not seek to obtain any of the direct financial rewards which copyright protection affords them.

software (and, indeed, developers of open-source software) have to ensure that their creations do not infringe any copyright in third-party software.¹⁸⁰ It may, however, be the case that ubiquity of open-source software means that knowledge of it now generally means that it forms part of the skill set of computer programmers, and, therefore, it is a more onerous, and costly task to insure non-infringement. Then, there are also the added social costs of developers having to find software design solutions to avoid the application of the copyleft obligations, or the fact that the copyleft obligation results in fewer derivative works than if the licensed works had been released under permissive licences or contributed to the public domain.

5 6 Incentives for participating in the development of open-source software

The conventional proprietary business model of software development corresponds with the economic rationale for copyright protection. Copyright affords an author proprietary rights which allows him to internalise the benefits associated with his creation: others are required to seek his consent to use his work, and he is able to charge a fee for allowing such use. In this manner, copyright, while not ensuring commercial success, allows the author to earn an income directly based on his creation, which greatly simplifies the calculus of whether the author should create such work in the first place. The impressive range of high-quality open-source software that has been produced, such as Linux (and its variations, such as Ubuntu Linux), Mozilla Firefox, and OpenOffice from Sun Microsystems, suggests that software developers, both the individual programmers and commercial software firms who have invested in open-source projects, must have incentives for participating in such projects.¹⁸¹ These incentives are obviously not the direct benefits derived from the conventional exploitation of the proprietary rights afforded by copyright, such as licensing its use in exchange for a fee. As we have seen, although the author of open-source software is able to charge a fee for the distribution costs of providing the software to a licensee on a particular medium, for

¹⁸⁰ Lee "New Perspectives on Public Goods Production: Policy Implications of Open Source Software" 92.

¹⁸¹ Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 103; Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 21-2.

example a CD-ROM, this cannot serve as the basis for a profitable business model.¹⁸² Open-source licensors have, in other words, foresworn the direct financial benefits afforded by copyright and the product-based business model it makes possible as a result of the freedoms granted to licensees to use, modify, and distribute the software.¹⁸³

It is, therefore, necessary to ascertain what these incentives are for creating open-source software, and whether these incentives shed any light on the economic justification for the copyright protection of computer programs generally. Are these incentives so powerful, and universal, that they cast doubt on the current policy of providing proprietary rights in computer programs, which is said to incentivise the creation of such works because of the potential profit which it allows their creators to earn? In doing so, it is necessary to separately consider the incentives of individual programmers, who devote personal time to the development of open-source software, and those of commercial software firms which have invested resources to produce such software.

5 6 1 Commercial firms

To ascertain what the incentives of commercial firms are in producing, or dedicating resources such as individual developers' time to the production of, open-source software is much more straight-forward than in the case of individual volunteers. As the object of a commercial firm is to make a profit for its owners, its business model has to optimise its prospects of achieving such goal. Commercial firms are not motivated by non-monetary considerations such as enhancing their reputations, except to the extent that such reputation adversely impacts on their commercial prospects.¹⁸⁴

¹⁸² The emergence of the Internet has also meant that the cost of distributing software is negligible.

¹⁸³ Nadan "Open Source Licensing: Virus or virtue?" 376-7.

¹⁸⁴ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 106.

There may be various reasons why developing open-source software may be a sensible business strategy for a commercial firm: first, it could seek to provide related services in respect of such software, whether the software was initially developed by such firm and then released as open-source software, or whether the open-source software was initially developed by a third party to which the firm contributes; second, the software may serve to promote sales in its other complementary products, such as hardware or, in fact, other proprietary software. The decision of a commercial firm to release its own software as open-source software may be motivated by the desire to establish a position of market dominance for its software, by possibly taking advantage of being the first mover, in addition to seeing it as a sensible strategy to principally generate income from related services or products.¹⁸⁵ The first of the above reasons for initiating, or supporting, open-source software — the provision of related services — may be more significant to an enquiry into the incentives and rationale for the copyright protection of computer programs.

The first significant example of how the release of the source code of software could soon result in establishing such software as dominant in a particular area, and focusing on providing related services, was Netscape's web browser software, Communicator. In 1998, Netscape released the source code to its software and soon its product was being improved by a legion of hackers, which contributed to its widespread acceptance by users.¹⁸⁶ The types of services that could be provided in

¹⁸⁵ Bobko "Open-Source Software and the Demise of Copyright" 83-4; Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 237; de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1522; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 82; Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 108; Kubelka and Fawcett "No Free Beer - Practice Tips for Open Source Licensing" 808-9; Lerner and Tirole "Some Simple Economics of Open Source" 210; Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 102; Nadan "Open Source Licensing: Virus or virtue?" 375; Potter "Opening Up to Open Source" 30; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 72.

¹⁸⁶ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1523-4; Kennedy "A Primer On Open Source Licensing Legal Issues: Copyright, Copyleft And Copyfuture" 353-4.

relation to open-source software, or, indeed any software are, for example, consulting services, services facilitating the use of the software, such as providing training and support for its installation, integration, and use, and providing user-specific (or bespoke) services such as customisation or enhancements.¹⁸⁷ There is a demand for these services and the viability of the service-seller business model is one which is well-established in the software industry. These services and enhancements help make open-source software more accessible to end-users, because such software, historically, was often not easy to install, integrate and operate for the non-technically minded user.¹⁸⁸ Furthermore, some of these complementary services are not efficiently provided by the open-source community.¹⁸⁹ End-users or consumers are prepared to pay for these services, or implementation costs, because they do not have to pay for the right to use the software, and the net result, including the service fees, may still represent a significant saving over the alternative proprietary software. From the consumers' perspective, they feel more in control of the costs related to using the software because they have the ability to effect modifications themselves, and only need to enlist the assistance of these service providers if required. Of course, commercial firms producing competing proprietary software are cognisant of this fact and will seek to convince consumers of the superior quality of their software (requiring, for example, lower implementation costs), and also set their prices at a competitive level.¹⁹⁰

From a business perspective, it may not be unrealistic or shortsighted to focus on being a service seller, rather than charging licence fees for the use of software: more than 80% of end-user expenditure on software is in respect of associated

¹⁸⁷ Depending on the type of open-source licence, namely, copyleft or non-copyleft, the customisation or enhancements may be developed on a proprietary or non-proprietary basis (de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1523).

¹⁸⁸ Lerner and Tirole "Some Simple Economics of Open Source" 210.

¹⁸⁹ 224-5.

¹⁹⁰ Maher "Open Source Software: The Success of an Alternative Intellectual Property Incentive Program" 644-5; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 71-2.

services, with the balance being attributed to licence fees for use.¹⁹¹ Because open-source software is available to all, its generic, commodity nature means that service providers have to compete on the basis of their brand equity earned through the recognition of their expertise and the quality of their services.¹⁹² Given the fact that other service providers' will not have had to invest resources in research and development costs to the extent which would have been required if they had created proprietary software, they can focus on their service competencies.¹⁹³ It is interesting, and significant, that the decision of a commercial firm to release its own software as open-source software, and focus on the provision of related services, does not necessarily mean that other firms will be able to compete with it on an equal basis in providing such services. The originators of such software have an advantage because of their intimate knowledge of their product, and users of their software tend to prefer to use their services.¹⁹⁴

As discussed above, open-source licences usually contain warranty disclaimers and blanket exclusions of liability, and commercial firms which provide services related to open-source software sometimes provide a quality-assurance function by providing users of their version of the open-source software with the

¹⁹¹ Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 89; Stromdale "How Open is Open Source?" 223-4. Ghosh, accordingly, uses this fact to suggest that "the economics of open-source is the economics of the majority of software development," and that the consideration that prevents others from embracing open-source development is their reluctance to abandon the licence fee for use, which is the real distinction in their business models. However, he does not indicate how much of the tying services expenditure is relates to proprietary software, in order that an assessment can be made, for example, on what represents better value for consumers. In any event, if about 20% of software producers are motivated by the licence fee which they could possible earn, as a consequence of the proprietary protection of computer programs, this incentive should only be removed on the basis that such incentive does not contribute to social welfare. This is not a case that seems to have been adequately made. Also, previous studies have suggested that the service-related aspects of the software market account for about two-thirds of the revenue (Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 426).

¹⁹² Maher "Open Source Software: The Success of an Alternative Intellectual Property Incentive Program" 643-4.

¹⁹³ Nadan "Open Source Licensing: Virus or virtue?" 374.

¹⁹⁴ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1524.

desired warranties and accept liability for its performance.¹⁹⁵ Red Hat is probably the best example of the extent to which a successful commercial firm that provides related services and a quality-assurance function can be commercially successful. Although Red Hat's customers can download and use its software at no cost, they chose to pay the associated fee, which can be characterised as an insurance premium.¹⁹⁶

The other business case identified above for supporting open-source software development is that it allows commercial firms to extend, or establish new, markets for their complementary products, whether it is computer hardware or software. For example, suppliers of computer hardware, such as Sun Microsystems, IBM and Hewlett-Packard, have enabled their equipment to be compatible with, or function optimally using, open-source software, which is referred to as widget frosting.¹⁹⁷ While the financial investment of hardware manufacturers to open-source software may, in isolation, represent a substantial amount of money, it is submitted that this does not provide any insight into the rationale, or the appropriateness of, protecting computer programs by way of copyright. These firms are simply developing the markets for their core products, and such investment does not reveal anything significant about the incentives for producing or investing resources in open-source software rather than proprietary software. Similarly, there are commercial firms who invest in the production of open-source software which will serve as the platform for their proprietary software offerings that will run on these platforms.¹⁹⁸ These

¹⁹⁵ 1522; Kogut and Metiu "Open-source Software Development and Distributed Innovation" 252.

¹⁹⁶ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1523; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 89; Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 102; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 68.

¹⁹⁷ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1523; Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 109; Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 102; Potter "Opening Up to Open Source" 32.

¹⁹⁸ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1523; Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 11. An

proprietary offerings may be distinct application programs which rely on the open-source software as an intended standardised industry platform or development tool on which proprietary software can be developed, or where the proprietary offerings may be enhanced, feature-rich versions of the basic open-source software versions of the software.¹⁹⁹ Where the open-source software is simply a basic version of the proprietary software, the open-source software can be said to fulfill a similar commercial role to freeware: it is a promotional device, or loss leader, to encourage potential customers to purchase its premium products.²⁰⁰

Software platform products, which provide a common standard, are regarded as the most fertile area for open-source development among commercial firms. The software-development community is wary of proprietary software platforms, on which others are required, or compelled, to develop software. There is the potential danger that the proprietor of such software platform will become dominant in the particular market and then exercise its rights, or manipulate such software, in a manner which could prejudice the businesses of other software producers who have based their products on such platform. This fear of vendor, or proprietary, lock-in could lead to the situation that socially beneficial software is not developed, or that other, less efficient, developments are pursued. Commercial firms, at different levels of the value chain, thus consider it in their interests to working on a collaborative, open-source platform.²⁰¹ In addition, software developers have realised that open-source

example of an open-source software component, in an otherwise proprietary computer program, is Darwin, which was the operating system on which Apple based its OS X.

¹⁹⁹ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1524; Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 87; Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 110; Kubelka and Fawcett "No Free Beer - Practice Tips for Open Source Licensing" 808-9. An example, of an enhanced, feature-rich version of a basic open-source software version is Sun's StarOffice, which is based on its OpenOffice open-source software.

²⁰⁰ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1524; Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 102; Potter "Opening Up to Open-source" 31.

²⁰¹ Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 11; Nadan "Open Source Licensing: Virus or virtue?" 374. There is, of course, still a free-rider problem. Whether such cooperation is successful will depend on whether contributors consider the benefits they receive

software allows them to distribute the costs of development of a resource which they all require but which does not distinguish them from their competitors, and, therefore, is not something which their customers will attribute any particular value to, or for which customers are prepared to pay. Economically, this type of platform is simply a commodity. This type of software platform has been compared to the provision of streets in the subdivision of a new housing development: all the homeowners benefit from the street on which their houses are situated and it is in their interests to share the costs of the streets. It, therefore, makes sense to spread these, largely unrecoverable, development, and maintenance, costs of this commodity by way of open-source development, and for software developers to focus their efforts on their core competencies: producing more differentiated, distinctive software based on such platform, which clients do value, and will use to evaluate and compare their comparison with those of other software developers.²⁰² The other benefit from such cooperation is that these firms are able to identify potentially disrupting technologies, which knowledge they can use to avoid being committed to a business model which may be exposed to the impending market disruption.²⁰³

The mere fact that these commercial firms chose to produce proprietary software is indicative of the fact that they have a purely functional approach to open-source software. Commercial firms make an assessment of whether they are likely to expand their customer base by supporting open-source software, allowing them to earn higher revenues from related services, or the sale of other software or products, than would be the case if they invested their resources in alternative proprietary

justify their investment in open-source software, bearing in mind the free-riding conduct of competitors (Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 40).

²⁰² Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 88; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 93; Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 24-5. It is submitted that Ghosh's conclusions that proprietary software appears to be "incompatible with the software development model most efficient for rapid innovation and knowledge diffusion today" is not supported by his examples of Google, Facebook and Twitter. As he acknowledges, these companies' are not software vendors, or even providers of ancillary services.

²⁰³ Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 25-6.

software.²⁰⁴ More generally, commercial firms seek to maximise their profits and reducing costs is probably the most effective way to achieve that goal. Open-source software development is a device which commercial firms can use to reduce their development costs.²⁰⁵

In addition, irrespective of whether a commercial firm has decided that its main source of revenue will come from providing software-related services, or from the sales of other products or software, open-source software as the basis for such forms of revenue generation can potentially provide a significant advantage over proprietary software. Open-source software can be developed, and maintained, at lower costs than the equivalent proprietary software because it allows the commercial firm to benefit from the works created by others.²⁰⁶ Releasing the software as open-source software encourages its use by educational institutions and this tends to produce a community of programmers with the necessary expertise in the relevant software. This so-called “*alumni effect*” has the effect that it reduces the costs of development, as these developers can be employed at lower costs than programmers with specialist expertise in firm-specific proprietary software, and it also means that this community may, on a voluntary basis, help maintain the software by contributing bug fixes and customisation of the software.²⁰⁷ Commercial firms have to weigh up these potential savings in development cost with the fact that potential competitors are, similarly, able to benefit from the software which has been developed in this manner.²⁰⁸

²⁰⁴ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1524-5; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 107-8.

²⁰⁵ Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 109-10.

²⁰⁶ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 89.

²⁰⁷ Lerner and Tirole "Some Simple Economics of Open Source" 215-6.

²⁰⁸ Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 109-10.

In fact, competitors will probably have even lower development costs than the firm that has released its own software as open-source software. It has been suggested that the potential for free-riding competitors to emerge, with adverse consequences for the firm which has made the relevant initial investment, means that initial investment in open-source software by commercial firms will be limited.²⁰⁹ Accordingly, commercial firms have to make forecasts of whether the cost advantages of engaging in open-source software development will be more than offset by the prospect of reduced income due to the existence of competitors who are also able to exploit the open-source software.²¹⁰ However, commercial firms do not have to make these decisions on a broad, all-or-nothing basis, in respect of an entire computer program. This calculus can take place at various levels of granularity. Commercial firms are, for example, prepared to release certain discrete portions of their software as open-source software, while maintaining proprietary rights in the rest, because they may have failed to successfully develop such components internally or the future maintenance burden did not warrant it being economically viable for it to be developed on a proprietary basis.²¹¹ These firms cannot be said to, in any way, have abandoned the appropriateness, and incentivising nature, of the business model of developing software as an asset, which they can license (at a fee) to others as a consequence of their proprietary rights.

The use of open-source software in this manner is thus consistent with the traditional economic rationale: firms will try to use the cheapest software and will give up proprietary rights when there is a cost advantage, such as the costs of development and maintenance, in doing so.²¹² With the lower coordination costs of software development made possible as a result of the Internet, consistent with the Coasean theory of the firm, firms will embrace open-source software development if its lower transaction, and, hence, development, costs provide an advantage over the

²⁰⁹ Lerner and Tirole "Some Simple Economics of Open Source" 225.

²¹⁰ Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 109-10.

²¹¹ 110-1.

²¹² 116.

conventional development within the firm, and if such participation is complementary to its business model.²¹³ In other words, the decision of whether to participate in open-source software is not motivated by non-commercial considerations, such as the desire to contribute to a software commons *per se*, but is simply appraised as a means by which profit, and a return on investment, can be maximised.²¹⁴ The significant cost savings, and shorter development times, which open-source software development can yield often makes it appealing to a start-up software firm, but it does mean that there needs to be clarity at the outset of what its business model will be. Such a firm may, effectively, deprive itself of the ability to exclusively exploit the resulting software, and of such software being a commercial asset.²¹⁵

Thus, commercial firms do not have a general *a priori* preference for open-source software development;²¹⁶ it is in fact arguable that they are more likely to consider open-source software as being inappropriate in their pursuit of profit, choosing instead to rely on exploiting the traditional proprietary rights afforded by copyright, and the types of revenue it enables. For example, until fairly recently, the data in the US still suggests that the business model of the overwhelming majority of new commercial software firms seeking venture capital is still one based on a proprietary software model.²¹⁷ Open-source software is, thus, simply a possible tool for profit maximisation, and probably not the preferred method to achieve that goal, given the direct benefits which conventional exploitation of the proprietary rights afforded by copyright potentially offers. It has, for example, been suggested that commercial firms, like Netscape, only considered the open-source software

²¹³ McGowan "Legal Implications of Open-Source Software" 285-6 and 303.

²¹⁴ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1525; Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 87; Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 109-10.

²¹⁵ Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 82; Nadan "Open Source Licensing: Virus or virtue?" 355; Rehm "Navigating the Open Source Minefield: What's a business to do?" 313-4.

²¹⁶ It may be the case that open-source software is becoming the accepted norm for the establishment of standardised industry platforms or development tools on which other proprietary software can be developed (Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 87).

²¹⁷ Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 13.

alternative as a desperate attempt at survival because it could no longer compete in respect of the actual of web-browser software due to the fierce competition from its rivals.²¹⁸

5 6 2 Volunteers

It is arguable that the continuing success of open-source software development, despite the significant financial investment by commercial firms today, is still primarily dependent on the voluntary contributions of individual programmers. There is much less room for doubting the pivotal role of these volunteers in the history of the development of open-source software. As already noted previously, some of these volunteers, like Richard Stallman, were, and continue to be, motivated by ideological concerns about the morality of protecting software by way of proprietary rights.²¹⁹ However, we are principally concerned with whether there are other significant incentives for creating computer programs, which may contribute to a better understanding of whether there is a need to provide incentives through the grant of property rights. In any event, based on the large number of participants in open-source software development, it seems unlikely that most of these persons are simply driven by ideological considerations.²²⁰

Before considering the motivations of these volunteers, it is necessary to make a few remarks about the interaction, or relationship, between commercial software firms (both providers of software-related services and developers of proprietary software) and these volunteers. First, references to “volunteers” in this chapter, unless otherwise indicated, are confined to those persons who contribute to open-source software development without receiving any form of direct remuneration for such contribution. This would, therefore, exclude employees of commercial firms who participate in open-source software development as part of their work duties to their employer. The majority of contributors to open-source software are volunteers,

²¹⁸ Lerner and Tirole "Some Simple Economics of Open Source" 225-6.

²¹⁹ Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 108.

²²⁰ 102.

as defined.²²¹ Second, it has been claimed that volunteers have the luxury of contributing to open-source software development because they are gainfully employed by producers of proprietary software. Therefore, open-source software is wholly dependent on the producers of proprietary software, who are indirectly funding its development.²²² Again, this broad-side dismissal of open-source software is reminiscent of the argument that open-source software is simply cost-free proprietary software, because it is based on copyright and contract. The reality is that commercial firms realise that many of the participants in open-source software development are highly motivated, and this is not simply as a consequence of what they are paid in terms of their employment contracts. Participation in open-source software as part of employees' duties is encouraged by commercial firms, who see it as a means of ensuring that their employees are acquainted with the latest developments, and, through such participation, can identify possible threats to their business models as a result of open-source projects. The knowledge gained by employees through their participation in open-source projects increases their human capital, and these skills benefit their employers when they produce proprietary software or add to open-source software used by their employers.²²³ Furthermore, such participation also serves to provide their programmers with intellectual stimulation and provides a forum for identifying potential employees.²²⁴ In any event, the commercial firms which contribute most to the development of open-source software are firms which provide related services, or where the open-source software serves to promote sales in complementary products, such as hardware. So, at a minimum, these commercial firms are benefitting commensurately from their employees' participation in open-source software development, rather than these firms simply paying for their employees' personal indulgences. Also, as noted above, historically, open-source software development preceded proprietary

²²¹ Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 68-9.

²²² Potter "Opening Up to Open Source" 22.

²²³ Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 424-5; Lerner and Tirole "Some Simple Economics of Open Source" 213. Even if such participation is not expressly approved by the employer, the reduced productivity of the employee due to his unauthorised participation in an open-source project is generally offset by the benefits to his employer as a result of the factors mentioned.

²²⁴ Lerner and Tirole "Some Simple Economics of Open Source" 213; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 73.

software and continues to be driven by volunteers, therefore, it is a crude generalisation to suggest that open-source software is simply a by-product, or consequence, of proprietary software, and that without proprietary software there would be no prospect of open-source software.

The motivations of volunteers who contribute to the development of open-source software can broadly be categorised as either intrinsic motivations or extrinsic motivations.²²⁵ Although these two types of motivation are not mutually exclusive and not easily distinguishable,²²⁶ the intrinsic motivations of volunteers are generally considered to be the following: the desire to contribute something of value to the programming community or the wider society; a personal need for the software; and, personal development and satisfaction from its creation.²²⁷ These intrinsic motivations, thus, largely relate to the alleged altruism of volunteers, their personal need, or the psychological benefits (for example, enjoyment and intellectual stimulation) volunteers derive from participation in open-source software development. In contrast, the extrinsic motivations are principally concerned with separate, distinct pecuniary benefits, such as career concerns (with its associated financial rewards) and deriving an economic benefit from the activity, whether directly or indirectly.²²⁸

Various surveys have been conducted amongst volunteers to determine their motivations, and to identify whether the intrinsic or extrinsic motivations are the prime motivations for participating in the development of open-source software. While the surveys clearly confirm the existence of both intrinsic or extrinsic motivations, they are inconclusive about which is the prime motivation.²²⁹ Given that

²²⁵ Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 162.

²²⁶ Lerner and Tirole consider there to be no difference and simply discuss both types of motivation under the signalling incentive (Lerner and Tirole "Some Simple Economics of Open Source" 213-4).

²²⁷ Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 161-2.

²²⁸ Kogut and Metiu "Open-source Software Development and Distributed Innovation" 258.

²²⁹ Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 105. The surveys that have been conducted have, for example, been based on a relatively small number of responses, and their voluntary nature may have also introduced a selection bias. Moreover, given the

this work focuses on the stated economic rationale for protecting computer programs, it is significant that even among volunteers, the extrinsic, economic motivations for participation in open-source software development are certainly not trivial or unimportant, and probably more substantial than reported by some surveys.²³⁰ The problem with the survey data that suggested intrinsic motivations may be more significant than extrinsic motivations are that they may be skewed; the subjective nature of these surveys meant that volunteers may have been reluctant to emphasise their extrinsic motivations because it is more socially acceptable in open-source communities to extol intrinsic motivations.²³¹ Another possible reason for this is that both types of motivations may be driven by the same factor. For example, the fact that the development of open-source software makes the talents of a volunteer visible to others, and thereby enhances the reputation of a volunteer, may both serve to provide a means of personal gratification, and provide a signal to prospective employers in the labour market or investors.²³² We, therefore, have to look at other factors which may suggest whether the prime motivations of volunteers for participating in open-source software development are intrinsic or extrinsic.

What is probably not contentious is to suggest that a volunteer participates in open-source development if the benefits of participation — both the psychological benefits associated with the intrinsic motivations, and the monetary rewards, direct or indirect, associated with the extrinsic motivations — exceed the opportunity costs of participation.²³³ The diffusion of the Internet was a major contributing factor in the

aforementioned factors, the formulation of the questions may have influenced the outcome of the particular survey.

²³⁰ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1517.

²³¹ Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 105.

²³² Lerner and Tirole "The Open Source Movement: Key Research Questions" 825-6; Lerner and Tirole "Some Simple Economics of Open Source" 213-4; McGowan "Legal Implications of Open-Source Software" 275.

²³³ Benkler "Coase's Penguin, or, Linux and 'The Nature of the Firm'" 429; Lerner and Tirole "Some Simple Economics of Open Source" 212-3; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 68. In other words, the volunteer considers there to be no other better-rewarded use of his time. These opportunity costs will typically include the following: engaging in remunerated programming activities, or enjoying leisure time.

growth of the open-source movement, as it significantly reduced the opportunity costs of participation, and enabled volunteers' efforts to be recognised on a global basis. It has allowed volunteers to find like-minded individuals and to coordinate their efforts.²³⁴ Another factor which may have significantly reduced the opportunity costs of participation for a number of programmers is, as mentioned previously, the alumni effect: there are a significant number of people who have acquired the expertise to participate in such projects. Volunteers will be more attracted to those activities that provide both intrinsic and extrinsic motivations, as the combined effect of these will be more likely to offset the opportunity costs of participation than an activity simply providing one of these motivations.²³⁵ This is no different to the considerations faced by a programmer engaged in proprietary software development.²³⁶ As will be illustrated below, the choices of volunteers in open-source projects are largely consistent with the standard economic theories relating to labour markets and the private provision of public goods.²³⁷

5 6 2 1 Altruism

It has been suggested that the participation of volunteers in the development of open-source software may be ascribed to notions of altruism: that volunteers engage in such an activity as a consequence of their generosity, and consider the donation of their works as a socially-beneficial endeavour or duty.²³⁸ In such a "gift culture" individuals are said to reciprocate in kind because a person's status in such a

²³⁴ Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 424; Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 138.

²³⁵ Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 432.

²³⁶ Lerner and Tirole "Some Simple Economics of Open Source" 212-3.

²³⁷ Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 102; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 73.

²³⁸ Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 163-4; de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1516-7; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 92; Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 104; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 68.

community depends on the generosity exhibited.²³⁹ While it may be true that there are volunteers who have such motivations, like there are those who engage in open-source development on the basis of ideology, this explanation for participation is less than convincing because it does not account for the large numbers of participants in the development of open-source software. There are other, more pressing, social causes which these volunteers could devote their time to, which they currently dedicate to software development. These actions may, thus, not be as obviously altruistic as suggested. A fact that gives credence to such suspicion is the fact that a similar level of provision of public goods is not evident in other specialised areas. It is not clear that volunteers are naturally imbued with a greater altruistic spirit than their counterparts in those other areas. Therefore, the increased levels of participation (and, consequently, comparatively lower level of free riding in relation to the development of open-source software) cannot simply be ascribed to altruism.²⁴⁰ Also, when it comes to the beneficiaries of this supposed largesse, there is no attempt to specifically address the needs of the poor or of those of developing countries. The beneficiaries are as likely to be affluent individuals or commercial firms.²⁴¹ Furthermore, if generosity and altruism is at the heart of such endeavours, why do volunteers insist on open-source licensing with its strong emphasis on individual attribution or copyleft provisions? Genuine altruism or generosity should not require acknowledgements or be preoccupied with the uses to which one's contribution may be put, unless the status one seeks to acquire through such contributions serves some other purpose.²⁴²

5 6 2 2 Personal need

²³⁹ Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 163-4; Lee "New Perspectives on Public Goods Production: Policy Implications of Open Source Software" 54.

²⁴⁰ Lerner and Tirole "The Open Source Movement: Key Research Questions" 822; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 68.

²⁴¹ Lerner and Tirole "Some Simple Economics of Open Source" 198.

²⁴² Lee "New Perspectives on Public Goods Production: Policy Implications of Open Source Software" 54.

Most volunteers claim that they are motivated to engage in open-source software development as a result of their own software needs.²⁴³ Bearing in mind the comments made early relating to the reliability of survey evidence concerning the motivations of volunteers, there is no apparent reason to doubt this claim by volunteers. It is, of course, true that some of the most successful open-source software projects, such as Linux, Sendmail and the Perl programming language, started out as projects to address the needs of their creators. The needs of volunteers are generally more modest than the aforementioned projects; volunteers may simply wish to customise existing software, or fix bugs.²⁴⁴

While it is obvious that someone may be motivated to create or fix something, like software, from which they would derive a benefit, it is not so obviously apparent why they would agree to make such software available as open-source software. Therefore, the personal-need motivation does not, on its own, provide a cogent reason why volunteers would produce open-source software.²⁴⁵ A possible reason for the release of software as open-source code involves the volunteer taking a more long-term, economic view of his creation. If a volunteer is of the opinion that he can derive greater benefit, at a much-reduced cost, from his creation as a consequence of the improvements others could bring about, and from their efforts in maintaining the software, it makes economic sense to release the source code under a copyleft-type open-source licence rather than keeping it confidential, on a proprietary basis, or simply contributing it to the public domain.²⁴⁶

²⁴³ Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 163; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 105.

²⁴⁴ Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 163; Lerner and Tirole "Some Simple Economics of Open Source" 217-8; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 68-9.

²⁴⁵ Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 163.

²⁴⁶ Lerner and Tirole "The Open Source Movement: Key Research Questions" 822.

5 6 2 3 Personal gratification

It is also claimed that volunteers participate in open-source software development for reasons of personal gratification, rather than as a consequence of any economic incentive, and which may include any combination of the following motivations: it may satisfy a desire to be intellectually challenged, or that such participation may simply be the result of curiosity; it may be a way of increasing a volunteer's skills; there may be an inherent need to create things, including software, and enjoyment associated with doing so; it may allow the volunteer to form relationships with like-minded individuals, and give the volunteer the opportunity to share knowledge and skills; there may be pleasure derived from the camaraderie associated with the teamwork involved in creating open-source software; or, it may give the volunteer a greater sense of self-worth as participation could enhance his reputation as a consequence of the recognition of his abilities by others in his community.²⁴⁷ To the extent that these incentives are significant, it is submitted that the most likely profile of individuals who will seek these types of intrinsic incentives will be young programmers with low opportunity costs or costs of participation, and who are, thus, more likely to conclude that it is beneficial — due to, for example, the associated play value — to personally develop the desired software.²⁴⁸

Apart from the fact that most of the abovementioned motivations are, due to their subjective nature, difficult to verify, no adequate explanation is provided for why these motivations should be so significant in relation to the creation of computer software, as opposed to any other creative endeavours, or why all, or most, of these benefits should not also be available in an employment context or enjoyed by

²⁴⁷ Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 424; Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 162; de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1516; Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 82-3; Harison *Intellectual Property Rights, Innovation and Software Technologies: The Economics of Monopoly Rights and Knowledge Disclosure* 92; Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 104; Lerner and Tirole "Some Simple Economics of Open Source" 213-4; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 105.

²⁴⁸ Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 161-2 and 166.

entrepreneurs developing proprietary software, individually or as part of a team.²⁴⁹ Furthermore, although some of these motivations are claimed to satisfy non-economic, personal needs, on closer examination the most important motivating factors clearly have an economic value to volunteers.

One of the most commonly-cited reasons by volunteers for participation is to learn and develop their skills, not only programming skills but other related aspects such as team work, team management, copyright law and licensing, which they generally do not acquire during their formal computer science courses, if they have done any at all. However, this participation is clearly not simply for self-edification or to fulfill a personal need for the software; employers value these skills — regarding participation by volunteers as form of quasi-apprenticeship — and employ volunteers on the basis of the acquired skills, while other volunteers utilise them in entrepreneurial projects. Prospective employers particularly value the fact that the volunteers have acquired generic, non-firm-specific, skills, which makes such candidates more versatile in the workplace. So, while the stated objective may be to satisfy a non-monetary objective, these skills clearly have an economic value to volunteers.²⁵⁰ It is doubtful whether, in the absence of such economic benefits, volunteers will participate in open-source projects in the numbers, and the extent hitherto.

The alleged desire of volunteers simply wishing to enhance their reputation, and earn the respect of their peers, rather than pursue any form of monetary reward, is not without precedent. Parallels are drawn with academics, who publish scholarly works primarily to gain the respect of their peers, and, if this is so, volunteers, like academics, will choose to be involved in open-source projects that maximise their chances of being recognised for their efforts.²⁵¹ The problem is that although a volunteer may simply seek to increase his reputation and status within the

²⁴⁹ Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 68.

²⁵⁰ Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 84; Lerner and Tirole "Some Simple Economics of Open Source" 216; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 69.

²⁵¹ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1517; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 116-7.

programming community, without seeking any obvious form of financial benefit, it is very difficult to distinguish this situation from one in which a person seeks to raise his profile as a signaling device in the relevant labour market. In any event, the economic incentives in these two situations are similar, and the issue of signaling, generally, will be discussed below, when considering the extrinsic motivations of volunteers. Economically, both these incentives address career concerns.²⁵² At the end of the day, the recognition earned "is valuable not only in its own right, but the reputation gained may lead to a higher-paying regular job."²⁵³ Furthermore, the signaling in a labour market and the ego gratification associated with the enhancement of one's reputation both require that a volunteer's efforts be visible to others.²⁵⁴ Whether the enhanced reputation of a volunteer is an end in itself or merely serves to signal his abilities, all open-source licences facilitate the showcasing of volunteers' contributions by imposing attribution obligations on licensees, which ensure that authors' needs for recognition are satisfied.²⁵⁵

5 6 2 4 Extrinsic incentives

As indicated above, the motivations of a volunteer to participate in an open-source software project may, in fact, involve the same the considerations as those faced by a computer programmer engaged in proprietary software production.²⁵⁶ The choices of volunteers are largely consistent with the standard economic theories relating to labour markets and the private provision of public goods.²⁵⁷ As indicated above, volunteers will, as general rule, only participate in the development of open-source

²⁵² Lerner and Tirole "Some Simple Economics of Open Source" 213-4; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 69.

²⁵³ Hawkins "The Economics of Open Source Software for Competitive Firms: Why Give it Away for Free?" 104.

²⁵⁴ Lerner and Tirole "The Open Source Movement: Key Research Questions" 825-6.

²⁵⁵ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1517.

²⁵⁶ Lerner and Tirole "Some Simple Economics of Open Source" 212-3.

²⁵⁷ Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 102; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 73.

software if they derive a net benefit from such participation.²⁵⁸ Professional computer programmers, to some extent, have a choice: in general, they can either chose to be paid directly for their services, typically, in terms of an employment contract, or offer their services on a more entrepreneurial basis. In the employment context their earning potential is more limited than what they could earn in entrepreneurial endeavours, but the latter also involves greater risks. A major factor which contributes to the success of entrepreneurship is whether the programmer can signal his superior abilities to others who may wish to engage his services.²⁵⁹

It is claimed that in the employment environment, where a computer programmer typically works as part of a larger group, individual contributions are virtually anonymous — and programmers' talents are considered to be "heterogeneous and unobservable" — and, therefore, individual ability is not recognised or valued.²⁶⁰ This accounts for the lower, but more predictable, economic returns for programmers in such positions. One way for talented programmers to have others observe their abilities is to engage in the development of open-source software, this is the so-called "signalling incentive" of volunteers. The public nature in which open-source software is developed, and the compulsory attribution obligations imposed by open-source licences, means that the individual contributions of volunteers are observable by their peers, and talented programmers are able to be recognised for their abilities. In the absence of copyright protection, and, therefore, the ability to enforce the compulsory attribution obligations, the signalling incentive would be severely hampered, if not made impossible. The fact that all open-source licences have such strong attribution obligations suggests that the signalling, and corresponding economic, incentive may be the most important incentive. Open-source projects detail the nature of the contributions of the various volunteers, which allows for a level of individual recognition which is not achievable in the context of proprietary software development. Also, given the fact that volunteers' contributions are made available immediately to other users means that a volunteer can gain a reputation in a much shorter period of time than if employed in

²⁵⁸ Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 68-9.

²⁵⁹ Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 106-7.

²⁶⁰ 105-6.

the development of proprietary software. Thus, an individual who has confidence in his abilities may be drawn to open-source development, to use it as a springboard to establish his reputation, and earn a greater return (than being an employee) in the long run.²⁶¹ It has, for example, been suggested that the signalling incentive may be particularly strong among talented programmers who lack formal qualifications, recently-graduated computer scientists, or programmers who work at small firms or institutions, and who all seek to use open-source projects as a showcase for their talents to enable them to enter the software industry or move to more lucrative positions.²⁶² In other words, this group is characterised by their lower opportunity costs of participation. However, open-source software development not only provides a showcasing opportunity for relative novices, it can also be used by vastly experienced computer programmers.

Given the geographic spread of volunteers, the success of an open-source project depends to a larger degree on the management skills of its project leader to motivate unpaid volunteers and coordinate their efforts. The project leader needs to be self-motivated, develop a critical mass of computer code to demonstrate the viability of the project, and make decisions on the appropriate solutions to identified problems; he needs to prevent the project from splintering into parallel projects, yet keep volunteers who disagree with the chosen course of action from defecting. Programming tasks that are assigned to volunteers should be discrete enough (that is, modularised) for them to be developed independently (without the need for supervision), yet be challenging enough to be intellectually stimulating and allow volunteers to exhibit their talents. In other words, a good project leader needs to

²⁶¹ Lerner and Tirole "The Open Source Movement: Key Research Questions" 822; McGowan "Legal Implications of Open-Source Software" 276-7; Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 106-7. It is claimed that this is similar to the academic world, which attracts the most talented individuals, who are able to establish a reputation (while sacrificing the immediate returns of industry), and earn a greater overall return than if they had gone into industry. It is questionable whether it is indeed the case that the most talented individuals chose academic jobs, instead of industry. Perhaps the author is appealing to the egos of his likely readers.

²⁶² Lerner and Tirole "The Open Source Movement: Key Research Questions" 823; Lerner and Tirole "Some Simple Economics of Open Source" 216-7; Schiff "The Economics of Open Source Software: A Survey of the Early Literature" 69-70.

demonstrate both his technical ability as a programmer and as an effective, and respected, manager. Given the public nature of the development process, a good project leader's abilities are very visible, and could potentially be richly rewarded.²⁶³

The delayed economic returns of participation in open-source projects may more than adequately compensate a volunteer for the opportunity costs associated with such participation. We have already seen that some volunteers engage in open-source projects to learn and develop their skills, which enable them to secure full-time employment. However, the delayed rewards of the most-talented, entrepreneurial volunteers may significantly exceed what they would earn in full-time employment. For a start, a talented volunteer may be able to provide well-paid consulting services or may be requested to customise software. As previously noted, the market for software-related services is much bigger than that for simply licensing the use of software. Furthermore, a successful project leader of an open-source project, displaying excellent managerial skills, in addition to sound technical skills, may be able to attract venture capital investment for an existing or future project, or he may be offered shares in commercial open-source-based companies as part of a package to attract his services.²⁶⁴

Open-source software development has allowed talented volunteers an alternative incentive structure, one which has analogies to those in the academic community. Whereas participants in the private sector generally seek to rely on proprietary protection, or confidentiality, of their creations, and seek to earn a direct income therefrom, the norm in the academic community is that the *individual* publishes the product of his labours widely to establish a reputation, which could potentially lead to subsequent higher financial returns than can be earned by such an individual in the private sector. These higher returns are possible because others are able to observe the individual's abilities, and the associated reputation among his

²⁶³ Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 84; Lerner and Tirole "The Open Source Movement: Key Research Questions" 824; Lerner and Tirole "Some Simple Economics of Open Source" 216 and 220.

²⁶⁴ Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 424-5; Lerner and Tirole "The Open Source Movement: Key Research Questions" 822; Lerner and Tirole "Some Simple Economics of Open Source" 213-4.

peers, which may not be so evident in the context of employment in the private sector.²⁶⁵ Greater long-term returns are made possible because open-source software development, as supported by the associated copyright licences, allows volunteers' efforts to be recognised and for them to signal their abilities, which are more visible, and which third parties can more accurately assess, and attribute to, the relevant individual. In contrast, in the traditional employment environment, where talented programmers participate in the development of proprietary software, the employer captures most of the surplus value of such programmers, and this is probably a fact about which the most-talented volunteers are cognisant.²⁶⁶

It should, therefore, be clear that volunteers are not a species distinct from other computer programmers who engage in the production of proprietary software; volunteers also require incentives, and, moreover, it appears that their economic incentives may be very significant.²⁶⁷ The evidence suggests that participants in open-source communities are more likely to be extrinsically motivated because situations in which some participants are intrinsically motivated, while others seek extrinsic reward, are unstable because of the obvious free-rider problem which it creates.²⁶⁸

²⁶⁵ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1517; Kogut and Metiu "Open-source Software Development and Distributed Innovation" 250; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 116-7; Mustonen "Copyleft: The Economics of Linux and other Open Source Software" 103-4. At present, there is no empirical evidence to support, or dismiss, the contention that talented programmers who have built a reputation in open source development earn a premium over other programmers (Bitzer, et al. "Intrinsic Motivation in Open Source Software Development" 167).

²⁶⁶ Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 103; Lerner and Tirole "Some Simple Economics of Open Source" 216.

²⁶⁷ Benkler "Coase's Penguin, or, Linux and "The Nature of the Firm"" 424-5; Lerner and Tirole "The Economics of Technology Sharing: Open Source and Beyond" 105.

²⁶⁸ Kogut and Metiu "Open-source Software Development and Distributed Innovation" 258-9.

5 7 Conclusion

As illustrated above, the emergence of open-source software as a phenomenon distinct from, and, for some, opposed to, proprietary software has received considerable attention. Proponents on both sides of this software divide have not been slow in resorting to rhetoric and hyperbole to defend their positions. On closer examination, open-source software development does not represent a significant paradigmatic change in respect of the incentives required by participants in software development. Neither is open-source software destructive, or as damaging, towards proprietary software as its opponents would have us believe.

As illustrated, from the perspective of commercial firms, the release of software as open-source software may represent an opportunity to establish market dominance, and focus on generating revenue from related services or products. For commercial firms, investment in open-source software development is often, therefore, a promotional device. Another significant reason why commercial firms may decide to dedicate resources to open-source software development is when it is in their collective interest to develop a common standard or platform for further product development. Open-source software, in these situations, represents a cost-effective solution for producing a commodity from which a firm is unlikely to derive direct financial benefit anyway.

Similarly, when it comes to individual volunteers, their actions can largely be accounted for by labour market economics. While there are no doubt individuals who participate in open-source software development as a consequence of their ideological convictions, the sheer number of individuals who participate in such activity would suggest that they have other motivations for doing so. While the intrinsic motivations for participation may be relevant, they too are probably not as important as the extrinsic motivations of volunteers. Although the latter statement may be disputed, as there is no definitive empirical evidence to support it, what is less debatable is that there is nothing to suggest that the motivations which are said to encourage volunteers to participate in open-source software development would, on its own, be sufficient to sustain the current level of software development.

While the range of available open-source software is encouraging, it is still comprises only a fraction of the software market.²⁶⁹ In other words, most producers of software are likely to still require the direct economic incentives which copyright affords authors.

²⁶⁹ de Laat "Copyright or Copyleft? An Analysis of Property Regimes for Software Development" 1531.

Chapter 6: Conclusion

“The presumption is that creativity and invention occur in response to the stimulus of reward. But this presumption can be questioned. The common response is that creativity and innovation occur independently of financial reward. This criticism is true, but somewhat misdirected. As long as some inventors respond to monetary rewards, the argument that intellectual property law spurs innovation still stands.”¹

There has been much scepticism about the appropriateness of protecting computer programs by way of copyright, and criticism that such protection prevents innovation, hurts consumers, and, is, ultimately, not socially beneficial. The concern that the protection of computer programs should not extend beyond that which is necessary to encourage their creation is a material societal concern, and not simply an academic matter, because “[t]he levers and cogs of the machines of the modern economy are forged out of ones and zeros instead of steel and brass.”² Critics of copyright protection of computer programs, and copyright generally, appear to have found support in the emergence of open-source software development. Open-source software is software that is publicly available in source-code form, and where the accompanying licence permits licensees to use (and redistribute) the software, and to modify the software and distribute the modified software in source-code form. As far as the range of criticisms directed at copyright protection of computer programs are concerned, on the one end, the most benign criticism is that copyright protection is unnecessary; while at the other end, it is claimed that copyright protection of computer programs inhibits software production, and leads to anti-competitive behaviour.³

In order to assess the validity of the criticisms it was necessary to consider the rationale for affording copyright protection generally, and for computer programs.

¹ Ghosh S "The Merits of Ownership; or, How I Learned to Stop Worrying and Love Intellectual Property" 2002 *Harv J Law & Tec* 15 453 475.

² Boyle *The Public Domain: Enclosing the Commons of the Mind* 120.

³ 120.

The reason for this is simply that such a system of property rights will be shaped by, and should be consistent with, such justifications.⁴ Furthermore, an evaluation of any specific aspect thereof, such as the scope of protection of computer programs, must be considered in such context. As illustrated, the justification for the protection of intellectual property rights, like that for tangible property, is either said to be based on the ethical or moral arguments — such as labour-based justifications and the personality theory — or on the economic argument for such protection.⁵ While the moral justificatory theories are still regularly invoked and have intuitive appeal, it has been suggested that they fail to provide satisfactory explanations for copyright protection.

It is submitted that the economic argument is the principal, and most plausible, justification for copyright protection; not only does it provide an account for the grant of property rights, it also provides a sound basis for copyright doctrine like the idea-expression dichotomy and the fair-dealing exceptions. In addition, analysing vexing issues of copyright doctrine, such as the idea-expression dichotomy, from an economic perspective, gives courts a superior, defined tool — especially as a first touchstone — to determine the appropriate scope of copyright protection. Economic analysis is a far more desirable approach than the subjective, intuitive, *ad hoc* approach which courts have tended to use to distinguish unprotectable elements from protectable expression. This is not to suggest that we have managed to empirically confirm the correctness of the economic theory relating to copyright protection — which postulates that it produces net social gains — or that the moral justifications do not, or should not, have any bearing on copyright policy. More resources should be dedicated to confirm or quantify the economic impact of copyright protection on social welfare in order to avoid speculating on its effects on social welfare, and to use this information to optimise its regulation. As for the moral considerations, it is submitted that where the economic analysis may be inconclusive, for example, due to a lack of empirical evidence, or where there are problems concerning the quantification of the possible effects of a particular policy or proposal, the moral justifications may serve to provide valuable additional

⁴ Hurt and Schuchman "The Economic Rationale of Copyright" 432.

⁵ May *A Global Political Economy of Intellectual Property Right: The new enclosures?* 7.

considerations about the appropriateness of such policy. Of course, the possibility also exists that moral considerations could trump the economic arguments in a given situation, but this should be done on the basis of express, and defensible, policy considerations, having regard to the economic costs of such decision. While it may be correct that, as a society, economics should not always dictate what we *ought* to do, moral arguments tend to involve incommensurable points of view, and arriving at a consensus where there are conflicting moral considerations is difficult. However, even where copyright policy is based on moral considerations, economic analysis can provide useful insights into the costs of a particular policy, and can assist in assessing the social costs of pursuing such policy.

The conventional economic justification for copyright protection is that it provides necessary incentives to authors to create the types of works it protects, and, by so doing, it encourages creation of these socially-desirable works. Due to their intangible nature, copyright works, like other intellectual property, are, economically, regarded as *public goods*. Because of their public-good nature, in the absence of the legal protection afforded by copyright, copyright works give rise to difficulties which may prevent their creation at a socially-desirable level in a free market. Copyright works create positive externalities — others can enjoy the benefits of such works without compensating their authors — and this gives rise to the so-called free-rider problem: non-paying users of the public good. In terms of game-theoretic descriptions of this situation, free riding becomes the dominant strategy for the end-users of copyright works and for authors' competitors. The consequence of this free riding is that it gives prospective authors a skewed signal of the actual demand for such works, leading to an underproduction (that is, below the socially-desirable level) of such works because authors fear that they are unable to recover their costs of creation, and secure an adequate return on their investment. In other words, the public-good nature of copyright works causes market failure (and consequent underproduction) because of the positive externalities, and free riding associated with such works. Furthermore, where works are created in the absence of copyright protection, authors — in an attempt to prevent free riding — would, inevitably, be required to make considerable investments to develop technical, or other, measures to restrict access to their works. In addition to the fact that these

investments would probably be a wasteful, or inefficient, use of resources, these measures would seek to restrict the flow of information, which is considered to be socially detrimental, and which copyright protection serves to encourage.

Because it is generally accepted that the social benefit of intellectual creations, such as copyright, generally exceeds the costs of their creation, their production should be encouraged. Copyright protection, through the grant of property rights, creates an exclusionary mechanism by which authors can prevent free riding, thus destroying the public-good nature of copyright works, and addresses the problem of market failure. The creation of property rights is considered to be the most efficient way in which the costs and benefits of externalities can be internalised by the author of the positive externality. Clear property rights provide authors with the necessary security to create copyright works knowing that they can earn a financial return from such works by charging for access, or exchanging such rights for value, and, thus, potentially earn an economic profit from such creative effort. This system of proprietary copyright protection is considered to be more socially efficient than other possible alternative solutions to the public-good problem, such as the public financing of production or patronage, and more effective than contractual restrictions.

However, it is important to recognise that copyright protection also imposes social costs, such as the costs of administering the copyright system, and the loss of socially-beneficial contributions free riders could make in the absence of copyright. The public-good nature of copyright works, particularly computer programs, means that, in terms of simple allocative efficiency, restrictions are socially detrimental and have to be justified; once a computer program exists, it is socially wasteful to exclude others from its benefits if the marginal cost of them enjoying such benefit is negligible (or less than the cost of exclusion). In other words, while the cost of providing the good to an additional person may be zero (or negligible), the cost of exclusion in the case of public goods is not negligible. It is, therefore, important, to determine whether copyright protection is efficient in addressing the identified market failure, or whether such protection does not introduce distortions leading to market failure by, for example, introducing other externalities or high transaction costs as a result of

providing excessive protection. It is, thus, necessary to ensure that such costs, which are a consequence of such protection, are outweighed by the perceived benefits due to the increased production of such works which copyright protection seeks to ensure. Copyright protection should, ideally, extend only so far as to provide the necessary incentives for authors to create copyright works, and not be too wide so as to introduce, or result in, unnecessary social costs in achieving such objective. Thus, while there is the concern that the absence of copyright protection will result in the underproduction of socially-beneficial works, the countervailing concern is that too much protection would result in the under-utilisation of such works, and the sub-optimal distribution of information, which too has a detrimental effect on social welfare.

The most important concern, from a social-welfare perspective, for purposes of this study, was to establish whether copyright protection leaves enough room for creativity, or whether it unduly raises the cost of creating new computer programs. If the scope of protection is too broad, the incentivising goal will be pursued at too great a social cost as such protection will limit the access of others to the broader themes and concepts used to create such works. Besides limiting the period of protection, copyright doctrine has generally sought to minimise these costs by, for example, not protecting ideas (and, therefore, not preventing independent creation) or commonplace facts. In the light of the analysis of the case law pertaining to non-literal copying of computer programs in the US and the UK, it is submitted that, while this was not initially the case, the scope of copyright protection of computer programs leaves enough creative room for the production of new software.

The courts in both jurisdictions recognised the functional nature of computer programs, and the fact that computer programs necessarily have to conform to certain technical requirements. This meant that they considered it necessary to restrict the scope of copyright protection of computer programs; a greater degree of similarity between two computer programs is required before a finding of substantial similarity, and, consequently, copyright infringement, can be made, when compared to, for example, fictional literary works. Also, it was recognised that excessive copyright protection of computer programs, due to their functional nature, would

result in a much greater additional social cost than copyright protection of aesthetic works, because such protection would have a similar effect to patent protection, by protecting ideas rather than their material expression.

The most recent UK and European Court of Justice cases, which reflects the position under the EU Software Directive,⁶ exclude protection of ideas and principles which underlie any element of a computer program, like its logic, algorithms, programming languages or interfaces. At the highest level of abstraction, the case law indicates that, at present, copyright law does not protect the conceptualisation, design and business logic embodied in a computer program. It also does not protect the structure, sequence or organisation of a computer program as these concepts — based on the analogy with fictional literary works — are inappropriate in the context of computer programs. The idea-expression dichotomy also means that functional aspects will not be protected where these have been independently replicated. Thus, reverse engineering the functionality of a computer program would not constitute copyright infringement. Accordingly, at the level of computer code, copyright law does not protect any elements of a computer program dictated by function (or purpose), technical (or external) constraints or efficiency considerations. Elements of a computer program may also be excluded from protection on the basis that they constitute standard or obvious programming techniques (or methods), or are commonplace expressions. This ensures that there is a sufficiently large public domain for other authors to create competitive computer programs.

Interestingly, the effect of the US and UK case law has been that even the graphic elements of the user interface of a computer program — the so-called “look and feel” of software — which could be protected as distinct artistic works, but do not constitute computer programs, receive much thinner protection than traditional artistic works. Others are generally free to develop a computer program which emulates the user interface of another program, provided that the later program has not copied the computer code of the first, or any of its detailed graphic elements (artistic works); other than for the detailed graphic elements of the user interface, not much else of a computer program’s user interface will be protected.

⁶ EU Directive on the legal protection of computer programs (2009/24/EC).

For the above reasons, it is submitted that, other than for the term of copyright protection of computer programs (which is excessive given the commercial life of software), and the remarks below, the current scope of copyright protection of computer programs in the US and UK does not appear to be excessive. Thus, cases like *Navitaire*⁷ reflect the recognition that the purpose of the copyright protection of computer programs is to incentivise their creation, not to stifle new creation.⁸ In fact, it is arguable that the current level of copyright protection essentially only prevents mechanical, or slavish, copying of computer programs. This view has been confirmed in the most recent European Court of Justice judgment concerning the scope of copyright protection of computer programs, *SAS Institute Inc v World Programming Ltd*,⁹ which decision is consistent with the *Navitaire* decision. The ECJ stated that “the main advantage of protecting computer programs by copyright was that such protection covered the individual expression of the work only and therefore left other authors the desired latitude to create similar or even identical programs provided that they refrained from copying.”¹⁰ However, this limited protection, combined with the first-mover advantage, is sufficient to ensure that a third party does not gain an unfair advantage over the author of the original program. The scope of copyright protection certainly does not appear to have inhibited innovation and the creation of new computer programs, which is evident from the size of the software industry.

The other aspect of the investigation undertaken in this study concerning the rationale for the copyright protection of computer programs was to ascertain whether the emergence of open-source software really undermines the economic rationale for copyright protection of computer programs. Put differently, is it correct that computer software would still be produced at the levels we currently enjoy in the absence of copyright protection of computer programs? It is important to recognise that when Richard Stallman formed the Free Software Foundation in 1985, to pursue

⁷ *Navitaire Inc. v easyJet Airline Company & Another* [2004] EWHC 1725 (Ch).

⁸ Stokes "The Development of UK Software Copyright Law: From John Richardson Computers to *Navitaire*" 133.

⁹ *SAS Institute Inc v World Programming Ltd* 2012 Case C-406/10 [41].

¹⁰ [41].

his ideological objection to copyright protection of computer programs, the scope of copyright protection of computer programs was, at best, unclear, and, probably, excessive. There was, thus, a genuine concern that copyright protection of computer programs would stifle creativity and innovation in the fast-developing area of computer software. This concern was only confirmed by subsequent cases which extended protection to the look and feel of computer programs.¹¹ However, as indicated, the scope of copyright protection of computer programs has narrowed significantly since then, and now mainly serves to prevent slavish copying of computer programs.

The liberal licensing policy of open-source software grants users a non-exclusive licence with transferable rights, obviating the need for persons seeking to perform any of the acts usually restricted by copyright, in relation to an open-source computer program, from having to obtain the consent of its author, and in return for such rights users agree to comply with a few conditions. In other words, whereas the default regime of copyright is to create an “all rights reserved” situation, open-source licences seek to remove those restrictions on third parties’ ability to use copyright works; it creates a licensed-by-default position. Although the effect of open-source software licences is that their authors are unable to charge licensees a fee for permission to use their software, which is the direct reward which copyright enables authors to earn as an incentive to create such software, this does not mean that these authors — both commercial firms and individual programmers — lack financial incentives to create such software.

The financial incentives of commercial firms are easier to identify than those of individual programmers as their goal is simply to maximise profits. Their investments in open-source software are premised on one or both of the following business cases: they either seek to provide related services in respect of such software; or, the software may serve to promote sales in their other complementary products, such as hardware, or, in fact, other proprietary software. In both these business cases, the investment in open-source software can represent a significant cost advantage over proprietary software. Open-source software can be developed,

¹¹ See, for example, *Lotus Development Corp. v Paperback Software Intl.* 1990 740 F. Supp. 37.

and maintained, at lower costs than equivalent proprietary software because it allows a commercial firm to benefit from the efforts of others. The first of these business cases — the provision of related services — may be more significant to an enquiry into the incentives for software creation because it may be argued that firms, generally, earn significant income from providing related services, and that the prospect of such income should provide the necessary incentives to create software in the absence of copyright protection.

However, the data suggests that the overwhelming majority of new commercial software firms still consider the proprietary-software business model to be more appropriate, which is an indication that copyright protection still provides much-needed incentives. If software producers were forced to rely on the revenue from related services, it could have a deleterious effect on innovation and adversely affect consumers. It is likely that the large, established software firms — who are, in any event, the object of the ire of those who are morally opposed to copyright protection of computer programs — will greatly increase their market share of the software industry because there will be greater consolidation. The services business model suits the established software companies, who, because of their size, have a comparative advantage over smaller software firms in providing integrated services.¹² In any event, the decision to base one's business model on open-source software is not without considerable risk and the long-term sustainability of such businesses have yet to be proved. For example, it has been suggested that Sun Microsystems's decision to make its Java programming language available as open-source software may not have benefitted the company because its competitors have earned more than it has from such software.¹³ Even the much-vaunted example of Red Hat, which had obtained a significant cash injection on its listing, and public offering, in 1999 to enable it to provide the level of services its business model would require, later released a proprietary version of its Linux operating-system software. It is claimed the revenues attributable to the sale of its proprietary software was probably the reason for its first profitable year in 2004.¹⁴ A 2009 article in *The New*

¹² Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 32-6.

¹³ Nikulainen "Open Source Software: Why is it Here and Will it Stick Around?" 148.

¹⁴ Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 35.

York Times reported that Red Hat was still a “rare case” of a profitable open-source software business; other open-source software firms generally developed a single product, which made them acquisition targets for proprietary-software firms.¹⁵ In addition, from the consumers’ perspective, although users did not pay for the open-source Linux software, an investigation in 2002 revealed that the total cost of using the Linux software (i.e. taking into account the additional costs of the associated services) exceeded that of using the proprietary Microsoft operating system.¹⁶

It is also arguable that the right to create proprietary software has been instrumental in the development of the vast range of applications for individual users. Whereas software aimed at corporate users may allow for business models based on revenues from related services such as maintenance and support, individual users are unlikely to use software that does not have a fixed cost, is not easy to install, and, comparatively, intuitive to use. Thus, the option of creating proprietary software has allowed the authors of these computer programs to cater to the consumer market, and rely on possible network effects to achieve the necessary market penetration, allowing them to earn an adequate return on their investment.¹⁷

The second of these business cases — where the software serves to promote sales of commercial firms’ complementary products — does not reveal anything significant about the incentives for investing resources in open-source software as these firms are simply developing the markets for their core products, or investing in platforms on which their proprietary software offerings will operate. In the case of the development of platforms, the investment is the outcome of a straight-forward economic consideration: the joint development of open-source platforms allows firms to distribute the costs of development of a resource which they all require but which does not distinguish them from their competitors, and, therefore, are not recoverable from their customers.

¹⁵ Vance A "Open Source as a Model for Business is Elusive" http://www.nytimes.com/2009/11/30/technology/business-computing/30open.html?_r=1&pagewanted=all (12 August 2012).

¹⁶ Anderson C *Free: How Today's Smartest Businesses Profit by Giving Something for Nothing* 1ed (2010) 109.

¹⁷ Mann "Commercializing Open Source Software: Do Property Rights Still Matter?" 41.

Similarly, the motivations of individual computer programmers (“volunteers”) who contribute to the development of open-source software are, arguably, extrinsic (economic) motivations, such as career concerns. Whether volunteers have extrinsic motivations or intrinsic (non-economic) motivations, they will only participate in open-source development if the benefits of participation — both the psychological benefits associated with intrinsic motivations, and the extrinsic motivations — exceed the opportunity costs of participation. The large number of participants in open-source development can be attributed to the lower opportunity costs of participation, which have been drastically reduced due to the diffusion of the Internet, and the alumni effect (people who have the expertise to participate). These lower opportunity costs have made participation in open-source software a cost-effective method of self-promotion, or a signalling device of one’s abilities. There is strong support for this conclusion when one has regard to the emphasis placed on personal attribution in open-source licences; volunteers insist on being recognised for their respective contributions.

In the final analysis, it appears that the choices of volunteers in open-source projects are largely consistent with the standard economic theories relating to labour markets and the private provision of public goods. Open-source software development both serves as a quasi-apprenticeship for inexperienced programmers, and as a showcase for the most-talented programmers to demonstrate their superior abilities to others who may wish to engage their services or invest in their projects. The highly visible nature of individual programmers’ contributions in open-source software development provides an ideal opportunity for talented programmers to signal their abilities to others. Most significantly, in the absence of copyright protection, and, therefore, the ability to enforce the compulsory attribution obligations, the signalling incentive would, at best, be severely hampered, and, probably, totally ineffective. Contributions by authors would soon become anonymous contributions.

Thus, as illustrated, the reasons commercial firms or volunteers participate in open-source software development are easily accounted for by standard economic principles. Simply put, participants in open-source software development do so

when they expect that the benefits — more specifically, the economic benefits — to be derived from participation will significantly outweigh the costs of their contributions.¹⁸

This is not to suggest that the open-source software phenomenon has been an irrelevance in the area of copyright. First, it has provoked us to re-examine or confirm the case for copyright protection of computer programs, which is a good thing. If the principal rationale for copyright protection is an economic one, it is important to periodically reflect whether incentives are still required to encourage the creation of protected works. As indicated above, because copyright protection imposes social costs, it is necessary to ensure that such costs are justified because they are offset by greater social gains, and that there is no other, more efficient, social institution that can achieve such result. Second, the emergence of business models around open-source software has meant that a software author should carefully consider what type of business model will give it the best chance of profiting from its creation. Prior to open-source based business models, software authors may have simply assumed that the most appropriate way to profit from their creation was to use the proprietary rights afforded by copyright protection, and maintain its “all rights reserved” default position, charging licensees a fee for permission to use their software. As indicated, while this direct reward which copyright enables authors to earn may still provide the necessary incentive for most authors to create computer software, authors should now possibly consider releasing software as open-source software if it is a means of accelerating market penetration, and there is a likelihood that significant revenues can be earned by providing related services. Third, the emergence of open-source software has allowed software developers to appreciate the extent to which the Internet has lowered coordination costs on software development, allowing them to easily spread the costs of development. This has encouraged software developers, particularly proprietary-software developers, to jointly develop standard, commoditised, software platforms which they all require (and on which they may seek to develop proprietary software) but which does not distinguish them from their competitors. This serves to illustrate that proprietary software and open-source software development are not necessarily mutually

¹⁸ Ghosh "Open Source Software: Economics, Innovation, Law and Policy" 83.

distinct phenomena, but may, in fact, complement each other; the synergies between these types of software development can be used strategically to both create more efficient business models and increase social welfare.¹⁹ Fourth, while the emergence of open-source software might not undermine the rationale for copyright protection of computer programs, it does pose a potential business threat to firms that develop proprietary software. A proprietary-software firm now has to consider whether there is any competing, or potentially competing, open-source software in its market, and whether it can persuade consumers that paying, or continuing to pay, for its product is still worthwhile when the competing product is available at no initial cost. Proprietary-software firms have generally been able to convince consumers to pay for their products, albeit at a lower price than they would have probably charged in the absence of open-source software, by ensuring that their offerings are of a superior quality (for example, ease of use requiring lower implementation costs, and having more features). Having said that, open-source software has become increasingly easier to use, requiring lower implementation costs. Furthermore, consumers are comforted by, and attach a monetary value to, the fact that proprietary software will be supported, and maintained, by its creator, whereas there are no such assurances in relation to open-source software.

Therefore, the emergence of open-source software, despite its impressive growth, does not suggest that the economic justification for copyright protection of computer programs is misguided, and neither does it undermine such rationale in any significant sense. Rather than open-source software being a testament to the ingenuity of the hacking mentality and their ability to hack the law to reverse its perceived undesirability, it is submitted that the open-source software phenomenon only serves to show how versatile, and efficient, copyright protection can be. It provides authors with the flexibility to determine their own form of possible remuneration for their efforts, and which should, therefore, encourage them to create socially-beneficial copyright works like computer programs. Copyright has allowed software developers to choose from a range of licences (in addition, of course, to

¹⁹ Blankenship and Baxter "What's Keeping Corporate Counsel Awake at Night?" 933; Bollier *Viral Spiral: How the Commoners Built a Digital Republic of Their Own* 251; Rychlicki "GPLv3: New Software Licence and New Axiology of Intellectual Property Law" 237.

simply donating their works to the public domain): at one end of the spectrum are licences that are based on the fact that the software source code will be proprietary, with all the attendant rights granted by copyright reserved by its author, and, at the other end of the spectrum, are the permissive open-source licences, which allow users complete freedom to use the freely-available source code as they wish, including for purposes of creating derivative proprietary software. While it may be the case that some people will create computer programs without requiring the direct financial rewards which copyright permit, others still require such financial rewards; provided that the social benefits of encouraging the creation of computer programs outweigh the costs of affording copyright protection, copyright protection is justified.²⁰ The most significant fact which supports the appropriateness of copyright protection of computer programs is the fact that open-source software currently still only accounts for a fraction of the software market. This strongly suggests that, in the absence of copyright protection, open-source software development will not result in increased development of software, as authors still require incentives, or, at the very least, are motivated by the potential economic rewards which copyright protection enables them to earn. In other words, copyright maximises social utility in terms of software creation, and the flow of related information, as it encourages the creation of software which may not have been produced otherwise.

Moreover, the present copyright regime even appears to address the perceived transaction-costs problem associated with third parties having to obtain the necessary authorisations to use computer programs, as it enables a licensed-by-default position to address any perceived market failure in this regards. Copyright has enabled the emergence of open-source software, which avoids the transaction costs associated with proprietary software (where users have to seek permission to use the software), and have to pay licence fees for such permission. Furthermore, even in the case of proprietary software, given that the scope of copyright protection afforded to computer programs is now so narrow, and the fact the copyright does not protect ideas but simply particular expressions thereof, it is arguable that the transaction costs associated with software must be significantly lower than other

²⁰ Ghosh "The Merits of Ownership; or, How I Learned to Stop Worrying and Love Intellectual Property" 475; Zittrain "Normative Principles for Evaluating Free and Proprietary Software" 281.

types of copyright work. Because of the wide range of elements in a computer program that third parties can use without the need to seek authorisation from its author, third parties would generally not require any consents to develop competitive products. This helps to significantly reduce any socially-detrimental restriction on the flow of information, which critics of copyright protection are keen to highlight as one of the most significant social costs associated with its proprietary nature. In this way copyright, particularly as a consequence of the manner in which the courts have limited the scope of copyright protection of computer programs, has sought to avoid socially-undesirable deadweight losses, and ensures a greater flow of information. As such, there is also no evidence to suggest that copyright protection of computer programs currently results in too great a social cost. Accordingly, the claims of the demise, or the inapplicability, of the economic rationale for copyright protection of computer programs as a consequence of the emergence of open-source software appear to be have been greatly exaggerated.

However, it is necessary, for completeness, to mention certain problems or shortcomings which have been identified in the course of this study relating to the current system of copyright protection of computer programs, both generally and with specific reference to South African law. As noted above, if the economic rationale for copyright protection is the basis for such protection — which it is submitted is the most coherent, and workable, basis for such protection — copyright protection should extend no further than providing the necessary incentives for the creation of copyright works. Because copyright protection imposes social costs, it is necessary to ensure that those costs are minimised by limiting the term and scope of copyright protection.

Given the comparatively short period that computer programs are considered useful, and, therefore, commercially valuable, it is submitted that the current term of copyright protection of computer programs, in all three jurisdictions considered in this work, is excessive. In this regard, South Africa, with its 50-year period of protection, provides more reasonable protection than the US and the UK, which provide 70 to 95 years' protection. However, it is submitted that even the 50-year period of

protection should be reduced for computer programs.²¹ It should not be too difficult to empirically determine the average commercial life of software, which should serve as the point of departure for considerations of the appropriate term of copyright protection.

The Copyright Act²² currently only contains one, rather limited, fair-dealing exception concerning the making of back-up copies. It is submitted that, in addition to a more extensive back-up fair-dealing exception, there should be exceptions allowing lawful users the following rights: the right to decompile a computer program, modify a program for the purpose of remedying errors, and the right to study and test a program. Other than the decompilation right, the fair-dealing exceptions should be on the same basis of the UK's Copyright, Designs and Patents Act.²³ The decompilation right should be a general right, as in the US, giving anyone, even a competitor of the author of a computer program, the right to decompile a program in order to determine how it functions. It is submitted that such a general decompilation right, would be the software equivalent of the right to reverse engineer three-dimensional utilitarian articles based on artistic works, which were produced for the public by an industrial process.²⁴ Pursuant to our obligations under the Berne Convention, such decompilation right must not unreasonably prejudice the legitimate interests of the copyright owner or conflict with the normal exploitation of the computer program.²⁵ It is submitted that such a general decompilation right does not give a competitor a decisive advantage because it does not yield directly usable source code of a computer program. For a competitor to produce its own source code for an equivalent program would still require significant effort and skill. Furthermore, there is no indication that the general decompilation in the US provides too little protection, and has hampered software development.

²¹ Of course, South Africa cannot reduce the term of protection of computer programs without an amendment of the Berne Convention in this regard because doing so unilaterally would result in it being in breach of its obligations under the Berne Convention.

²² Copyright Act 98 of 1978 (SA Copyright Act).

²³ Copyright, Designs and Patents Act 1988 (UK CDPA).

²⁴ S 15(3A) SA Copyright Act and s 51 UK CDPA.

²⁵ Article 9(2) Berne Convention for the Protection of Literary and Artistic Works 1886.

Lastly, given the fact that the design phase in software development requires a significant investment, and is often vital to the success of good software, consideration should be given to what is the most appropriate protection for preparatory design material. While the position under the EU Software Directive is that the preparatory design material of a computer program is also covered as part of the copyright protection of the computer program,²⁶ the problem is that there is no clarity as to the level of detail which would be required before the preparatory design material can be considered to be a computer program. The advantage of protecting the preparatory design material as part of the computer program is that it avoids the possible complication that the copyright in a computer program and its preparatory design material may vest in different authors.

²⁶ Article 1(2) EU Software Directive.

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