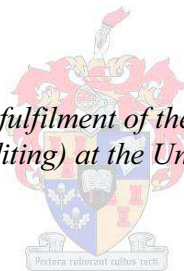


# Defining and reducing the IT gap by means of comprehensive alignment

by  
Sybil Smit

*Thesis presented in partial fulfilment of the requirements for the degree  
MAcc (Computer Auditing) at the University of Stellenbosch*



Supervisor: Prof. Rika Butler  
Faculty of Economic and Management Sciences  
Department of Accounting

December 2009

<b>Contents</b>	<b>Page</b>
1. Introduction	3
2. Strategic business imperatives	8
3. IT objectives and IT governance	14
4. Alignment	29
5. Defining and analysing the IT gap	32
6. Model for alignment between business and IT	37
7. Conclusion	51
8. References	53

## **1. Introduction**

### 1.1. Background

Alignment, according to the Oxford English Dictionary, is “arrangement in a straight or other determined line; the drawing of a straight line in such a position that it shall pass through a particular point; the action of bringing into line” (Oxford English Dictionary, 1989). What this study suggests with alignment is for a business as a whole (including Information Technology (IT) as a crucial part of the business) to work together – in a straight line – towards the same goals. Therefore, considering IT in particular, alignment is achieved when IT works as an element of the business towards achieving the business’ goals. According to McKeen & Smith, 2003 (as cited by Bleinstein, Cox, Verner, & Phalp, 2005), strategic alignment of IT exists when a business organisation’s goals, activities and processes are in harmony with the information systems that support them.

Several articles have been written on business and IT alignment over the past two decades. Although various models to align IT and business have been developed, in practice business and IT managers still experience a lack of alignment between their respective sectors (Simonsson & Johnson, 2006). The lack of alignment between business and IT (the “IT gap”) mainly exists due to the difference between management’s expectations of IT and what actually occurs in IT (Rudman, 2008).

Most of the research performed on the IT gap approached the problem from a governance (Bhattacharjya & Chang, 2006; Bowen, Cheung & Rhode, 2007 and Silva, Plazaola & Ekstedt, 2006) or a technical (Curtin, 1996 and Henderson & Venkatraman, 1993) viewpoint. Although this methodology contributed valuable information towards understanding of the problem, it did not provide a solution to the problem of misalignment between business and IT. The reason for this is that technology and governance are elements of business; business is not a component of technology and governance (IBM, 2006). Therefore this study will develop a model for alignment by starting with the business and its requirements of IT.

The draft King III reports states that every company's approach to IT governance should be based on the business' needs and reliance on IT to drive and support the company's objectives (Institute of Directors in Southern Africa, 2009). It therefore follows that the starting point to finding a solution to align business and IT should be business rather than technology or governance.

Although a number of organisations recognise the importance of business and IT alignment, some businesses still do not comprehend the value and importance of alignment, and often, if they do realise the importance, they lack the expertise to perform the alignment task themselves. The need for a holistic, practical alignment methodology remains unmet (Chen, Kazman & Garg, 2004).

## 1.2. Problem statement and purpose of the study

Existing guidelines for alignment between business and IT are still insufficient (Simonsson & Johnson, 2006 and Chen, Kazman & Garg, 2004). The Control Objectives for Information and Related Technology (CobiT), issued by the IT Governance Institute (CobiT 4.1, 2007)), focuses on the types of controls that can be applied for alignment, but it fails to provide practical guidelines as to how the alignment should be achieved. CobiT does support most needs, but one of the shortfalls of CobiT is that it is lacking in the provision of information on how decision-making structures should be implemented (Simonsson & Johnson, 2006).

In light of the insufficient practical guidelines on alignment between business and IT, this study intends to build a model which demonstrates how to achieve alignment between business and IT.

This study aims to show that alignment should be achieved on two levels in a business in order to eliminate the gap between business and IT (Rudman, 2008). At the first level, business objectives must be aligned with IT

governance processes and objectives (Boshoff, 2007). IT objectives are the goals of the IT plan/policies/controls which define what the business expects from IT (CobiT 4.1, 2007). Here the first part of the IT gap may exist which could be difficult to identify and management may even be embarrassed to admit its existence. The gap on the first level (between business objectives and IT governance objectives) will be referred to as gap A for purposes of this study.

At the second level, the IT governance objectives identified at the first level must be aligned to the IT operations, consisting of IT processes and tasks (Boshoff, 2007). IT processes are the grouping of resources and automated business applications used when implementing the IT objectives (CobiT 4.1, 2007). The activities performed in the IT processes are referred to as the IT tasks (Boshoff, 2007). The second gap occurs where IT operations are not in line with business and governance requirements. For purposes of this study the gap on the second level will be referred to as gap B.

The purpose of this study is to attempt to develop a model for business and IT alignment to reduce the above mentioned gaps between business and IT. This model is practical, simple and readily adaptable to any business. Any organisation with a need to align their business and IT should be able to use the model to reduce the gap between these two sectors.

### 1.3. Research design and methodology

This study is a model-building study and the aim thereof is to develop a model to reduce the existing gap between business and IT. The study is non-empirical and is based on an extensive literature review. A deductive strategy is used, whereby strategic business imperatives is formulated from whence the solution (the model) is constructed.

In order to develop this model to reduce the gap between IT and business, this study is structured as follows:

The study starts by identifying strategic business imperatives (section 2). The strategic business imperatives identified were chosen to illustrate the working of the final model to align business and IT and thereby reduce the gap between business and IT.

In section 3 the objectives for IT operations are identified and the role of IT governance and the governance frameworks available are discussed. The IT governance objectives must be aligned with the strategic business imperatives and then with IT operations. By achieving this alignment, the gap between business and IT should be reduced.

The aim of this study is to reduce the gap between business and IT by alignment of business and IT. In section 4 this study focussed on the benefits of alignment and the risks of misalignment, as identified in the literature study. An understanding of the risks and the implications of these risks associated with the problem will determine whether it is necessary to solve the problem of misalignment between business and IT.

The IT gap is defined and analysed in section 5. Only once the problem has been identified and defined, can a possible solution be found. The development of a definition for the IT gap is conducted after an extensive review of existing literature.

The final model to reduce the gap between business and IT through comprehensive alignment was developed in section 6. This model shows the steps to be taken by any business to align their IT with the business and in doing so, reduce the gap between business and IT.

#### 1.4. Limitations of the study

The study is not specific to a particular industry and will reflect the observations and opinions of the author, based on the research conducted. It

aims to formulate a generic approach, to be adapted by individual organisations to help reduce the IT gap.

## **2. Identifying strategic business imperatives**

The purpose of a business is to offer goods or services that are in demand in a local or international community (Correia, Flynn, Uliana & Wormald, 2007). To be successful, a business must set objectives and meet these objectives. There are many generic (logical) objectives that apply to any business that aims to be successful, for example: to make profit; to reduce costs.

However, each business is unique and will therefore have core objectives that are specific to the business and its needs. Without setting and meeting these objectives, the particular business would not be successful. Achieving these objectives are strategic and vital for the survival of the business. This study will refer to these specific objectives as strategic business imperatives – core objectives that are essential and specific to each unique business. A well-managed organisation is likely to have existing strategic business imperatives as part of their strategic business plan. Not all of these strategic business imperatives will however have an impact on IT.

For the purposes of this study, 11 strategic business imperatives on which IT might have an impact were identified from the literature review. The specific 11 strategic business imperatives were chosen to illustrate the working of the final model to reduce the gap between business and IT. This list does not intend to be a complete list of all the strategic business imperatives that are influenced by IT.

- Customer service: ensure customer satisfaction by providing complete customer service.
- Cost information: manage costs to control expenditure and to ensure correct setting of prices.
- Cost efficiency: manage IT costs to receive the benefits IT can provide at the lowest cost.
- Total quality management: measure and evaluate processes, products and services to ensure quality.



- Reduction of time: enhance productivity by reducing the cycle time and minimising down-time of systems.
- Innovation: be first with new products and ideas.
- Total value chain analysis: manage the value chain to manage costs efficiently and ensure consumer satisfaction.
- Continuous improvement: evaluate the business to ensure continuous improvement.
- Empower employees to take responsibility (employee empowerment).
- Financial management: ensure accurate and efficient financial management.
- Social responsibility and corporate ethics: meet corporate ethics and social responsibility.

Each of the strategic business imperatives that are influenced by IT are discussed in the remainder of this section.

### 2.1. Customer service

Today consumers have access to more information on a wider range of products or services which enables consumers to make choices (Drury, 2004). The result of this is customers who are far more demanding. Customer service will have an impact on IT if the organisation is to keep customers satisfied. A good IT system is necessary to store information on customers, ranging from the first purchase to the efficient handling of complaints. If an organisation has competition and a wide range of customers, IT will have an impact on the strategic business imperative of good customer service.

### 2.2. Cost information

Customers are likely to buy the product with the lowest cost (Drury, 2004). If the manufacturing process or the process required to bring the product or service to customers is not complicated, an IT system is not necessary to

obtain cost information and to manage these costs. In this case, the business objective of having reliable and timely cost information will not be a strategic business imperative for IT purposes.

However, if it is not easy to determine and control costs, the IT system will be required to provide management with accurate cost information to determine and manage costs in order to set prices. This information will be used to analyse profits and to pinpoint loss-making products and activities. In this case, having reliable and timely cost information will be a strategic business imperative where IT will have an impact.

### 2.3. Cost efficiency

Cost efficiency is an additional strategic business imperative. IT will be cost efficient if the system is able to manage IT costs in order to reap the benefits that IT can provide for a business at the lowest possible cost (Boshoff, 2007).

### 2.4. Total quality management

Businesses are required to focus on total quality management. Total quality management is defined as the involvement of all business functions in a process of continuous quality improvement. Managers ought to realise that quality saves, rather than increases, cost. Quality results in reduced waste of resources – for example, to detect, rework, scrap or handle returned and substandard items. (Drury, 2004)

If it is important for an organisation to measure and evaluate the quality of products and services and the activities involved to produce them, total quality management will be a strategic business imperative for IT purposes.

### 2.5. Reduction of time

Customers expect on-time delivery. The time taken to develop, produce and deliver products is referred to as the cycle time. According to Drury, the

cycle time can be divided into time that adds value and non-value adding time. The only time that adds value is the processing time. The time it takes to move products during production, inspection time and waiting time does not add value to the product. Furthermore, if an organisation has online sale facilities, speed is essential to prevent customers from becoming frustrated with slow offline services and choosing to rather buy from a competitor. In addition, productivity of employees should be enhanced. A reliable IT system is required to monitor the time spent on each activity and to identify and report inefficient activities. (Drury, 2004)

## 2.6. Innovation

For most organisations success in a global market will depend on innovation. The organisation that is first to develop an innovative new product has an advantage above competitors. Businesses must be able to adapt to continuously changing customer requirements (Drury, 2004). If this is applicable to an organisation, it will be a strategic business imperative for them to have an IT system that can assess the key characteristics of new products and compare them to those of competitors. The system should be able to process feedback on customer satisfaction and generate information on the number of new products and the time taken to launch them.

## 2.7. Total value chain analysis

In order to increase customer satisfaction and manage costs more efficiently, the individual elements of the value chain must be coordinated to work together as a team. The value chain (illustrated in fig.1) is a linked set of value-creating activities from raw material suppliers to end users (Drury, 2004). The ultimate goal is to manage these linkages better than competitors and to attain this goal, a proficient IT system is required. A competent IT system can also result in large cost savings. Total value chain analysis will therefore be a strategic business imperative where IT will have an impact.

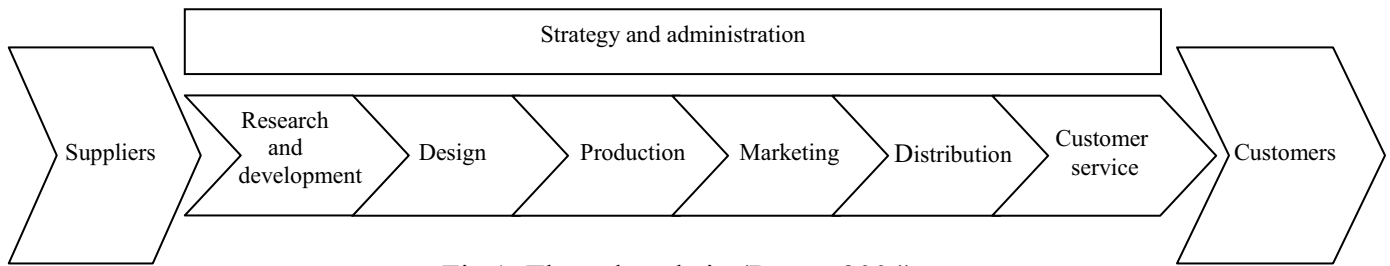


Fig.1: The value chain (Drury, 2004).

## 2.8. Continuous improvement

Business is an ongoing process. There is a continuous search to reduce costs, eliminate waste and to improve quality and performance. The technique that is increasingly being used to measure this is benchmarking (Drury, 2004). Benchmarking is a process whereby an organisation's products, services and other activities are measured against other organisations. If the focus is on external benchmarking, an IT system capable of performing benchmarking against the latest developments, best practices and model examples of other organisations is required and continuous improvement will become a strategic business imperative with an IT impact.

## 2.9. Employee empowerment

The people closest to the operating process and to the customers usually have the best practical knowledge of where improvement is required. In order to enable employees to make continuous improvements, they must be provided with relevant information. This will also enable employees to respond faster to customers, increase flexibility, reduce cycle time and improve overall morale (Drury, 2004). Granting this power to employees could be a risk, unless a sound IT system can help to control these powers.

## 2.10. Financial management

Meticulous financial management is crucial for any business. The need for a specialist IT system for accounting and financial management purposes will

depend on the size of the company, the complexity of calculations, the quality of information needed and the resource management required.

#### 2.11. Social responsibility and corporate ethics

It is becoming increasingly important for companies to maintain a good public image. This image includes aspects such as social responsibility, employee safety, environmentally friendly products and operations, and upholding corporate ethics (Romney & Steinbart, 2009). Depending on the size of the organisation, its operations and products, an IT system that can measure, monitor and report on its social responsibilities and corporate ethics may be required.

The environment in which a business operates is continually evolving (PAIB, 2006), especially in the case of IT resources. A business's objectives should continuously progress to adapt to growing needs, although the basic strategic business imperatives (core business objectives) should remain fairly constant.

### **3. IT objectives and IT governance**

#### 3.1. IT objectives

IT is an integral part of business (PAIB, 2006 and Reich & Benbasat, 2000) and embedded in all business activities (IBM, 2006). The IT operations of a business should support the strategic business imperatives by achieving the IT objectives (Romney & Steinbart, 2009). IT objectives are the goals of the IT plan/policies/controls which define what the business expects from IT (CobiT 4.1, 2007)

The role of IT in a business is to collect, provide and protect information to help the business achieve its objectives. Data regarding organisational activities, resources and personnel must be collected and stored by utilising IT. The collected data must then be transformed into useful information to enable management to make decisions and to plan, execute, control and evaluate business activities, resources and personnel. IT must also provide adequate controls to protect a business's assets, including data, to ensure that the data is available, accurate and reliable. (Romney & Steinbart, 2009)

The IT operations of a business consist of various IT processes and IT tasks. IT processes are the grouping of automated business applications and resources used when implementing the IT objectives (CobiT 4.1, 2007). The IT tasks, in turn, are the activities performed in the IT processes (Boshoff, 2007).

IT is required to meet business needs in the provision of service to business. Possessing the following characteristics, IT will help the business to achieve its strategic business imperatives:

##### 3.1.1. Effectiveness

Information provided by IT must be relevant, timely, correct, consistent and usable (IT Governance Institute, 2006). For information to be relevant, it has to reduce uncertainty and enable decision makers to make predictions

and confirm or correct prior expectations. Information is timely if it is provided in time for decision makers to plan ahead (Romney & Steinbart, 2009). Effectiveness of IT will be dependant on the hardware and software used by the business.

### 3.1.2. Efficiency

The information used in the business ought to be provided through the most productive and economical use of resources (IT Governance Institute, 2006). IT users should be consulted in the planning stages when implementing a new system, or when changes to an existing system are made to identify their specific needs. IT users should also be adequately trained to utilise the system to its full potential.

### 3.1.3. Confidentiality

If the information used by the business is sensitive it must be protected from unauthorised disclosure (IT Governance Institute, 2006). Sensitive information can include both organisational data and customer information.

### 3.1.4. Integrity

Information within the business must be valid in accordance with business values and expectations, and must be accurate and complete (IT Governance Institute, 2006). Good access control is of vital importance to ensure that data cannot be changed by an unauthorised user.

### 3.1.5. Availability

Information must be available when it is required by users or management within the organisation. Physical resources should also be safeguarded to ensure that they are available when required for business purposes (IT Governance Institute, 2006). A detailed business continuity plan to restore the normal service operations with a minimal impact on the business process should be in place in the case of a breakdown.

### 3.1.6. Compliance

External laws, regulations and contractual agreements, as well as internal policies that might be applicable to the specific business, must be complied with (IT Governance Institute, 2006).

### 3.1.7. Reliability

Appropriate information, which is both complete and accurate, must be available to management to enable them to manage the entity and exercise its fiduciary and governance responsibilities (IT Governance Institute, 2006).

### 3.1.8. Quality

Services should be at a level of quality that allows permanent reliance on them. For this to be the case, proper user support and sufficient procedures for handling and tracking complaints is required.

## 3.2. IT governance

The King II Report on Corporate Governance for South Africa was published in 2002 and recommends that:

“The board should make use of generally recognised risk management and internal control models and frameworks in order to maintain a sound system of risk management and internal control to provide a reasonable assurance regarding the achievement of organisational objectives ...” (PAIB, 2006).

According to the draft King III report, IT governance is a “framework that supports the effective and efficient management of information resources (for example people, funding and information) to facilitate the achievement of corporate objectives (Doughty and Grieco, 2005 (as cited by the Institute of Directors in Southern Africa, 2009)). IT governance should therefore be an integral part of the overall governance structures within a company.



IT governance, as a subordinate discipline of corporate governance, is concerned with the strategic alignment of IT to the business (Bowen et al., 2007). Various frameworks are available to provide guidelines on alignment of IT and business, for example the Control Objectives for Information and Related Technology (CobiT), ITIL and Prince2.

For purposes of this study CobiT will be used as framework to identify the IT governance objectives for alignment between business and IT. Ramos, 2004 and Pathak, 2003 (as cited by Brown & Nasuti, 2005) describe CobiT as the generally accepted IT standard for governance. The draft King III report also describes CobiT as an example of a common management framework for IT governance (Institute of Directors in Southern Africa, 2009). One of the goals contained in the CobiT framework is for CobiT to support IT governance by providing a framework to ensure that IT is aligned with business (PAIB, 2006).

The mission of CobiT is:

“To research, develop, publicise and promote an authoritative, up-to-date, internationally accepted IT governance control framework for adoption by enterprises and day-to-day use by business managers, IT professionals and assurance professionals.” (CobiT 4.1, 2007).

In the CobiT framework, IT activities and risks are ordered into four domains. The four domains are:

- Plan and Organise (PO)
- Acquire and Implement (AI)
- Deliver and Support (DS) and
- Monitor and evaluate (ME).

CobiT has identified 34 processes, organised into the four domains, to meet the IT characteristics required by business in order to achieve its strategic business imperatives. These 34 processes, seen in this study as the IT governance objectives, are the objectives that must be met by IT. To achieve

alignment these IT governance objectives must be aligned with strategic business imperatives.

The 34 processes, as it relates to this study, will now be discussed briefly.

#### PO1: Define a strategic IT plan

Strategic IT planning must be done in order to control and guide the IT resources to be in line with the business objectives and priorities. It is the responsibility of the IT department and business management to ensure that the most advantageous value is realised from project and service portfolios. This strategic IT plan should increase the main stakeholders' comprehension of IT abilities and boundaries, the measuring of present operations, determining the capability and human resource needs, and clarifies the extent of investment necessary. The business direction and requirements are to be manifested in portfolios and performed by the strategic IT plan, which should include brief goals, action plans and tasks that are comprehended and acknowledged by IT and business. (CobiT 4.1, 2007)

#### PO2: Define the information architecture

The IT function must produce, and frequently update, the business information model and has to identify the suitable systems to optimise the utilisation of this information. This approach increases the value of management decision making by ensuring that dependable and secure information is supplied, and it permits decreasing IT resources to aptly meet business objectives. This IT process should enlarge responsibility for the integrity and security of data and also increase the efficiency and control of distributing information across applications. (CobiT 4.1, 2007)

### PO3: Determine technological direction

The IT services function should determine the IT direction to support the business. This will entail the design of an IT infrastructure plan and an architecture board that establishes and administers transparent and realistic expectations of what IT can present in terms of products, services and delivery mechanisms. This IT infrastructure plan must be updated on a regular basis and should include features such as systems architecture, IT direction, acquisition procedures, standards, migration approaches and incident management. The IT infrastructure plan should facilitate apt reaction to changes in the competitive environment, economies of scale for information systems staffing and investments, along with improved interoperability of platforms and applications. (CobiT 4.1, 2007)

### PO4: Define the IT processes, organisation and relationships

The IT operations must be defined by taking into account the need for staff, expertise, functions, responsibility, authority, and supervision. The IT operations are set into an IT process framework that warrants clarity and control and the participation of senior management. One or more steering committees consisting of IT and business management and personnel should shape the prioritisation of IT resources to be in line with business requirements. IT should be included in the decision making process to ensure that IT sufficiently support business requirements. (CobiT 4.1, 2007)

### PO5: Manage the IT investment

A framework should be created and sustained to administer IT-enabled investment programmes. The investment programme framework should include cost, profit, prioritise the budget, and prescribe budgeting procedures. IT users must be conferred with to distinguish and manage the total costs and benefits within the framework of the strategic and tactical IT plans, and to take corrective action if required. This process encourage collaboration between IT and business users and results in the effective and efficient use of IT resources. (CobiT 4.1, 2007)

#### PO6: Communicate management aims and direction

Management must develop a business control framework for IT and identify and communicate policies. In order to convey the mission, objectives, policies and procedures that management have put in place, an ongoing communication programme must be executed. This communication programme supports accomplishment of IT goals and warrants the comprehension of business and IT risks, goals and mission. This process will also ensure compliance with the relevant laws and regulations. (CobiT 4.1, 2007)

#### PO7: Manage IT human resources

For IT to create and deliver a service to the business, skilled employees must be hired and retained. The defined and agreed-upon practices with regards to recruiting, training, evaluating performance, promoting and terminating must be followed to achieve this. These procedures are crucial, as people are valuable assets, and governance and the internal control environment are profoundly dependent on the motivation and competence of employees. (CobiT 4.1, 2007)

#### PO8: Manage quality

A quality management system (QMS) should be developed and preserved. This is made possible by planning, implementing and maintaining the QMS through the provision of transparent quality requirements, procedures and policies. "Quality requirements are stated and communicated in quantifiable and achievable indicators. Continuous improvement is achieved by ongoing monitoring, analysis, acting upon deviations and communicating results to stakeholders. Quality management is essential to ensure that IT is delivering value to the business, continuous improvement and transparency for stakeholders". (CobiT 4.1, 2007)

#### PO9: Assess and manage IT risks

A framework for management of IT risks has to be developed and maintained. This framework must record a mutual and agreed-upon level of IT risks. The impact of any unplanned event on the objectives of the business must be identified, evaluated and considered. Risk alleviation strategies should be accepted to reduce residual risk to an acceptable level. The outcome of this assessment is comprehended by the users and management and stated in financial terms, to enable management to align risk to an acceptable level of tolerance. (CobiT 4.1, 2007)

#### PO10: Manage projects

A programme and project management model for the management of IT projects must be created. This model guarantees the right prioritisation and co-ordination of the projects. The model consist of a master plan, allocation of resources, definition of deliverables, approval by users, a phased approach to delivery, quality assurance (QA), a formal test plan, and testing and post-implementation review after installation to ensure project risk management and value delivery to the business. This method decreases the risk of unpredicted expenses and project cancellations, enhances communication to and involvement by business and end users, ensures the value and quality of project deliverables, and maximises their contribution to IT-enabled investment programmes. (CobiT 4.1, 2007)

#### AI1: Identify automated solutions

Before a new application or function is acquired or developed, an analysis must be done to ensure that business needs are met in an effective and efficient manner. This analysis should include the definition of the requirements, contemplation of alternative sources, evaluation of technological and economic feasibility, completing of a risk analysis and cost-benefit analysis, and conclusion of a final decision to develop in-house or 'buy'. These actions enable businesses to reduce the cost of acquiring and implementing solutions to a minimum while ensuring that the objectives are achieved. (CobiT 4.1, 2007)

#### AI2: Acquire and maintain application software

Applications have to be made available to meet with business needs. This procedure includes the design of the applications, the enclosure of application controls and security requirements, and the development and configuration in line with standards. This will help IT to appropriately support business objectives with the correct automated applications. (CobiT 4.1, 2007)

#### AI3: Acquire and maintain technology infrastructure

The business should have a process for acquiring, implementing and upgrading the technology infrastructure. "A planned approach to acquisition, maintenance and protection of infrastructure in line with agreed-upon technology strategies and the provision of development and test environments is required". This approach should warrant the continuous technological support for business applications. (CobiT 4.1, 2007)

#### AI4: Enable operation and use

Knowledge about new systems should be made available. This will include documentation and manuals for end-users and IT personnel, and also

training to ensure the correct use and operation of applications and infrastructure. (CobiT 4.1, 2007)

#### AI5: Procure IT resources

IT resources, consisting of people, hardware, software and services, must be obtained. This requires formal procurement procedures, the selection of suppliers, the set-up of contractual arrangements, and the acquisition. This will ensure that the business is able to acquire all the required IT resources in a timely and cost-effective manner. (CobiT 4.1, 2007)

#### AI6: Manage changes

Alterations relating to IT infrastructure and applications within the production environment, including emergency maintenance and patches, should be properly managed. Modifications to procedures, processes and system and service parameters must be recorded, evaluated and authorised before implementation and assessed against planned outcomes following implementation. This will ensure the reduction of the risks that can impact negatively on the stability and integrity of the production environment. (CobiT 4.1, 2007)

#### AI7: Install and accredit solutions and changes

When development is completed, the new systems must be made operational. This will require detail testing in an assigned environment with relevant test data, definition of rollout and migration instructions, release planning and actual promotion to production, and a post-implementation review. This should then guarantee that the operational systems will meet the agreed-upon expectations and outcomes. (CobiT 4.1, 2007)

#### DS1: Define and manage service levels

The definitions and understanding of IT services and service levels should be communicated effectively between business users and IT management in formal documentation. This documentation should include monitoring and timely reporting to users and management on the achievement of service levels. This process should also enable alignment between IT services and the related business needs. (CobiT 4.1, 2007)

#### DS2: Manage third-party services

An effective third-party management process must be in place to warrant that services provided by third parties (suppliers, vendors and partners) meet business needs. In this process the roles, responsibilities and expectations in third-party agreements, as well as reviewing and monitoring such agreements for effectiveness and compliance, must be clearly defined. Effective management of third-party services reduces the business risk associated with non-performing suppliers to a minimum. (CobiT 4.1, 2007)

#### DS3: Manage performance and capacity

The present functioning and ability of IT resources must be reviewed regularly. This review will include estimation of future needs based on workload, storage and contingency requirements. This process will ensure that information resources supporting business needs are constantly available. (CobiT 4.1, 2007)

#### DS4: Ensure continuous service

The provision of continuous IT services requires the development, maintenance and testing of IT continuity plans, utilising off-site backup storage and the provision of periodic continuity planning training. An efficient continuous service process reduces the probability and impact of a major IT service interruption on key business functions and processes. (CobiT 4.1, 2007)



#### DS5: Ensure system security

A security management process is required to maintain the integrity of information and protect IT assets. This process includes establishing and maintaining IT security roles and responsibilities, policies, standards, and procedures. Security management also includes performing security monitoring and periodic testing and implementing corrective actions for identified security weaknesses or incidents. Effective security management protects all IT assets to minimise the business impact of security vulnerabilities and incidents. (CobiT 4.1, 2007)

#### DS6: Identify and allocate costs

IT costs must be measured accurately and allocated in accordance with the agreement with business users. This will require the establishment of a fair and equitable system of allocating IT costs to the business. This system should include building and operating a system to capture, allocate and report IT costs to the users of services. “A fair system of allocation enables the business to make more informed decisions regarding the use of IT services”. (CobiT 4.1, 2007)

#### DS7: Educate and train users

The training requirements for all IT users must be established to ensure the effective instruction of all users of IT systems. This process will also include defining and performing a strategy for successful training and measuring the results. A successful training programme should increase the efficient use of technology by minimising user errors, enhancing productivity and increasing compliance with key controls, for example user security measures. (CobiT 4.1, 2007)

#### DS8: Manage service desk and incidents

A service desk and incident management process which is well-designed and well-executed will ensure the provision of timely and effective responses to IT user queries and problems inquiries. This will include the set-up of a service desk function with registration, incident escalation, trend and root cause analysis, and resolution. The advantages for the business of this will include enhanced productivity through quick resolution of user queries. The business can also deal with root causes through effective reporting. (CobiT 4.1, 2007)

#### DS9: Manage the configurations

An accurate and complete configuration repository should be created and maintained to ensure the integrity of hardware and software configurations. This repository will include collecting of initial configuration information, establishing baselines, verifying and auditing configuration information, and updating the configuration repository when required. Efficient configuration management bring about better system availability, reduces production issues and resolves issues more speedily. (CobiT 4.1, 2007)

#### DS10: Manage problems

Problems should be identified and classified, the cause analysed and then resolved. This process of problem management will include the preparation of suggestions for improvement, maintenance of problem records and a review of the status of corrective actions. “An effective problem management process maximises system availability, improves service levels, reduces costs, and improves customer convenience and satisfaction”. (CobiT 4.1, 2007)

#### DS11: Manage data

In order to ensure effective data management, data requirements must be identified. The management of data should consist of the establishment of

effective procedures to manage the media library, back-up and recovery of data, and proper disposal of media. The effective management of data will help to ensure the quality, timeliness and availability of business data. (CobiT 4.1, 2007)

#### DS12: Manage the physical environment

Well-designed and well-managed physical facilities are required to ensure adequate protection of computer equipment and personnel. This process of managing the physical environment will include defining the physical site requirements, deciding on appropriate facilities and designing effective processes for monitoring environmental factors and managing physical access. This will minimise business interruptions due to damage or injury to computer equipment and personnel. (CobiT 4.1, 2007)

#### DS13: Manage operations

Management of data processing procedures and diligent maintenance of hardware must be efficient to ensure complete and accurate processing of data needs. These procedures will include defining of operating policies and procedures for efficient management of planned processing, protecting sensitive output, monitoring infrastructure performance and ensuring preventative maintenance of hardware. Effective management of operations will help to maintain data integrity and minimise business interruptions and IT operating costs. (CobiT 4.1, 2007)

#### ME1: Monitor and evaluate IT performance

Effective IT performance management is dependant on a monitoring process. This process should include defining relevant performance indicators, systematic and timely reporting of performance, and prompt response to deviations. Monitoring is required to ensure that the correct procedures are followed and that they resemble the set directions and policies. (CobiT 4.1, 2007)

## ME2: Monitor and evaluate internal control

A well-defined monitoring process must be in place that establishes an efficient internal control programme for IT. This monitoring process consists of the monitoring and reporting of control errors, results of self-assessments and third-party reviews. “A key benefit of internal control monitoring is the provision of assurance regarding effective and efficient operations and compliance with applicable laws and regulations”. (CobiT 4.1, 2007)

## ME3: Ensure compliance with external requirements

A review process to ensure compliance with laws, regulations and contractual requirements will lead to effective management of compliance. This review process comprise of the identification of compliance requirements, optimising and assessing the response, gaining assurance that the requirements have been met and also the integration of IT’s compliance reporting with the business as a whole. (CobiT 4.1, 2007)

## ME4: Provide IT governance

The establishment of an effective governance framework must include the definition of organisational structures, processes, leadership, roles and responsibilities to guarantee that the business’ IT investments are in line with the mission and goals of the business. (CobiT 4.1, 2007)

This study attempts to generate a model to help organisations identify the processes from CobiT which are relevant to their business in order to align the applicable processes to strategic business imperatives with the purpose of reducing the gap between business and IT.

#### 4. Alignment

One of the principles in the draft King III report is that “the board should ensure that IT is aligned with business objectives...” (Institute of Directors in Southern Africa, 2009). All businesses have objectives that are crucial to their success. The draft King III report states that it is important for the board to guide management in aligning IT operations with real business requirements (Institute of Directors in Southern Africa, 2009). This is illustrated in figure 2.

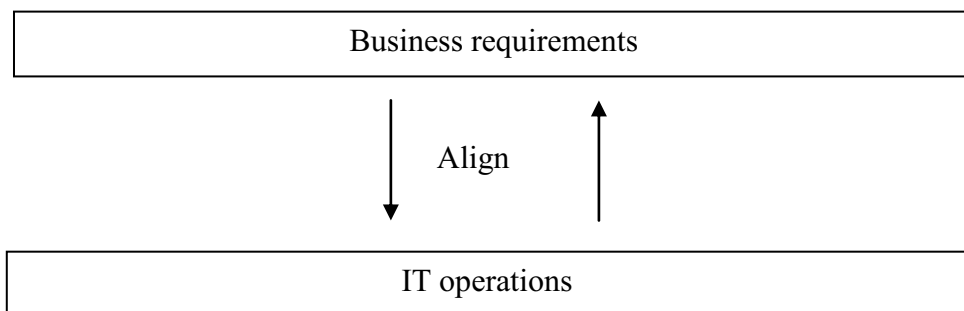


Fig. 2 Alignment between business and IT

The draft King III report stated that “successful companies understand and manage the risks and constraints of IT” (Institute of Directors in Southern Africa, 2009).

It is reasonable and logical to assume that companies that are focused and well managed will achieve better results than those that are not. IT is a critical element of most companies, and a company in which IT is aligned with the business and managed as part of the business, should have an advantage above other companies where IT is not aligned with the business.

##### 4.1. Advantages of alignment between business and IT

The assumption that it is to a business’ advantage to align business and IT, has been confirmed by various studies. These studies concluded that companies who believed they had achieved alignment reported the following advantages over less integrated peers:

- A move from fixed to variable costs (IBM, 2006).

- Shared or reduced risk and capital investment (IBM, 2006).
- Access to skills/products (IBM, 2006).
- Focus and specialisation (IBM, 2006).
- Faster time-to-market (IBM, 2006).
- Better access to market/customers (IBM, 2006).
- Overall speed and strategic flexibility (IBM, 2006).
- Increased revenue (IBM, 2006).
- Higher quality/customer satisfaction (IBM, 2006).
- Reduced costs (IBM, 2006, Shpilberg, Berez, Puryear & Shah, 2007).
- Increased growth rate (Shpilberg et al., 2007).

An organisation might not perceive the advantages as sufficient reason to make alignment between business and IT a high priority. The question, however, should rather pertain to what the risks of misalignment are and not so much what the advantages of alignment are. It is important to understand the risks and the implications of the risks associated with misalignment in the process of making a decision on whether it is really necessary to align business and IT. Being under the impression that business and IT are aligned, when, in fact, this is not the case, could result in a very unwelcome eye-opener.

#### 4.2. Risks of misalignment between business and IT

As IT is an integral part of business (PAIB, 2006 and Reich & Benbasat, 2000) misalignment of IT and business could have an enterprise wide business effect. Not only will the company as a whole miss out on the advantages of alignment, but it could also be affected very negatively by misalignment.

The major risks of misalignment identified by researchers are discussed below:

- Misalignment could prevent a company from achieving its mission and business objectives due to weak support of business objectives

by IT. This results in a shortfall from management's measurements and expectations (Bakari, Tarimo, Yngström, Magnusson & Kowalski, 2007).

- Business interruptions and ineffective IT services could lead to financial loss, embarrassing media coverage, loss of confidence by customers and staff (Bakari et al., 2007) and loss of customers and market share.
- Misalignment could also lead to the ineffective use of IT resources, resulting in unnecessarily high IT costs and overheads (IBM, 2006).
- Legal action, again leading to bad publicity, and high legal costs, could also be a consequence of misalignment (Bakari et al., 2007).
- For most organisations, success in a global market will depend on innovation. The organisation that is first to develop an innovative new product has an advantage over competitors. In other words, without proper alignment between business and IT, precious opportunities could be wasted (IT Governance Institute, 2006).
- Ineffective and incomplete IT controls, leading to inadequate processing and reporting of information is another big risk of misalignment.

These risks indicate that misalignment of business and IT can doom IT to either irrelevance or failure (Shpilberg et al., 2007), whereas alignment can provide an organisation with a multitude of advantages. Alignment must be achieved to reduce the IT gap and thereby position a business to have advantages such as those identified in section 4.1, above other organisations.

## 5. Defining and analysing the IT gap

The Oxford English Dictionary defines the word gap as “any opening or breach in an otherwise continuous object; ... a weak point; a blank or deficiency; a break in continuity. Also, a difference in development, condition, understanding, etc.” (Oxford English Dictionary, 1989).

By merely examining the definition, it is clear that the existence of any gap (misalignment) in a business could be detrimental. Consider the words: opening, breach, weakness and deficiency. If this gap or misalignment exists in an integral part of the business, the risk increases even more and the consequences could be disastrous.

### 5.1. Defining the IT gap

The risks of misalignment between business and IT were discussed in section 5.2. The gap between business and IT is referred to as the IT gap for purposes of this study. Both business and IT managers acknowledge the existence of this infamous gap in alignment between their respective sectors. In a study conducted by IBM in 2006, the majority of CEOs admitted to being unable to integrate business and technology to the desired extent (IBM, 2006). In another study, only 18% of the respondents believed that their company’s IT spending was highly aligned with business priorities (Shpilberg et al., 2007).

### 5.2. Reasons for the existence of the IT gap

The IT gap exists mainly as a result of the difference between management’s expectations of IT and what actually occurs in IT (Rudman, 2008 and The Economist, 2006).

A few other reasons for the existence of this gap are listed below:

- Business managers’ poor understanding of IT’s capacity to support the business objectives (The Economist, 2006);



- Business managers' lack of understanding the technology (the IDC US Market Watch Survey in July 2006, as cited in *The Economist*, 2006);
- Inadequate communication, or a lack of understanding from both the business side and the IT side (Coughlan, Lycett & Macredie, 2005);
- A perception problem: the business team and the IT team view IT from two very different perspectives, using different measures of success. Business sees it as a IT concern, whereas IT sees it as a business problem (Simkova & Basl, 2006 and Bakari et al., 2007);
- IT managers often don't have a clear perspective of the business health of critical processes that their IT systems are supporting (Simkova & Basl, 2006);
- In business, change is constant and misalignment between business and IT is inevitable (Chen et al., 2004);
- Business executives' goals for IT differ from the goals that the IT department has for itself (Simkova & Basl, 2006).

### 5.3. Analysing the IT gap

By aligning business and IT, the IT gap can be reduced. IT governance, as a subordinate discipline of corporate governance, is concerned with the strategic alignment of IT to the business (Bowen et al., 2007) and therefore aims to reduce the IT gap.

In order to achieve alignment, the IT gap needs to be addressed on two levels:

- Gap A: at the first level the gap occurs where business objectives (as described in section 2) must be aligned with IT governance objectives (as described in section 3.2).
- Gap B: on the second level the IT governance objectives (section 3.2) must be aligned with IT operations (section 3.1).

5.3.1. Gap A: the gap between strategic business imperatives and IT governance objectives

According to Romney and Steinbart, goal conflict occurs when a decision or action of a subdivision of business is inconsistent with the goals of the organisation as a whole. Goal congruence is achieved when a subdivision achieves its goals while contributing to the organisation's overall goals. Subdivisions should therefore strive to maximise organisational goals, even if that subdivision's goals are not maximised (Romney & Steinbart, 2009). As a subdivision of business, IT should aim to maximise the overall business objectives.

Each business must identify their strategic imperatives and then assess the impact (if any) of the strategic business imperatives on IT. Once it has been decided which strategic business imperatives have IT implications, the IT governance objectives for the specific imperatives can be identified.

It is at this point where the first part of the IT gap (gap A) originates. Business managers fail to link the strategic business imperatives to the relevant IT governance objectives or omit business objectives, resulting in IT not meeting the strategic business imperatives, even if alignment on the second level (linking IT governance objectives to IT operations) is achieved.

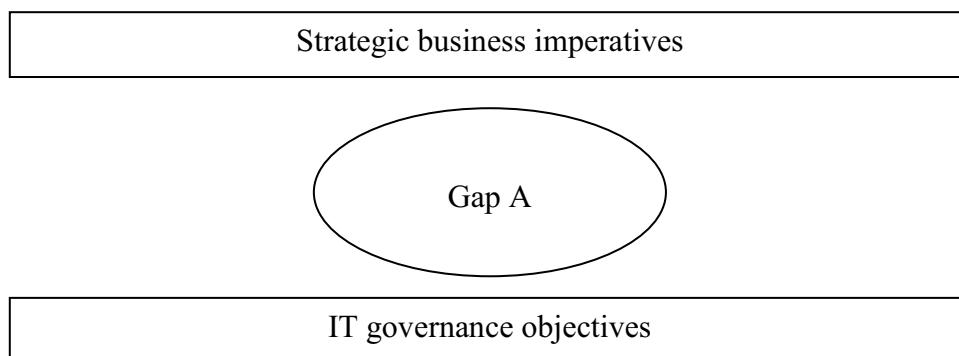


Fig. 3: Gap A

### 5.3.2. Gap B: the gap between IT governance objectives and IT operations

IT governance is a subordinate discipline of corporate governance, helping businesses to align IT operations to their business objectives. The second

gap takes shape here, where the actual work (installation, configuration, maintenance, etc.) or IT operations are done.

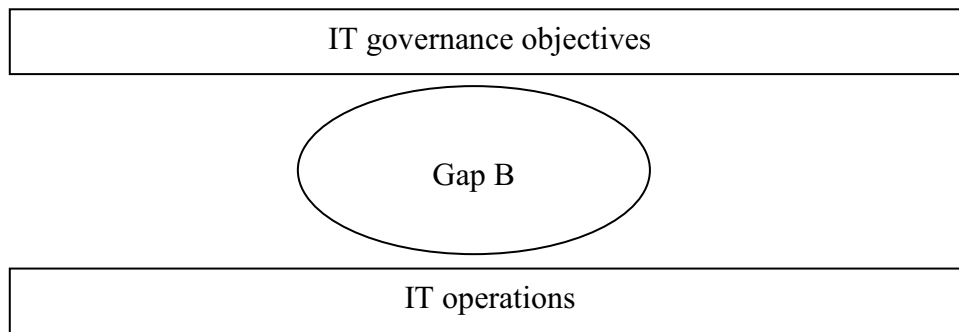


Fig. 4: Gap B

IT specialists do not always understand the strategic business imperatives, or, in the worst case scenario, may not even be aware of them. They therefore do not comprehend the impact of IT not meeting these imperatives. Similarly, business managers may not see the need for IT to grasp these imperatives and will therefore not realise the consequences of IT not meeting the strategic business imperatives. IT objectives are mistakenly viewed as separate objectives with no relation to business objectives.

What managers would like to happen (to meet strategic business imperatives and to adhere to corporate and IT governance) and what actually happens in IT are two separate matters (Rudman, 2008). The IBM Global CEO Study 2006 found that the overwhelming majority of CEOs are challenged by the large gap that exists between their current and desired levels of business and technology integration (IBM, 2006).

#### 5.4 Reducing the IT gap

When the IT gap (gap A and gap B) is eliminated it will result in the alignment of business and IT. The two levels where the IT gap exists and which needs to be eliminated are illustrated in figure 5.

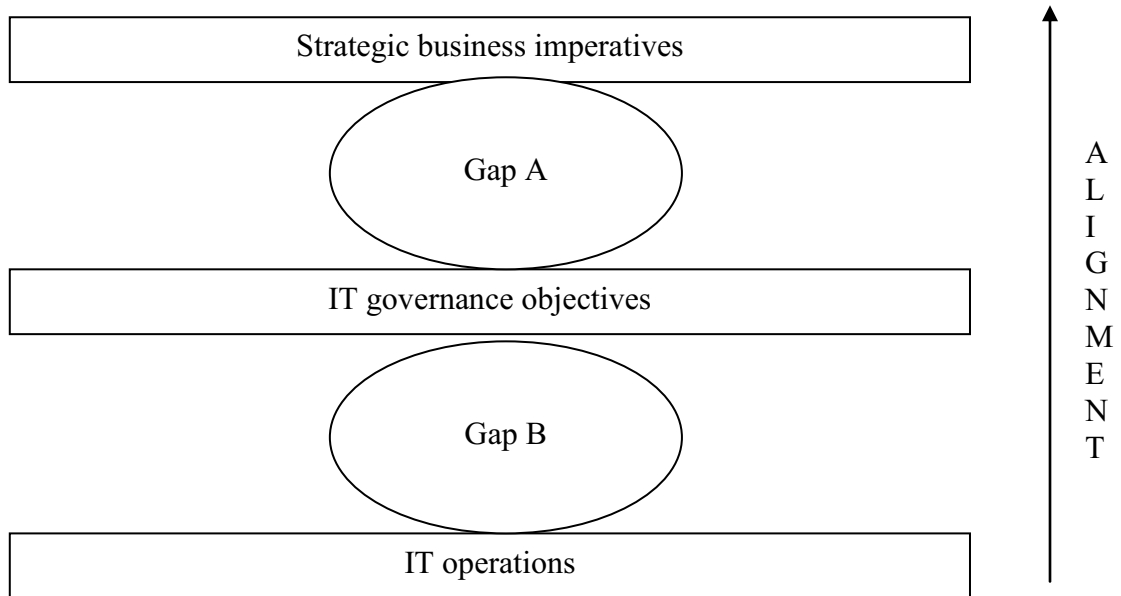


Fig. 5: Two levels to align (Rudman, 2008 and Boshoff, 2007, adapted)

As the problem has now been identified and analysed a possible model as a solution to the alignment problem, can now be designed.

## 6. Model for alignment between business and IT

The solution to the alignment problem needs to be addressed on two levels, gap A and gap B, as identified in the previous section.

### 6.1 Reducing gap A:

By aligning the IT governance objectives to the identified strategic business objectives, gap A will be reduced, thereby ensuring that IT and business work together towards the same goals in order to strengthen the business.

It is easier to blame the IT gap on business and IT misunderstanding each other, than to admit that the gap starts with the failure of management to adequately link IT governance objectives with strategic business imperatives.

Tables 1.1 to 1.11 illustrate how the 11 strategic business imperatives (identified in section 2) can be linked to the IT governance objectives (taken from the IT processes from CobiT - identified in section 3.2):

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
1. Customer service	PO1	Define a strategic IT plan
	PO3	Determine technological direction
	AI1	Identify automated solutions
	AI2	Acquire and maintain application software
	DS3	Manage performance and capacity
	DS4	Ensure continuous service
	DS10	Manage problems

Table 1.1

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
2. Cost information	PO1	Define a strategic IT plan
	PO2	Define the information architecture
	AI2	Acquire and maintain application software
	AI7	Install and accredit solutions and changes
	DS3	Manage performance and capacity
	DS5	Ensure systems security
	DS7	Educate and train users
	DS11	Manage data
	DS13	Manage operations

Table 1.2

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
3. Cost efficiency	PO1	Define a strategic IT plan
	PO3	Determine technological direction
	PO5	Manage the IT investment
	PO10	Manage projects
	AI1	Identify automated solutions
	AI5	Procure IT resources
	DS6	Identify and allocate costs
	DS10	Manage problems
	DS13	Manage operations

Table 1.3

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
4. Total quality management	PO3	Determine technological direction
	PO4	Define the IT processes, organisation and relationships
	PO6	Communicate management aims and direction
	PO8	Manage quality
	PO10	Manage projects
	AI1	Identify automated solutions
	AI2	Acquire and maintain application software
	AI6	Manage changes
	DS1	Define and manage service levels
	DS2	Manage third-party services
	DS8	Manage service desk and incidents
	DS11	Manage data
	ME2	Monitor and evaluate internal control
	ME3	Ensure compliance with external requirements

Table 1.4

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
5. Time reduction	PO3	Determine technological direction
	PO4	Define the IT processes, organisation and relationships
	PO7	Manage IT human resources
	AI2	Acquire and maintain application software
	AI4	Enable operation and use
	AI6	Manage changes
	DS2	Manage third-party services
	DS3	Manage performance and capacity
	DS4	Ensure continuous service
	DS5	Ensure systems security
	DS7	Educate and train users
	DS8	Manage service desk and incidents
	DS9	Manage the configuration
	DS10	Manage problems
	DS12	Manage the physical environment
	DS13	Manage operations
	ME2	Monitor and evaluate internal control

Table 1.5



<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
6. Innovation	PO1	Define a strategic IT plan
	PO2	Define the information architecture
	PO3	Determine technological direction
	PO8	Manage quality
	AI1	Identify automated solutions
	AI2	Acquire and maintain application software
	DS3	Manage performance and capacity
	DS5	Ensure systems security
	DS11	Manage data
	DS13	Manage operations

Table 1.6

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
7. Total value chain analysis	PO1	Define a strategic IT plan
	PO2	Define the information architecture
	PO4	Define the IT processes, organisation and relationships
	PO8	Manage quality
	PO9	Assess and manage IT risks
	PO10	Manage projects
	AI2	Acquire and maintain application software
	AI6	Manage changes
	DS1	Define and manage service levels
	DS4	Ensure continuous service
	DS6	Identify and allocate costs
	DS9	Manage the configuration
	DS10	Manage problems
	DS13	Manage operations
ME2	Monitor and evaluate internal control	

Table 1.7

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
8. Continuous improvement	PO2	Define the information architecture
	PO3	Determine technological direction
	PO8	Manage quality
	AI1	Identify automated solutions
	AI4	Enable operation and use
	DS3	Manage performance and capacity
	DS11	Manage data
	ME1	Monitor and evaluate IT performance
	ME3	Ensure compliance with external requirements
	ME4	Provide IT governance

Table 1.8

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
9. Employee empowerment	PO2	Define the information architecture
	PO4	Define the IT processes, organisation and relationships
	PO5	Manage the IT investment
	PO7	Manage IT human resources
	AI2	Acquire and maintain application software
	AI4	Enable operation and use
	AI5	Procure IT resources
	DS5	Ensure systems security
	DS7	Educate and train users
	DS8	Manage service desk and incidents
	DS10	Manage problems
	DS13	Manage operations
	ME2	Monitor and evaluate internal control

Table 1.9

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
10. Financial management	PO1	Define a strategic IT plan
	PO2	Define the information architecture
	PO4	Define the IT processes, organisation and relationships
	PO5	Manage the IT investment
	PO6	Communicate management aims and direction
	PO9	Assess and manage IT risks
	AI1	Identify automated solutions
	AI2	Acquire and maintain application software
	AI5	Procure IT resources
	DS3	Manage performance and capacity
	DS5	Ensure systems security
	DS6	Identify and allocate costs
	DS7	Educate and train users
	DS11	Manage data
	DS13	Manage operations
	ME2	Monitor and evaluate internal control
	ME3	Ensure compliance with external requirements

Table 1.10

<b>Strategic business imperative</b>	<b>IT governance objectives</b>	
11. Social responsibility and corporate ethics	PO2	Define the information architecture
	PO4	Define the IT processes, organisation and relationships
	PO6	Communicate management aims and direction
	AI3	Acquire and maintain technology infrastructure
	DS2	Manage third-party services
	DS12	Manage the physical environment
	DS13	Manage operations
	ME1	Monitor and evaluate IT performance
	ME2	Monitor and evaluate internal control
	ME3	Ensure compliance with external requirements

Table 1.11

By aligning strategic business imperatives with IT governance objectives, gap A of the IT gap is reduced.

Only once alignment is achieved on level 1 (gap A), may an attempt be made to reduce the gap on the second level, gap B.

## 6.2 Reducing gap B:

Once the strategic business imperatives are aligned to the IT governance objectives, these IT governance objectives must be aligned with IT operations. IT operations are often not properly linked to IT governance objectives. Although CobiT was used to identify IT governance objectives, CobiT lacks in the provision of information on how these objectives should be implemented (Simonsson & Johnson, 2006). CobiT applies the concept of internal control to IT only, and not to the business as a whole (PAIB, 2006).

Therefore, in an attempt to reduce the second gap, it might be necessary to use additional frameworks to link the IT governance objectives to the IT operations. Various frameworks are available, as is a document mapping these frameworks to CobiT – “CobiT Mapping: Overview of international IT guidance, 2<sup>nd</sup> edition” (IT Governance Institute, 2006.). The following frameworks were identified and mapped to CobiT in the above mentioned document (IT Governance Institute, 2006):

**COSO *Internal Control – Integrated Framework*** defines a framework that initiates an integrated process of internal control.

**ITIL** – The IT Infrastructure Library® is a collection of best practices in IT service management. It focuses on the service processes of IT and considers the central role of the user.

**ISO/IEC 17799:2005** – The *Code of Practice for Information Security Management* is an international standard based on BS 7799-1/ISO/IEC 17799:2000. It is presented as best practice for implementing information relating to security management.

**FIPS PUB 200** – The *Minimum Security Requirements for Federal Information and Information Systems* is applicable to federal government organisations in the US. It defines categories for systems and guidelines for information security controls.

**ISO/IEC TR 13335** – The technical report *Guidelines for the Management of IT Security* contains information on IT security management, not only

from the planning perspective, but also from the implementation and maintenance perspectives.

**ISO/IEC 15408:2005** – *Security Techniques – Evaluation Criteria for IT Security* is used as a reference to evaluate and certify the security of IT products and services.

**PRINCE2** – Projects in Controlled Environments (PRINCE) provides a structured method for effective project management, published in a single document, *Managing Successful Projects With PRINCE2*.

**PMBOK** – *A Guide to the Project Management Body of Knowledge* (PMBOK® Guide) is described as ‘the sum of knowledge within the profession of project management’. It is an American National Standard, ANSI/PMI 99-001-2004.

**TickIT** provides a scheme for the certification of the software quality management system. It intends to improve the effectiveness of the quality management system and targets customers, suppliers and assurance professionals.

**CMMI** – *Capability Maturity Model Integration*® combines three source models – Capability Maturity Model for Software (SWCMM) v2.0 draft C, Electronic Industries Alliance Interim Standard (EIA/IS) 731 and Integrated Product Development Capability Maturity Model (IPD-CMM) v0.98 – into a single improvement framework for use by organisations pursuing enterprise wide process improvement.

**TOGAF 8.1** provides a detailed method and a set of supporting tools for developing an enterprise architecture.

**IT Baseline Protection Manual** provides IT security standard safeguards.

**NIST 800-14** – The US National Institute of Standards and Technology’s special publication *Generally Accepted Principles and Practices for Securing Information Technology Systems* contains information for establishing a comprehensive IT security programme.

Each business is unique and has its own specific needs. There is thus not a single governance framework that will be suitable for all businesses. Available frameworks must be studied, and the best framework, or frameworks, for the specific business needs should be chosen and applied to the business (King, 2007).

By selecting and applying the appropriate framework(s), the gap between IT governance objectives and IT operations can be partially reduced. According to Rudman, 2008, when selecting the appropriate frameworks, the following steps should be followed:

1. Determine IT governance objectives as well as the business, strategic and operational context.
2. Obtain a full understanding of the IT governance framework(s) available.
3. Assess usefulness of the framework(s).
4. Understand the environment in which the governance framework is to be implemented at a process, operational, application and infrastructure level.
5. If various governance frameworks are to be integrated, determine the relationships and interaction between them.
6. Set simplified attainable outcomes.
7. Evaluate the appropriateness of the proposed governance framework in terms of common sense.
8. Implement the IT governance framework in the same manner as any project with full stakeholder participation.
9. Evaluate the framework against the stated objectives.
10. Assess the complexity surrounding the implementation of the framework and re-evaluate the process if necessary.

In order to identify the best practices to reduce the gap between IT governance objectives and IT operations a few basic principles, identified in various studies, must be followed.

- Clear communication between IT and business is a key principle. “...many IT leaders don’t speak ‘business’; they speak technology. Business leaders, on the other hand, speak the language of business. The combination leads to ineffective communication...” (IBM, 2006). The solution to this problem entails basic explanations of the terms used by both IT personnel and management. IT and business personnel must make an effort to understand each other’s languages. This includes the effective sharing of information, understanding

and awareness of the leverage points of the industry, the history and current issues of the business, and learning how to apply common sense in the application of technology to business. Such communication helps to focus IT's attention on those technologies and ideas that could produce the most benefit for the business, rather than those that offer the most technical promise (Reich & Benbasat, 2000). Shared domain knowledge, including both IT-knowledgeable business managers and business-knowledgeable IT managers (Reich & Benbasat, 2000) will positively influence the communication between business and IT, ultimately resulting in better alignment between business and IT.

- Secondly, healthy interpersonal relationships are vital. The appointment of the CIO as a Board member (King, 2007) is essential to ensure that there is a shared ownership and shared governance of IT (Shpilberg et al., 2007). It will also increase the ability of IT and business executives, at an in depth level, to understand and participate in each other's key processes and to respect each other's unique contributions and challenges (Reich & Benbasat, 2000). CIOs are able to provide a bridge between IT and business. All other staff members should be made aware of the company's strategic business imperatives and the IT governance objectives to ensure that they take responsibility for their part in the business process as a whole (Hardy, 2006).
- The involvement of senior management during the entire process is essential to ensure that IT capabilities are sufficient to meet the business objectives. IT governance is the responsibility of executive management and the Board (Von Solms & Von Solms, 2005 and Institute of Director in Southern Africa, 2009). It is becoming increasingly important to have or hire senior IT staff with both business and IT experience (The Economist, 2006). During the past decade there has been a general rise in IT literacy among business executives, which has affected their views on how IT capabilities can meet and enhance business objectives (The Economist, 2006).



- All parties must understand how the governance decisions are made and must accept responsibility for the effective use thereof. It is important for IT professionals to understand how to apply a framework's principles to their day-to-day operations (IBM, 2006). Enabling IT personnel to better understand the business and governance objectives, will grant IT service managers and service owners a better business perspective and the right level of knowledge to respond to the business (Simkova & Basl, 2006).
- Management and IT should communicate and document their expectations and ensure that they are realistic (IBM, 2006).
- Each party involved must have specific responsibilities and be held accountable for their work. It is important to ensure that all employees understand the importance of the decisions they make and they should be made aware of the consequences, to themselves and the business, if their work does not meet the requirements. Everyone in the business should work together as one team towards their common goal. If individuals are given responsibility, and are involved in the process and understand the goals and risks, they can be held accountable for their decisions and work. If not, they may just aim to get the job done, no matter the consequences to the company (IBM, 2006).

### 6.3 A model to reduce the IT gap

By implementing the guidelines above, and adjusting them to the specific needs of each unique business, the IT gap (gap A and gap B) can be eliminated and IT can be aligned to business. This solution to the problem of aligning business and IT is illustrated in figure 6.

Alignment can be achieved in any business by following the simple, adaptable steps outlined in the model.

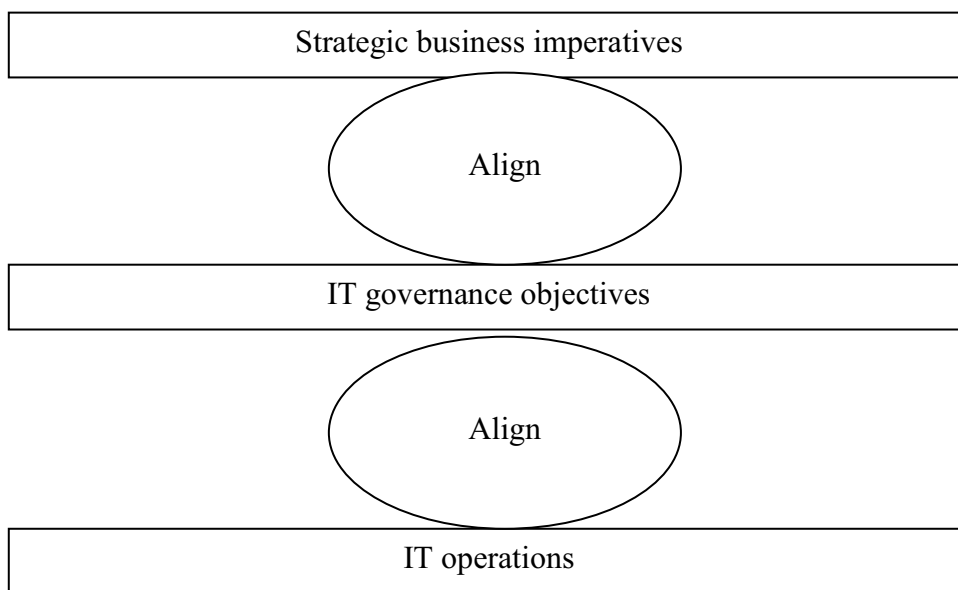


Fig. 6: Model for alignment between business and IT

## **7. Conclusion**

Even though many models have been developed to reduce the gap between IT and business, the problem of misalignment between business and IT still exists (Simonsson & Johnson, 2006).

The aim of this study was to attempt to develop a model to reduce the gap between business and IT. This model was derived at by doing an extensive literature review.

This study found that the IT gap originates on two levels, in this study referred to as gap A and gap B. Gap A comes from a misalignment between business objectives and IT governance objectives. The second gap, gap B, stems from a lack of alignment between IT operations and the above mentioned IT governance objectives.

A model to reduce this gap was designed and is depicted in the end of section 6. From figure 6 the following steps to reduce the gap between business and IT can be identified:

Step 1: Identify strategic business imperatives with an IT impact (refer to section 2);

Step 2: Identify the relevant IT governance objectives (refer to section 3.2);

Step 3: Link the strategic business imperatives to the IT governance objectives, thereby achieving alignment on the first level (refer to section 6.1); and

Step 4: Identify available solutions and suggesting best practices to align IT governance objectives from step 3 with IT operations (refer to section 6.2).

The model to reduce the IT gap developed in the study is practical, simple and easily adaptable to any business. Any organisation with the need to

align their business and IT could apply the steps in this model to their specific business needs and requirements.

## 8. References

Bakari, J.K., Tarimo, C.N., Yngström, L., Magnusson, C. & Kowalski, S. 2007. Bridging the gap between general management and technicians – A case study on ICT security in a developing country. *Computers & Security*, 26: 44-55. Online: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6V8G-4MFK3YC2&\\_user=613892&\\_coverDate=02%2F28%2F2007&\\_alid=752765336&\\_rdoc=1&\\_fmt=high&\\_orig=search&\\_cdi=5870&\\_sort=d&\\_st=4&\\_docanchor=&\\_ct=1&\\_acct=C000032099&\\_version=1&\\_urlVersion=0&\\_userid=613892&md5=70cf401bdb252eccc03face1b7bffa64](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V8G-4MFK3YC2&_user=613892&_coverDate=02%2F28%2F2007&_alid=752765336&_rdoc=1&_fmt=high&_orig=search&_cdi=5870&_sort=d&_st=4&_docanchor=&_ct=1&_acct=C000032099&_version=1&_urlVersion=0&_userid=613892&md5=70cf401bdb252eccc03face1b7bffa64). Accessed 19 March 2008.

Bhattacharjya, J. & Chang, V. 2006. Evolving IT Governance Practices for IT and Business Alignment – A Case Study in an Australian Institution. Proceedings of Conference on Information Science, Technology and Management (CISTM 2006), Chandigarh, India. July 16-18. Online: <http://www.information-quarterly.org/CISTMProc/CISTM-06-CD/pdfs/22.doc>. Accessed 18 March 2008.

Bleinstein, S.J., Cox, K., Verner, J. & Phalp, K.T. 2005. B-SCP: A requirements analysis framework for validating strategic alignment of organizational IT based on strategy, context, and process. *Information and software technology*, 48: 846-868. Online: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6V0B-4J55603-2&\\_user=613892&\\_coverDate=09%2F30%2F2006&\\_alid=749603705&\\_rdoc=1&\\_fmt=high&\\_orig=search&\\_cdi=5642&\\_sort=d&\\_st=4&\\_docanchor=&\\_ct=1&\\_acct=C000032099&\\_version=1&\\_urlVersion=0&\\_userid=613892&md5=3334ec2c12abd75e11e569fb3355bf10](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V0B-4J55603-2&_user=613892&_coverDate=09%2F30%2F2006&_alid=749603705&_rdoc=1&_fmt=high&_orig=search&_cdi=5642&_sort=d&_st=4&_docanchor=&_ct=1&_acct=C000032099&_version=1&_urlVersion=0&_userid=613892&md5=3334ec2c12abd75e11e569fb3355bf10). Accessed 19 March 2008.

Boshoff, W. 2007. *IT Governance: IT Governance frameworks and their Integration*. Masters in Accounting (Computer Auditing) presentation. Stellenbosch University. September 2007.

Bowen, P.L., Cheung, M.D. & Rhode, F.H. 2007. Enhancing IT governance practices: A model and case study of an organization's efforts. *International Journal of Accounting Information systems*, 8: 191-221. Online: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6W6B-4PJD9TB-1&\\_user=613892&\\_coverDate=09%2F30%2F2007&\\_alid=750251215&\\_rdoc=1&\\_fmt=high&\\_orig=search&\\_cdi=6594&\\_sort=d&\\_st=4&\\_docanchor=&\\_ct=1&\\_acct=C000032099&\\_version=1&\\_urlVersion=0&\\_userid=613892&md5=63c10b095e8a60833f7f1a66650c637c](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6W6B-4PJD9TB-1&_user=613892&_coverDate=09%2F30%2F2007&_alid=750251215&_rdoc=1&_fmt=high&_orig=search&_cdi=6594&_sort=d&_st=4&_docanchor=&_ct=1&_acct=C000032099&_version=1&_urlVersion=0&_userid=613892&md5=63c10b095e8a60833f7f1a66650c637c). Accessed 19 March 2008.

Brown, W. & Nasuti, F. 2005. What ERP systems can tell us about Sarbanes-Oxley. *Information Management & Computer Security*, 13(4): 311-327. Online: <http://www.emeraldinsight.com/Insight/ViewContentServlet?Filename=/published/emeraldfulltextarticle/pdf/0460130405.pdf> Accessed 20 March 2008.

Chen, H., Kazman, R. & Garg, A. 2004. BITAM: An engineering-principled method for managing misalignments between business and IT architectures. *Science of Computer Programming*, 57: 5-26. Online: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6V17-4F924NN-1&\\_user=613892&\\_coverDate=07%2F31%2F2005&\\_alid=749675914&\\_rdoc=1&\\_fmt=high&\\_orig=search&\\_cdi=5667&\\_sort=d&\\_st=4&\\_docanchor=&\\_ct=1&\\_acct=C000032099&\\_version=1&\\_urlVersion=0&\\_userid=613892&md5=2fcb146e8e415ba1f9f5394a1ade579c](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6V17-4F924NN-1&_user=613892&_coverDate=07%2F31%2F2005&_alid=749675914&_rdoc=1&_fmt=high&_orig=search&_cdi=5667&_sort=d&_st=4&_docanchor=&_ct=1&_acct=C000032099&_version=1&_urlVersion=0&_userid=613892&md5=2fcb146e8e415ba1f9f5394a1ade579c). Accessed: 19 March 2008.

COBIT 4.1. IT Governance Institute 2007.

Correia, C., Flynn, D., Uliana, E. & Wormald, M. 2007. *Financial management* (6<sup>th</sup> ed.). Paarl: Juta.

Coughlan, J., Lycett, M. & Macredie, R.D. 2005. Understanding the business-IT relationship. *International Journal of Information Management*, 25: 303-319. Online: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6VB4-4G4PC12-1&\\_user=613892&\\_coverDate=08%2F31%2F2005&\\_alid=749653009&\\_rdoc=1&\\_fmt=high&\\_orig=search&\\_cdi=5916&\\_sort=d&\\_st=4&\\_docanchor=&\\_ct=1&\\_acct=C000032099&\\_version=1&\\_urlVersion=0&\\_userid=613892&md5=8d939a7c6531b2f3bc38a3f36eaf1845](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VB4-4G4PC12-1&_user=613892&_coverDate=08%2F31%2F2005&_alid=749653009&_rdoc=1&_fmt=high&_orig=search&_cdi=5916&_sort=d&_st=4&_docanchor=&_ct=1&_acct=C000032099&_version=1&_urlVersion=0&_userid=613892&md5=8d939a7c6531b2f3bc38a3f36eaf1845). Accessed 19 March 2008.

Curtin, T.E. 1996. White Paper: Business-IT Alignment: Mapping Your Organization's Course. Online: [http://archive.bitacenter.com/bitalib/bita/IBM\\_Consulting\\_Business\\_IT\\_alignment\\_mapping\\_your\\_organizations\\_course.pdf](http://archive.bitacenter.com/bitalib/bita/IBM_Consulting_Business_IT_alignment_mapping_your_organizations_course.pdf). Accessed: 28 May 2008.

Drury, C. 2004. *Management and Cost Accounting* (6<sup>th</sup> ed.). London: Thomson Learning.

Hardy, G. 2006. Using IT governance and COBIT to deliver value with IT and respond to legal, regulatory and compliance challenges. *Information Security Technical Report II*: 55-61. Online: [http://www.sciencedirect.com/science?\\_ob=ArticleURL&\\_udi=B6VJC-4JD1XS8-9&\\_user=613892&\\_rdoc=1&\\_fmt=&\\_orig=search&\\_sort=d&view=c&acct=C000032099&\\_version=1&\\_urlVersion=0&\\_userid=613892&md5=bc7f2728ae66903b327f4e4adec6dfdd](http://www.sciencedirect.com/science?_ob=ArticleURL&_udi=B6VJC-4JD1XS8-9&_user=613892&_rdoc=1&_fmt=&_orig=search&_sort=d&view=c&acct=C000032099&_version=1&_urlVersion=0&_userid=613892&md5=bc7f2728ae66903b327f4e4adec6dfdd) Accessed 20 March 2008.

Henderson J.C. & Venkatraman N. 1993. Strategic alignment: Leveraging information technology for transforming organizations. *IBM systems journal*: 32: 472-484. Online: <http://www.research.ibm.com/journal/si/382/henderson.pdf>. Accessed 28 April 2008.

IBM. 2006. Igniting innovation through business and IT fusion. Online: [http://i.i.com.com/cnwk.1d/html/itp/IBM\\_CIO\\_Series\\_IgnitinginnovationthroughbusinessandITfusion](http://i.i.com.com/cnwk.1d/html/itp/IBM_CIO_Series_IgnitinginnovationthroughbusinessandITfusion). Accessed 18 March 2008.

Institute of Directors in Southern Africa. 2009. Draft code of governance principles for South Africa - 2009. King Committee on governance. Online: <http://african.ipapercms.dk/IOD/King3>. Accessed 5 June 2009.

IT Governance Institute. 2006. CobiT Mapping: Overview of international IT guidance, 2<sup>nd</sup> edition. Online: <http://www.itgi.org/AMTemplate.cfm?Section=Deliverables&Template=/ContentManagement/ContentDisplay.cfm&ContentID=32756>. Accessed 8 June 2009.

King, M. 2007. [Opening address at The Information Security Forum's 18<sup>th</sup> Annual Congress in South Africa]. Cape Town. December 2007. Online: [www.globalsecuritymag.fr/Professor-Mervyn-King-King,20071219,1136.html](http://www.globalsecuritymag.fr/Professor-Mervyn-King-King,20071219,1136.html). Accessed 20 March 2008.

Oxford English Dictionary (2<sup>nd</sup> edition). 1989. Oxford University Press. Online: <http://dictionary.oed.com/>. Accessed 19 March 2008.

Professional Accountants in Business Committee (PAIB). 2006. Information paper: Internal Controls – A Review of Current Developments. August 2006. Online: [http://www.ifac.org/members/downloads/internal\\_controls.pdf](http://www.ifac.org/members/downloads/internal_controls.pdf). Accessed 6 February 2008.

Reich, B.H. & Benbasat, I. 2000. Factors that influence the social dimension of alignment between business and information technology objective. *MIS Quarterly*, 24(1): 81-113. Online: <http://www.jstor.org/stable/pdfplus/3250980.pdf>. Accessed 10 June 2008.

Romney M.B. & Steinbart P.J. 2009. *Accounting Information Systems* (11<sup>th</sup> ed.). New Jersey. Pearson Education.



Rudman, R.J. 2008. IT governance: a new era. *Accountancy SA*, March 2008: 12-14.

Shpilberg, D., Berez, S., Puryear, R. & Shah, S. 2007. White paper: MIT Sloan Management Review: Avoiding the Alignment Trap in Information Technology. 2007. Online: <http://sloanreview.mit.edu/wsj/insight/pdfs/49102.pdf>. Accessed 1 April 2008.

Silva, E., Plazaola, L. & Ekstedt, M. 2006. <http://www.uni.edu.ni/sarec/fec/Sitio/LeonelPlazaola/StrategicBusinessandITAlignmentAprioritizedTheoryDiagram.pdf>. Accessed 12 June 2008.

Simkova, E. & Basl, J. 2006. Business value of IT. *Systems Integration*, 421-427 Online: <http://si.vse.cz/archiv/clanky/2006/simkova.pdf>. Accessed 18 March 2008.

Simonsson, M. & Johnson, P. 2006. Assessment of IT Governance – A Prioritization of Cobit. Proceedings of The Conference on Systems Engineering: Paper #151. Online: [http://www.ee.kth.se/php/modules/publications/reports/2006/IR-EE-ICS\\_2006\\_007.pdf](http://www.ee.kth.se/php/modules/publications/reports/2006/IR-EE-ICS_2006_007.pdf). Accessed 18 March 2008.

The Economist. 2006. White paper: Great expectations: The changing role of IT in the business. September 2006. Online: [http://i.i.com.com/cnwk.1d/html/itp/cisco\\_20060918\\_EIU\\_Great\\_Expectations.pdf](http://i.i.com.com/cnwk.1d/html/itp/cisco_20060918_EIU_Great_Expectations.pdf). Accessed: 18 March 2008.

Von Solms, B. & Von Solms, R. 2005. From information security to... business security? *Computers & Security*, 24: 271-273. Online: [http://www.sciencedirect.com/science?\\_ob=ArticleListURL&\\_method=tag&\\_temp=&sort=r&sisrterm=&\\_ArticleListID=743570230&view=c&\\_chunk=0&count=16&\\_st=&refsource=&\\_acct=C000032099&\\_version=1&\\_urlVersion=0&\\_userid=613892&md5=7bf95bf835a7ce4a9dceb8fa2bb009f2](http://www.sciencedirect.com/science?_ob=ArticleListURL&_method=tag&_temp=&sort=r&sisrterm=&_ArticleListID=743570230&view=c&_chunk=0&count=16&_st=&refsource=&_acct=C000032099&_version=1&_urlVersion=0&_userid=613892&md5=7bf95bf835a7ce4a9dceb8fa2bb009f2). Accessed 20 March 2008.