

Knowledge Roles and Flows in Open Innovation

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Declaration

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Synopsis

Companies are under constant pressure to stay competitive in order to survive in an ever changing market. It is important for companies to stay ahead of the market and to ensure that any window of opportunity is exploited with maximum benefit to the company.

Innovation is regarded as a tool that provides companies with a competitive advantage and that ensures sustainability and success. Organisations need to enhance their innovative capabilities to ensure growth and sustainability.

Knowledge can be seen as the building blocks of innovation. Innovation and knowledge management are, therefore, tightly linked. Knowledge generation can be very costly and is sometimes found to be limited in organisations. When internal knowledge is insufficient in an organisation, external knowledge can be utilized by means of innovation networks between different organisations which share common goals. By knowledge being shared between organisations, not only will each organisation benefit individually, but it will also help the partners and strategic alliances to evolve and grow in stature.

Required knowledge can be generated internally and can also be extracted from different organisations by means of open innovation. Open innovation sets the scene for knowledge to flow across organisational boundaries and enlarges the creative knowledge capacity and knowledge pool. The flow of knowledge should be governed by knowledge management.

The research in this study bridges the gap between the previous innovation models and the notion of an open approach to internal innovation, which improves the speed and effectiveness of the innovation process. The fundamentals of innovation had been investigated, where after the focus moved to understanding a specific and existing innovation process framework, named the FuGle Innovation Process Model.

The tracking of knowledge in Open Innovation Models assigned to the FuGle Innovation Process Model, leads to the proposed change of converting Innovation role players to function in an Open Innovation paradigm.

By understanding the responsibilities of the role players and the intricacies of controlling the flow of different types of knowledge between interlinked companies, will provide an organisation with the opportunity to deploy an Open Innovation approach at appropriate points within their different processes. This will assist the organisation to stay competitive in an ever fluctuating market.

Opsomming

Maatskappye is onder konstante druk om kompetierend te wees en om te verseker dat hulle in 'n veranderende omgewing kan oorleef.

Innovasie word beskou as 'n hulpmiddel en instrument wat maatskappye kan voorsien van 'n kompeterende voordeel wat volgehoue sukses kan verseker. Maatskappye behoort hulle innoverende vermoëns uit te bou om groei en volhoubaarheid te verseker.

Kennis kan gesien word as die boustene van innovering. Innovasie en kennisbestuur is dus stewig met mekaar verbind. Die verkryging van kennis kan organisasies duur te staan kom en daarom is kennis binne organisasies somtyds beperk. Wanneer interne kennis in 'n organisasie beperk is, kan van 'n innoverende netwerk gebruik gemaak word om eksterne kennis tussen verskillende organisasies wat na dieselfde doel streef met mekaar te deel. Dit kan gesien word as innoverend om kennis tussen organisasies te deel. Wanneer kennis tussen organisasies gedeel word, sal nie alleenlik die enkele organisasie daarby baatvind nie, maar ook die ander organisasie en selfs vennote en alliansies van die organisasie sal ontwikkel en in statuur groei.

Noodsaaklike kennis kan intern verkry word en kan ook deur middel van verskillende organisasies deur die proses van Oop Innovasie verkry word. Oop Innovasie dek die tafel vir die vloeï van kennis oor organisatoriese grense heen wat die kreatiewe kenniskapasiteit en die kennispoel vergroot.

Die navorsing in die studie oorbrug die gaping tussen die vorige innovasie modelle en die gedagte van 'n oop benadering tot interne innovasie wat die spoed en effektiwiteit van die innovasieproses sal verbeter.

Die grondslag van innovasie is eers ondersoek, waarna die fokus verskuif het na die begrip van 'n spesifieke innovasie proses, naamlik die FuGle Innovasie Proses Model.

Die navolging van die vloeï van kennis in die Oop Innovasie Modelle wat toegedig is aan die FuGle Innovasie Proses Model, het gelei tot die voorgestelde verandering om die rolle van die innovasie rolspelers te verander sodat hulle beter kan funksioneer binne 'n Oop Innovasie paradigma.

n' Begrip van die verantwoordelikhede van , rolspelers en die ingewikkelde kontrole oor die vloeï van kennis tussen die organisasies, verskaf aan die organisasie die geleentheid om 'n Oop Innovasie benadering op gepaste punte binne die onderskeie prosesse binne die organisasie te ontplooi. Hierdie stap sal die organisasie behulpsaam wees om kompetierend te bly binne 'n veranderende mark.

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1 Introduction

1.1 Introduction

Organisations are looking towards innovation as a tool to help them stay competitive in an ever evolving market. It is important for any organisation to stay ahead of the market, in order to ensure that a window of opportunity is well exploited for the maximum benefit of the organisation. These windows are only open for a short period of time, mainly because of the level of competition existing in the market.

This is the case because of the increasingly competitive environment that is being created by an ever increasing demand by consumers who have access to more information, better products and more and better services. (Tidd, Bessant and Pavitt 2005). Shourkry and Clement agree with Tidd, Bessant and Pavitt by stating that a large number of organisations are confronted by a dynamic and uncertain environment, due to the accelerated rate of technological change. They are forced to quickly respond to various market pressures (Shoukry and Clement 1993).

This means that innovation is becoming a major part of corporate strategy. Relevant studies show that effective organisational performance depends to a large extent on the success of the innovative activities within the organisation and particularly on the way these activities are managed (Shoukry and Clement 1993).

Utterback believes that innovation “is a life-or-death ingredient for firms” and that firms need to create incremental innovations in order to meet today’s market demands. These firms, however, also need to ensure their long term survival by preparing radical innovation that reinvents their business strategies and market(s). If this is not done, Utterback argues, another company will take their place in the market. Radical innovations may create discontinuity with the past that may affect the whole structure of knowledge-flow and may result in temporary dominance of the innovator in the marketplace (Utterback 1994).

1.2 Problem Statement

Companies are under pressure to enhance their innovative capabilities in order to grow and sustain their entities. Innovation is regarded as a tool that will provide the company with a competitive edge, needed to be dynamic and growing in stature. Innovation is, therefore, essential for survival because companies/organisations render themselves more competitive.

It is clear from the introduction that organisations are put under pressure by the market and that it is a survival game for organisations to stay alive in these markets. It is also clear that innovation can give the needed competitive edge in order for them to stay in the “game”. Timing is also important. Action needs to be taken while the window of opportunity is still open and before the market is flooded with competitors and same-level technology maturity levels are reached. Many questions are posed: How is innovation defined and what is the driving force(s) behind innovation? How can you render your organisation to be innovative and how can these innovation processes be completed more rapidly?

1.3 Problem Statement Confirmation

This section will endeavour to confirm the problem statement through literature studies, in order to determine if the problem statement is valid. A main research question and refined problem statement will be introduced after the problem statement is confirmed.

1.3.1 Argument

Innovation and knowledge management are very closely linked, as Guillermo Perez-Bustamante tells us in his writing: Knowledge Management in Agile Innovative Organisations. He states that knowledge is the cornerstone of intellectual capital and that innovation and knowledge management are tightly linked together (Perez-Bustamante 1999). Knowledge is necessary to help the innovative processes to progress from an invention to an innovation and more knowledge is needed to sustain this innovation. Perez-Bustamante also writes that technology and innovation processes are formed by knowledge bases and the continuous flow of information. (Perez-Bustamante 1999)

Knowledge is seen as the building blocks that are needed to help innovation progress and move forward through its life-cycle stages. Knowledge generation needs to be done as quickly as possible and before the window of opportunity closes and the competitive advantage is, therefore, lost. ‘Knowledge Networks’ enhance knowledge sharing between and among individuals, groups and organisations in formal and informal ways (C. S. Schutte 2010). Internal knowledge may be

insufficient, therefore, external knowledge must be utilized by introducing innovation networks between different organisations which are sharing common goals.

The knowledge being used to assist in the innovation processes, will most likely be shared with other organisations seeking the same type of knowledge. These networks can be seen as a pool of knowledge that is being shared by a number of organisations.

Internally sourced knowledge that is being used to enhance the innovation processes is part of the Open Innovation paradigm because of the purposive inflows and outflows of knowledge that accelerate internal innovation (H. Chesbrough 2006). Internally sourced technology and knowledge which is brought into the innovation system, are significantly important to the outcome of the systems output, enabling the structures to facilitate the process of substantiating and implementing ideas. More knowledge at critical times can increase the success rate for more sound output of ideas entering through the Innovation Funnelling Paradigm.

Henry Chesbrough states that the costs are so high and the potential value so difficult to perceive that innovation often sits “on the shelf”. He states in addition, that an important factor spurring the process of open innovation is the rising cost of technology development in many industries, which implies that only the big will benefit, while everyone else falls behind. (H. W. Chesbrough 2007)

Chesbrough argues that as a result of both trends, rising development costs and shorter product life cycles, companies are finding it increasingly difficult to justify investments in innovation and that open business models address both effects. It attacks the cost side of the problem by leveraging external research-and-development resources to save time and money in the innovation process. (H. W. Chesbrough 2007)

Figure 1 illustrates an adapted version of the Innovation Funnelling Diagram, which has been influenced by Open Innovation by means of ideas entering through the Innovation Funnelling Paradigm.

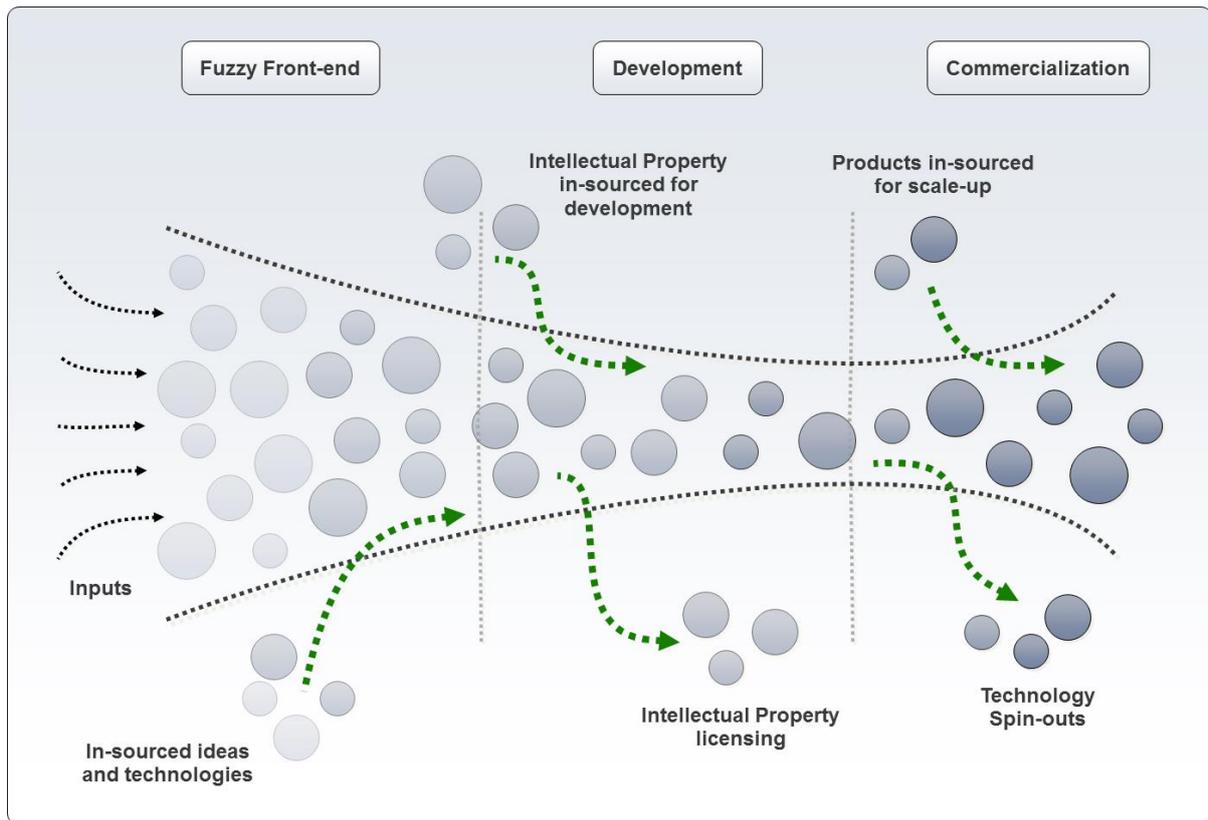


Figure 1: The Innovation Funnelling Diagram adapted from (H. Chesbrough 2006)

1.3.2 Research Domains and Related Research

Research in this thesis focuses on combining two research fields:

- Innovation Management
- Knowledge Management

These two areas are very broad and there will be a focus on the overlapping areas of these two fields. In order to understand these research areas, certain aspects of these research fields will come under scrutiny:

- Innovation
- Knowledge
- The role of knowledge in innovation management

The following domains contribute to a better understanding of the role of knowledge in innovation management:

- Open Innovation
- Roles in Innovation

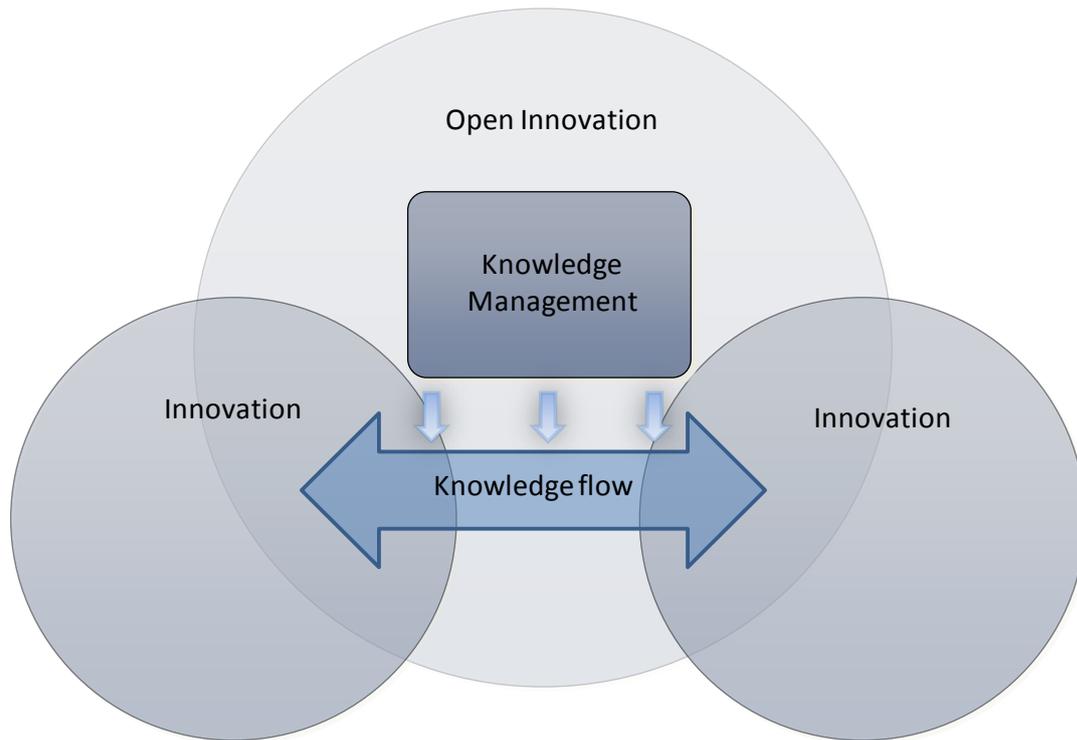


Figure 2: Innovation Management Venn diagram

2 Research Methodology

2.1 Introduction

This Chapter will firstly refine the problem statement with retrospect to research domains that have been emphasized by the Argument in Section 1.3.1. The Problem Statement will be followed by a Main Research Question and a series of Sub-Questions. These questions will be answered throughout the rest of the document. The method that will be used to answer the research questions will be described in the Hypothesis that will follow the research questions.

2.2 Refined Problem Statement

The problem statement in Section 1.2 is very broad and generally stated. The proposed chapter can now be reconsidered and refined after seeing the Argument stated in Section 1.3.1.

Looking at the perspectives provided by the Problem Statement Confirmation which have been acknowledged by its literature review in the previous chapter, the problem statement for this research study may well now be defined as follows:

“Organisations are looking towards innovation as a tool to help them to stay competitive in an ever evolving market. It is important for organisations to stay ahead of the market, in order to ensure that a window of opportunity is well exploited for the maximum benefit of the organisation. The problem that presents itself is how to increase the effectiveness and accuracy of the innovation process by understanding the creation, transferring and managing of innovation-specific knowledge”.

2.3 Research Questions

2.3.1 Main Research Question

Which role-players are present and what knowledge transfers are evident in Open Innovation?

2.3.2 Sub-research Questions

These research questions are in support of the main research question. The sub-research questions will lead to the main research question and link the problem statement to the research question. The sub-research questions will be answered in the remaining chapters of this thesis. The main research question will be answered if all the supporting questions have been answered.

2.3.2.1 Question 1: How can organisations be/stay competitive?

This question serves as a launching pad and refers back to the initial problem statement. The question is how an organisation can become competitive and stay competitive in an ever evolving market?

2.3.2.1.1 Question 1.1: What tools can be used to stay competitive?

This question is in support of the previous question. If we know how to be/stay competitive, the next logical question must be what tools must be used to stay competitive? There are different types of tools that can be used in different fields of study.

2.3.2.1.2 Question 1.2: What is innovation and why is it important?

This is a very general and broad question. It is anticipated that the answers to the previous questions will lead to Innovation as the Argument in Section 1.3.1 was led too.

2.3.2.2 Question 2: How can innovation help competitiveness?

By this time and with the previous questions having been answered, it is assumed that enough is known about innovation and why it is important. Now the question remains how innovation can help a company to be more competitive?

2.3.2.2.1 Question 2.1: What does innovation consist of?

The answer to this question will assist in the understanding of innovation, as well as providing an answer to the previous question.

2.3.2.2.2 Question 2.2: What innovation processes exist?

Looking at innovation processes will assist in directing the study to a more in-depth look at sub-sections inside innovation.

2.3.2.3 Question 3: Does a formalized Innovation Management Process help the innovation process?

The outcome of the previous question will lead to the next question. If the innovation process can help a company to be more competitive, it is important to know whether a company can stay competitive by managing the innovation process and understanding its main components.

2.3.2.3.1 Question 3.1: What are the main components of the innovation process?

It is of great importance to know what the main components are, if the innovation process is to be managed effectively.

2.3.2.3.2 Question 3.2: What is knowledge and what types of knowledge exist?

This question is asked in order to know more about one of our main research domains mentioned in Section 1.3.2

2.3.2.3.3 Question 3.3: How is knowledge created?

Knowledge is seen as the building blocks needed to help innovation progress and to move through its life-cycle stages.

2.3.2.3.4 Question 3.4: Who is responsible for the creation of knowledge?

Knowledge needs to be created and must be transferred between different role-players. After this question is answered, more will be known about knowledge creation and the role-players inter-linked with each other.

2.3.2.4 Question 4: How can Open Innovation be used to create and gain more knowledge?

Open Innovation may assist in the creation of knowledge in an organisation through the transferring of knowledge across organisational boundaries. This set of questions will create a better understanding regarding the related benefits.

2.3.2.4.1 Question 4.1: What is Open Innovation?

This question is asked in order to know more about one of our main research domains mentioned in Chapter 1.3.2

2.3.2.4.2 Question 4.2: What is the difference between Open and Closed Innovation?

The difference needs to be known if the integration between an Innovation Process Model and an Open Innovation Paradigm is to be achieved.

2.3.2.4.3 ***Question 4.3: Is the concept of Open Innovation compatible with existing Innovation Management Models, such as FuGle?***

This question will provide the answer as to whether FuGle, which is an Innovation Management Model, will be able to help the innovation process when functioning as the basis and if knowledge can be transferred from one organisation to another?

2.3.2.4.4 ***Question 4.4: Which Open Innovation models can be assigned to existing Innovation Management Model processes?***

This question is asked in order to determine whether there are any Open Innovation models that can be used to help the cross-over from an Innovation Management Model into an Open Innovation Paradigm?

2.3.2.5 ***Question 5: Which role-players are present and what knowledge transfers are evident in Open Innovation?***

Question 5 represents the Main Research Question and is, as has already been mentioned, independent of the other questions. It can only be answered once the first four questions have been answered. The following questions will help in providing an answer to Question 5, and are based on the conclusions of the previous sub-questions.

2.3.2.5.1 ***Question 5.1: How do the responsibilities of role players as defined in innovation roles differ when introduced to Open Innovation?***

We want to know if the same set of responsibilities used in closed innovation can be assigned to role-players active in the Open Innovation process and if any alterations must be made to fit the portfolio better?

2.3.2.5.2 ***Question 5.2: Who is involved in the transfer of knowledge in the Open Innovation model?***

This question serves to provide an answer to which responsibilities of each role-player play a primary role in the transfer of knowledge?

2.3.2.5.3 ***Question 5.3: How involved are role-players from outside the organisation?***

Do role-players from outside the organisation form part of the knowledge transfer process. The answer to this question will help us to understand which outside role-players are crucial for the gaining of knowledge through the use of Open Innovation?

2.3.2.5.4 *Question 5.4: What type of knowledge is gained through the Open Innovation processes?*

This question focuses the attention on what type of knowledge is transferred across organisational boundaries. In addition, it will give insight into what steps are necessary to ensure that the transfer of knowledge is carried out effectively?

2.4 Research Method and Hypothesis

There is no doubt that in any modern economy, innovation is essential for the survival of an organisation. In order for innovation to be managed effectively, it must be understood that innovation does not only consist of a single act, nor is it dependent on a single individual or institution. The innovation process has a distinct life-cycle and involves a wide range of role-players. The difficulty lies in successfully integrating the different managerial fields in each case and specific transfer of knowledge in an innovation perspective. The designing of a framework or mechanism to help manage this innovation-specific knowledge, depends on the successful integration of different models that are used to explain each domain mentioned in the research questions.

The Research Hypothesis for this study is defined as follows:

A competitive edge can be achieved through the exchange of ideas and knowledge in an Open Innovation paradigm if the responsibilities of the role-players in the process of controlling the flow of different types of knowledge between interlinked companies are understood.

The Research Method for this study is illustrated in Figure 3:

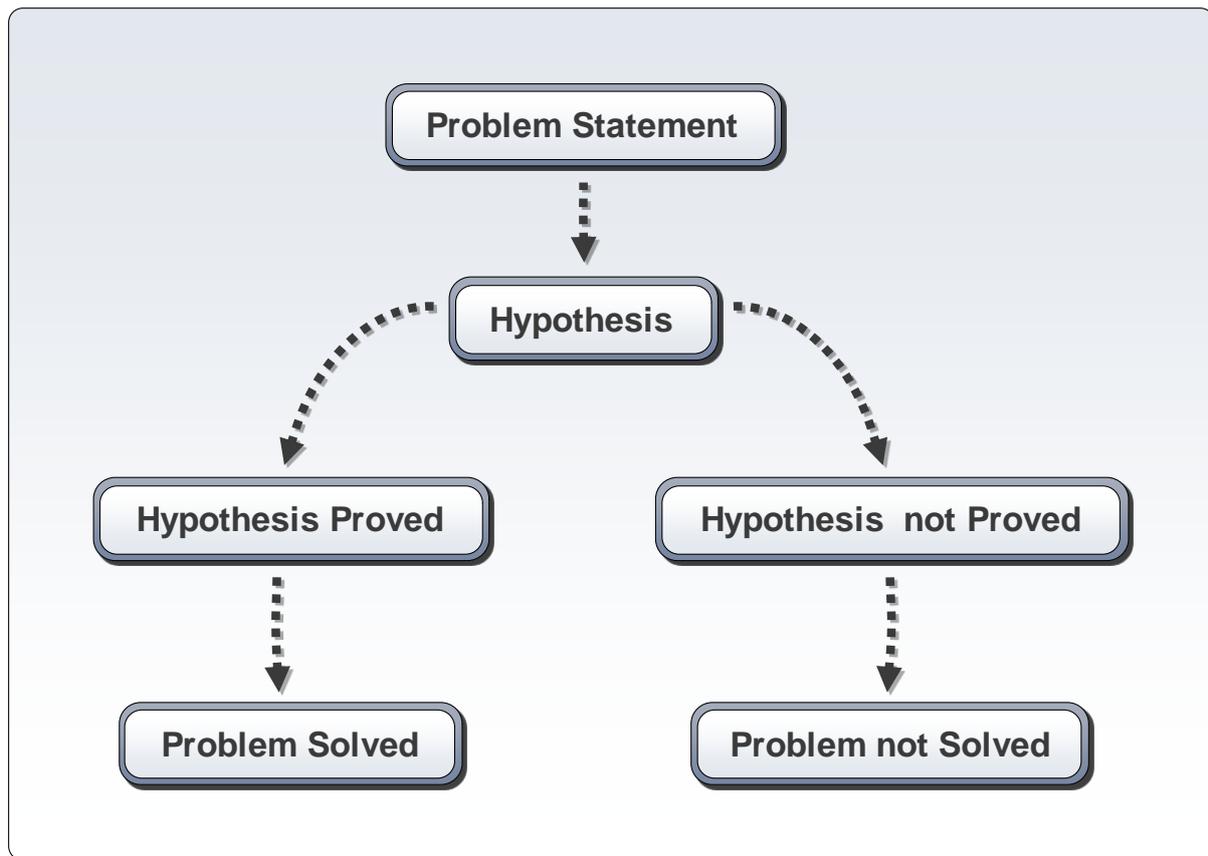


Figure 3: Research Method

2.5 Research Questions and Methodology

Table 1: Research Questions

Questions	Research Methodology	Section
<i>Question 1: How can a company be/stay competitive?</i>	By concluding Question 1.1 and 1.2	Sections 3.1- 3.2.3
<i>Question 1.1: What tools can be used to stay competitive?</i>	Literature Study	Section 3.1
<i>Question 1.2: What is Innovation and why is it important?</i>	Literature Study	Section 3.2.2
<i>Question 2: How can Innovation create more competitiveness?</i>	By concluding Question 2.1 to 2.2	Sections 3.2.4-3.2.6
<i>Question 2.1: What does innovation consist of?</i>	Literature Study	Sections 3.2.4-3.2.5
<i>Question 2.2: Which innovation processes exist?</i>	Literature Study	Section 3.2.6
<i>Question 3: Does a formalised Innovation Management Process help the Innovation Process?</i>	By concluding Question 3.1 to 3.3	Sections 3.2.7.1-3.3.5
<i>Question 3.1: What is knowledge and what types of knowledge exist??</i>	Literature Study	Section 3.2.7.1
<i>Question 3.2: What are the main components of the innovation process?</i>	Literature Study	Sections 3.3.1-3.3.2
<i>Question 3.3: How is knowledge created?</i>	Literature Study	Section 3.3.4
<i>Question 3.4: Who is responsible for the creation of knowledge?</i>	Literature Study	Sections 3.3.4-3.3.5
<i>Question 4: How can Open Innovation be used to create and gain more knowledge?</i>	By concluding Question 4.1 to 4.4	Section 3.4-3.5
<i>Question 4.1: What is Open Innovation?</i>	Literature Study	Section 3.4.1
<i>Question 4.2: What is the difference between Open and Closed Innovation?</i>	Literature Study	Section 3.4.3

<i>Question 4.3: Is the concept of Open Innovation compatible with existing Innovation Management Models such as FuGle?</i>	Literature Study	Sections 3.5
<i>Question 4.4: Which Open Innovation models can be assigned to existing Innovation Management Models processes?</i>	Literature Study	Section 3.6
<i>Question 5: Which role-players feature and what Knowledge transfers are evident in Open Innovation?</i>	By concluding Question 5.1 to 5.4	Section 4.9
<i>Question 5.1: How do the responsibilities of role players as defined in innovation roles differ when introduced to Open Innovation?</i>	Validation in Section 4.9.1	Section 4.9.1
<i>Question 5.2: Who is involved in the transfer of knowledge in the Open Innovation models?</i>	Validation in Section 4.9.2	Section 4.9.2
<i>Question 5.3: How involved are outside organisational role-players?</i>	Validation in Section 4.9.3	Section 4.9.3
<i>Question 5.4: What type of knowledge is gained with the Open Innovation process?</i>	Validation in Section 4.9.4	Section 4.9.4

2.6 Scope

It is important to understand that the scope of this project does not extend across all the domains listed in Section 1.3.2. Only a small portion of the domains are extensively looked at when their boundaries cross each other. The areas in the domains include:

- Understanding the research domains;
- Identifying and researching existing fields relating to the research domains;
- Highlighting certain research;
- Highlighting steps that can be taken to fill in the gaps identified by other researchers.

2.7 Identifying Opportunities

Once the scope is understood, the opportunities and steps to be taken to improve the management processes in the overlapping areas defined by the scope can be identified. This will be done by:

- Identifying and understanding existing methodologies being proposed in research and/or used in practice;
- Interpreting these methodologies and merge frameworks from these different research domains to understand the gaps that may occur when trying to understand the overlapping of the domains in the scope of the project;
- Identifying problems being experienced in practice;
- Deriving at and documenting requirements.

2.8 Developing a Framework and Methodology

Once existing methodologies are understood and the problems within these methodologies are identified, a new adapted framework can be developed and constructed:

- Determining the different areas where knowledge is applicable and what type of knowledge it represents;
- Determining a way in which this knowledge can be transferred from one organisation to another;
- Proposing good practices of how a company can manage its knowledge transfer inside the realm of Open Innovation;
- Structuring these practises in a generic framework to form a universal framework for all types of organisations.

2.9 Evaluating and Validating

In order to evaluate the validity and applicability of the proposed framework and methodology, it is necessary to verify it against the research questions. The validation will be done in two steps:

- **Primary validation:** Various candidates and professionals in the line of study will be chosen to help with the validation of the framework by validation the answers to the research questions.
- **Secondary validation:** a Professional in the industry will be chosen to help with the validation of the validity of the research, and the potential for realistic adoption.

2.10 Research Conclusions

Based on the outcome of the verification, it will be possible to conclude the research by discussing how the hypothesis has been addressed, what contributions have been realised, and the potential for future work.

2.11 The Document Structure

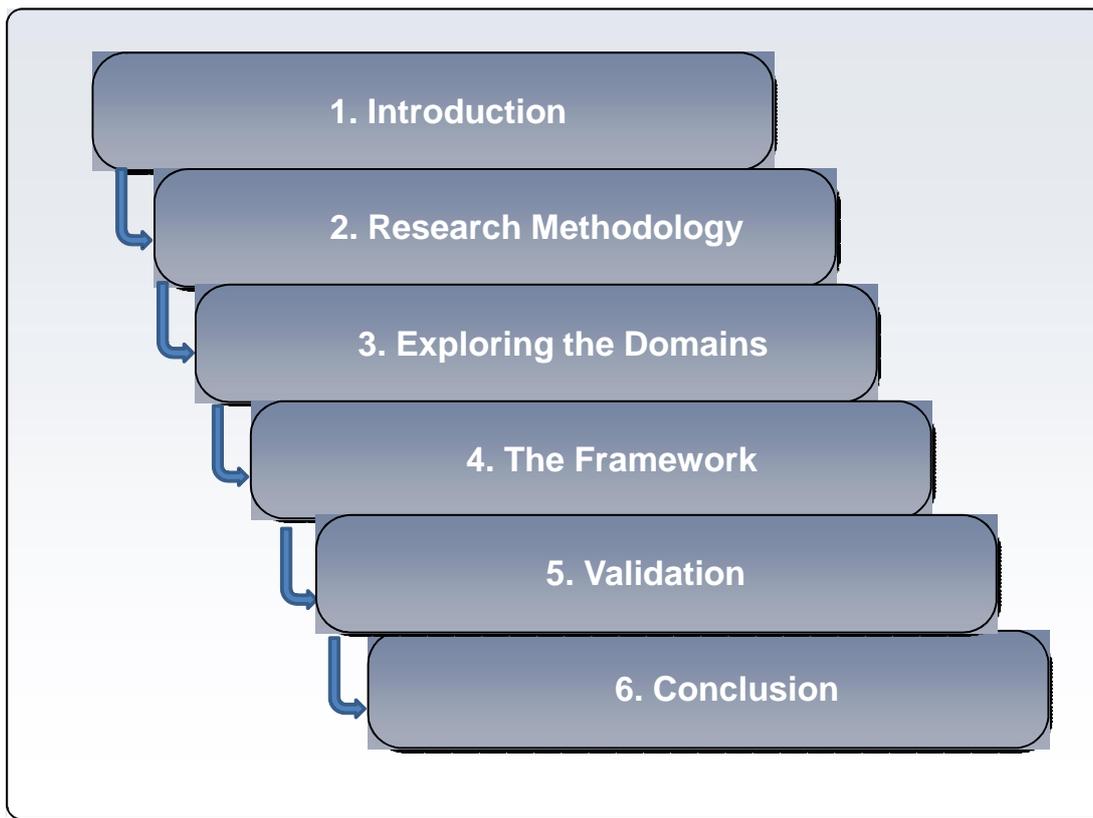
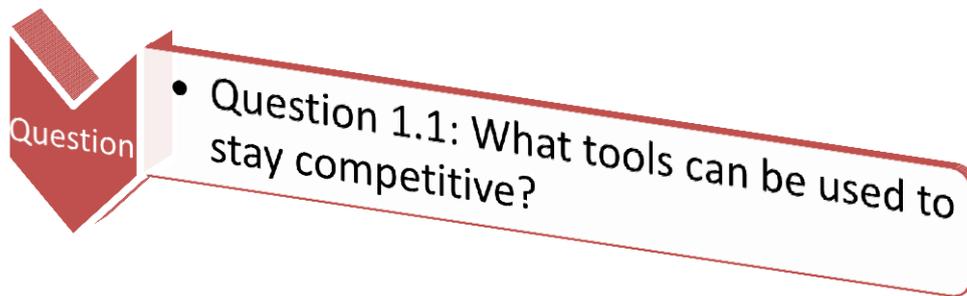


Figure 4: Document Structure

3 Exploring the Domains

3.1 Introduction



Chapter 3 explores the domains mentioned in Section 1.3.2 as well as additional domains that have been found to be associated and of interest to answer the research questions stated in Section 2.4:

- Innovation
- Innovation Roles
- Knowledge
- Open Innovation

Section 2 started with an introduction and background as a starting point to the argument and we now want to summarise the section briefly to serve as introduction to the literature study.

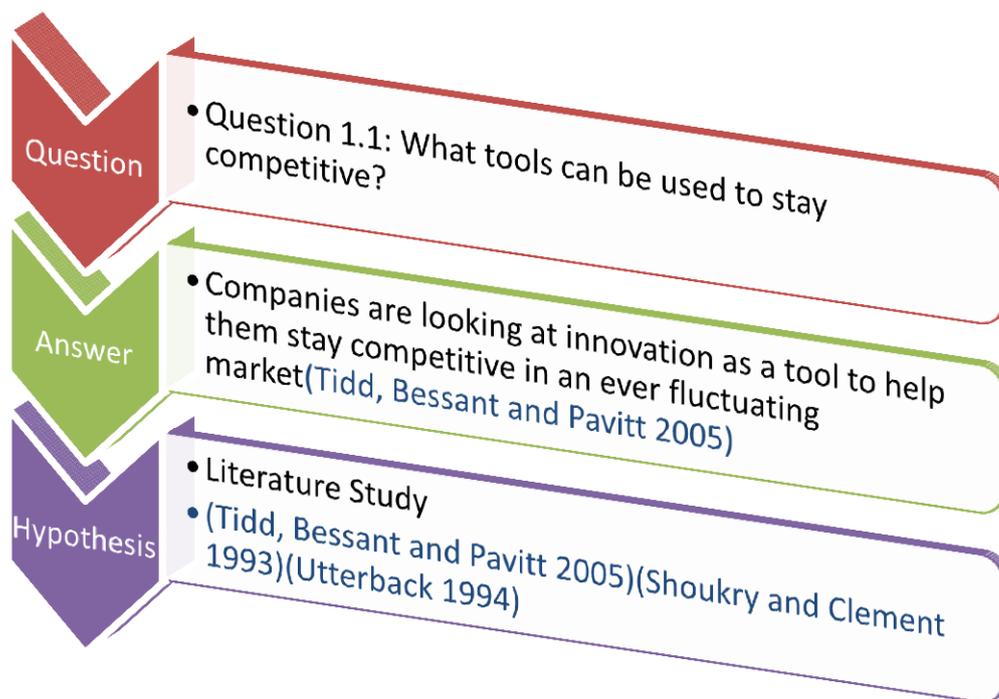
It is stated by (Tidd, Bessant and Pavitt 2005) that organisations are looking at innovation as a tool to help them stay competitive in an ever evolving market and that it is important to stay ahead of competitors in the market in order to ensure that the window of opportunity is well exploited for the maximum benefit of the company.

This approach is necessary because of the increasingly competitive environment created by an ever increasing consumer demand, consumers who have access to more information and better products and services (Tidd, Bessant and Pavitt 2005). Shourkry and Clement agree with Tidd, Bessant and Pavitt by stating that many organisations are being confronted by a dynamic and uncertain environment, due to the accelerated rate of technological development, and the fact that organisations are forced to develop quick responses to various market pressures (Shoukry and Clement 1993).

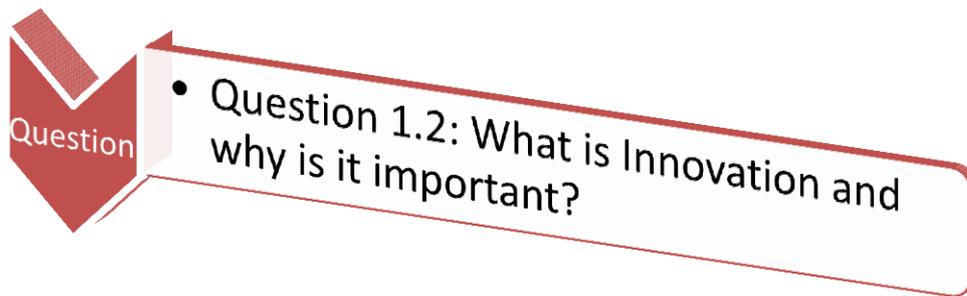
It is, therefore, clear that innovation has become a major part of modern corporate strategy. A relevant study has shown that effective organisational performance depends to a large extent on the

success of the innovative activities within the organisation and more particularly on the way these activities are being managed (Shoukry and Clement 1993).

Utterback believes that innovation “is a life-or-death ingredient for firms” and that firms need to create incremental innovations in order to meet today’s market demands. They, however, also need to ensure their long-term survival by preparing radical innovation, which reinvents their business and market(s). If they do not comply, Utterback argues that another company/organisation will take their place in the market. Radical innovations may create discontinuity with the past and will affect the entire structure of knowledge-flow and may even result in temporary dominance of the innovator in the market place (Utterback 1994).



3.2 Innovation



3.2.1 Definition of Innovation

Innovation is a topic of increasing interest to organisations and researchers. Various scholars have recognised the importance of innovation for an organisation's competence and have compiled their own definition of innovation. Porter defines innovation as a new way of doing things that is commercialized (Porter 1990). Freeman and Soete say '*innovation in the economic sense is accomplished only with the first commercial transaction involving the new product, process system or device, although the word is used also to describe the whole process. Of course further inventions often take place during the inventions and innovations may be made during the diffusion process*' (Freeman and Soete 1997).

In recent years, the concept of innovation has become more complicated. West notes that innovation involves "the intentional introduction and application of ideas, processes, products or procedures which are new and benefit the job, the work team or the organisation" (West and Farr 1990)

3.2.2 Innovation Today

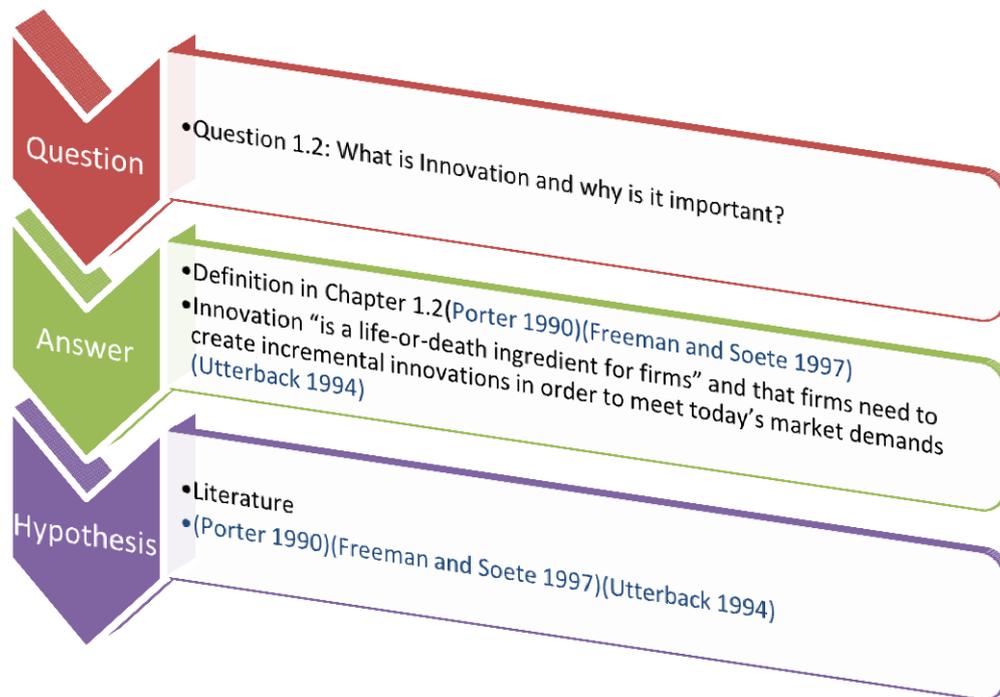
Innovation has evolved drastically over the years and has had different forms and roles in companies. Innovation started very simple and with each evolutionary change has developed into a complex combination of fields. Rothwell describes the evolution of innovation over the years in five generations from the 1950's to the 1990's in Figure 5. However, two additional generations have since been added:

(Rothwell 1992) (Fagerberg 2006).

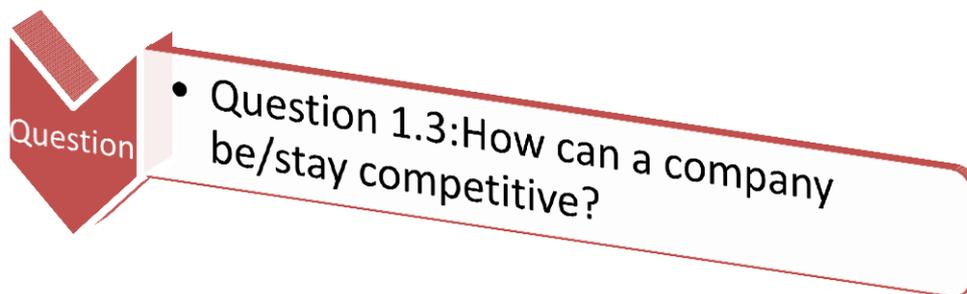


Figure 5: Evolution of different generations of innovation process models (Du Preez, Essman H and Louw L 2009)

We are now at a stage of combining network models and Open Innovation. By combining network models, such as knowledge networks with the idea of Open Innovation, it is becoming more popular in the industry and has taken centre stage in discussion. This topic is discussed later in the thesis.



3.2.3 Innovation: a Tool for Competitiveness

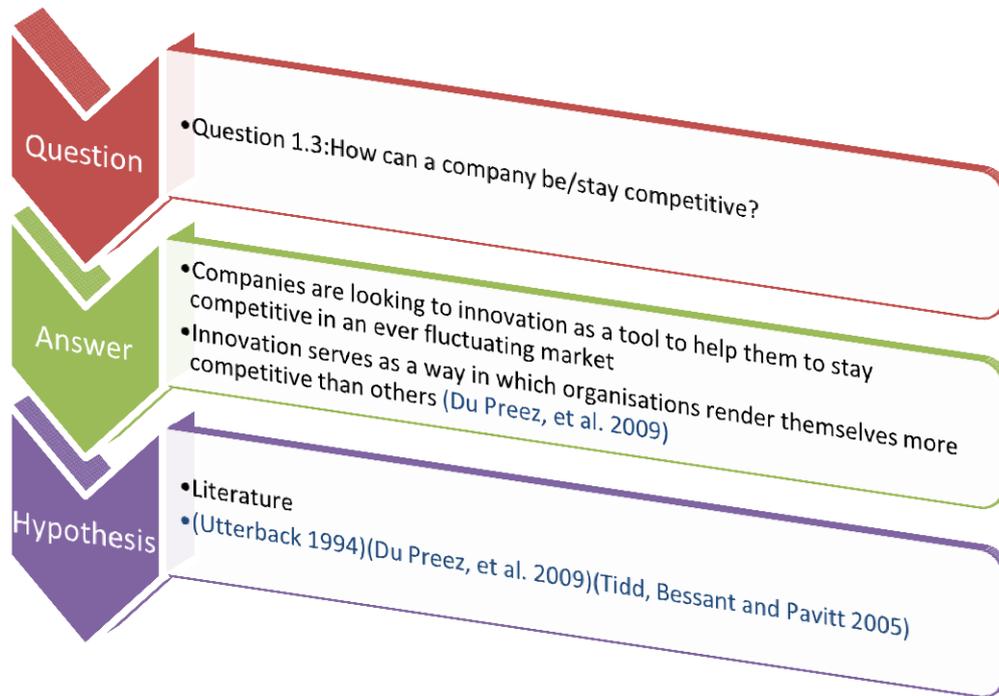


Utterback believes that innovation is a life-or-death ingredient for firms and that firms need to create incremental innovations in order to meet today’s market demands. Companies also need to ensure their long-term survival by developing radical innovations, which will keep on reinventing their businesses and markets. If they do not comply, Utterback argues that other companies will take their market share. Radical innovations may create discontinuity with the past that can affect the whole structure of knowledge flow and may result in temporary dominance of the innovator in the marketplace (Utterback 1994).

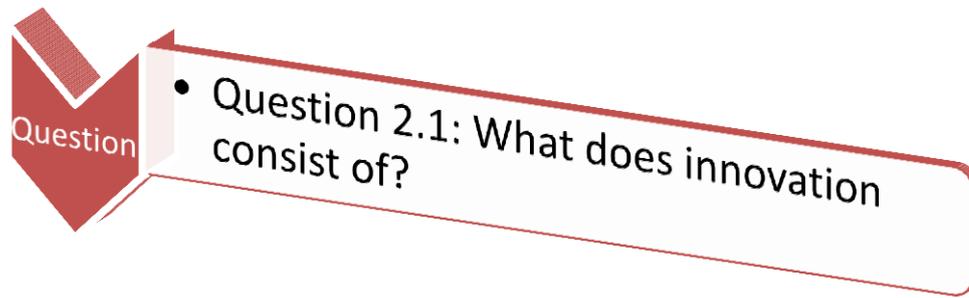
Innovation has clearly been confirmed as a critical factor for competitiveness. Innovation serves as a way in which organisations render themselves more competitive than others, especially in an

environment where more demanding customers have access to more information and better products and services (Du Preez, Essman H and Louw L 2009)

However, it is argued that innovation must be continuous and this demands the continuous exploration for new innovative ideas. Joseph Tidd states that innovation is a “generic enterprise activity that focuses on the long-term survival of the enterprise.” (Tidd, Bessant and Pavitt 2005)



3.2.4 Categorization of Innovation



Schumpeter describes five different areas of importance to innovation:

- New products
- New methods of production
- New sources of supply
- The exploration of new markets
- New ways to organize business (J. A. Schumpeter 1939)

This classification may be further simplified into three different areas, mainly based on the primary objective of the initiative:

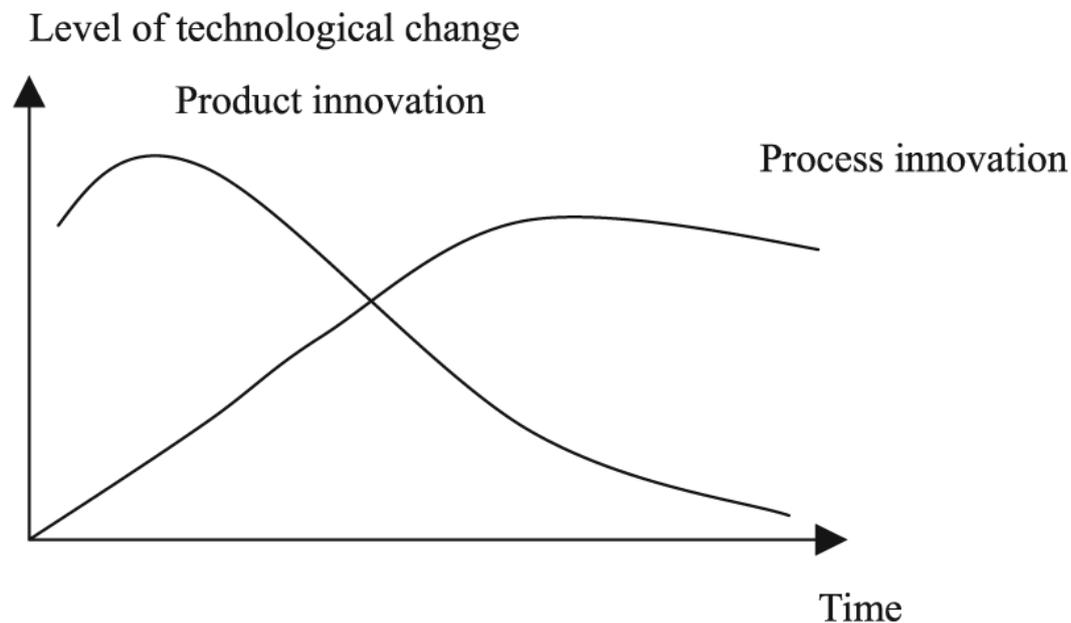
- Product innovation
- Process innovation
- Strategy innovation

3.2.4.1 Product Innovation

Product Innovation includes services and products and services in combination. According to Rothberg, Product Innovation viewed from the perspective of an organisation encompasses a “change in, or an addition to the entities that comprise its products line” (Rothberg 1981). Product Innovation may create a competitive advantage in the form of sought-after products that are sufficiently differentiated to claim a portion of a current market, or assert an unidentified or untapped market. (Du Preez, Essman H and Louw L 2009)

3.2.4.2 Process Innovation

Process Innovation refers to any course of action, procedure, technique, practice or modus operandi that may be established and executed within an organisation in an effort to transform or support the transformation of resources. The process may be manual or automated in nature. Moreover, a process may be of a high-level managerial nature and is referred to as “Management Innovation” (Hamel 1996). Process Innovation may create a competitive advantage in the form of organisational improvements which bring about differentiation in the form of quality, time-to-market, and after-market support and is often associated with improving the effectiveness and/or efficiency of production (Du Preez, Essman H and Louw L 2009).



Source: Utterback and Abernathy (1975)

Figure 6: Level of Technological Change

3.2.4.3 Strategy Innovation

Strategy Innovation refers to the functioning of the higher echelons of organisational governance, i.e. the positioning and direction of the organisation. This includes the mission and vision, policies, business models, etc. Strategy Innovation is referred to as Business Concept Innovation. (Baker 2002) (Hamel 1996). Strategic Innovation creates a competitive advantage in the form of the direction and positioning of the company and these serve to create long-term differentiation. Such differentiation on a strategic level may create new markets, anticipate future markets, or revitalize old markets to allow the organisation to proactively position itself for competitiveness (Du Preez, Essman H and Louw L 2009).

3.2.5 The Innovation Process: Life-cycle

The innovation life-cycle consists of five phases that must be implemented in the order shown in Figure 7. Each phase needs to be completed before moving to the next phase.

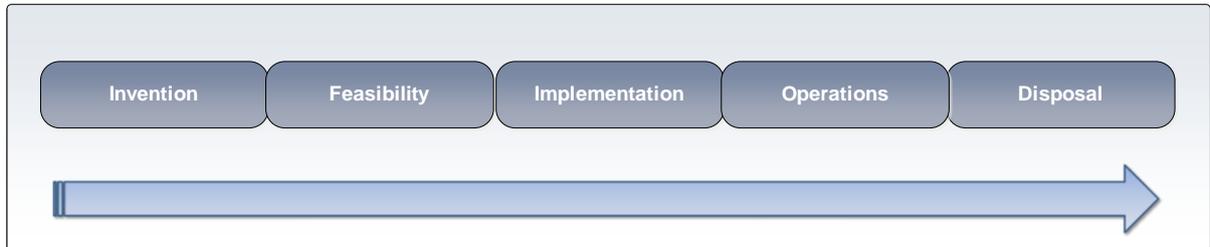
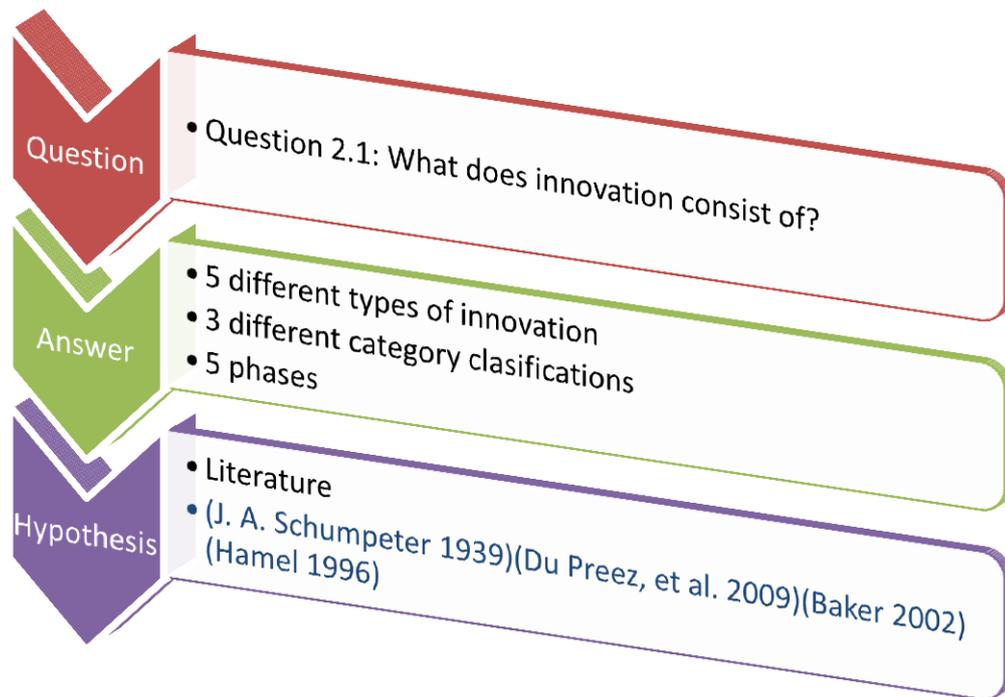


Figure 7: The Basic Innovation Life Cycle (Du Preez, Essman H and Louw L 2009)

Each phase in the innovation life-cycle needs knowledge input to help complete the phase before the next phase can be tackled. Each phase needs different types of knowledge in their respective functionalities.

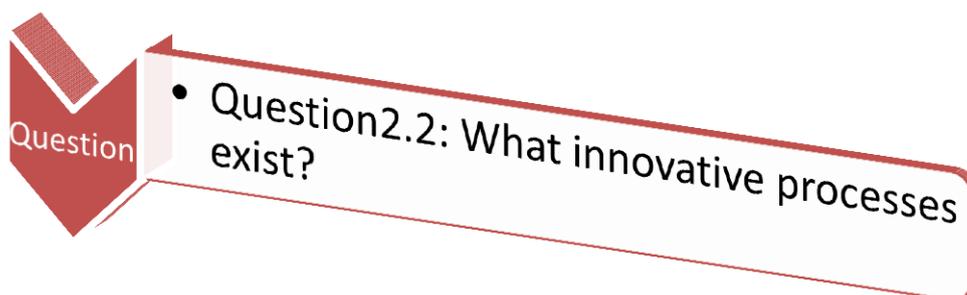
- **Invention:** The invention phase is seen as the opportunity identification and ideas creation phase. Each organisation has its own creative pool, which is represented by the workers of the organisation itself. Each organisation decides how it will obtain its own creative ideas, and whether it is by means of research or brainstorming conferences.
- **Feasibility:** The feasibility phase includes testing, screening and market research to determine whether the invention is feasible. "Specialised" knowledge and knowledge applicable technology is needed in this phase.
- **Implementation:** The implementation phase incorporates the knowledge that is needed to address the detailed design of the product or service.
- **Operation:** In this phase, activities such as production and product quality control, monitoring and optimisation of processes and deployment of strategy are performed. Specific knowledge is needed for each division in this phase. This area requires a lot of expertise in each division.
- **Disposal:** This represents the last phase and is entered after the desired utilisation has been achieved. This does not mark the conclusion of the innovation process, but rather the closure of the particular initiative. The product or service will move out of the innovative life-cycle into sustainability, research and development phases.

The innovation life-cycle shows that different types of knowledge are used at different times in the life-cycle process and this is critical to the success of completing the innovation process.



3.2.6 Innovation Process Model

Looking at innovation processes will help to direct the study into taking a more in-depth look at subsections inside innovation by introducing an innovation process that resembles the innovation life-cycle and exploits the processes in the life-cycle.



3.2.6.1 The FuGle Innovation Model

Research done by (van Zyl 2006) and (van Zyl, Du Preez and Schutte 2007) has resulted in a summarised view of the most prominent innovation process frameworks in the landscape, categorised according to their application types and innovation process phase presence. This summary is extended by (Du Preez and Louw 2008) to incorporate a more inclusive view of the list of models initially mentioned in the FuGle Innovation Process Model.

The aim of the model is to help businesses or organisations to identify, evaluate, develop, implement and exploit new products and services more efficiently and effectively. The model is centred on a generic innovation process which combines the convergent innovation front-end or funnels (identification and evaluation) with the divergent deployment and exploitation stage of the innovation. (Du Preez and Louw 2008)

The FuGle Innovation Process Model is divided into two phases and is linked in the middle by a portfolio stage. These phases are:

- Identifying opportunities and creating a prospects portfolio;
- Commercialise by developing, deploying and exploiting.

The portfolio stage consists of:

- Develop a portfolio
- Manage the portfolio
- Prepare for the project launch

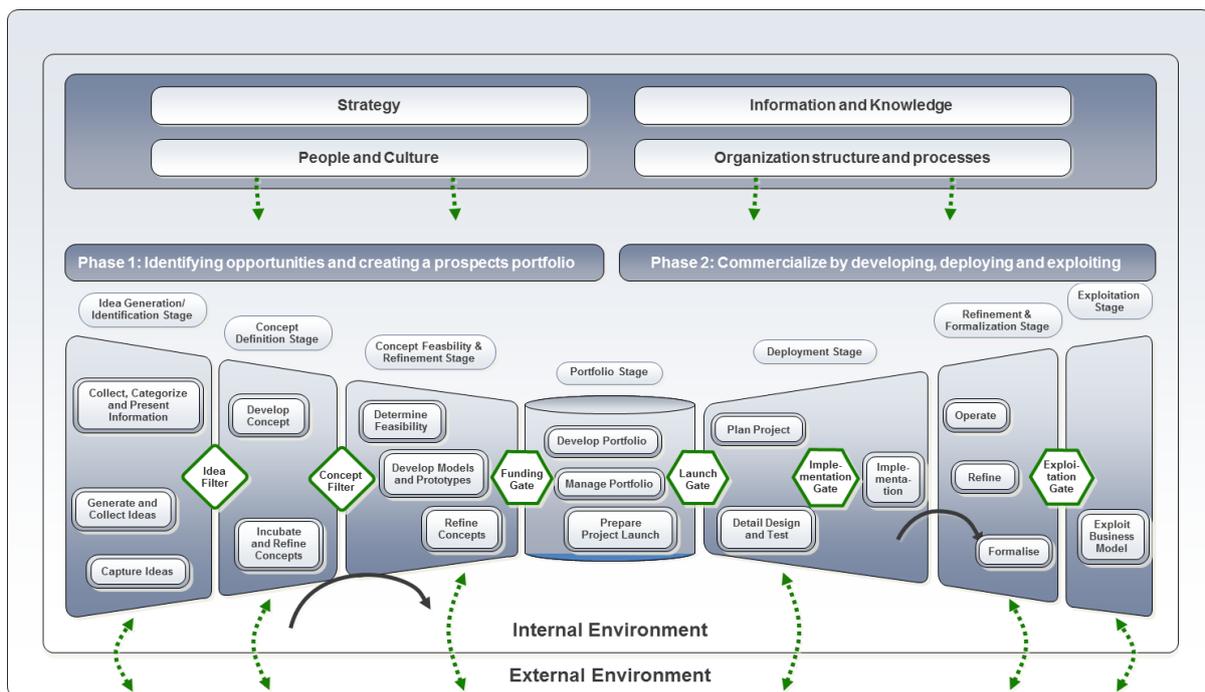


Figure 8: The FuGle Innovation Process Model

3.2.6.2 Identifying opportunities and creating a Prospects Portfolio

This first phase consists of different stages and all is unique to the role they play in the whole model as seen in Figure 9. These stages are:

- Idea Generation/Identification stage
- Concept Definition stage
- Concept feasibility & refinement stage

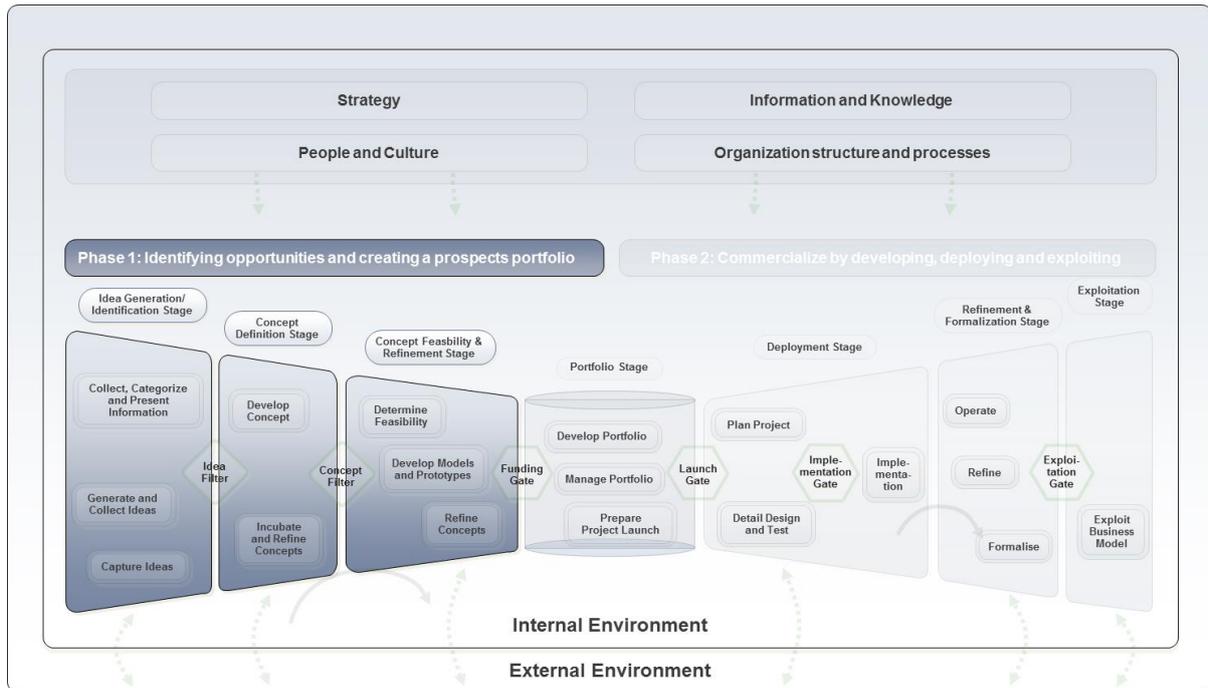
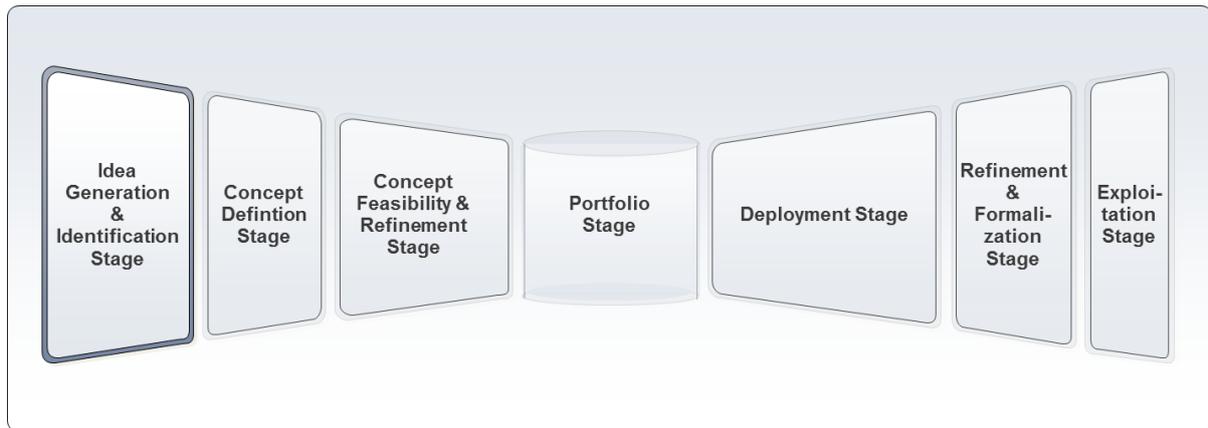


Figure 9: Identifying Opportunities and Creating a Prospects Portfolio

3.2.6.2.1 *Idea Generation/ Identification Stage*



This is the creative stage where new ideas are generated and new opportunities are identified. These new ideas are born during brainstorming sessions, both inside and/or outside the organisation. The aim is to pro-actively generate and nurture new ideas to be finally developed into usable ideas in the future. This stage collects, categorises and refines ideas and it needs information to do so. This information needed comprise:

- information about current problems or problem areas in the business;
- information about competitors;
- information about clients and markets;
- information about technologies;
- information about company strategies and objectives (Du Preez and Louw 2008)

Ideas can be generated purposefully if so desired. However, it needs hard thinking to determine its significance. Du Preez and Louw state that by making the right information available to the right people in the right manner, can help trigger new or innovative ideas.

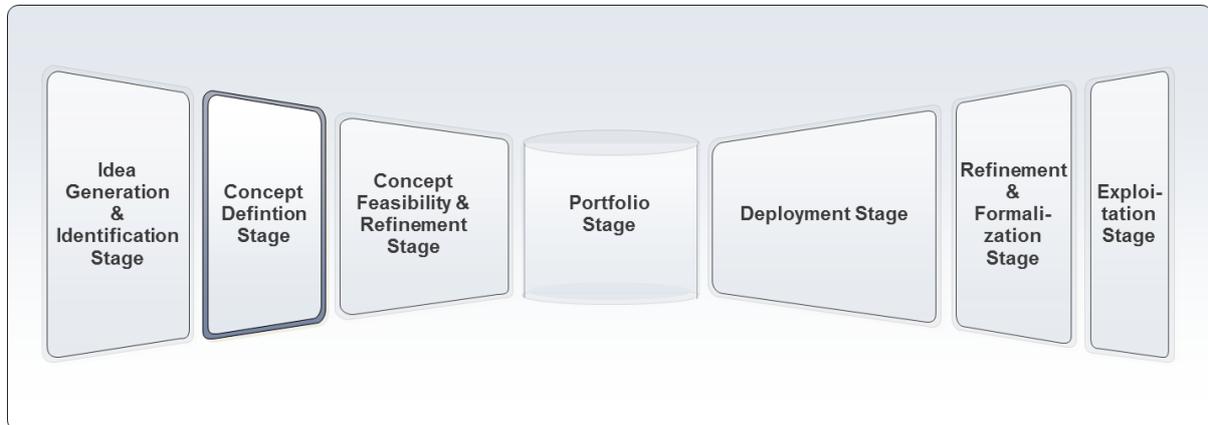
Whether the idea is a spur of the moment thought or has been created during a brainstorming session, it is important to capture or frame the idea in some acceptable manner so that it can be communicated to others and developed further into a concept (Gaynor 2002). It is important to keep a history of these ideas, because an idea can be unworthy at that specific moment due to pertaining circumstances, but can be more feasible in the future.

Filtering

An organisation's strategies will help to act as a guide for filtering new ideas. Ideas that are clearly out of line with the organisational strategies can be rejected during this phase. Since it takes a considerable amount of time and resources to develop new ideas into concepts and evaluate their

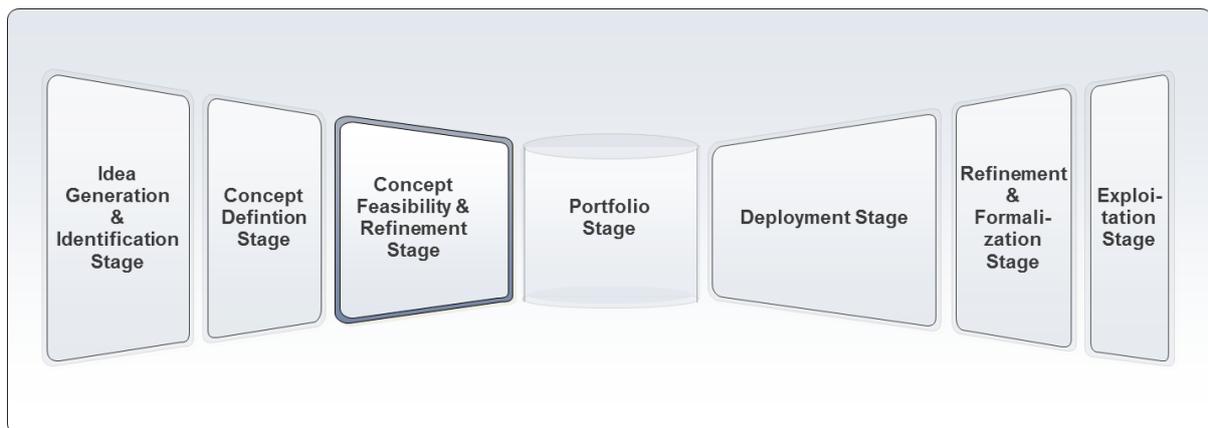
feasibility, it is essential to intelligently filter new ideas while decreasing the probability of rejecting good ideas. Ideally, new ideas must be put through a filtering process and its criteria evaluated. Rejected ideas must, however, be captured along with the reasons for their rejection, because of possible future use.

3.2.6.2.2 *Concept Definition*



During this stage, the focus is on transforming the idea into a workable concept. It must be taken into consideration that concepts are often developed by combining different ideas. Once the initial concept definition is done, sometime must be provided for sharing the concept with different people in order for the concept to incubate. If necessary, this may lead to the refinement of some of the ideas, followed by another filtering process to select the concepts that are most promising for further evaluation in order to determine their feasibility.

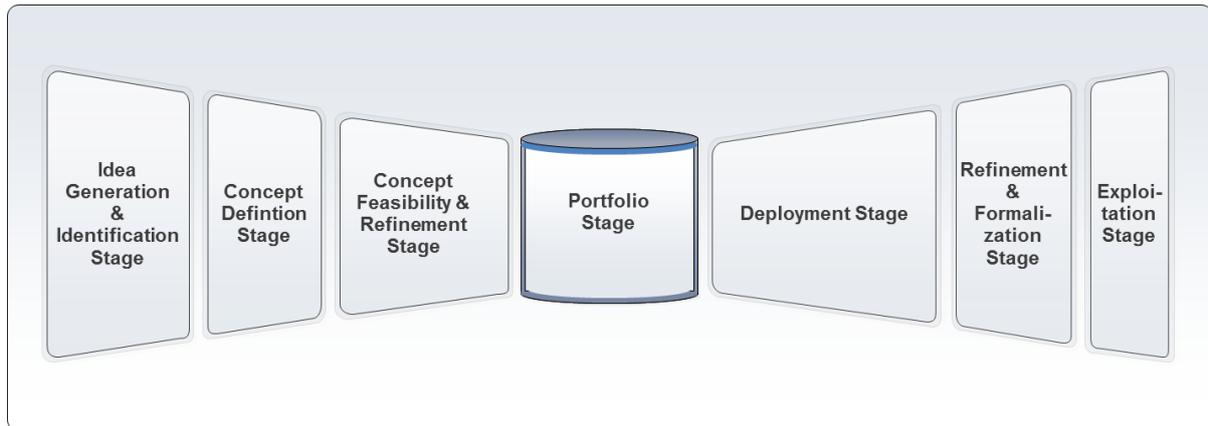
3.2.6.2.3 *Stage Concept Feasibility & Refinement Stage*



The Concept Feasibility stage is aimed at further investigating the concept and collecting additional information to compliment the potentially limited information that have been available during the definition stage. Modelling and prototyping also provide valuable information during concept feasibility. Iterative loops of concept refinement and evaluation will typically occur, and must be

used as a learning experience. It is both better and more cost effective to fail at this stage than later during the Deployment stage. The funding gate at the end of the stage is used to make decisions on which concepts must be resourced and developed further, thereby producing a list of prospective innovation projects as the stage output.

3.2.6.2.4 *Portfolio Stage*



Innovation Portfolio Management entails the holistic management of the enterprise's innovation initiatives and includes prioritisation, scheduling and alignment of prospective innovation projects. Resource allocation is also considered during this stage, along with assignment of responsibility. Innovation initiatives must be continuously monitored to understand the aggregate effect of the innovation portfolio on the strategic objectives of the enterprise. Innovation projects progress towards deployment by determining a launch date for each individual project.

3.2.6.3 **Commercialise by Developing, Deploying and Exploiting**

The second phase of the Fugle model commences with the Deployment Stage. Whereas the “funnel” stage was concerned with better defining the proposed ideas, the second half, the “bugle” stage, focuses on the actual development, deployment and extended control of the chosen projects (from the portfolio). The stages include:

- Deployment Stage
- Refinement & Formalization Stage
- Exploitation Stage

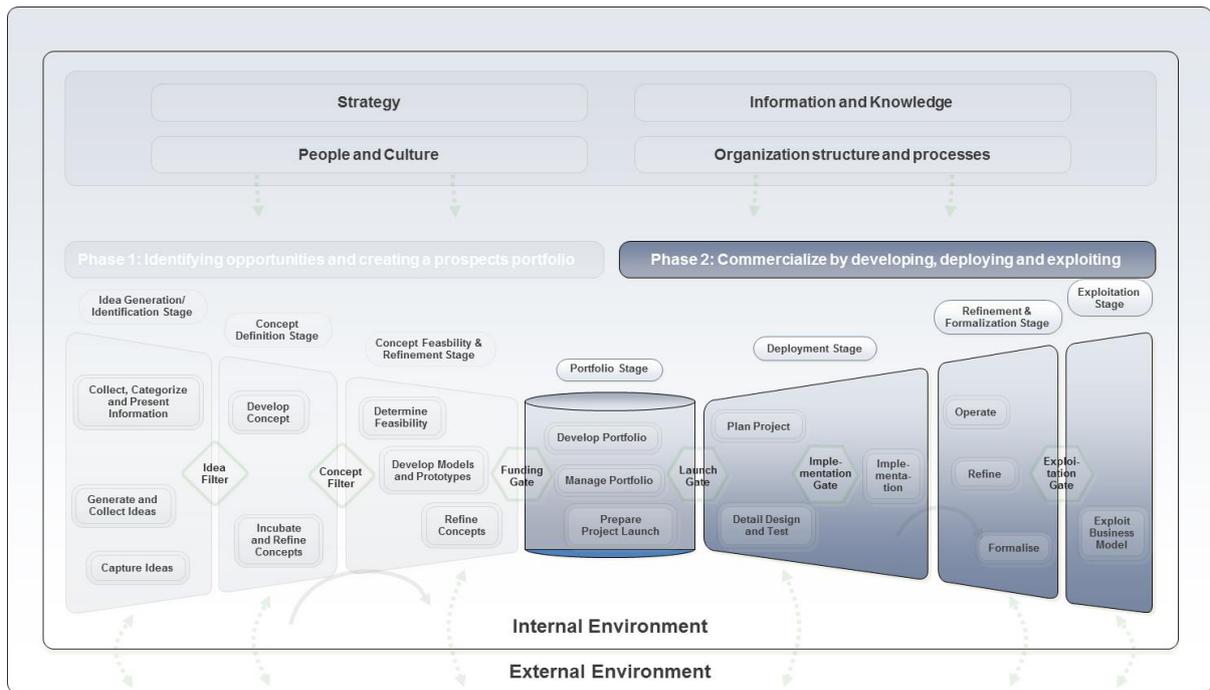
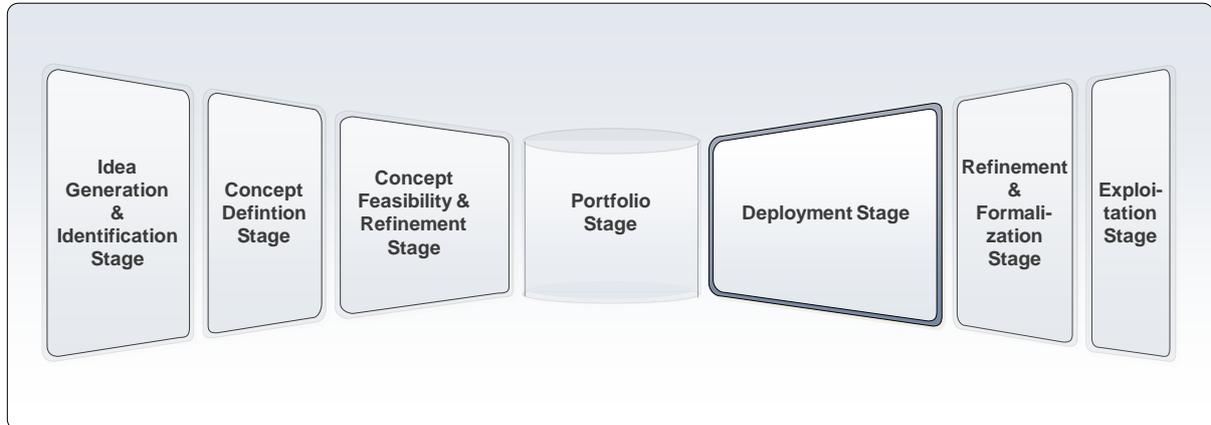


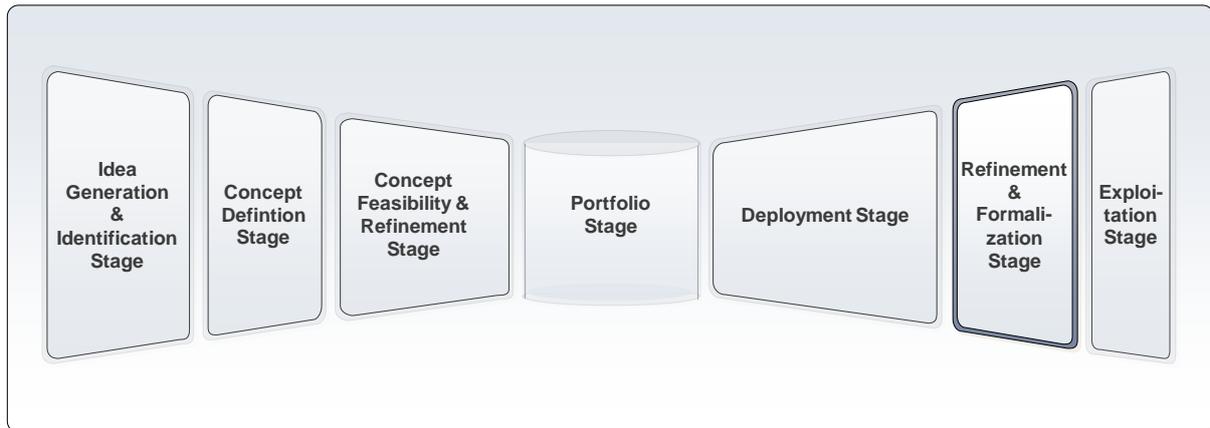
Figure 10: Commercialize by Developing, Deploying and Exploiting

3.2.6.3.1 Deployment Stage



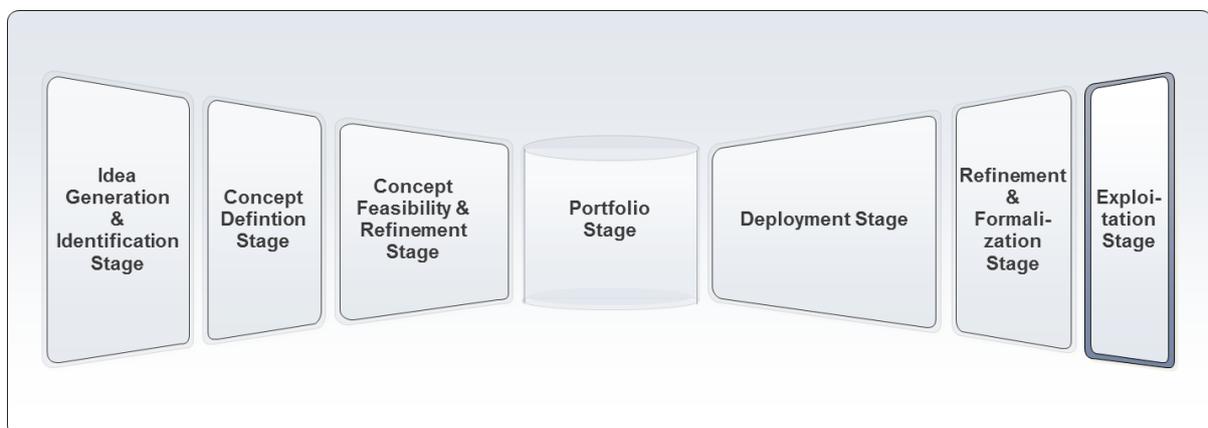
The Deployment stage involves the design, implementation and testing of the innovation solution as identified, conceptualised and decided upon during the previous stages. It includes the detail project planning and management of the design and implementation of projects. After the detail design, an implementation gate is used as a final design review before implementation. Implementation of the design involves the development and roll-out of the new innovation.

3.2.6.3.2 *Refinement & Formalization Stage*



After initial deployment, the innovation project is in operation, but will most likely not function optimally. The progress of the project must therefore be monitored, measured, evaluated and refined until it functions satisfactorily and according to specifications. Once the solution is performing satisfactorily, it can be formalised in terms of operational documentation.

3.2.6.3.3 *Exploitation Stage*

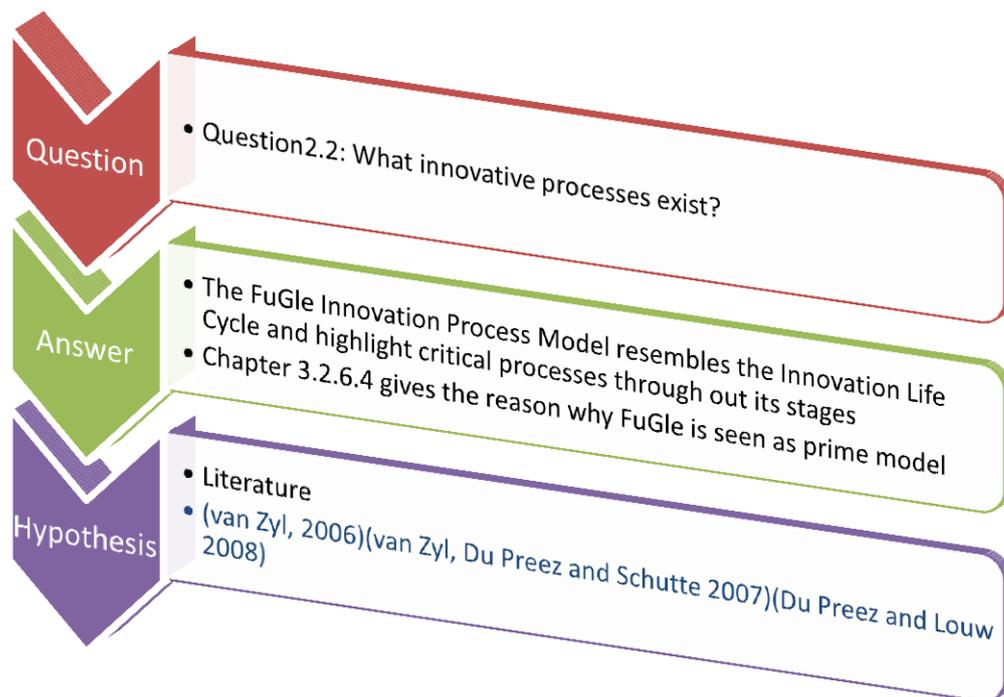


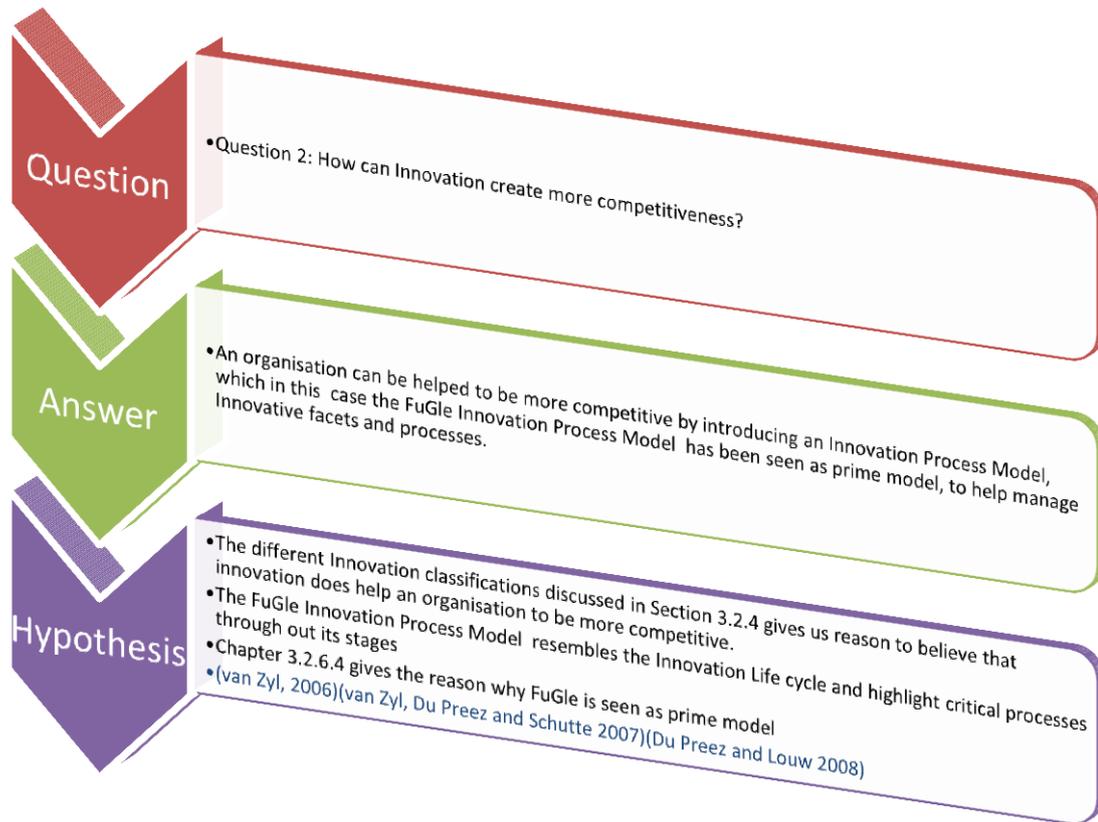
Once the solution has been formalised, the final stage is reached where the solution is further exploited through new business models and markets. The aim is, therefore, to generate more value from the solution. Before this stage is entered into, an exploitation stage needs to be concluded, where decisions are made regarding which solutions can and must be further exploited. Although this innovation process model appears to be a linear staged process, there are many iterative loops and overlaps between the steps within the different stages. Many of these steps (e.g. idea generation and idea capturing) also occur concurrently. Activities such as portfolio management and the managing of information occur throughout the process.

3.2.6.4 FuGle Innovation Model Summary

Most innovation process models which have been evaluated focus mainly on the funnel part of the innovation process (i.e. identifying and filtering new ideas and concepts). In addition, they mostly address product innovation as opposed to service companies that have less tangible products (e.g. insurance companies). These models also neglect, or even totally exclude, the exploitation stage of a new innovation, i.e. to successfully exploit the innovation in different markets and application areas (including exploitation stage of different business models for the enterprise). This is important, since an innovation must at the end generate more value for the company than the cost that it is associated with. (Du Preez and Louw 2008).

The aim of the model is to help businesses to identify, evaluate, develop, implement and exploit new products and services more efficiently and effectively. The model is centred on a generic innovation process that combines the convergent innovation front-end or funnels (identification and evaluation) with the divergent deployment and exploitation stage of the innovation. (Du Preez and Louw 2008)





3.2.7 Innovation Related Role-Players

3.2.7.1 Introduction

Innovation-related role-players provide an understanding of the individual's role in (responsibility for and/or exposure to) developing organisational innovation capability. This sections looks into the roles defined by (Essmann 2009). This section will give us an indication on what role players will feature in the different knowledge flows in different innovation models.

3.2.7.2 Description of the different role-players in the Innovation Process

(Essmann 2009) conducted a study based on the history of assigned role players to the innovation paradigm. A Summary of this history can be found in Appendix A based on studies done by (Hering and Phillips 2005), (Taylor 2007), (Kelly and Littman 2006) and lastly (IBM 2004)

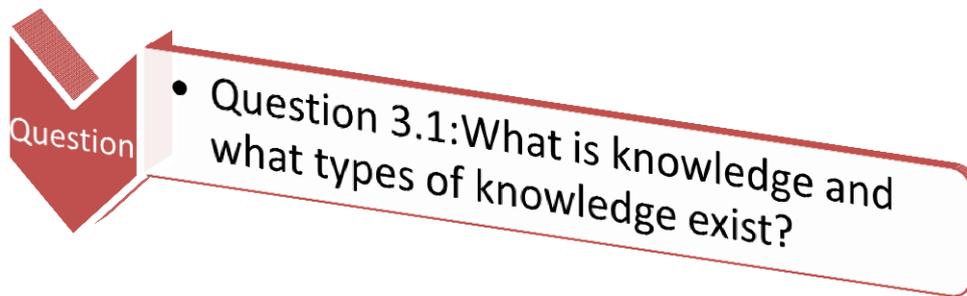
Essmann commenced with a distillation process that involved combining the overlapping role-players and reducing them to the most essential core roles. Reducing them to the core is a primary objective because these roles will be used within the questionnaire, where it will be impractical to provide a lengthy list for respondents to identify with. (Essmann 2009)

The number of role-players presented by the literature ranged from 7 in Taylor (2005) to 24 in IBM (2004). As can be imagined, the level of detail at which each of the roles is being represented also differed substantially.

The details of the distillation process are presented in Appendix A. The roles from the literature are related to one another, consolidated and then reduced to the core innovation roles in this table. The five innovation role-players and representative descriptions that emerged from this process are as follows:

- **Networker:** Scans market, industry, technology, regulatory and societal trends to understand potential futures and identify latent opportunities. Creates connections between internal and external individuals, teams and organisations that have common or complementary objectives.
- **Coordinator:** Balances project objectives, resources and risk. Contextualises position and promotes opportunities and concepts. Prioritises, plan, coordinates, schedule, and assures completion of projects. Overcomes or outsmarts obstacles faced during projects.
- **Builder:** Makes tangible concepts of ideas, demonstrates concepts, obtains feedback from colleagues and customers, and refines concepts. Builds, tests and refines working "products" and ensures "production" readiness. Strives towards the initial vision of the concept with minimal compromise for design, production and delivery.
- **Anthropologist:** Develops understanding of how people interact physically and emotionally with products, services, one another and their environment. Transforms the physical environment into a tool to influence behaviour and attitude, enabling individuals to do their best work. Anticipates and services the needs of colleagues, customers, suppliers and other stakeholders.
- **Leader:** Aligns activities with strategy and objectives. Builds and involves teams of the "right" individuals at the "right" time. Evaluates and prioritises opportunities and ideas against a standard framework considering all business requirements. Guides progress, monitors metrics and instigates corrective action. Builds synergy into projects and the organisation.

3.3 Knowledge



3.3.1 Introduction

According to Schumpeter, invention and innovation are two different terms. To be innovative, you need inventions and launch them successfully into the market (J. Schumpeter 1931). With no knowledge about a field or subject, no ideas will be forthcoming and this may lead to no inventions. If there are no inventions, there will be no innovation.

3.3.2 Definition of Knowledge

'Knowledge' is defined as what we know. Knowledge involves the mental processes of comprehension, understanding and learning that take place in the mind and only in the mind, despite how much they involve interaction with the world outside the mind and interaction with others. Whenever people wish to express what they know, they can only do so by uttering messages of one kind or another. Such messages do not carry 'knowledge', they constitute 'information', which a knowing mind may assimilate, understand, comprehend and incorporate into its own knowledge structures. These structures are not identical neither for the person uttering the message nor for the receiver of the message, because each person's knowledge structures are, as Schutz (Schutz 1967) puts it, 'biographically determined'. Therefore, the knowledge built from the messages can never be exactly the same as the knowledge base from which the messages are uttered (Wilson 2002).

3.3.2.1 Types of Knowledge

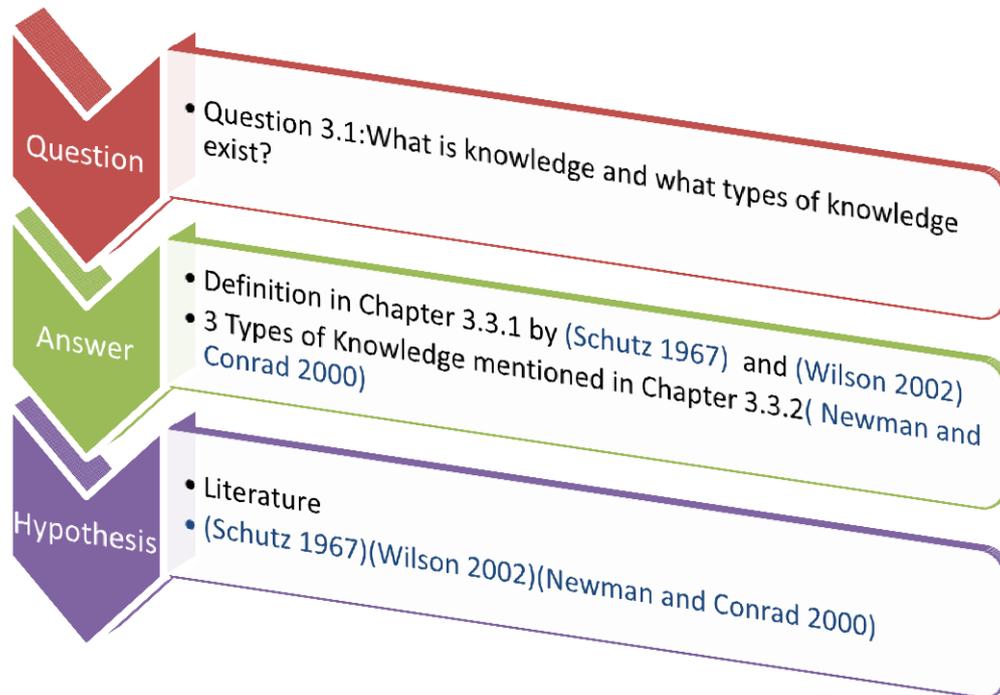
Different types of knowledge can be distinguished, as is described by Bjorn T. Asheim and Lars Coenen in a journal entitled "Knowledge bases and regional innovation systems: Comparing Nordic clusters". They distinguish between two types of knowledge bases: analytical and synthetic. These indicate different mixes of tacit and codified knowledge (Asheim and Coenen 2005). All these types of knowledge can be exchanged, where factors containing different types of knowledge and

competencies come together with the aim of solving technical, organisational, commercial or intellectual problems (Bathelt, Malmberg and Maskell 2004).

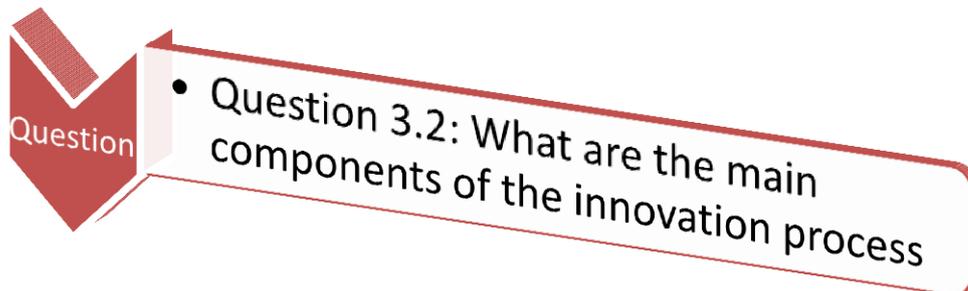
- **Explicit Knowledge:** This consists of knowledge artefacts that have been articulated in such a way that they can be directly and completely transferred from one person to another. (E.g. books, reports, data files, newsreels, audio cassettes and other physical forms).
- **Implicit Knowledge:** This consists of knowledge artefacts whose meaning is not explicitly captured, but can be inferred; in effect, the codification process is incomplete.
- **Tacit Knowledge:** This may be the most insidious and powerful of the three. Michael Polanyi refers to tacit knowledge as “knowing more than we can say”. Simply stated, tacit artefacts are those that defy expression and codification. (Newman and Conrad 2000)

Faulkner (Faulkner 1994) demonstrates that a variety of innovation studies have for many years developed categorisations of the knowledge used in innovation which go beyond simple tacit and explicit knowledge. Fleck and Tierney (Fleck and Tierney 1991) distinguish between seven different types of knowledge, ranging from ‘metaknowledge’, through formal and informal knowledge, to ‘instrumentalities’, whilst Vincenti (Vincenti 1991) identifies six rather different categories. Drawing together these categorisations, Faulkner (Faulkner 1994) builds a ‘composite typology’ of 15 types grouped according to the ‘object’ of knowledge. Finally the types of knowledge can additionally be grouped along another axis concerning five distinct sets of “characteristics’ of knowledge:

- Tacit versus Articulated
- Complex versus Simple
- Local versus Universal
- Specific versus General
- Understanding/Information/Skill (Coombs and Hull 1997)



3.3.3 Knowledge Management



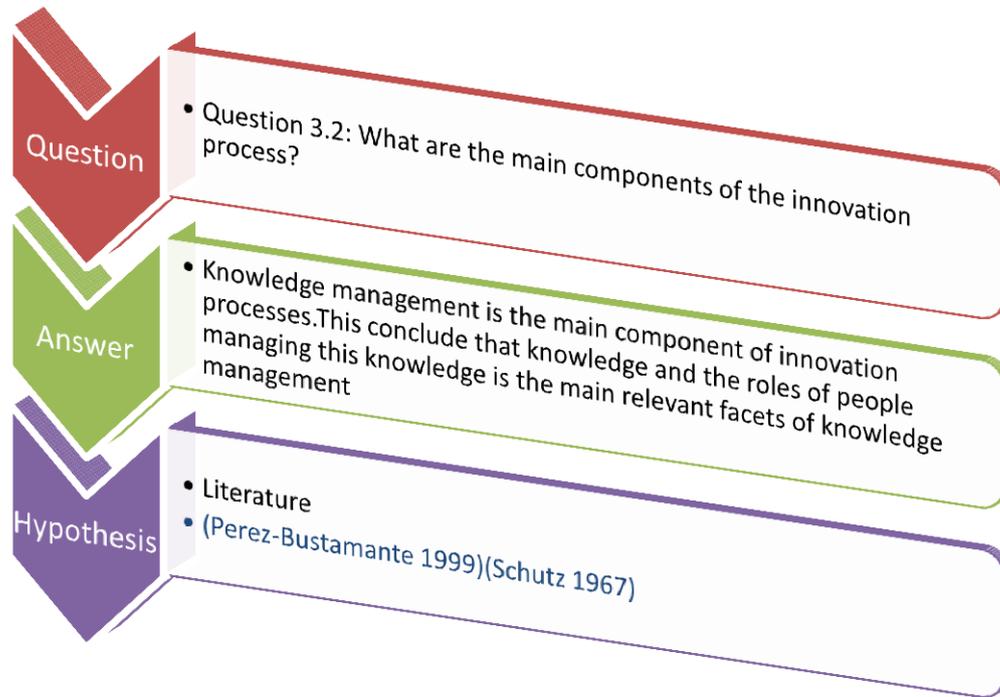
3.3.3.1 Introduction to Knowledge Management

In Section 1.3.1 it is pointed out that Guillermo Perez-Bustamante states in his document: “Knowledge Management in Agile Innovative Organisations”, that innovation and knowledge management are closely linked and that knowledge is the cornerstone of intellectual capital. (Perez-Bustamante 1999)

An increasing number of researchers and commentators have recently been turning their attention to knowledge management (I. Nonaka 1994) and the role of knowledge management in innovation (Leonard-Barton 1995).

Knowledge is needed to help the innovation processes to progress from an invention to an innovation and more knowledge is needed to sustain this innovation. Perez-Bustamante also writes that technology and innovation processes are formed by knowledge bases and the continuous flow

of information. (Perez-Bustamante 1999) This knowledge is generated inside a person's brain and involves the mental processes of comprehension, understanding and learning that take place in the mind and only in the mind, however much they involve interaction with the world outside the mind, and interaction with others. (Schutz 1967)



3.3.3.2 Definition of Knowledge Management

As described by (Bornemann, et al. 2003), Knowledge Management is the coordination of knowledge and the management of the organisational environment to support individual knowledge transfer and the subsequent creation and preservation of collective knowledge. Knowledge management is, therefore, not the management of "knowledge" itself, but rather the management of the organisation with a particular focus on "knowledge". A simplification of this process is to differentiate between the following two fundamental levels:

- The **data level** and
- The **knowledge level**.

This is based on the traditional differentiation between knowledge on the one hand and data and stimuli on the other.

There are three main aspects to knowledge:

- **Individual Knowledge:** the sum of an individual's capabilities and experience determine the possible actions open to an individual and, consequently, the contributions they are able to make to a particular project or task;
- **Action:** includes both physical and mental actions (e.g. problem solving);
- **Data:** resulting from the actions. This includes both internal data (e.g. from other projects) and external data sources such as libraries or online databases.

There are also three data levels that are linked with five core knowledge processes (information, documentation, communication, application and learning) for a basic model of knowledge management as seen in Figure 11.

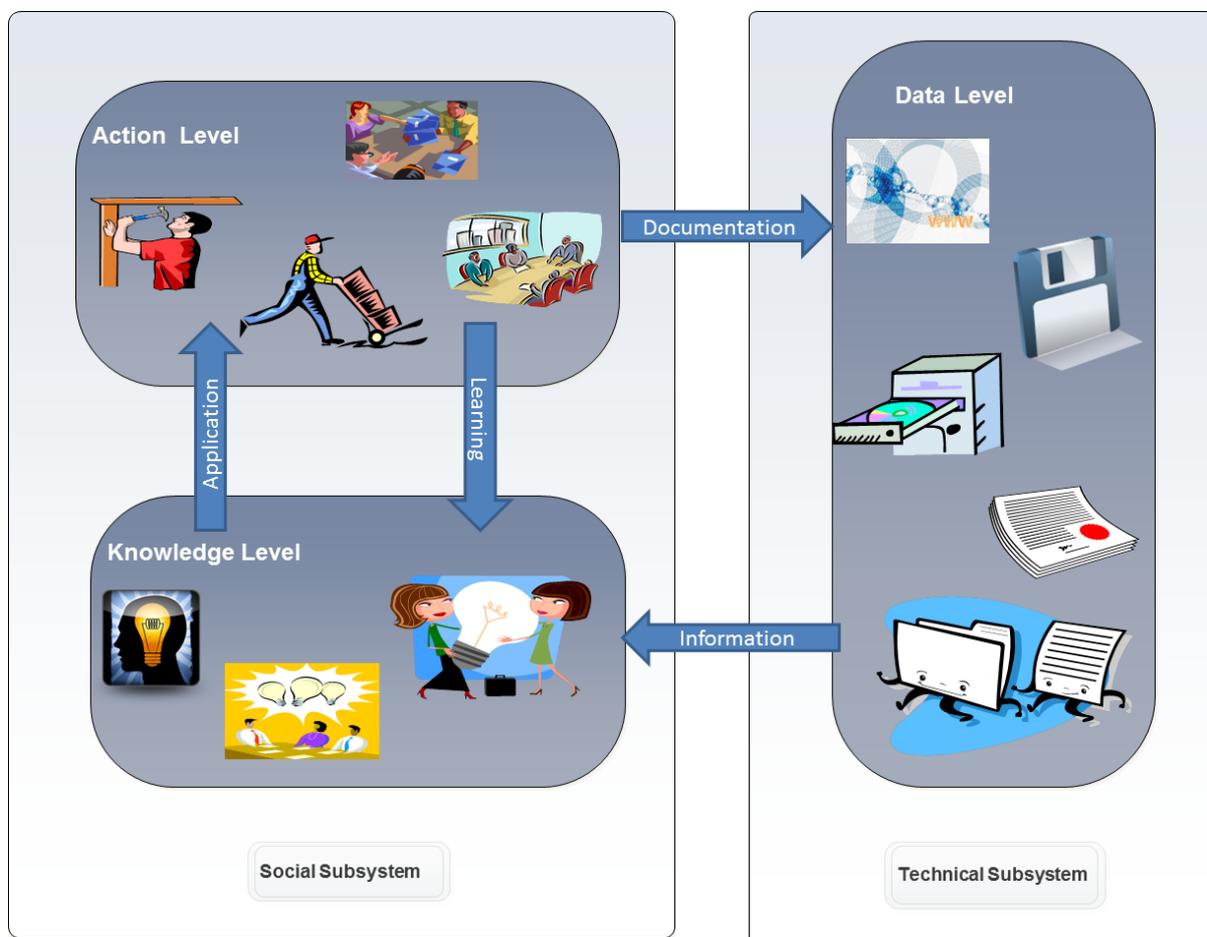


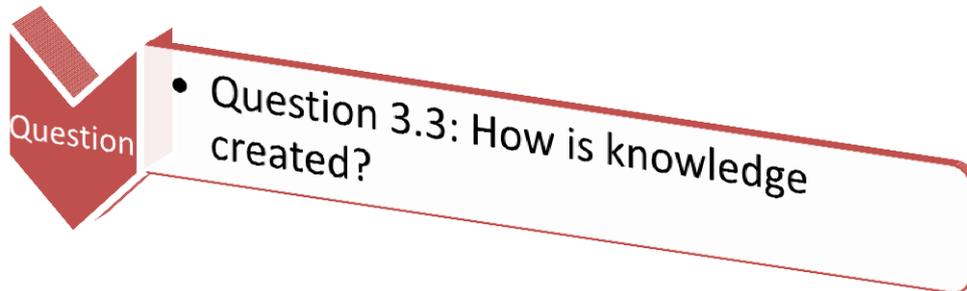
Figure 11: Basic model of Knowledge Management –adapted from (Bornemann, et al. 2003)

These three levels are:

- **Knowledge level:** The knowledge level is made up of the knowledge of the individual members of the organisation and their interaction with each other.
- **Data level:** The data level consists of all available documented knowledge (e.g. in databases or as printed documents).

- **Action level:** The knowledge and data levels provide input for the action level. This is where business processes are enacted and represents the organisation's value creating processes.

3.3.4 Knowledge Work Process



Organisational knowledge is created through a continuous dialogue between tacit and explicit knowledge (Nonaka 1994). Knowledge Work Processes comprise social interaction and communication processes on an individual or group level. These processes may be categorised according to the transformation that knowledge undergoes as a result of the activity (Schutte and Du Preez 2008).

- Socialisation comprises the exchange of tacit knowledge between individuals in order to convey personal knowledge and experience.
- Externalisation involves the conversion of implicit into explicit knowledge, and the exchange of knowledge between individuals and a group.
- Systematisation transforms explicit knowledge into more complex and more systematised explicit knowledge.
- Internalisation is the conversion of organisation-wide, explicit knowledge into the implicit knowledge of the individual.

These four knowledge work processes combine to form a spiral representing all the knowledge creation and transfer activities within the network.

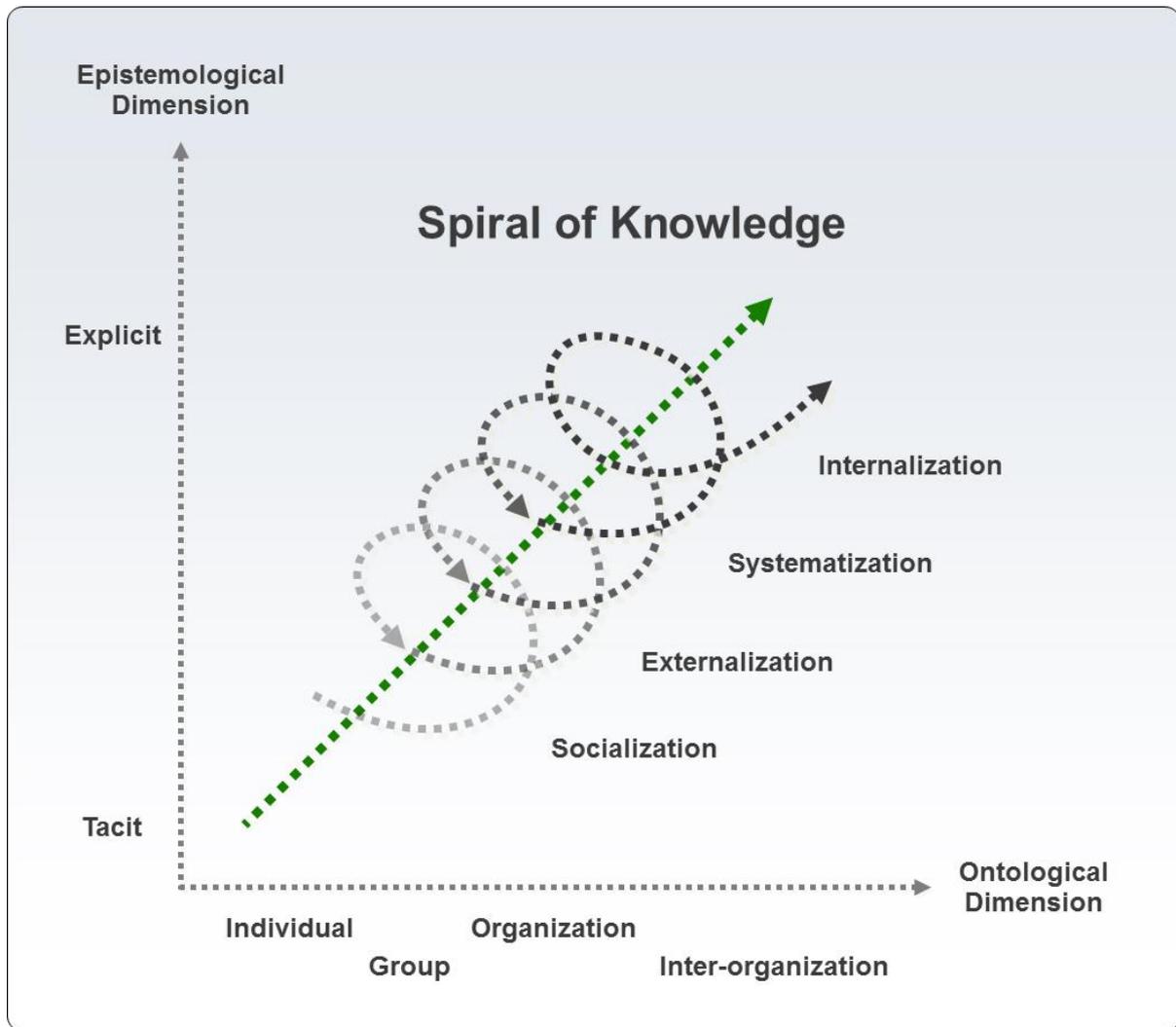


Figure 12: Knowledge Work Processes as a spiral (Nonaka and Takeuchi, 1995)

The Knowledge Work Processes is described by the SECI model in Figure 12, which describes the processes of socialisation, externalisation, combination, and internalisation as four conversion modes from implicit to explicit knowledge (Nonaka and Takeuchi, 1995)

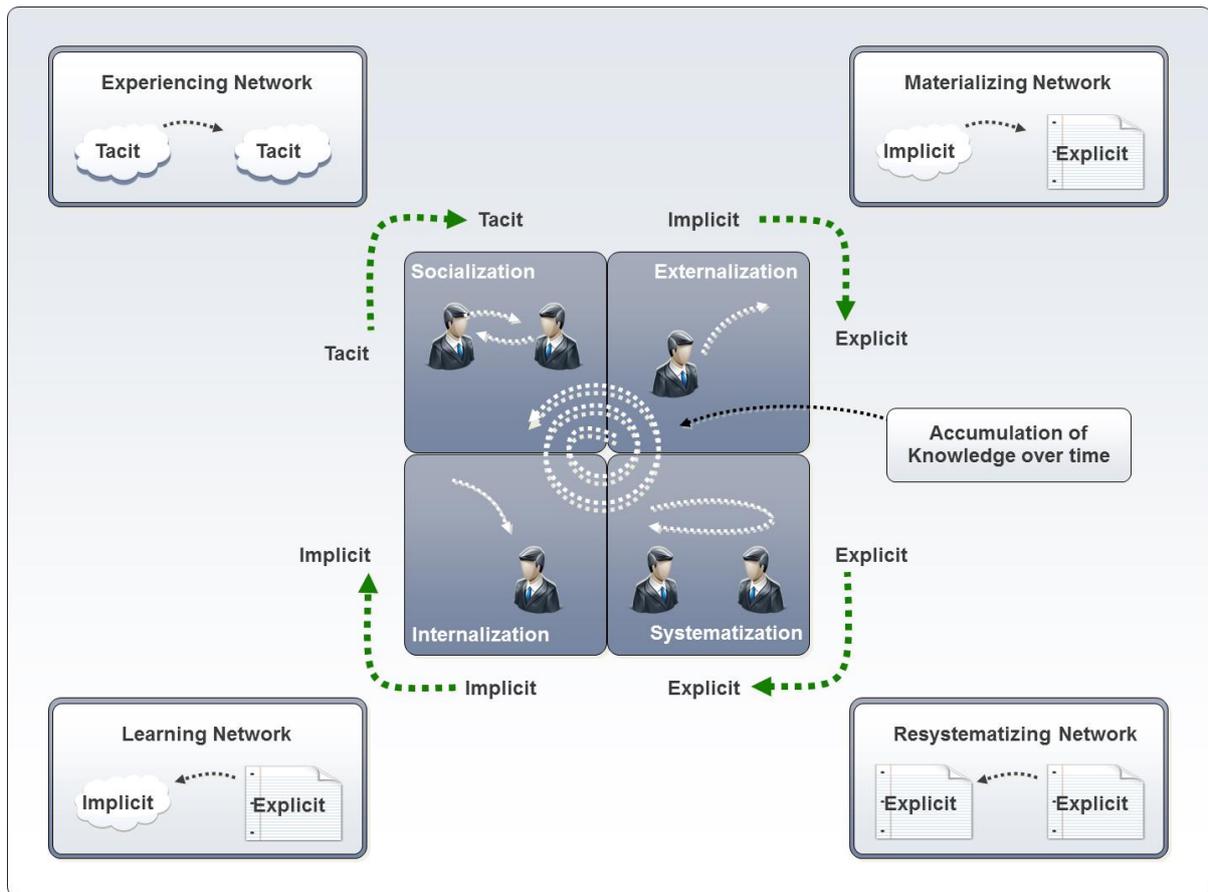


Figure 13: Organisational Knowledge Creation SECI Model adapted from (Nonaka, Konno and Toyama 2001)

Socialisation consists of the exchange of tacit knowledge between individuals in order to communicate personal knowledge and experience. The term “socialisation” is used to emphasise the importance of joint activities in the process of converting new tacit knowledge through shared milieus and experiences. Since tacit knowledge is context specific and difficult to formalize, transferring tacit knowledge requires sharing the same experience through joint activities. In practice, socialisation involves capturing knowledge through physical proximity. Knowledge is acquired from outside the organisation through direct interactions with suppliers and customers.

(Nonaka and Takeuchi, 1995)

Externalisation

Externalisation describes the transformation processes. This means the conversion of tacit into explicit knowledge, and the exchange of knowledge between individuals and a group. Through externalisation, the process of articulating tacit knowledge into explicit knowledge, knowledge becomes crystallised, thus able to be shared by others, and becomes the basis of new knowledge. Through externalisation, tacit knowledge is expressed and translated into such forms as metaphors, concepts, hypotheses, diagrams, models, or prototypes so that it can be understood by others. Yet, expressions are often inadequate, inconsistent and insufficient. Such differences and gaps between

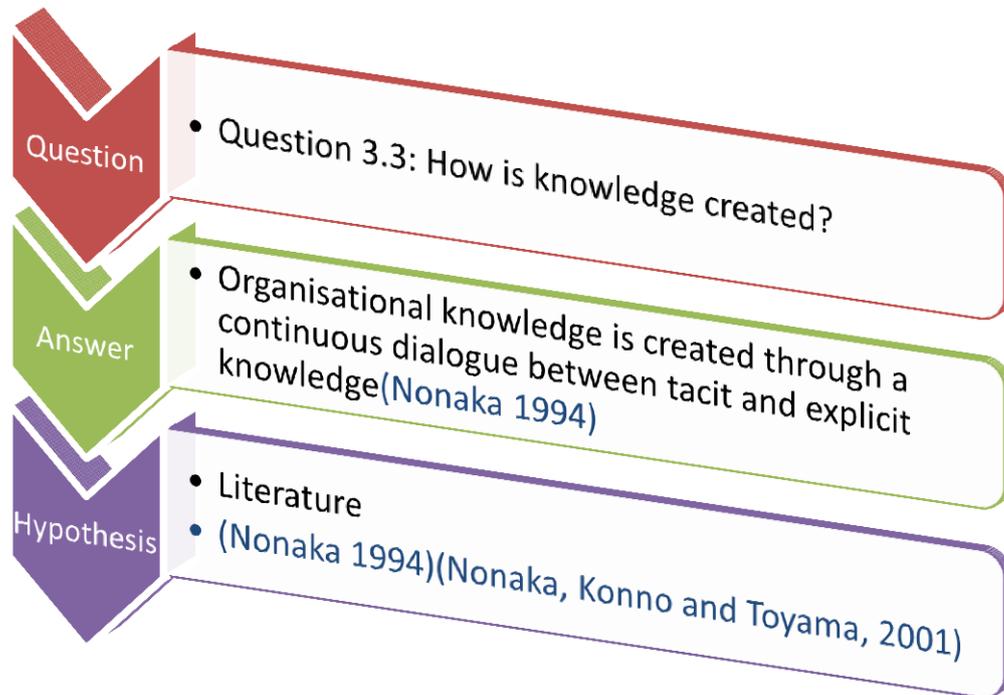
images and expressions can help promote “reflection” and interaction between individuals. (Nonaka and Takeuchi, 1995)

Systemisation

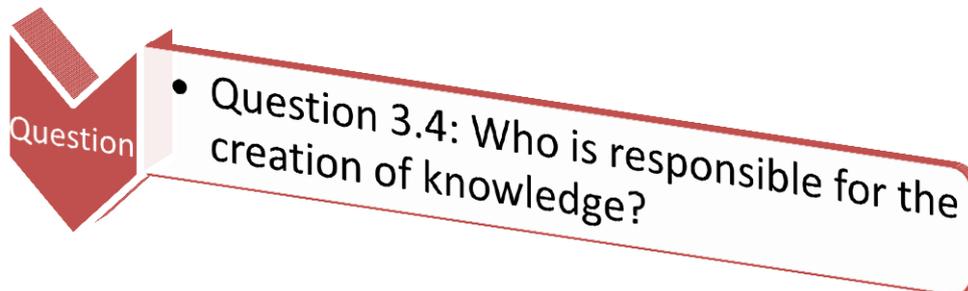
The transformation of explicit knowledge into more intricate, complex and more systematised explicit knowledge represents the stage combination. Knowledge is exchanged and combined through such media as documents, meetings, telephone conversations or computerised communication networks, to converge explicit knowledge into more complex and systematic explicit knowledge which is then called systemisation. Reconfiguration of existing knowledge through sorting, adding, combining and categorising can create new knowledge. In this mode, communication, diffusion and systemisation of knowledge are the key components. Systemisation can also include the “breakdown” of concepts. Breaking down a concept, such as a corporate vision, into operationalized business or product concept also creates systemic, explicit knowledge. In the combination process justification of knowledge takes place so as to form the basis for agreement and allows an organisation to take practical concrete steps. (Nonaka and Takeuchi, 1995)

Internalisation

Internalisation is the conversion of organisation-wide, explicit knowledge into the tacit knowledge of the individual. This requires that the individual must be able to recognise personally relevant knowledge within the organisation. Internalisation, the process of embodying explicit knowledge into tacit knowledge, is closely related to “learning by doing”. Through internalisation, knowledge that has been created is shared throughout an organisation. Internalised knowledge is used to broaden, extend and reframe organisational members’ tacit knowledge. When knowledge is internalised into individuals’ tacit knowledge bases in the form of shared mental models or technical knowhow, it becomes valuable assets. This tacit knowledge accumulated at the individual level is in turn shared with others through socialisation, setting off a new spiral of knowledge creation. (Nonaka and Takeuchi, 1995)



3.3.5 Knowledge Transferring

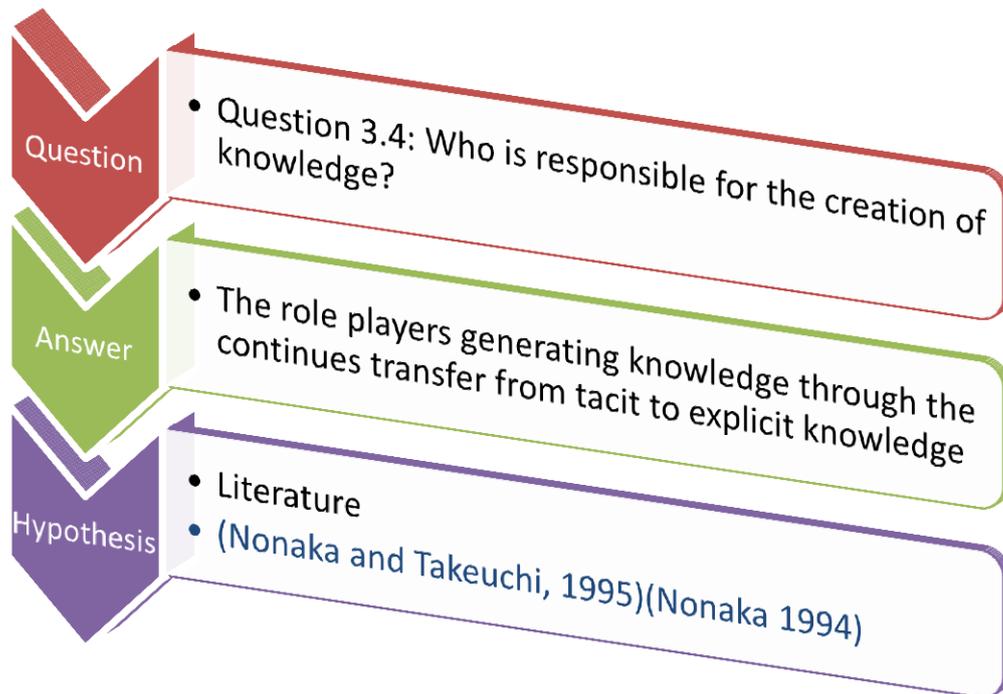


An increasing number of researchers and commentators have recently been turning their attention to knowledge management (I. Nonaka 1994) and the role of knowledge management in innovation (Leonard-Barton 1995). According to Corne Schutte, professor at the University of Stellenbosch, networking resources within a formal and informal structure proactively improves the ability of any participating enterprise to use/re-use knowledge in a concurrently growing knowledge base. (C. S. Schutte 2010)

Fahey and Prusak state that the managing of knowledge demands for a flow rather than a stock perspective. This perspective considers knowledge flows as in constant flux and change, which are created on a day-to-day basis, connecting, binding and involving individuals who, in turn, transmit, develop and lever new knowledge bases (Fahey and Prusak 1998).

Knowledge networks in may be categorised according to the Knowledge Work Process that is most prolific within the network (Seufert, von Krogh and Bach 1999)

- An Experiencing Network mainly pursues socialisation (transferring tacit knowledge between individuals). It supports the members to exchange their knowledge, best practices, and solutions through common experiences.
- A Materialising Network focuses on externalisation (transforming implicit knowledge into explicit knowledge) and serves to motivate and stimulate network members possessing implicit knowledge to externalise their experiences and thoughts.
- A Systematising Network mainly deals with systematisation (structuring explicit knowledge into explicit knowledge while adding value). This network type produces organisational handbooks, yellow pages, newsletters and training materials as a means of efficiently reusing explicit knowledge.
- A Learning Network pursues internalisation (transforming explicit knowledge into the implicit knowledge of individuals) and supports the learning, embodiment and application of existing explicit knowledge. New implicit knowledge is created in the process.



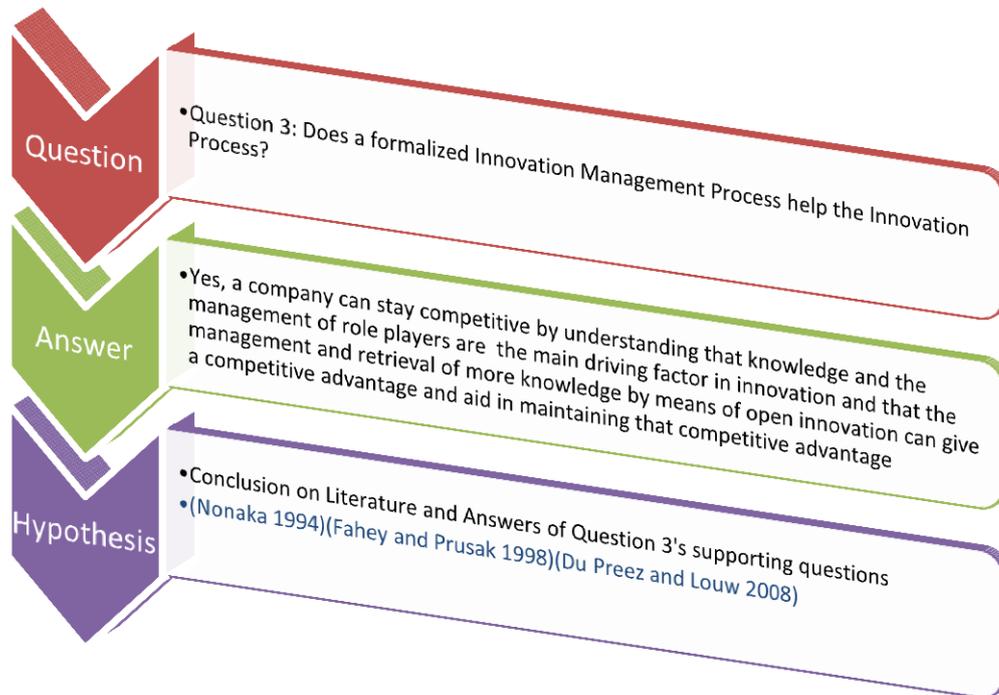
3.3.6 Knowledge Summary

With no knowledge about a field or subject, no ideas will be forthcoming and this may lead to no inventions. Knowledge is defined as what we know. Knowledge involves the mental processes of comprehension, understanding and learning, all of which happen in the mind and only in the mind, however much they involve interaction with the world outside the mind and interaction with others.

Organisational knowledge is created through a continuous dialogue between tacit and explicit knowledge (Nonaka 1994). Knowledge Work Processes comprise social interaction and communication processes on an individual or group level. The role players generate knowledge through the continuous transfer of tacit into explicit knowledge.

Fahey and Prusak state that the managing of knowledge demands for a flow rather than a stock perspective. This perspective considers knowledge flows as in constant flux and change, which are created on a day-to-day basis, connecting, binding and involving individuals who, in turn, transmit, develop and lever new knowledge bases (Fahey and Prusak 1998).

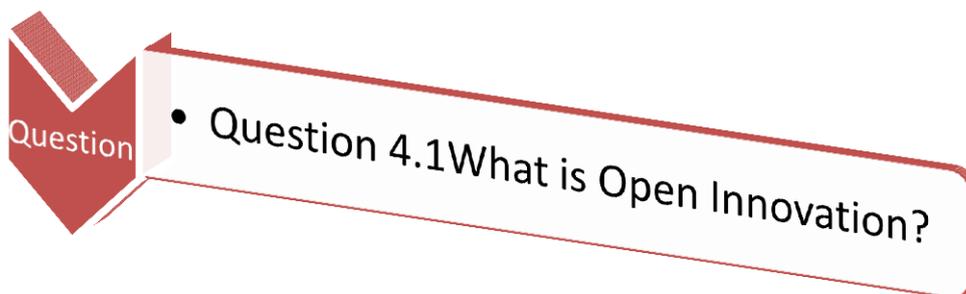
The aim of the Innovation Management Process is to help businesses to identify, evaluate, develop, implement and exploit new products and services more efficiently and effectively, and to serve as a tool to help the management of knowledge. The model is centred on a generic innovation process which combines the convergent innovation front-end or funnels (identification and evaluation) with the divergent deployment and exploitation stage of the innovation. (Du Preez and Louw 2008)



3.4 Open Innovation

3.4.1 Why Open Innovation?

As stated by Stephan Marais in his thesis “The definition and development of Open Innovation models to assist the innovation process” Open Innovation proposes to be a valuable additional methodology that could enhance the standardised innovation process in the same manner as knowledge management does. Knowledge management is supposed to be an underlying function of the entire innovation process. This also applies to the methodology of Open Innovation. The application of the specific models at specific points in the process will be a realisation of this methodology. (Marais 2010)



3.4.2 Definition of Open Innovation

The Open Innovation paradigm assumes that firms can and must use external as well as internal ideas and internal and external paths to market, as they look to advance their technology. Open Innovation assumes that internal ideas can also be taken to the market through external channels, outside a firm's current business domain, to generate additional value (H. Chesbrough 2004).

The Open Innovation paradigm must be understood as the antithesis of the traditional vertical integration model, where internal research and development activities lead to internally developed products that are distributed by the company. According to (Fredberg, Elmquist and Ollila 2008), Chesbrough also later defines Open Innovation as the use of purposive inflows and outflows of knowledge to accelerate internal innovation and expand the markets for external use of innovation respectively (H. Chesbrough 2006).

Open Innovation processes:

- Combine internal and external ideas into architectures and systems;
- Utilise business models to define the requirements for these architectures and systems (H. Chesbrough 2006).

This definition of Open Innovation is in contrast with the definition of Closed Innovation in the previous section of this chapter, where an organisation only relies on its own internal research and development (R&D), idea generation and problem solving. The open innovation policy, on the other hand, makes use of individuals and/or organisations outside the organisation's hierarchical structure to help in the processes of R&D, idea generation and problem solving of that organisation.

Figure 14 adapted from (H. W. Chesbrough 2003) and (Docherty 2006) illustrates the traditional innovation process iteration, where an idea enters the innovation funnel as an input and goes through the development stage until it eventually becomes commercially available in the market.

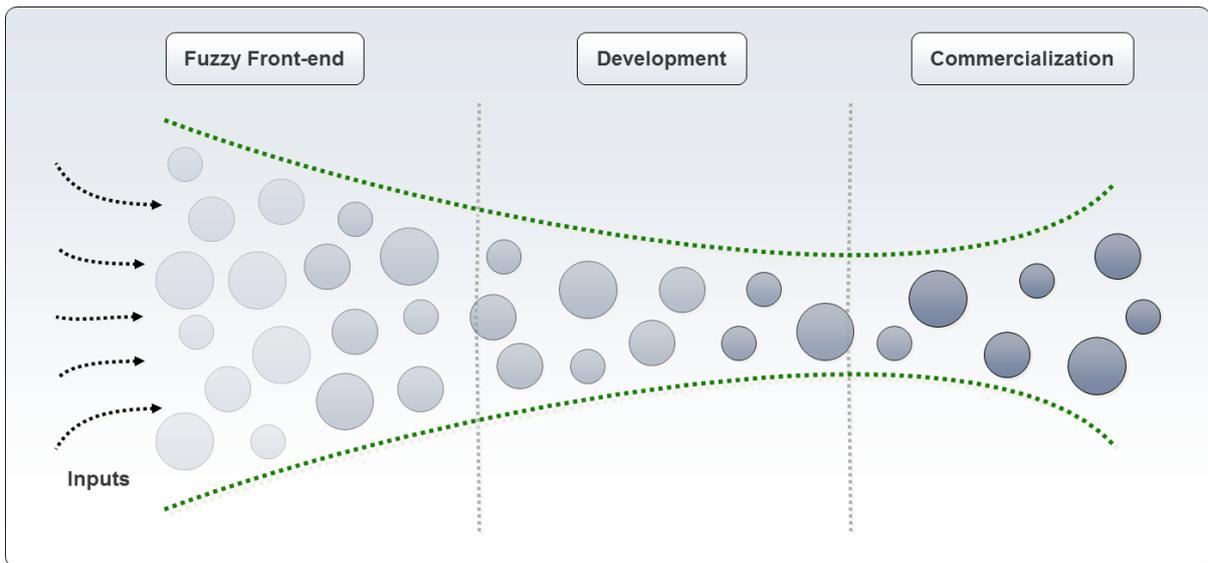


Figure 14: Illustration of the Traditional Innovation Process Iteration (H. W. Chesbrough 2003) and (Docherty 2006)

In contrast, Figure 15 gives an adaptation of the graphical representation of the Open Innovation process as first described by (H. W. Chesbrough 2003). This diagram shows how different cycles of the innovation process can utilise sourcing from different organisations.

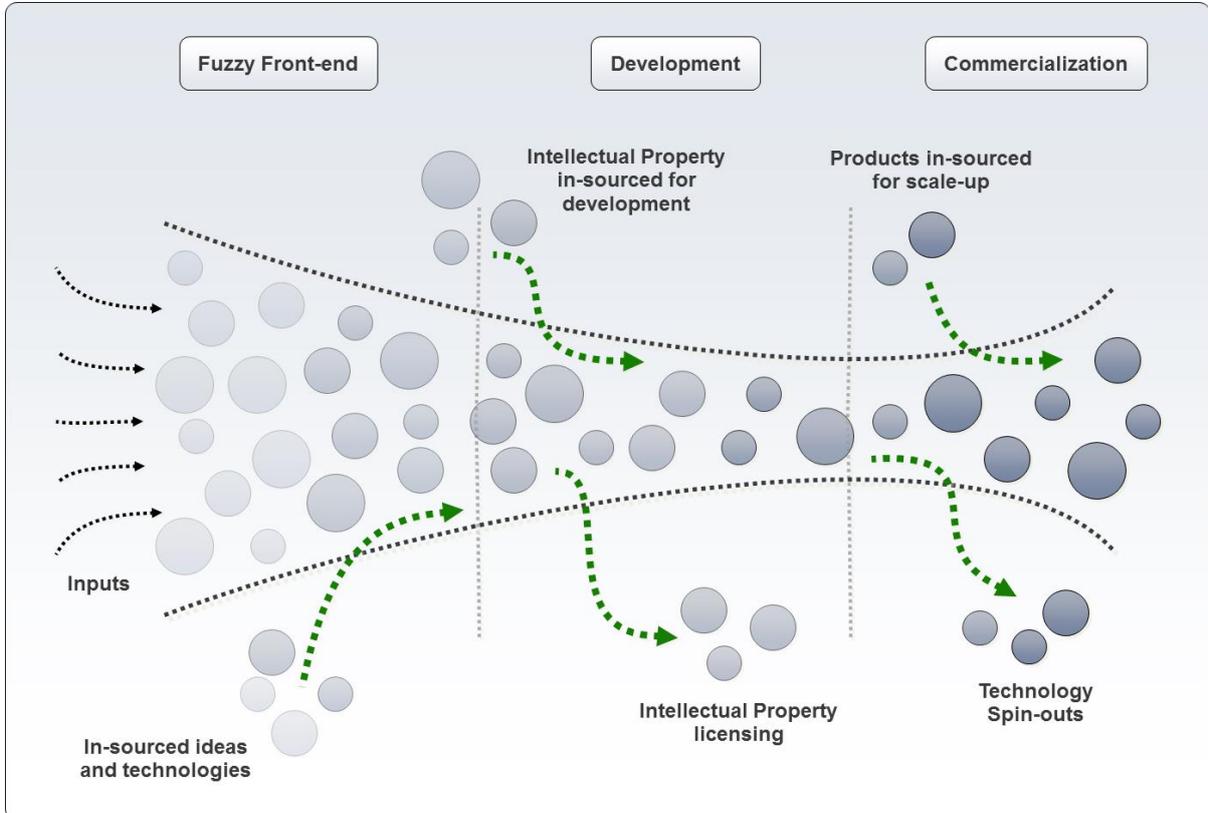
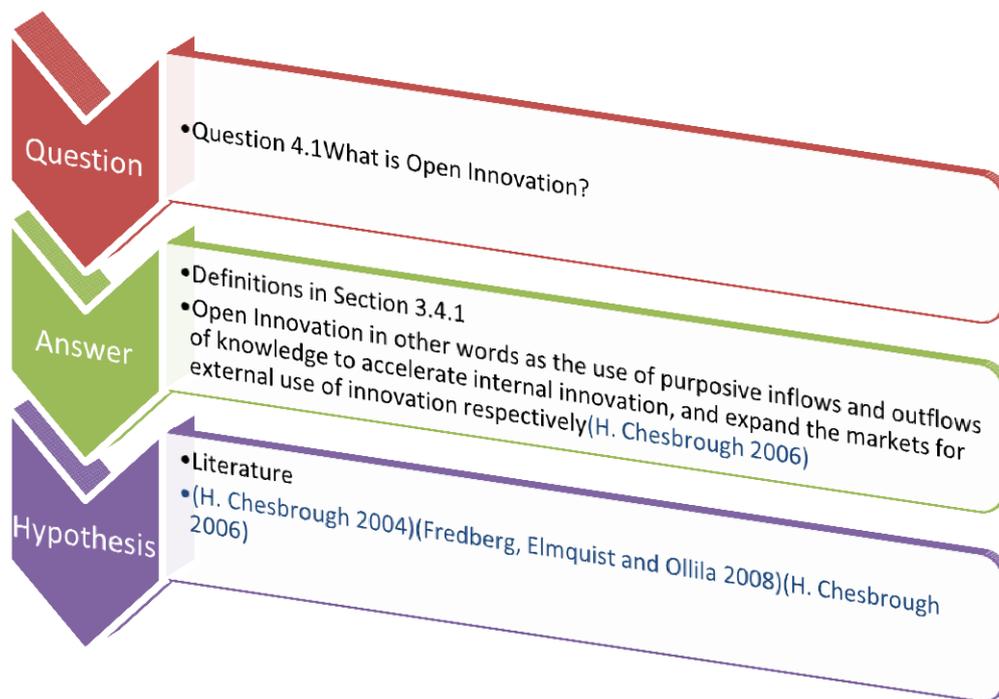


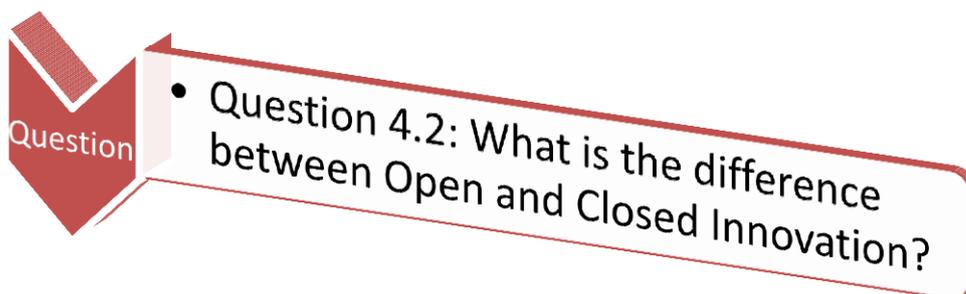
Figure 15: Graphical Representation of the Open Innovation Process (H. W. Chesbrough 2003)

The end result of the adapted innovation process, as well as the spin-offs iteration, can result in any number of concepts or products, as described by (Docherty 2006)

- In-sourced ideas and technologies
- Intellectual property in-sourcing for development
- Intellectual property licensing
- Products in-sourced for scale-up
- Technology spin-outs



3.4.3 Differences between Open and Closed Innovation

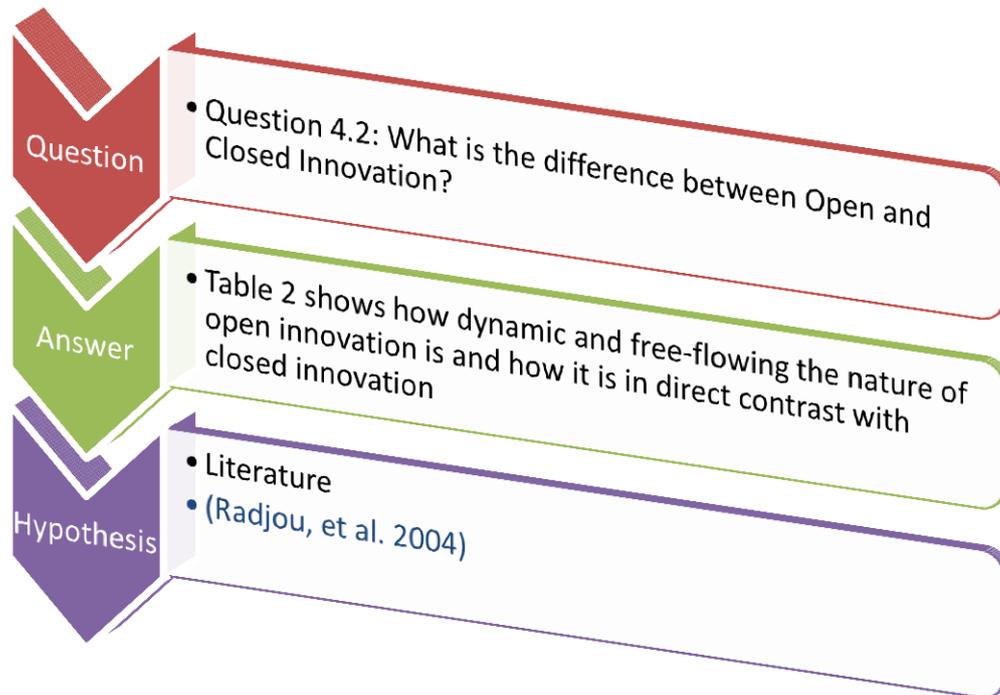


A further explanatory depiction of the differences between Open and Closed Innovation is given in Table 2. (Radjou, et al. 2004)

Table 2: Differences between Open and Closed Innovation

	Closed Innovation	Open Innovation
Corporate ethos	<i>Negative stigma surrounding “Not Invented Here” / “We can do it” / “We will do it”</i>	Best from anywhere
Role of customer	Passive recipient	Active co-innovators
Core competency	Vertically integrated product & service design	Core competitive differentiation and collaborative partner management
Innovation success metrics	Increased margins / revenues, reduced time to market, market share	R&D ROI, breakthrough product or business model
Attitude towards Intellectual property	Own and protect	Buy, sell – the corporation is the knowledge broker using both licensing and commercial development to monetise Intellectual Property rights
Role of R&D and operations	Design, develop and market in-house inventions	Optimise performance of owned assets through both in-house and external development, do enough R&D internally to recognise significant external R&D

This table shows how dynamic and free-flowing the nature of Open Innovation is and how it is in direct contrast with Closed Innovation. It is also important to notice the role that knowledge plays as a commodity that can be handled between two or more organisations. This shows how organisations must regard the incorporation of external knowledge and also the externalisation of internally produced knowledge to advance external collaboration.



3.4.4 Summary of Open Innovation

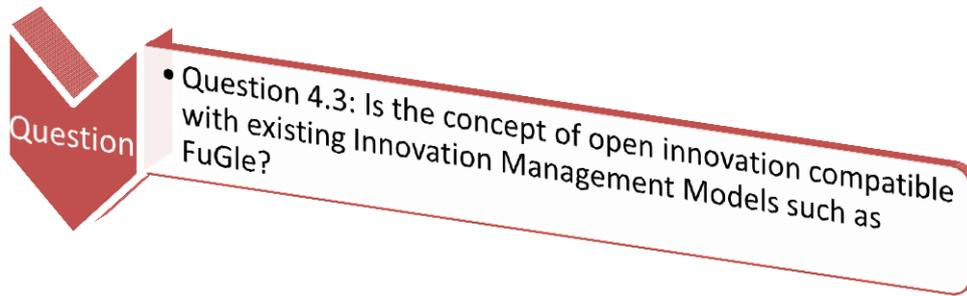
The Open Innovation paradigm assumes that firms can and must use external as well as internal ideas and paths to market, as they look to advance their technology. Open Innovation assumes that internal ideas can also be taken to market through external channels, outside a firm's current business area or domain, to generate additional value (H. Chesbrough 2004).

This definition of Open Innovation is in contrast with the definition of Closed Innovation, where an organisation only relies solely on their own internal research and development (R&D), idea generation and problem solving. Open Innovation policy, on the other hand, makes use of individuals and/or organisations outside the organisation's hierarchical structure to help in the processes of R&D, idea generation and problem solving of that organisation.

This illustrates that organisations must regard as important the incorporation of external knowledge and also the externalisation of internally produced knowledge to advance external collaboration.

Figure 14 illustrates the traditional Innovation Process Iteration and Figure 15 shows the graphical representation of the Open Innovation Process. The diagrams show the only difference in these cycles of the innovation processes as being the utilisation of knowledge outsourced from different organisations. The innovation processes are the same and the differences shared in Table 2 does not change the innovation processes but are based only on a paradigm shift.

3.5 The Role of Open Innovation in Knowledge



It is clear from the literature study that innovation is very important for the survival of the organisation and that innovation gives an organisation a competitive edge above others (Section 3.1). The pressure is on those organisations to pass through the innovation phases as quickly as possible in order to reap the benefits while the window of opportunity is still open.

It is safe to say that knowledge is the driving force behind innovation (Section 3.3.3). The more knowledge exist, the faster the innovation processes can take place and the quicker the product or service will pass through the innovation life-cycle phases and also the more successful these ideas will pass through the innovation funnel.

Knowledge is needed in every stage of innovation. Knowledge is needed in the field of study and throughout the whole process, from the invention to the production, operations and all the way to the sustainability and R&D processes. The question is how an organisation, which is limited in size, can generate more knowledge when the intellectual capital is limited, without having higher expenses for research and development and doing this in a short period of time and still be competitive? The answer is very likely to be found in Open Innovation as argued in Section 3.4.

Open Innovation enlarges the pool of knowledge by combining or pooling the intellectual property of organisations. Expenses are still low and this bigger pool of knowledge consists of more knowledge and expertise and will be able to perform faster if knowledge is shared. Open Innovation also brings a new paradigm to this innovation funnel. Knowledge and information are now able to join the funnel and help the successful output of innovative ideas. Knowledge flowing as a flux (Fahey and Prusak 1998) across organisational boundaries will be better than a stock perspective. The only problem is handling the different types of knowledge across these boundaries. This is where knowledge management becomes crucial. Knowledge management is the tool governing the transfer of knowledge across borders between organisations.

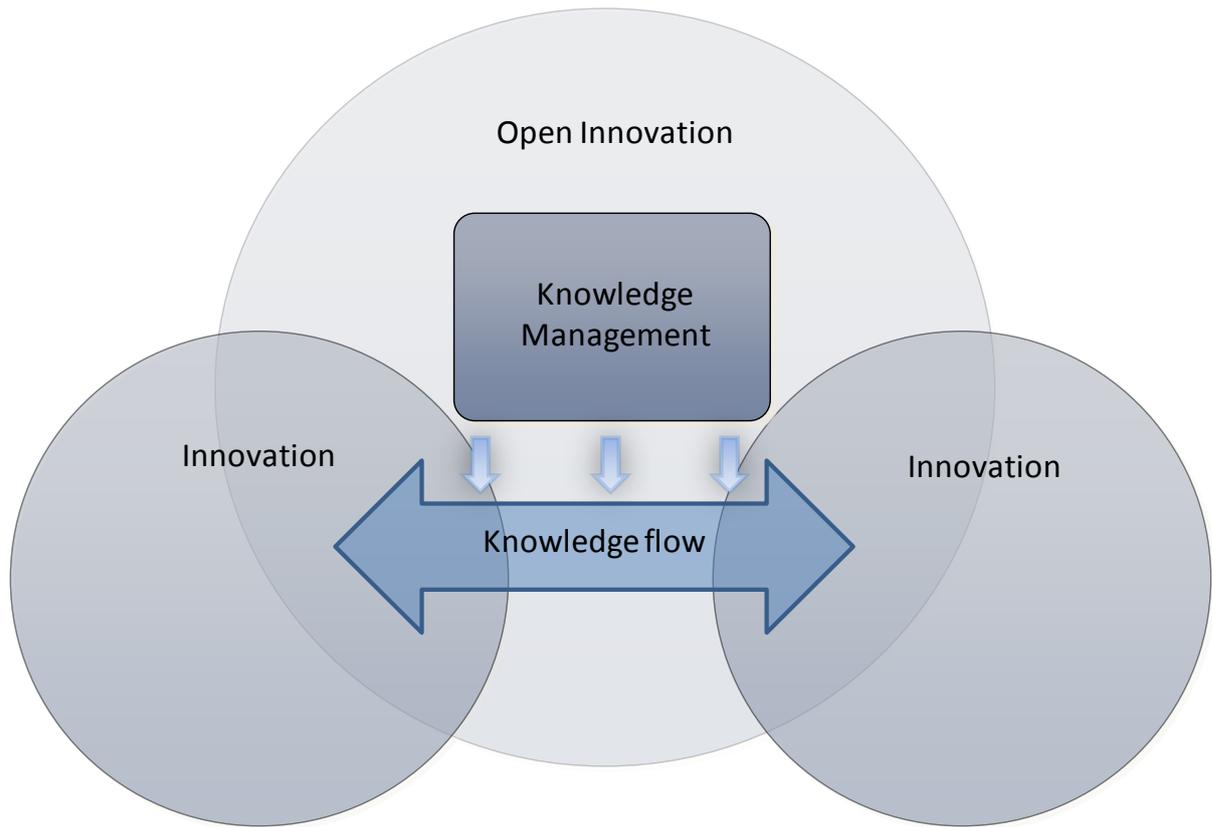
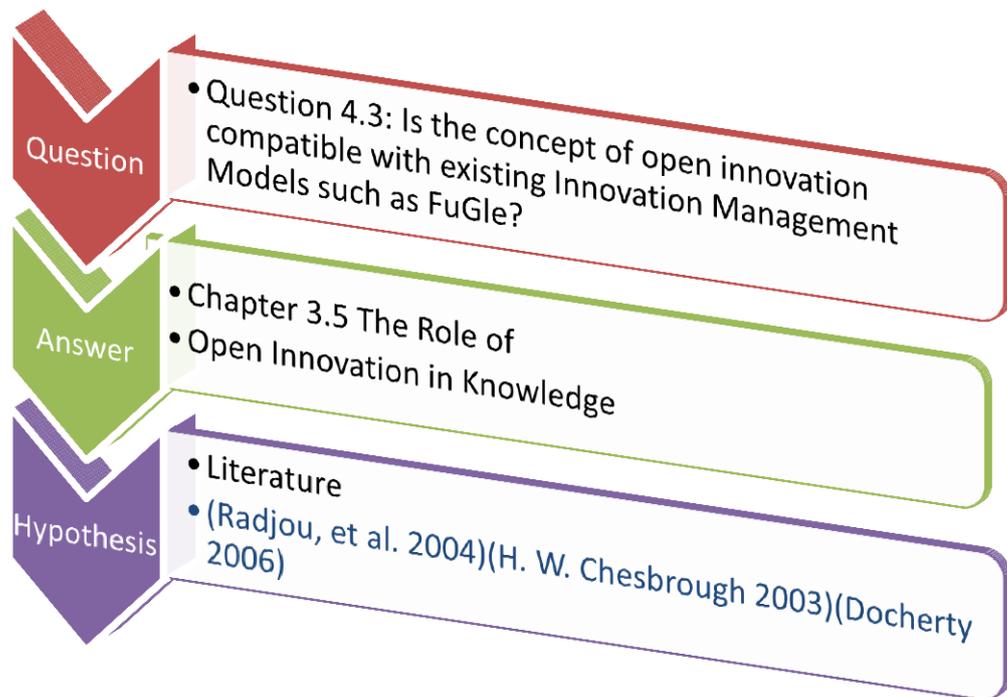


Figure 16: Open Innovation Diagram

This diagram shows how two organisations with their respective innovation departments are working in conjunction with each other by allowing knowledge to flow across each other's borders. This paradigm is named Open Innovation. Knowledge management is the governing body for this flow of knowledge and is the link to an Innovation Management Model, like FuGle, to help manage the flow of knowledge.



3.6 Assignment of Open Innovation Models to an Innovation Management Model



The FuGle model is a good example of how innovation can work in a company or organisation. Each stage has its own processes and different types of knowledge that are needed in order to complete each stage. The knowledge present in each stage is crucial for the success of the entire innovation process and each piece of knowledge must be gathered from the best source possible. The allocation of Open Innovation to FuGle, by assigning an Open Innovative model to each stage, will open up and help the innovation process to enable organisations to share knowledge.

3.6.1 Summary of the Innovation Requirements

Table 3 summarises the requirements that may prove to be relevant to Open Innovation. These requirements will be used when the developed Open Innovation models are allocated to the FuGle process, based on the primary offering each Open Innovation model can provide to the requirements.

Table 3: Relevant Requirements to Open Innovation

Stage	Primary focus	Open Innovation-relevant requirements
Generation / Identification Stage	Identification of ideas and Opportunities	<ul style="list-style-type: none"> • Number of ideas, creativity
Concept Definition Stage	Combining ideas and developing concepts	<ul style="list-style-type: none"> • Sharing concepts with relevant role players
Concept Feasibility & Refinement Stage	Determine feasibility, prototyping, refining concepts	<ul style="list-style-type: none"> • Iterative testing • Tangible prototypes to tests
Deployment Stage and Refinement & Formalisation Stage	Project planning, detail design and testing, implementation, initial refinement	<ul style="list-style-type: none"> • Developed product, testing, refining • Role-players to assist in refinement
Exploitation Stage	Identifying new markets, exploiting new markets, increasing revenues from product	<ul style="list-style-type: none"> • Developed product to exploit new market channels

3.6.2 The Allocation of Open Innovation Models to Assist the FuGle Process

Research carried out by (van Zyl 2006) and (van Zyl, Du Preez and Schutte 2007) resulted in a summarised view of the most prominent innovation process frameworks in the landscape, categorised according to their application types and innovation process phase presence. This summary has been extended by (Du Preez and Louw 2008) to incorporate a more inclusive view of the list of models initially mentioned in the FuGle Innovation. This study has been taken further by (Marais 2010) in his thesis, “The Definition and Development of Open Innovation Models to Assist the Innovation Process”, where he allocates Open Innovation models that have been identified earlier in this chapter to each of the stages of the FuGle Process Innovation Model, solidifying the gradual evolution of innovation models. Throughout his research, the investigation of Open Innovation has steadily progressed to the point where a set of implementable models have been developed.

The task at hand has been completed by (Marais 2010) and that has been to allocate the developed models to the traditional innovation process (the FuGle model) that has been discussed earlier in this chapter. This allocation has been done by matching the focus of each FuGle stage with the primary offering of each Open Innovation model.

The designing of a new framework is not intended to be a complete substitute for all activities within the FuGle process, but only for specific activities. (Marais 2010) states that an organisation has to find a balance between opening certain activities and facets of the innovation process within each phase, while retaining full control of others. It is this balance that will prove to be the greatest asset of the innovation management process in the future.

Table 4 below depicts the primary focus of each FuGle stage, as well as the requirements for each stage that may prove to be relevant to the allocation of the Open Innovation models.

Table 4: Allocated Models Summary (Marais 2010)

FuGle Stage	Stage Requirements	Allocated Models	Model Contributions
Idea Generation/ Identification	<ul style="list-style-type: none"> Quantity of ideas Creativity 	<ul style="list-style-type: none"> Idea competitions 	<ul style="list-style-type: none"> Increase quantity of ideas Improves customer insight
Concept Definition	<ul style="list-style-type: none"> Sharing of concept to foster refinement 	<ul style="list-style-type: none"> Idea competitions (Speculative type) Innovation networks 	<ul style="list-style-type: none"> Provides opportunity to share Receives suggestions for refinement
Concept feasibility & Refinement	<ul style="list-style-type: none"> Concept prototyping Iterative testing 	<ul style="list-style-type: none"> Idea competitions (Speculative type) Customer immersion 	<ul style="list-style-type: none"> Assists in concept development Assists in prototype testing
Deployment, and Refinement & Formalization	<ul style="list-style-type: none"> Product development Product testing Refinement 	<ul style="list-style-type: none"> Innovation networks Collaborative product development Idea competitions 	<ul style="list-style-type: none"> Assists in design problem solving, actual product development and product testing
Exploitation	<ul style="list-style-type: none"> Exploitation stage techniques New markets New channels 	<ul style="list-style-type: none"> Platforming 	<ul style="list-style-type: none"> Assists in capturing more value from markets

3.6.3 Open Innovation Models

This section will give background regarding the models allocated by (Marais 2010):

- Idea competition
- Innovation networks
- Customer immersion
- Collaborative product design
- Platforming

3.6.3.1 Idea Competition

The phenomenon of idea competitions is growing in popularity. An idea competition entails an organisation or group of organisations launching a competition where individuals (researchers, designers, consumers or normal customers) submit solutions to a problem or objective set out by the hosting organisation, in the hope of winning a reward (financial incentive, recognition or another form of value). Companies having made use of the process include:

- *Peugeot Concours Design Competition* where individuals have been openly invited to design a concept car, with the hope of having their dream car become a tangible prototype. In 2008 this competition was in its fifth year.
- IKEA launched a contest called *Ingenious People*, where individuals can enter to design new storage units for home media systems. Fourteen winners were selected and invited to the IKEA headquarters to receive a financial reward (Palmer and Kaplan 2008).
- The *Google Online Marketing Challenge* took place for the second consecutive year in 2008, with 1,600 student teams from 47 countries participating. The aim of the competition was for student groups to manage a company's online marketing for a specified period of time. The winner was chosen based on the professionalism of the campaign and the increase in the online presence of the participating company.
- Carol Boyes, the well-known South African cutlery designer, has since 2005 held the annual *METAL* competition, where aspiring designers are able to submit ideas in accordance with set criteria. The top three designs win a financial reward.
- *My Starbucks Idea* is a synthesis between a continuous idea competition and a modern-day suggestion box system. Consumers are urged to submit and comment on ideas submitted by the Starbucks community, and the ideas are moderated by a Starbucks employee committee.

The advantages to the organisations responsible for the idea competitions are as follows:

- The organisation receives numerous design ideas, or possible problem solutions, whilst only giving rewards and recognition to a select few of the entries.
- The competitions are usually structured in such a way that the organisation retains the rights to the entrants' intellectual property.
- The capital expense to the hosting organisation is minimal if compared to the amount of information and knowledge received by the organisation.

The marketing and promotional aspect of idea competitions cannot be ignored. Creating a competition where entrants are creatively stimulated is an excellent method to market and promote a product or brand. Whereas a television or printed media advertisements create and stimulate brand awareness for a very short time (a few seconds), idea competitions require the potential customer to ponder and be creatively active for a longer period of time, while the definition and development of Open Innovation models brand remains active in the entrant's mind. This increases more and longer-lasting awareness and has a bigger impact than any other form of advertising will – and all at a reduced cost to the organisation (Marais 2010).

3.6.3.2 Innovation Networks

Research carried out by (Marais 2010) has culminated in the following definition to describe innovation networks:

“Innovation networks refer to the technique of incorporating the input from a network of contributors in the form of solutions to identified problems related to the hosting organisation in exchange for a reward in the form of an incentive”.

Innovation networks thus entail the organisation posing a problem it is experiencing in its product development process to a community (network) of prosumers. These prosumers are willing to put their effort into solving the problem, because they want to win a prize which the organisation offers in the form of an incentive relevant to the industry.

This model differs from the idea competition model in the sense that the problems posed are more specific, detailed and technical problems that need solving. (Marais 2010) Whereas idea competitions are orientated towards gaining ideas (open-ended type) or solutions (speculative-type) to broad, undefined problems, the innovation network is suited to more specific, well-defined and well-developed (almost analytical) problems, as illustrated in Figure 17.

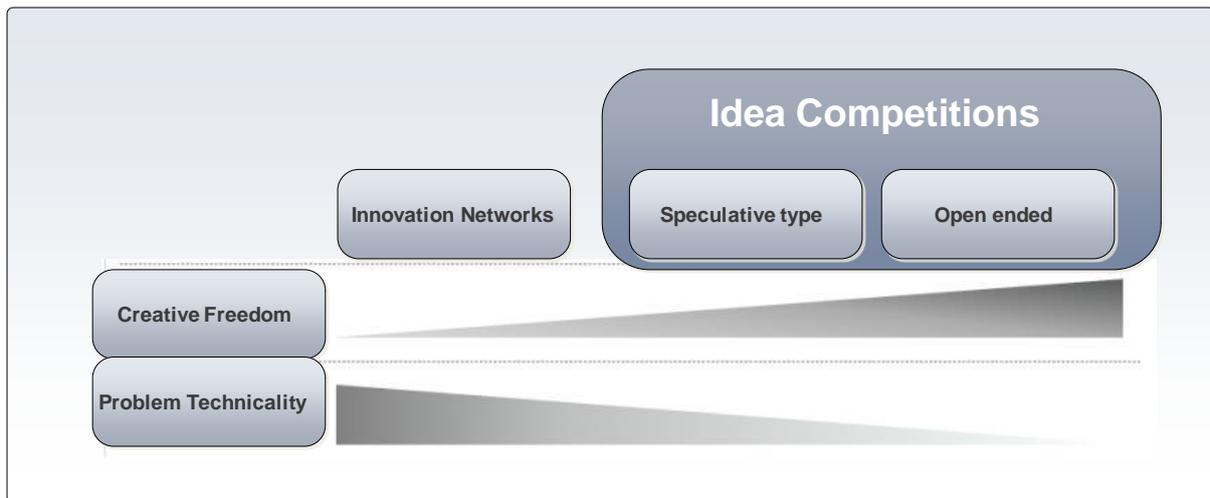


Figure 17: The Differences between Innovation Networks and Idea Competitions

3.6.3.3 Customer Immersion

Organisations have long since made use of various methodologies to acquire customer input for new product or service development. The prevalent method being used is focus groups, which have first been conceived by Robert K. Merton at the United States Bureau of Applied Social Research (Kaufman 2003).

Using focus groups to gain insight into customer behaviour, involves interviewing or studying the attitude of a group of people towards a new product, service or brand. In many cases, the item in question is of a hypothetical nature, which makes it more difficult for the focus group attendees to evaluate and comment on.

However, the accuracy and accountability of focus groups have been questioned. It is claimed that 80% of new products and services fail within the first six months after having been approved by focus groups (Zaltman 2003). He emphasises the poor accountability of focus groups, mainly because their focus does not reflect experience, but rather hypothetical choices. Their views are often forced from attendees under circumstances characterised by misleading communication.

On the other hand, Ulwick argues that the approach currently used by organisations to attain customer input into the design process is incorrectly orientated. According to (Ulwick 2002) organisations are asking the wrong questions at the wrong time during the innovation cycle. An outcome-based approach to customer input is recommended.

This is in contrast to the more popular product-ideation input from potential customers allowed by organisations. The reasoning is that customers cannot be trusted with providing solutions, since it is

not their speciality. Rather, the *functional needs and wants* of a product or service are what is expected from the customer. This argument relates to Henry Ford's statement:

"If I'd ask my customers what they wanted, they'd have said a faster horse."

This then, relates to the incremental innovations customers can incubate, instead of radical innovations. (Ulwick 2002) recommends a five-step process about how to approach and introduce customer input into the innovation process:

- *Plan outcome-based customer interviews:* Deconstruct the process or activity for the product or service into identifiable steps or phases.
- *Capture desired outcomes of each step:* Have the interviewees consider every aspect of the process they go through when using the product or service. The interviewer must then re-word the outcome to contain both an improvement and a quantifiable unit of measure.
- *Organise outcomes:* Group related outcomes and remove duplicates.
- *Rate outcomes for importance and satisfaction:* Conduct a survey with the interviewees to assess the importance of each specified outcome.
- *Use the outcomes to jump-start innovation:* Use this data to uncover opportunities for new innovations, products or market segmentation.

3.6.3.4 Collaborative Product Development

The development of the following definition is based on the research done by (Marais 2010). This serves as an introductory definition of the Open Innovation Model:

"Collaborative product design and development is the technique of increasing the importance and responsibility of suppliers and customers in the product design process and supply chain to result in increased productivity to the benefit of the organisation, and eventually the customer".

This process mainly entails outsourcing the detail design and development of product segments to different parties in the supply chain. Widespread supply chains are not a new concept to business, but the alternative twist it is given in the Open Innovation environment certainly requires a new way of thinking.

The level of detail design required by Collaborative Product Design and Development (CPDD) demands the commitment of an absolute openness between all the parties involved (suppliers and consumers) to minimise the risk of project failure.

While in the normal flow of events an organisation will be continuously scanning for market pull and technology push, and with the product and value-addition flowing from supplier to customer, the Open Innovation process adds an additional dimension to the flow of the supply chain.

The organisation only fulfils the role of mediator and quality assurer – responsibilities that will prove to be of crucial importance. In terms of its role as mediator, the organisation still has the responsibility to ensure that all collaboratively developed parts (or segments) fit together to form the whole.

The responsibility of quality assurance means that the organisation has to ensure that the collaborated product still meets the guaranteed quality requirements which all internally developed products have to meet.

It is the responsibility for these aspects that gives the organisation its hierarchical control over the process and which justifies its assumption of a profit-taking position in a collaborative environment.

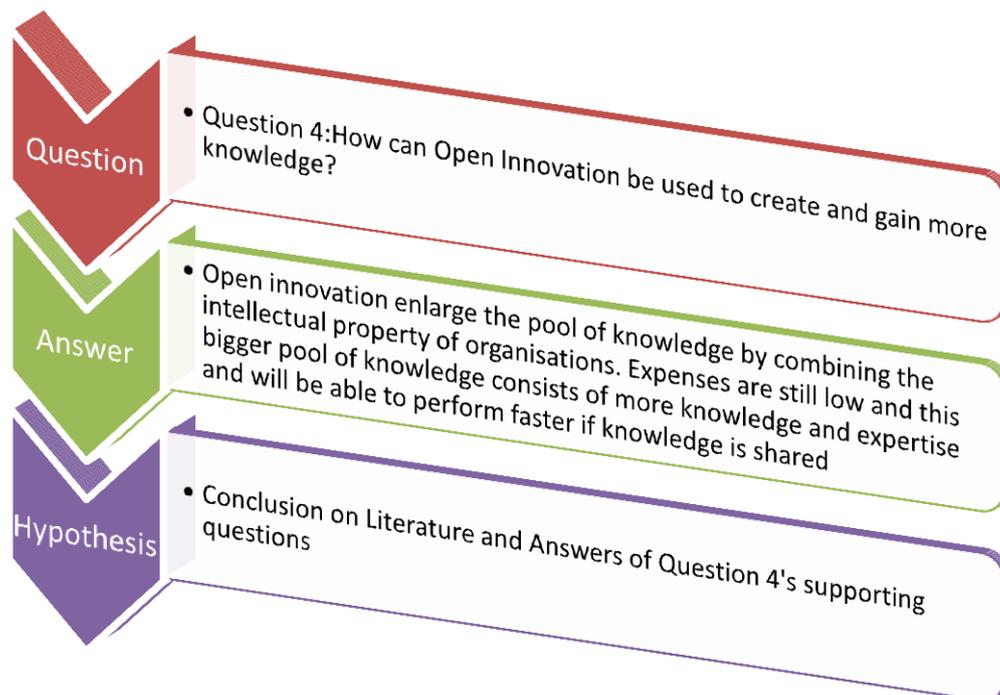
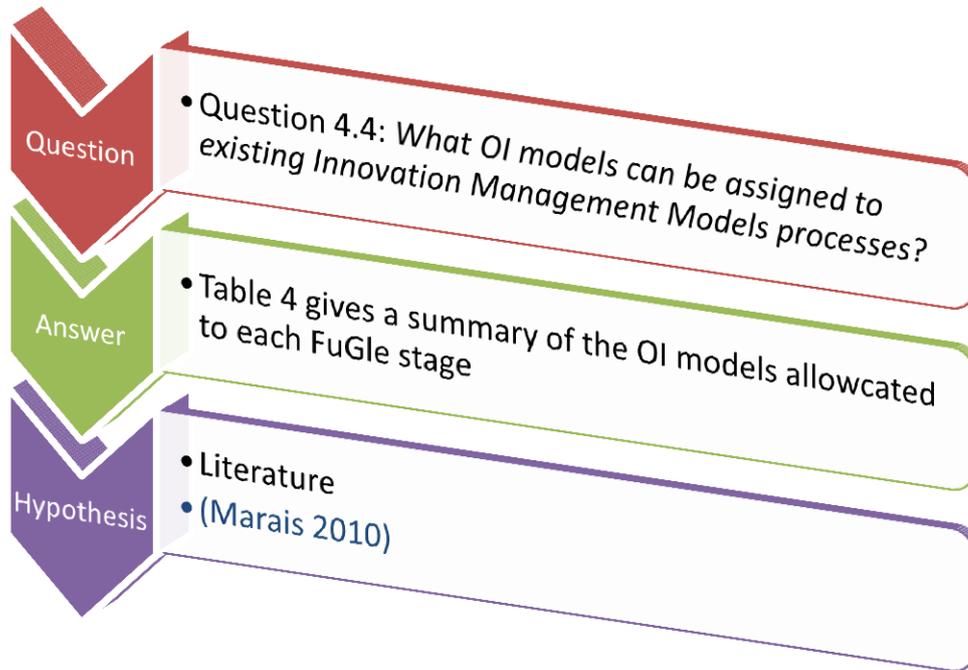
In a recent survey published by IBM, 36% of CEO respondents state that they are investing more heavily in serving and incorporating these “more sophisticated” customers. This proves that the concept of incorporating these “prosumers” is a reality that will influence the strategic direction and daily activities of the enterprise of tomorrow (Somers 2008)

3.6.3.5 Platforming

The concept of platforming entails an organisation developing and launching a certain product with the aim of it being a platform to which users can add customised individual value.

The platform product must be seen as a proverbial sandbox. The organisation supplies the sand, plastic buckets and shovels and then invites prosumers to come up with creations using the supplied elements and tools, resulting in the organisation and the prosumer both gaining value from it.

The essential element in this method is that the organisation must also benefit from the value the prosumer has added to the product. It defies the point if the organisation develops a platform, but loses all control over the prosumer’s creations, thus not maximising the exploitation stage of the created platform (Marais 2010).



4 The Framework

4.1 Introduction

In this chapter, the focus is on the flow of knowledge and role players that feature in Open Innovation in regards with the previous chapter. This chapter's main goal is to mainly answer Question 5. Question 5.1 to 5.4 will also be answered in order to answer Question 5, while a framework will be set up to help understand all the intricacies of such a framework. These Questions will be answered by validating the research done in Chapter 4.

4.2 Validation of Question 5: Which role players feature and what knowledge transfer are evident in Open Innovation?

The formulation of a proposition to solve the problem stated in Section 2.2 may be approached as follows:

The framework will comprise of structured procedures that may be found in the Open Innovation models that are assigned to the FuGle. This framework will show typical knowledge flows based on the work of (Nonaka, Konno and Toyama 2001), who worked on the four different knowledge conversion models and highlighted the different dimensions in each stage based on the Knowledge Network Framework developed by (Seufert, von Krogh and Bach 1999).

Each FuGle stage consists of its own processes. Each process needs to be understood with its relations to knowledge flows and the innovation role players that feature in each stage. Conclusions can be made on the data created, while looking at the knowledge flows and the role of specific knowledge transfers. These knowledge flows will be graphically represented to help a better understanding of the flows in each process. The graphical representations will help answer the research questions that are still pending.

Table 5: Validation of Question 5

Questions	Research Methodology	Section
<i>Question 5: Which role players feature and what knowledge transfers are evident in Open Innovation?</i>	By concluding Question 5.1 to 5.4	Section 4.9
<i>Question 5.1: How do the responsibilities of role players as defined in innovation roles differ when introduced to Open Innovation?</i>	Validation in Section 4.9.1	Section 4.9.1
<i>Question 5.2: Who is involved in the transfer of knowledge in the Open Innovation models?</i>	Validation in Section 4.9.2	Section 4.9.2
<i>Question 5.3: How involved are role players from outside organisations?</i>	Validation in Section 4.9.3	Section 4.9.3
<i>Question 5.4: What type of knowledge is gained with Open Innovation processes?</i>	Validation in Section 4.9.4	Section 4.9.4

Requirements:

- Knowledge object support- show different handling of different knowledge in life-cycle
- Holistic approach to knowledge
- Inter organisational flexibility
- Interaction and team work
- Communication

The general structure to be used in this chapter is as follows:

- Each stage will start with a brief summary and the processes that are present within the stage;
- For each process in each stage, the Open Innovation model will be confirmed or an additional Open Innovation model will be suggested. It will also be stated whether the process is being done internally;
- The Knowledge Flows will be discussed, as well as the Innovation role players which feature in each process;
- Finally, comments will be made on each stage process.

4.3 Idea Generation and Identification

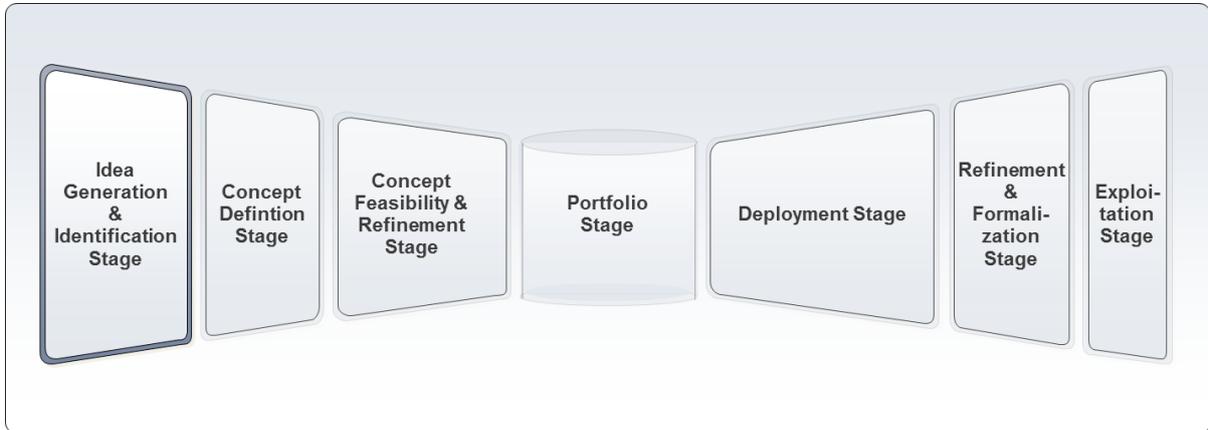


Figure 18: Idea Generation and Identification

This stage deals with idea generation and the collection and categorization of ideas. This is the creative engine of the company where brainstorming and idea swapping take place internally and externally. An idea can be generated, further developed by a creative mind to eventually evolve over time into a functional idea or invention.

This stage consists of four processes:

Table 6: Idea Generation and Identification Stage

FuGle Process	Open Innovation Models assigned by (Marais 2010)
Collect, categorize and present Info	<i>Opportunity</i>
Generate and collect ideas	Open-ended type idea competition
Capture ideas	<i>Opportunity</i>
Idea filtering	<i>Opportunity</i>

Each of the four processes in this stage is discussed below, with a discussion on the Open Innovation model, or in cases where an opportunity was identified, suggestions are made for additional Open Innovation model mappings.

4.3.1 Collect, Categorize and Present Information

Information is regarded as the “seed and fertilizer” for the idea generation stage:

- information about current problems or problem areas in the business,
- information about competitors,
- information about clients and markets,
- information about technologies,
- information about company strategies and objectives (Du Preez and Louw 2008)

4.3.1.1 Innovation Networks

The 5 different sources of information crucial for this stage are found in different areas of the company or organisation. Information concerning current problems in the company or organisation can be obtained from people in every level of the company’s corporate structure. This is where every employee is valuable as a source of information. People working in a certain area can easily spot problems that accrued or may occur in their area of expertise.

Information about competitors, clients, new trends, openings in the market and new technologies are examples of an area where a skilled worker can be a source of information. A person working on the front end of innovation and management, therefore, will have the insight and skills to give the right information regarding the above mentioned subject matters. A great number of networks may be established across organisational boundaries to exploit these windows of opportunity before they close.

Information about company strategies and objectives are more bound to be generated by top management. Innovation networks must be used to network together inside a group of organisations sharing the same field of interest and combining strategies and objectives to allow companies to benefit together.

4.3.1.1.1 Knowledge Flows

Knowledge flows from many areas in the company to a centralized “pool of ideas”, mostly in encoded form. Different information comes from different departments all across the organisation. Information about competitors, clients, new trends, openings in the market and new technologies are sourced from the Innovation department in the organisation which focuses solely on finding

gaps in the market based on anything from new markets to spin-offs from current markets and even markets that can be used for platforming on current products and services. Problem reports, minutes of meetings, e-mails and submitted complaints are all sources of information. All these information ends up in a compiled pool of information.

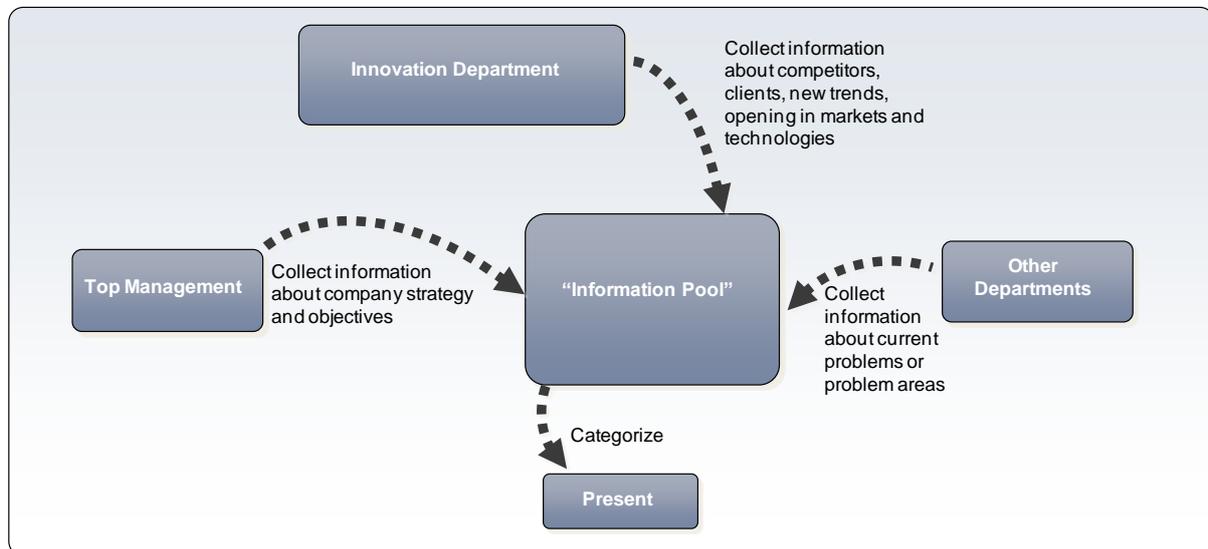


Figure 19: Information Pool

4.3.1.1.2 Innovation Roles

All information compiled from different company departments need to be collected and sorted. This collection and sorting of information is not assigned to any role player in (Essmann 2009)'s final role consolidation.

However, with Open Innovation, the field changes and an opportunity forms and creates an area where the Framer can be brought back just as (Essmann 2009)'s initial roles have been consolidated. This opportunity occurs where all knowledge is centralized, evaluated, prioritised, stored and dispersed.

The role of the Framer is defined as follows:

- Defining and deploying the frameworks by which opportunities, ideas and concepts are evaluated and prioritised; meta-data to facilitate capture, storage and retrieval of ideas and information; and innovation metrics to measure innovation.

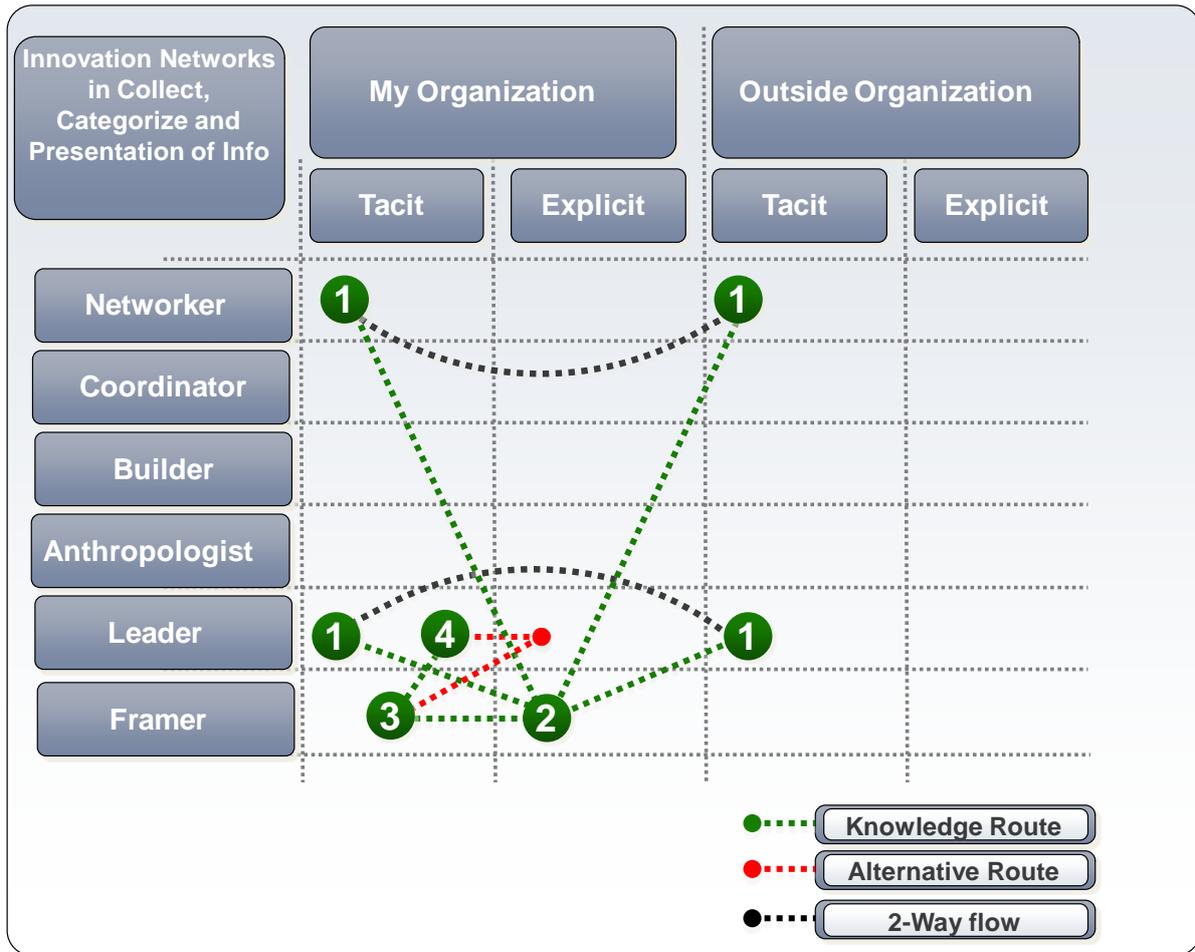


Figure 20: Innovation Networks in the Collect, Categorize and Present Info Stage

- 1- Information is collected from each department comprising different role players. Information about competitors, clients, new trends, openings in the market and new technologies are collected from the Networker. Open Innovation provides the platform for innovation networking to take place between Networkers from different organisations. Information about company strategies and objectives are received from the Leader roles that are also established with the help of innovation networks comprising Leaders from different organisations. Information about current problems is received from all people representing numerous roles (not shown on diagram, information is collected by the Framer).
- 2- The Framer collects all the information,
- 3- The Framer needs to internalize information. Information first needs to be understood before it is categorised. After categorization, the information is made presentable.
- 4- Information is sent to the Leader who has to make a decision based on the information compiled. The reason for the alternative route is because this information can be sent in encoded form or communicated directly to the Leader.

4.3.1.1.3 *Comments*

This process consists of retrieving and collecting information from different sources. By using Open Innovation, more information can be collected and it may even be opened across organisational boundaries. However, at this early stage, it must be treated with utmost caution. It is in the most critical phase of all and can easily leak out if people and other organisations are untrustworthy.

The role players that feature in this phase are the Leader, the Networker and the Framer.

- 1- Leader: Provides information regarding company strategies and objectives and aligns the concepts with the company's accepted business and innovation strategies and objectives. The Leader also validates the relevance of ideas and prioritizes innovation activities.
- 2- Networker: Provides information about competitors, clients, new trends, openings in the market and new technologies. They are seen as on the front-end of innovation and search for gaps in the market.
- 3- Framer: The Framer plays the biggest role in this phase, namely to collect, categorise and present the information.

4.3.2 **Generating and Collecting Ideas**

Although many ideas can be regarded as a spur of the moment thought, ideas can also be purposefully generated in workshops or brainstorming sessions. An idea, however, needs to be thoroughly thought through in order to determine its significance. By making the right information available to the right people in the right manner can help to trigger new or innovative ideas. Thus, a formalized Knowledge Supply Chain significantly improves and supports innovation. (Du Preez and Louw 2008)

4.3.2.1 **Open-Ended Idea Competition**

The Open Innovation model assigned for this stage by (Marais 2010) is the open-ended type idea competition. A large number of ideas can be generated by using this Open Innovation model. This supports the fact that large numbers of ideas are required to fulfil identified opportunities aimed at meeting the requirements of identified customer. The specific activity that lends itself to being open is the actual idea generation. It is here that the open-ended idea competitions can be deployed to increase the quantity of ideas, as well as the possibility of creative input into the process.

The generation of ideas must be done by people inside the organisation/company, or it can be opened to generate more ideas. These ideas are unrefined (raw) and have not been processed by

the organisation/company. This sub-stage comprises throwing a large number of ideas that is mostly in an explicit knowledge form into a pool by the use of an idea competition.

4.3.2.1.1 Knowledge Flows

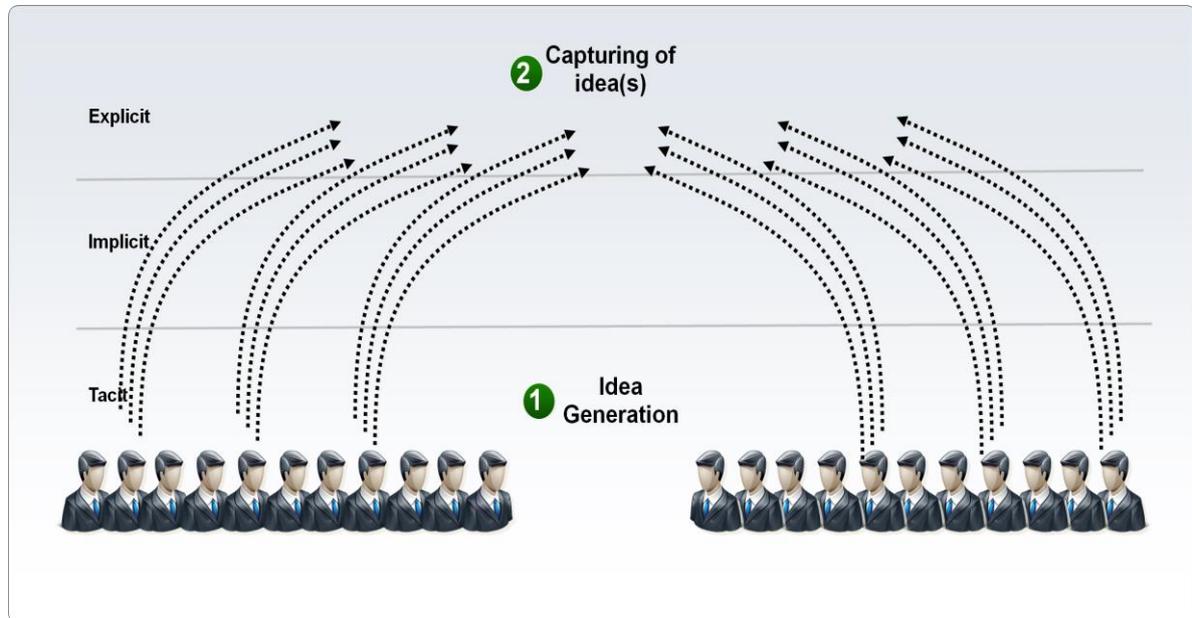


Figure 21: Idea Collection/Idea Competition

The knowledge flow in the Open Innovation model idea competition is simply collecting individually generated ideas from people in the public sector who are participating in a competition and who stand a chance to be rewarded for solving a problem for the organisation. The individually generated ideas start in tacit form and are sent in explicit form to the organisation where all ideas are captured and filtered.

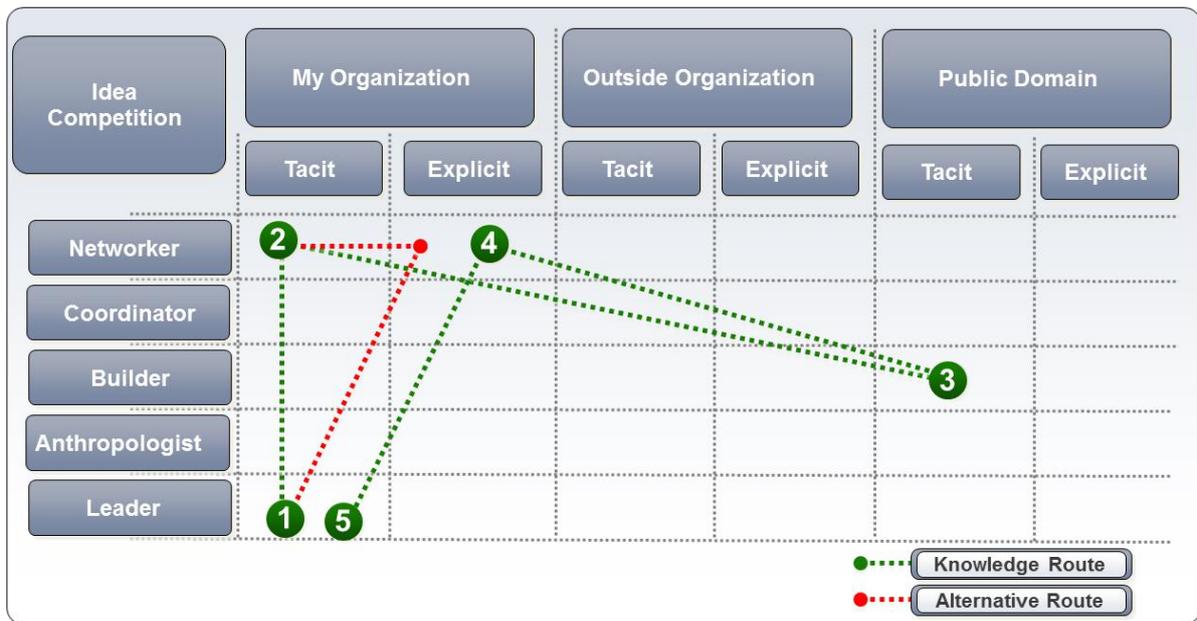
4.3.2.1.2 *Innovation Roles*

Figure 22: Idea Competition

- 1- In open-ended idea competition, the flow of knowledge starts with a problem. The Leader, the person appointed to solve the problem, needs an idea to start generating a solution. The Leader formulates a problem statement to define the idea generation starting point.
- 2- The Leader sends this formulated problem to a Networker, who knows the market and industry and also has connections with individuals, both within and outside the company. The Networker needs to internalise the task at hand to make decisions on potential futures, as well as identified opportunities and to determine where in the network the relevant knowledge can be generated. The formulated problem may be communicated via a meeting or in the form of codified data. The Networker may utilise either a different company's idea generating power, or refer to the public domain itself.
- 3- The public domain generates ideas in mass by launching an idea competition campaign. These ideas are then sent back to the Networker.
- 4- The Networker collects the ideas and filters them before sending the filtered ideas to the Leader.
- 5- The Leader then aligns the concepts with the company's accepted business and innovation strategies and objectives. The Leader also validates the relevance of ideas and prioritises innovation activities.

4.3.2.1.3 Comments

This generation process need not be done by opening it up to public participation via open-ended type idea competition, but may also utilise speculative type idea competition and innovation networks by introducing organisations or companies that have common or complimentary objectives.

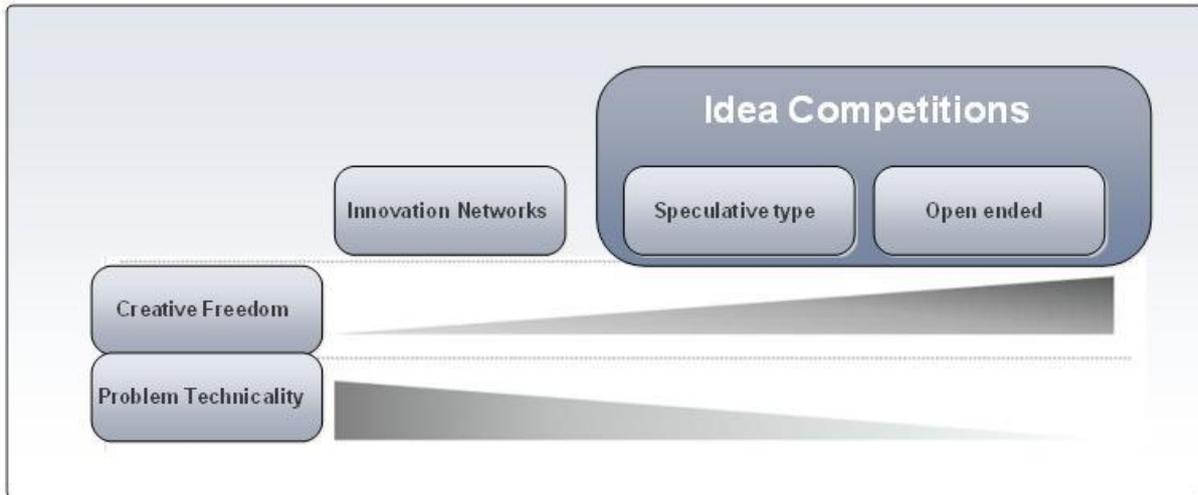


Figure 23: Relationship between Innovation Networks and Idea Competition

The shift from collecting ideas to generating ideas can be seen in Figure 23.

The collection of ideas deals with the collection of explicit knowledge. Ideas can also be collected from people inside the organisation or from an outside organisation regarded as reliable and which has similar business targets and goals than your own organisation. Innovation networks on the other hand refer to a network of people that are interlinked and can communicate on a daily or hourly basis. This represents more idea generation than it is collecting ideas. Idea generation uses ideas to stimulate a different person to either have a spin-off idea, or to contribute and build upon the existing idea. Thus, both types of idea competition may be used for idea collection, while innovation networks are used for idea generation.

4.3.2.2 Idea Generation

In the context of this thesis, Idea Generation is regarded as the process of generating ideas by communicating ideas in groups, e.g. brainstorming sessions. When this is brought into an Open Innovation context, it resembles the Open Innovation model Innovation Networks by communicating with outside organisations and generating ideas between people from different organisations.

4.3.2.2.1 Knowledge Flows

Generation of ideas between people, e.g. brainstorming, will have a great effect on the creation of ideas. Ideas are generated inside the brain in a tacit knowledge form and must be communicated to another person. Communicating an idea that has not yet explicitly been captured, but that can be inferred by conversation, can be seen as explicit knowledge where the codification of the knowledge has not yet been completed. After the idea has been communicated to another person, the idea needs to be internalised and processed in the recipient's brain. The internalisation of knowledge refers to the conversion of company-wide, explicit knowledge into the tacit knowledge of the individual. Each individual processes information differently, thus transferring the idea to a group of people will result in a number of differently processed sets of information. Internalised knowledge is used to broaden, extend and reframe company members' tacit knowledge. The newly processed information, with different points of reference, may form an idea to mean totally something new, or allow the person to add an additional interpretation or direction to the idea. This tacit knowledge accumulated at the individual level is in turn shared with others through socialisation, setting off a new spiral of knowledge creation.

Figure 24 illustrates the process of how ideas are communicated between two individuals. The effect of a group entering into conversation will be much greater than is the case between two individuals.

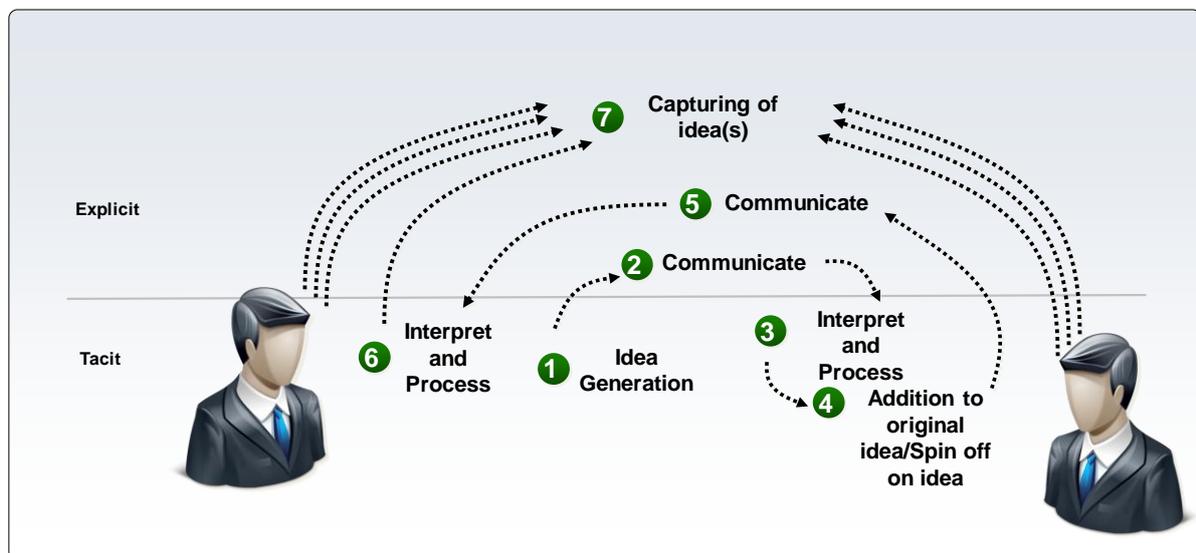


Figure 24: Idea Generation

4.3.2.2.2 Innovation Roles

This idea generation process need not be kept inside the company and may even be opened and joined with other organisations via innovation networks. The Builders in these two different companies or organisations are joined together by the continuous passing of ideas to generate more ideas and the evolving of ideas.

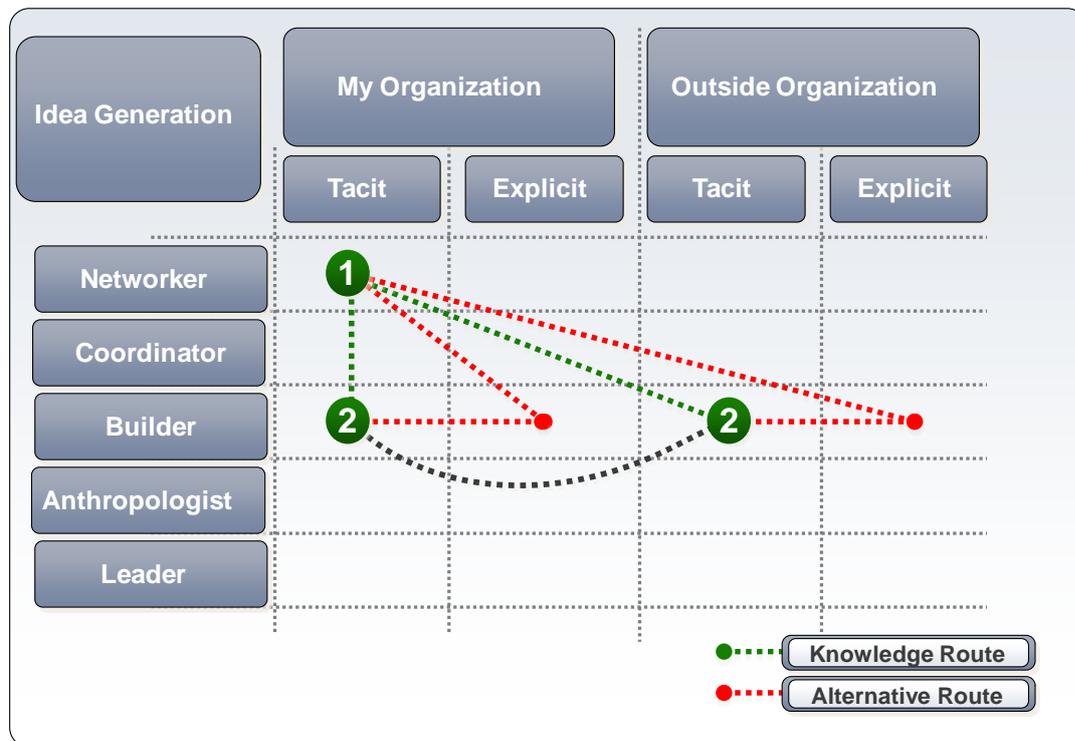


Figure 25: Idea Generation in Innovation Networks

- 1- The Networker scans the market, industry, technology and regulatory social trends and seeks potential futures and identifies latent opportunities. He then sends this information to the Builders in the respective organisations.
- 2- The Builder, as defined by (Essmann 2009), creates tangible concepts from ideas, demonstrate concepts and obtain feedback from colleagues and customers and refines concepts. In addition, the function of the Builder includes the use of the initial idea of the Networker to generate new and better ideas as demonstrated in Figure 24. This generation of ideas is directed both ways and is seen more as a back and forth flow of knowledge between the Builders.

4.3.2.2.3 *Comments*

Idea generation in a company and with the help of an outside company can be very efficient if used as a group activity. Playing ideas off each other can be a valuable step in innovation.

4.3.3 Capture Ideas and Filtering

Whether the idea is a spur of the moment thought or created in a brainstorming session, it is important to capture or frame the idea in some acceptable manner so that it can be communicated to others and developed further into a concept (Docherty 2006). Capturing ideas is also important for keeping a history of new ideas, because very often ideas that have been rejected due to specific circumstances may become more relevant in future. It is also important to capture the ideas taking into consideration the development life-cycle, the relevant team members and various external considerations. (Du Preez and Louw 2008)

4.3.3.1 Combining Idea Generation and Idea Collection

Open-ended idea competition must be filtered by people from the organisation/company because of their relevant knowledge of the organisation's/company's field of operation. Ideas collected from these open-ended channels will help the relevant organisation/company partners and field experts to generate ideas for the company. These creative ideas can be totally irrelevant to their specific field of operation, but may serve as a creative input if processed in conjunction with the company's own generated ideas, thus triggering the socialisation and internalisation knowledge generation spiral.

4.3.3.1.1 Knowledge Flows

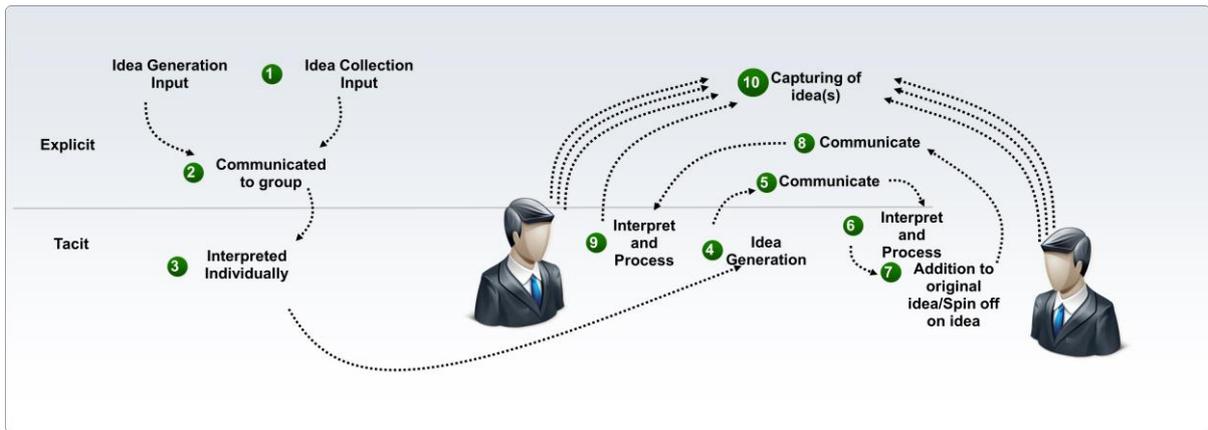


Figure 26: Idea Capturing by combining Idea Generation and Idea Collection

Figure 26 illustrates how the ideas that have been generated by the company and outside companies by use of innovation networks, are combined with ideas collected from the public with the use of open-type idea competition. These ideas are thrown together and are again processed in groups. These groups may consist of groups interlinked across organisational boundaries via innovation networks. Ideas are again played off between one another to generate the best ideas before moving to the next stage.

4.3.3.1.2 Innovation Roles

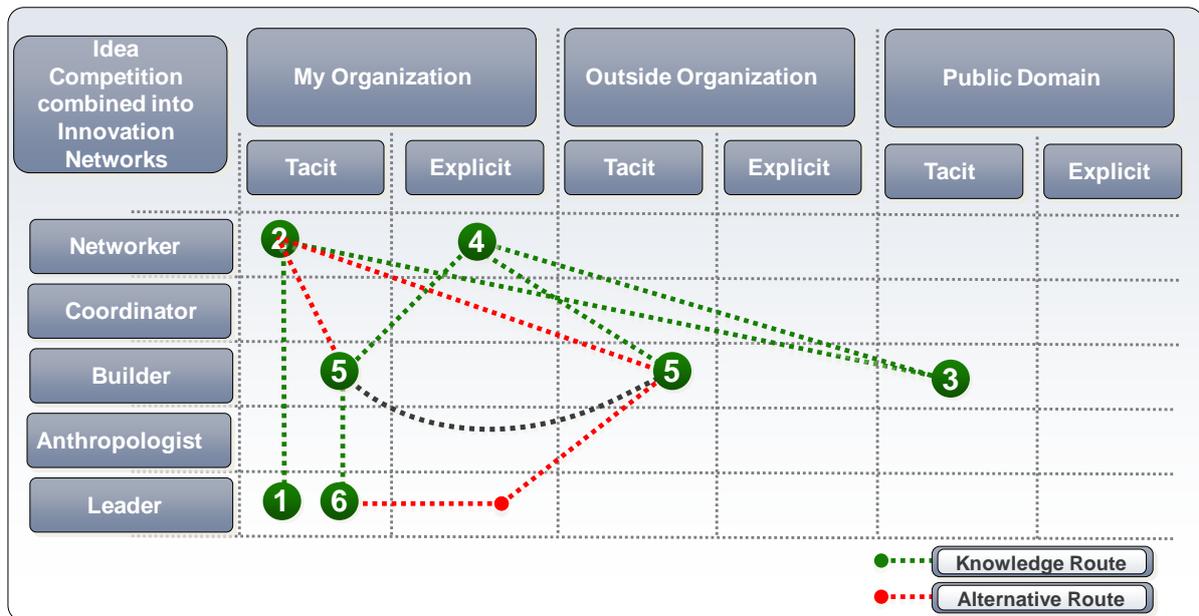


Figure 27: Idea Capturing and Filtering

- 1- In open-ended idea competition the flow of knowledge starts with a problem and the Leader needs an idea to start generating a solution. The Leader formulates the problem as a starting point.
- 2- The Leader sends this formulated problem to the Networker who knows the market and industry and also has the connections with internal and external individuals. The Networker needs to internalise the task at hand to make decisions on potential futures and identify where in the network the relevant knowledge can be generated. The Networker may utilise a different company's idea generating power or refer to the public domain itself.
- 3- The public domain generates ideas in mass by launching an idea competition campaign. The ideas are sent back to the Networker.
- 4- The Networker collects the ideas and filters them before sending the filtered ideas to the Builders.
- 5- The Builders, again linked in a two-way share of knowledge, use the play off of ideas against each other by using their own ideas (innovation networks) and the ideas generated by the public domain (idea competition). This generation of ideas is directed both ways and is seen more as a back and forth flow of knowledge between the Builders.
- 6- The ideas are then sent to the Leader, who aligns the concepts with the business and innovation strategy and objectives. The Leader also validates the relevance of the ideas and prioritises innovation activities.

4.3.4 Stage Conclusion

This stage will work well in group format with creative-orientated people, or people who enjoy working in teams and who are able to communicate well. Different backgrounds and academic history may benefit the group significantly because of the different interpretations that will be generated.

The opportunity to open the collect, categorise and present information phase is taken by assigning innovation networks as the Open Innovation model. It is seen fit to share information across organisational boundaries to ensure more quantities of information.

It is observed that not only open-ended type idea competition can be used to collect ideas, but speculative-type idea competitions and innovation networks can be used to reach the same goals. Open-ended type idea competition is responsible for large numbers of creative ideas, while innovation networks are responsible for fewer but qualitative ideas with higher technicality.

The capturing and filtering of ideas opportunity is filled by combining the ideas that have been collected and generated and putting these ideas together through the idea generation stage for new ideas to spin off and to be filtered.

Table 7: Idea Generation and Identification Stage Conclusion

FuGle Process	OI Models assigned by (Marais 2010)	OI Models assigned	Graphical Representation
<p>Collect, categorize and present Info</p>	<p>Opportunity</p>	<p>Innovation Networks</p>	
<p>Generate and collect ideas</p>	<p>Open-ended type idea competition</p>	<p>Open-ended and speculative type idea competition/Innovation networks</p>	
<p>Capture ideas</p>	<p>Opportunity</p>	<p>Idea competition combined with innovation networks</p>	
<p>Idea filtering</p>	<p>Opportunity</p>		

4.4 Concept Definition Stage

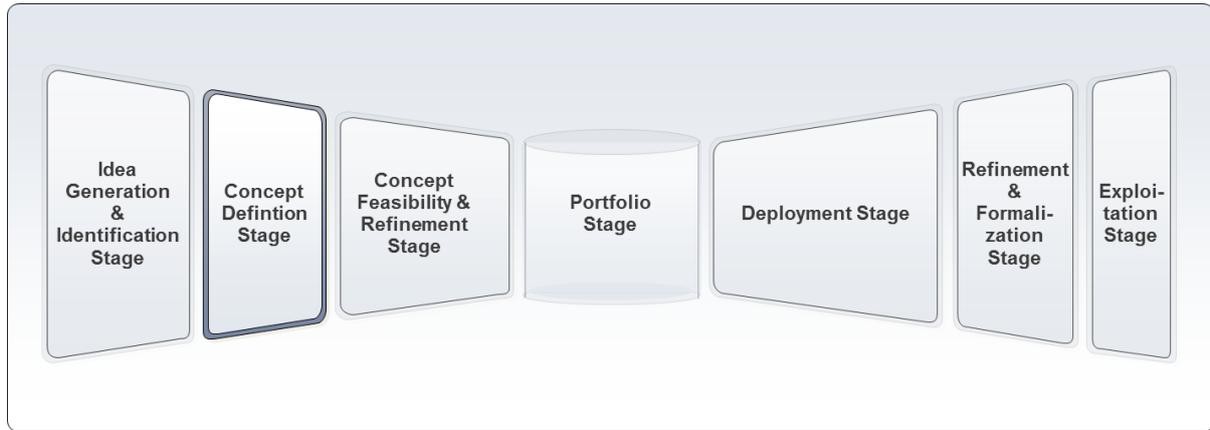


Figure 28: Concept Definition Stage

It is during the Concept Definition Stage that the ideas identified and evaluated in the previous stage are transformed to form more tangible and plausible concepts. Literature suggests that in various instances different ideas must be combined to form a concept (Du Preez and Louw 2008).

The Concept Definition Stage comprises three parts:

Table 8: Concept Definition Stage Processes

FuGle Process	OPEN INNOVATION Models assigned by (Marais 2010)	
Develop concepts	<i>Opportunity</i>	
Incubate and refine concepts	Speculated type idea competition/innovation networks	
Concept Filtering	<i>Opportunity</i>	

4.4.1 Develop Concepts

The focus of this stage is to transform the idea into a workable concept. A concept may be developed from different combinations of various ideas.

4.4.1.1 Combining Ideas with Open Innovation

The Open Innovation model introduced in this process, involves speculative-type idea competition. It is important to share concepts with the relevant role-players. Creative thinking is joined by experience and the knowledge of market reactions on all types of products/services that are in line with the company's main field of operation. The stage will only be successful if the combination of ideas involves people with more knowledge and experience than has been the case in the previous stage where open-ended idea competition has been used. Therefore, speculative type idea competition requires more technical skills and a higher level of creativity. Increased technicality will reduce creative freedom until it becomes an innovation network.

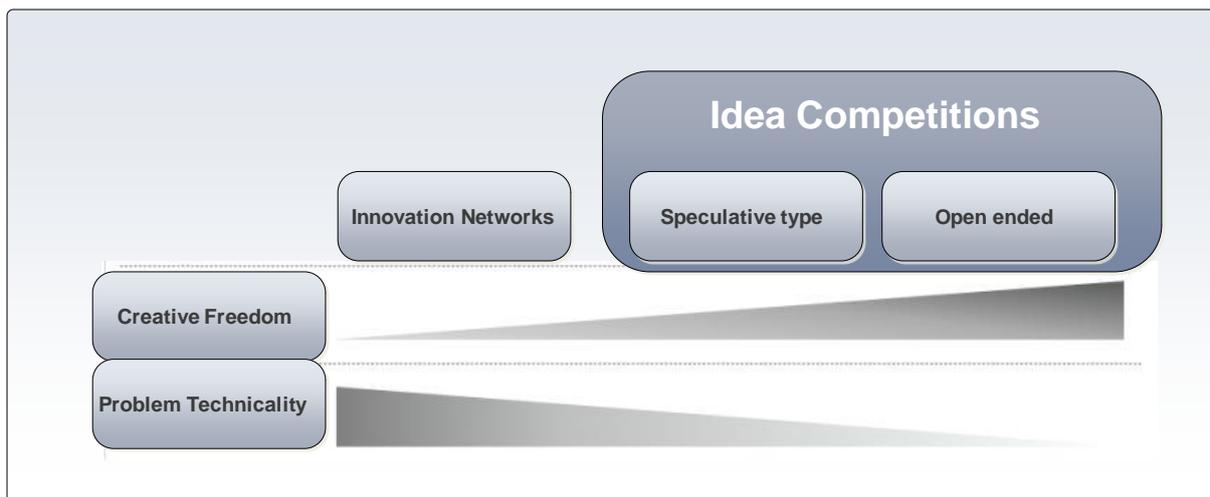


Figure 29: Creative Freedom versus Problem Technicality

4.4.1.1.1 Knowledge Flows

Concepts are created by grouping and combining similar ideas in order to create a unique fusion of interlinked ideas. These grouped ideas may be combined with other ideas, which in their character may be very different, or by incorporating only a certain aspect of each idea to form a new concept.

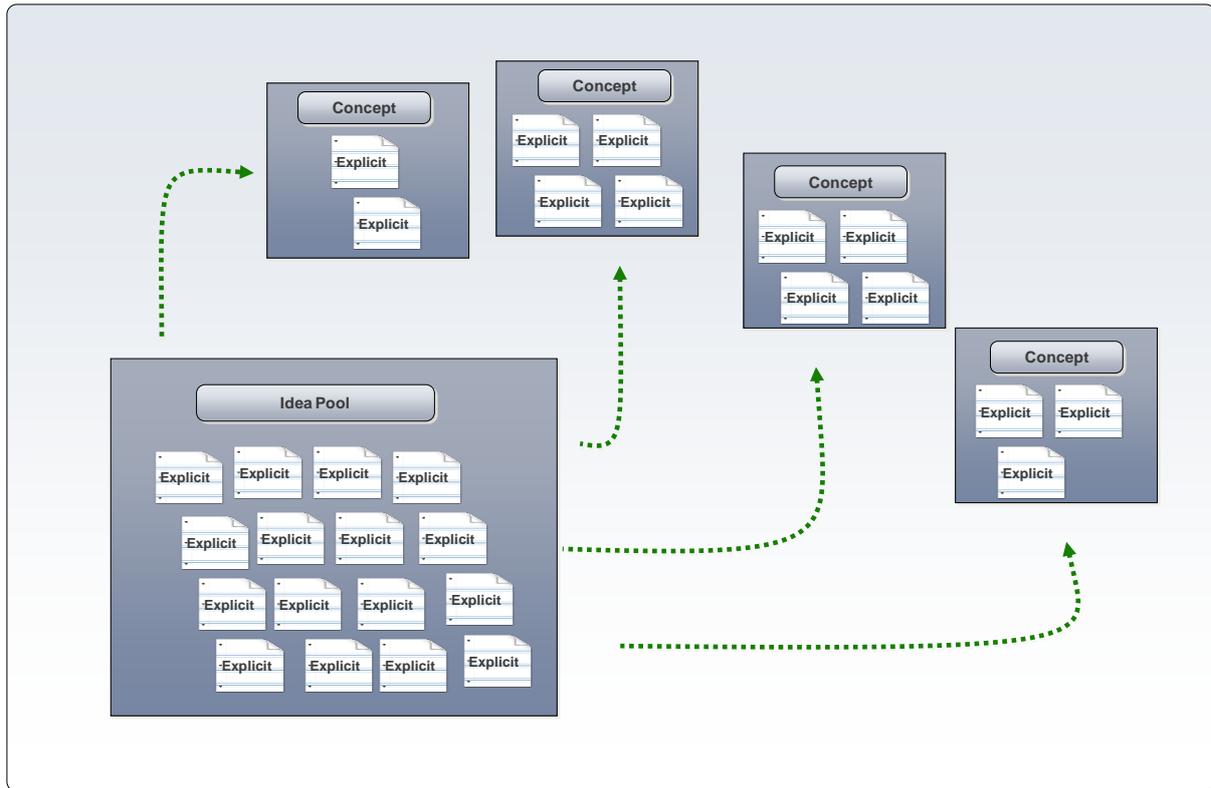


Figure 30: Concepts Created by Combining Similar Ideas

4.4.2 Incubate and Refine Concepts

It is suggested that the preliminary concept be shared with specific individuals for incubation. The purpose is to provide more time for refinement of the concept before it is subjected to the concept filter. In addition, valuable insights and new opportunities can be gained from sharing the concept with specific role-players.

4.4.2.1 Speculative-Type Idea Competition/Innovation Networks

Incubation takes place when the Open Innovation models are allocated. The sharing and collaborative approach of refining is supported by speculative-type idea competitions, as well as innovation networks, if it is suitable in the context of each organisation's trade. These two models will help to address technical or non-technical problems that are experienced early in the concept definition stage. Innovation networks provide the company with quick solutions early on and will improve the plausibility of the approval of the concept at the next filtering phase.

The innovation network involves the sharing of concepts between two or more companies. The sharing of concepts is being done in various ways, such as via internet discussions, e-mails, group meetings and forums. It comprises mostly of knowledge sent through as explicit knowledge.

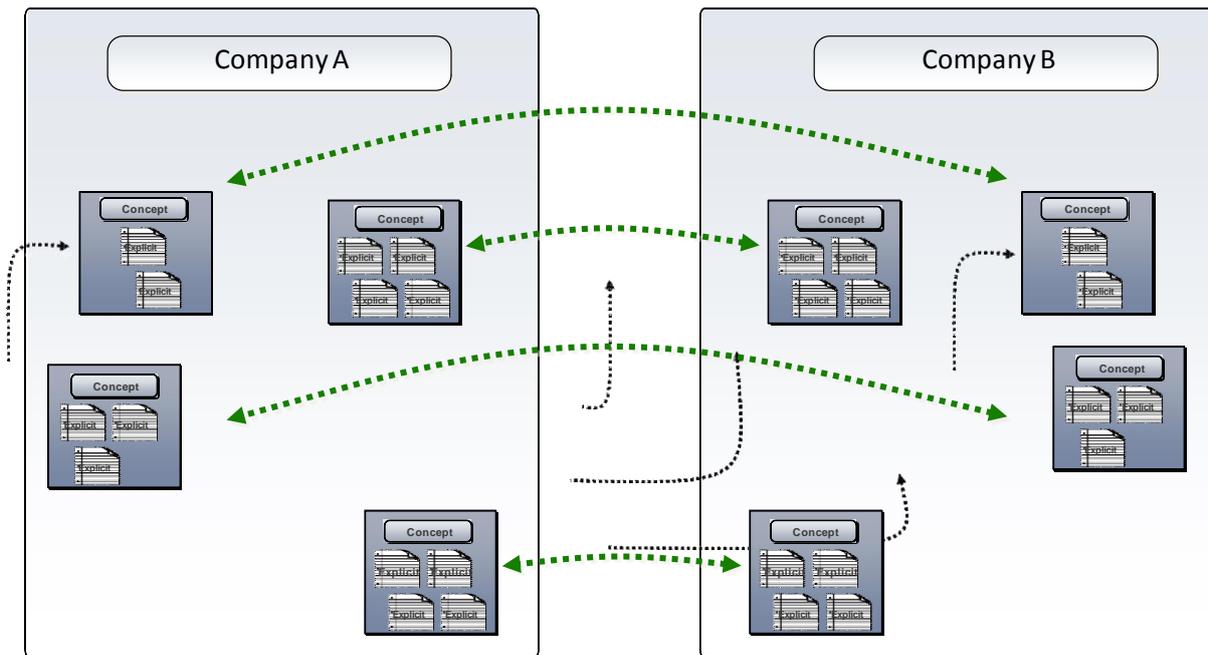


Figure 31: Sharing of Concepts between Two Companies

4.4.2.1.1 Knowledge Flows

The passing of information is, however, a complicated process. This is mainly because of the different stages knowledge has to go through. By using the Organisational Knowledge Creation SECI Model (Nonaka, Konno and Toyama 2001) it is clear from Figure 13 that knowledge changes form everytime it passes from one medium to another. The diagram below shows only a part of (Nonaka, Konno and Toyama 2001)'s diagram, which is represented in a straight line and not in a circular flow as originally represented.

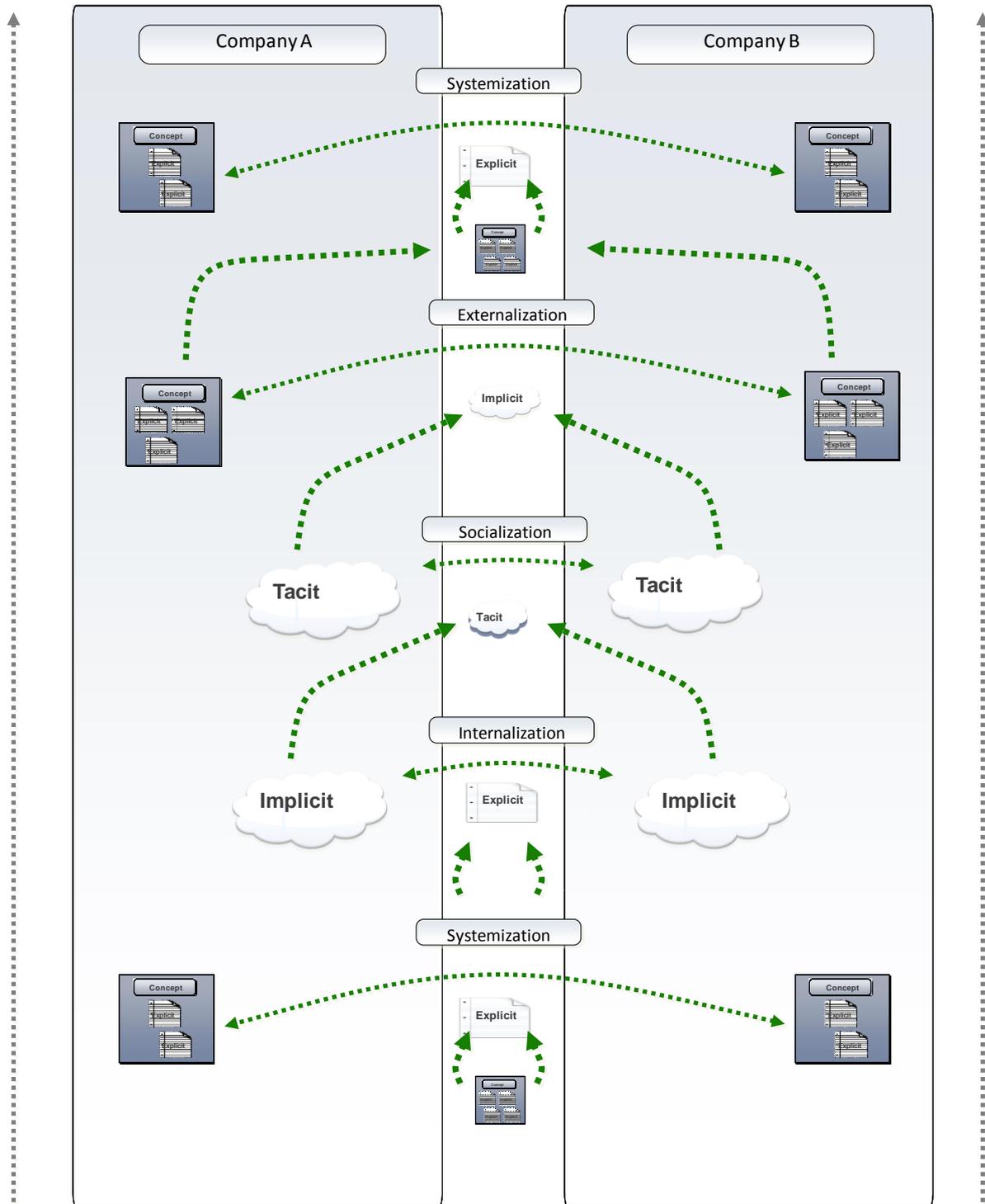


Figure 32: Straight Line Representation of the Organisational Knowledge Creation SECI Model (Nonaka, Konno and Toyama 2001)

Starting at the bottom of the diagram, knowledge is followed through its stages. The concept starts off on paper or as an e-mail or as a forum discussion that is being held via the internet and is shared between the two companies in an explicit form. Every partner/role-player will read the explicit

knowledge and internalisation of the knowledge takes place individually, thus changing it to implicit knowledge as it is internalised and further to tacit knowledge when it is processed in the individual's brain. Incubation of the concept takes place during socialisation, which is the next step, while role-players discuss these concepts with one another through an implicit medium and sets off the knowledge cycle all over again.

This tacit knowledge needs to find its way back to the original organisation/company where it has been created, resulting in knowledge taking on its next form in the externalisation phase where a group or individual communicates the incubated concept via a document, e-mail or forum and it changes from a tacit form to an implicit form and finally to an explicit form. (Nonaka, Konno and Toyama 2001) presented his Knowledge Work Process as a circular spiral in Figure 12, meaning that the knowledge reverts back to its original form in which it is received (explicit knowledge), and is sent back to its origin.

4.4.2.1.2 Innovation Roles

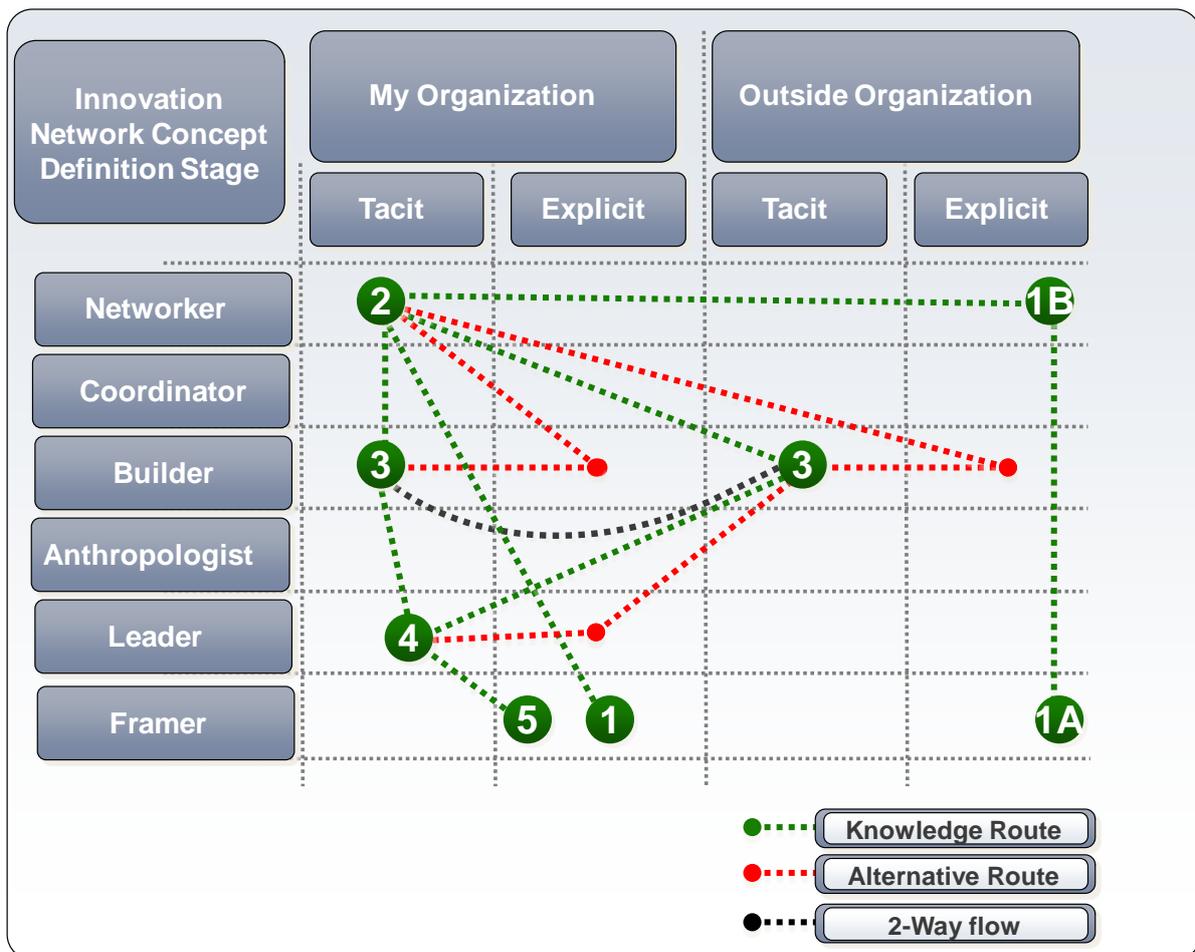


Figure 33: Innovation Network Concept in the Definition Stage

- 1- 1/1A-The raw ideas are stored as categorised by the Framer. Data is retrieved from this role-player. Open Innovation enables data to be retrieved by other organisations or companies as seen in 1A.
- 2- Ideas are sent to the respective Networkers who know the industry and they create connections between internal and external individuals, teams and organisations that have common or complementary objectives.
- 3- The Builder, as defined by (Essmann 2009), makes tangible concepts of ideas, demonstrates concepts, obtains feedback from colleagues and customers and refines concepts. Builders use ideas to create concepts in team context. These communications are directed both ways and are seen more as a back and forth flow of knowledge between the Builders.
- 4- The concepts are then sent to the Leader who aligns the concepts with the business and innovation strategies and objectives. The Leader also validates the relevance of and prioritises innovation activities.
- 5- The Leader sends the concepts to the Framer to be evaluated, prioritised and captured.

4.4.3 Concept Filtering

The concept filter is used to evaluate the proposed concepts against a set of criteria. These criteria include:

- Matching the concept against the organisation's strategy;
- Assessing the commercial attractiveness of the intended offering;
- Sharing the rough concepts with relevant role-players to foster better incubation.

4.4.3.1 Comments

The filtering of ideas may be opened across organisational boundaries, but are better kept inside the company. Decisions made at this stage will only affect the company directly, therefore it is better that final decisions are made internally.

The Leader will be in charge of matching the concepts against organisational strategy. Assessing the commercial attractiveness of the intended offering will be the responsibility of both the Leader and the Networker. While the Networker has the insight into the market, the Leader has the business knowledge and in combination they may yield an answer on the commercial attractiveness of the intended offering.

4.4.4 Stage Conclusion

The development of concepts may also be opened with the same Open Innovation models that are used in the Incubate and Refine Phase. By only using innovation networks, it will be seen that the technicality will be high, but it will reduce creative freedom, thus leaving an area for speculative-type idea competition.

In this stage the flow of knowledge is clearly visible, as well as in which state knowledge passes from one person to another. Having knowledge of this, helps in the better management of the whole system. It also provides understanding that one person's tacit knowledge that is externalised and internalised by a different person is ultimately not the same. This gives the Builder the responsibility to make sure the Leader, who validates the relevance of the concept and prioritises the innovation activities, understands the concept(s) fully.

Table 9: Definition Stage Conclusion

FuGle Process	Open Innovation models assigned by (Marais 2010)	Open Innovation models assigned
Develop concepts	<i>Opportunity</i>	Speculated type idea competition/innovation networks
Incubate and refine concepts	Speculated type idea competition/innovation networks	Speculated type idea competition/innovation networks
Concept Filtering	<i>Opportunity</i>	Done internally

4.5 Concept Feasibility & Refinement Stage

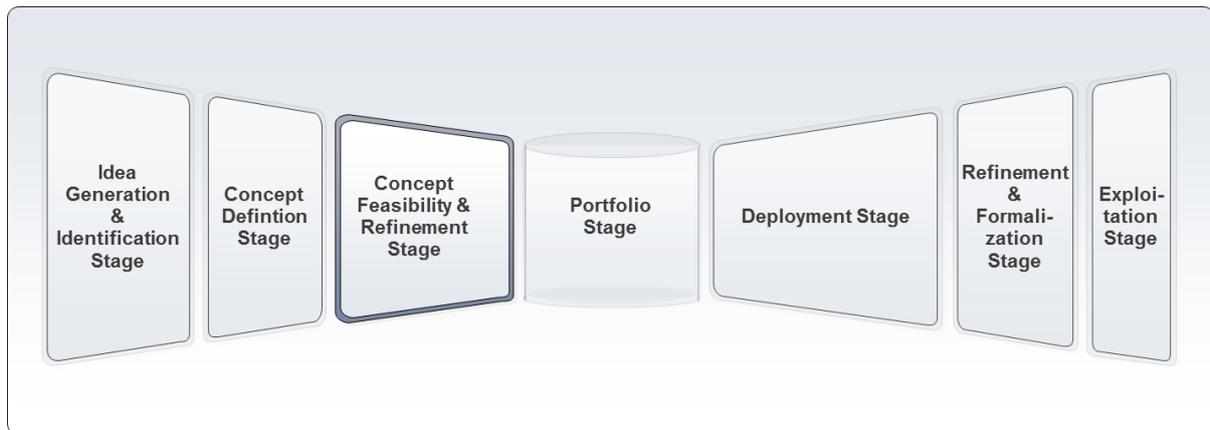


Figure 34: Concept Feasibility & Refinement Stage

As the life-cycle iteration progresses through the stages, the ideas are made more tangible. The roughly refined concept identified in the previous stage, is now further refined and researched to determine its feasibility.

The Concept Feasibility and Refinement Stage generates its information from iterative loops of concept refinement and evaluation. The question is, however, what iterative loops are used for and what criteria are used in the evaluation process? Surely each concept will be case-specific and that leads to the point that this stage not only generates its own information, but also needs insight into the steps that are taken to complete this stage.

Table 10: Concept Feasibility & Refinement Stage

FuGle Process	Open Innovation Models assigned by (Marais 2010)
Determine feasibility	Done internally
Develop models and prototypes	speculative-type idea competitions/customer immersion
Refine concepts	

4.5.1 Determining Feasibility

During the Concept Definition Stage, information about the concept may be limited. The Concept Feasibility Stage deals with further investigation of the concept by collecting additional information, as well as with modelling and prototyping in order to determine its feasibility.

It is proposed by (Marais 2010) that the initial representation of the product (prototypes and models) must be developed by the organisation. The concept refinement must also be completed internally to ensure that the iterative process is controlled in an agreed manner.

4.5.2 Develop Models and Prototypes, & Refine Concepts

Refinement and feasibility are not seen as two different segments in this stage, but happens in conjunction with each other. The concept refinement actions need to be carried out internally to guarantee a controlled iterative process in an agreed manner. Figure 35 illustrates that an iteration cycle is formed to help refine the models or prototypes by determining their feasibility through Customer Immersion and then refining the concept and finally altering the developed model or prototype.

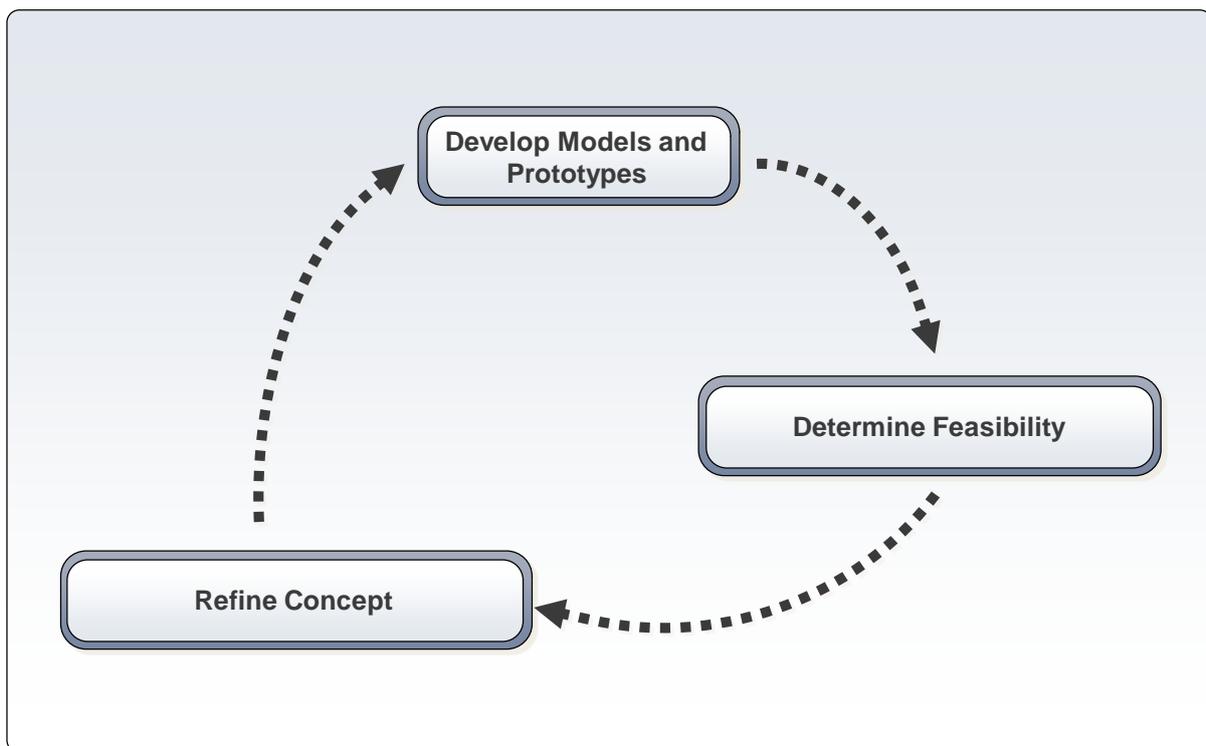


Figure 35: Development, Feasibility and Refinement Cycle

The initial representation of the prototypes/models is best developed by the organisation or company to ensure focused development for targeted markets.

4.5.2.1 Speculative-Type Idea Competitions/Customer Immersion

The two Open Innovation models assigned to this stage are referred to as *Customer Immersion* and *Speculative-Type Idea Competition*. Customer Immersion is a modern adaptation of focused groups that will assist in prototype testing by pointing out the significant points of difference and experimenting with market attractiveness. Customer Immersion is a way of identifying the plausibility of the intended product by exposing the product to potential customers. Incorporating the suggestions from the customer immersion activities may result in identifying new avenues for exploration, thus opening up the possibility of deploying speculative-type idea competitions. Ideas or concepts that are not accepted for the next stage of the FuGLE, may be referred back to the idea pool for matching with other ideas to form a new concept.

4.5.2.1.1 Knowledge Flows

Different role-players with different levels of risk elements, technical skills and creative freedom may be introduced in the feasibility assessment. Figure 36 below illustrates how internal organisational structures combine with customer immersion and the option of using an outside organisation to determine the feasibility of a prototype/model.

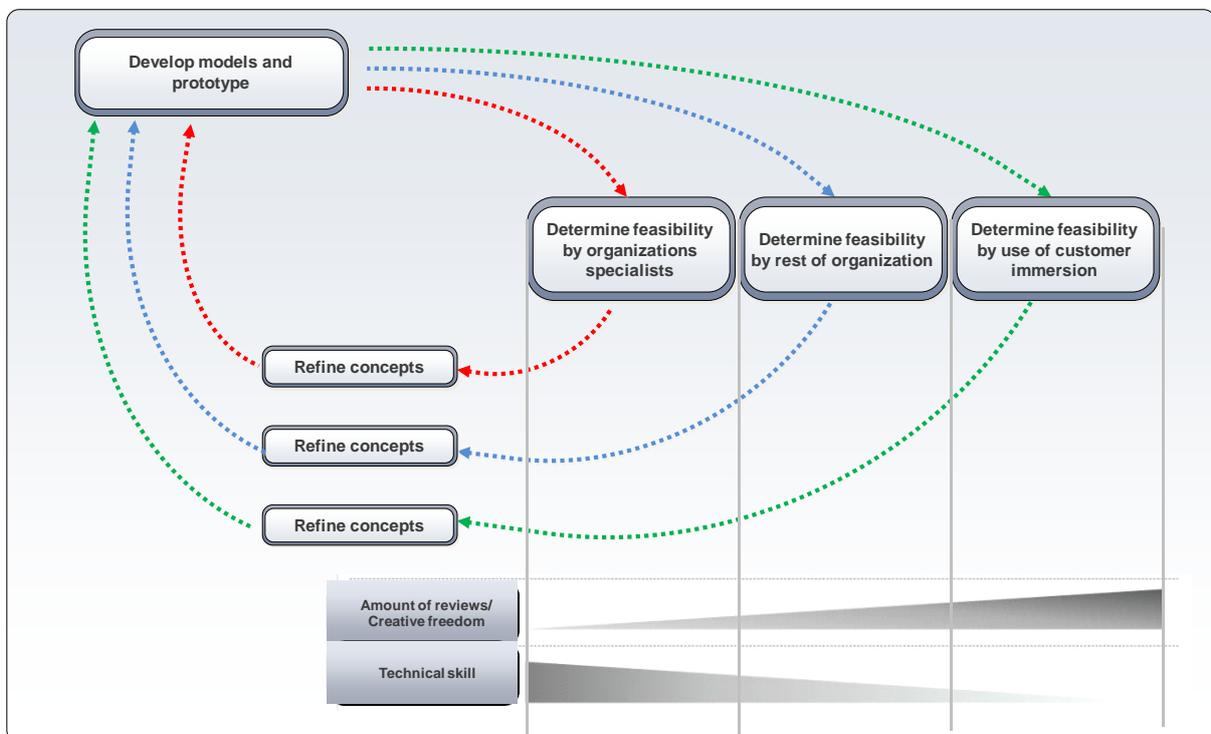


Figure 36: Inside Organisational Development, Feasibility and Refinement Cycle with Customer Immersion

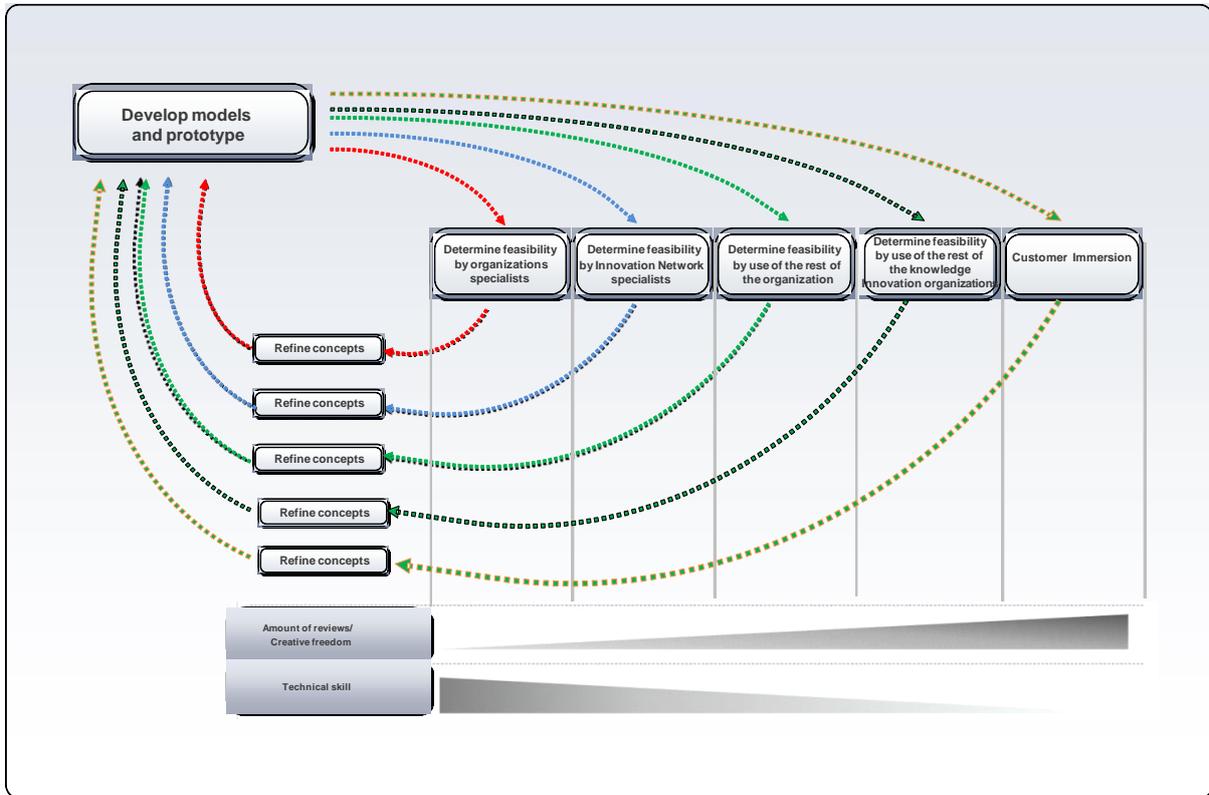


Figure 37: Open Organisational Development, Feasibility and Refinement Cycle with Customer Immersion

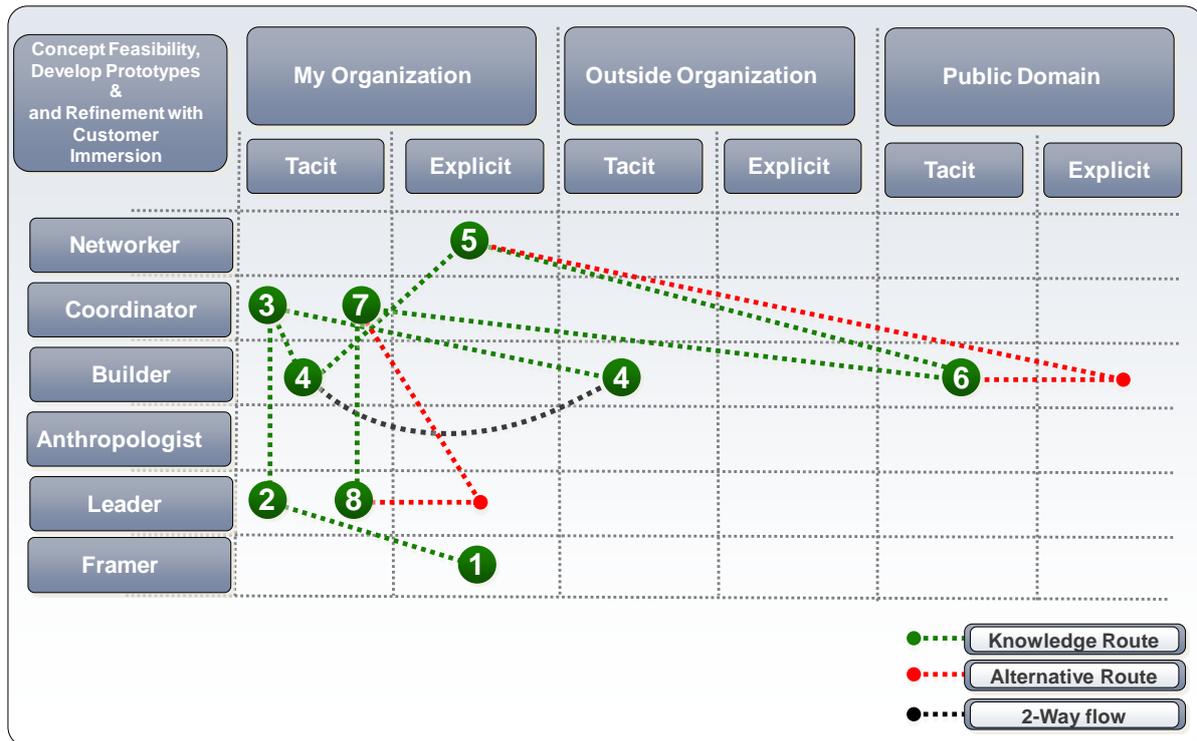
4.5.2.1.2 *Innovation Roles*

Figure 38: Concept Feasibility and Refinement with Customer Immersion

- 1- Concepts are dispersed by the Framer.
- 2- The Leader sends the concepts to the Coordinator.
- 3- The Coordinator balances the project objectives, recourses and risks. He prioritises, plans, coordinates, schedules and ensures the completion of the project. If ready to start, it will be helpful if the Coordinator has the characteristics of the Networker, who creates connections between internal and external individuals, teams and organisations which have common or complimentary objectives.
- 4- The Coordinator sends the concepts to the Builders, who work in conjunction with outside organisations to develop prototypes and models. The Builders use ideas to create concepts in a team context. These communications are directed both ways and are seen more as a back and forth flow of knowledge between the Builders.
- 5- The prototypes are then sent to the Networker who creates connections between internal and external individuals, teams and organisations which have common or complimentary objectives.
- 6- The prototypes are given to selected people in the public domain for use.
- 7- Feedback and suggestions from the public are referred back to the Coordinators. This feedback is measured against the project goals. If the project goals are met, then the final prototypes are sent to the Leader for approval.

- 8- If the project goals are not met, the prototypes are put back into the cycle and sent to the Builder for further development.

4.5.3 Stage Conclusion

As already mentioned, the feasibility assessment and refinement may use external collaboration. External role-players may be used, but they must also comprise people from within the intended market. This collaboration must be controlled because it may put proprietary knowledge at risk, and must consist of trusted external role-players.

During this stage, knowledge is still being generated and the quantity of knowledge can be controlled by the amount of refinement iterations that are being done each time. The cost of these iterations will be case-specific, because of the different form of each concept. The amount of iterations needed to generate enough knowledge is illustrated in the figure below.

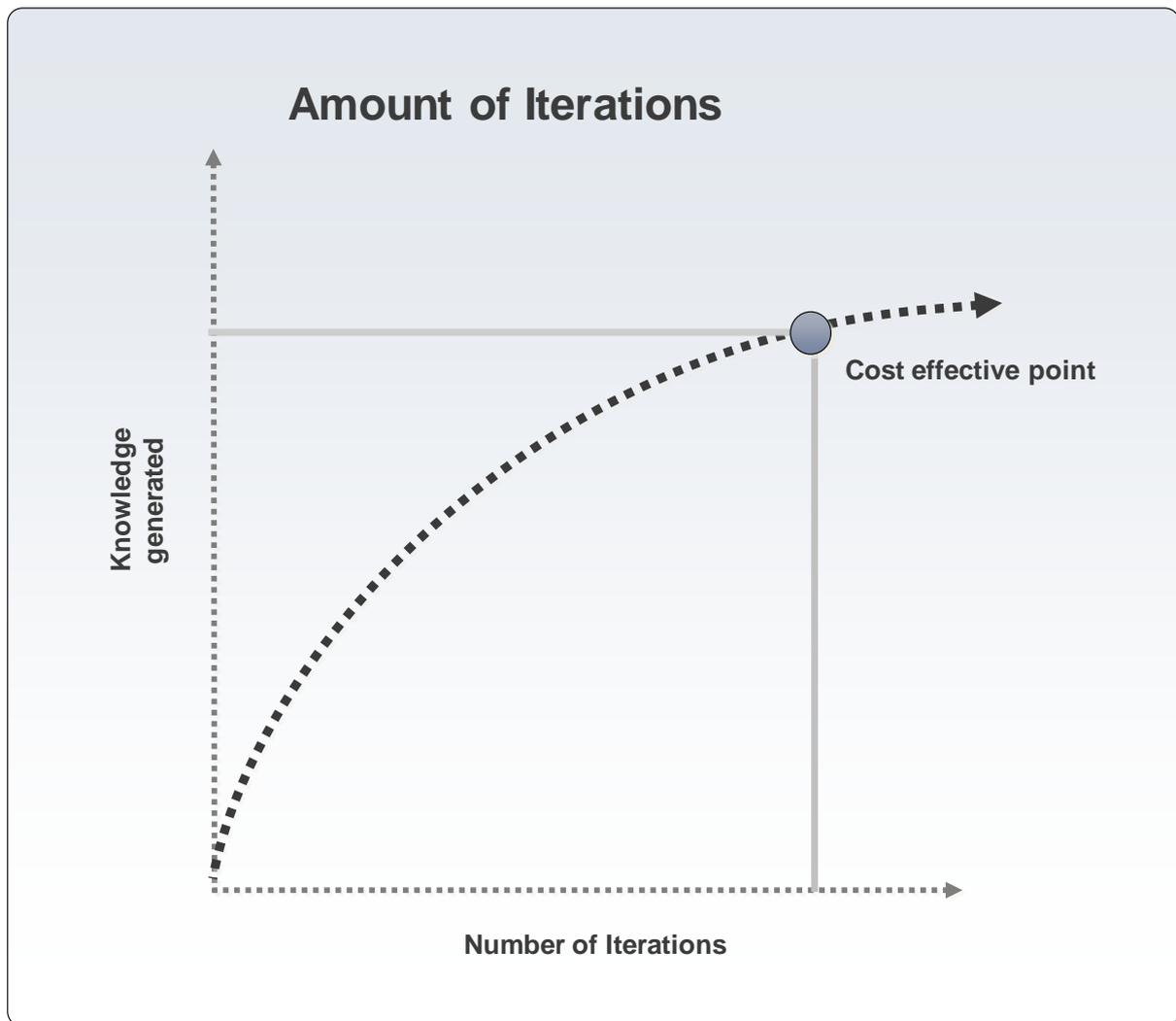


Figure 39: Number of Iterations

Table 11: Concept Feasibility & Refinement Stage Conclusion

FuGle Process	Open Innovation Models assigned by (Marais 2010)	Open Innovation Models assigned
Determine feasibility	Done internally	Done internally
Develop models and prototypes	speculative-type idea competitions/customer immersion	speculative-type idea competitions/customer immersion
Refine concepts		

4.6 Portfolio Stage

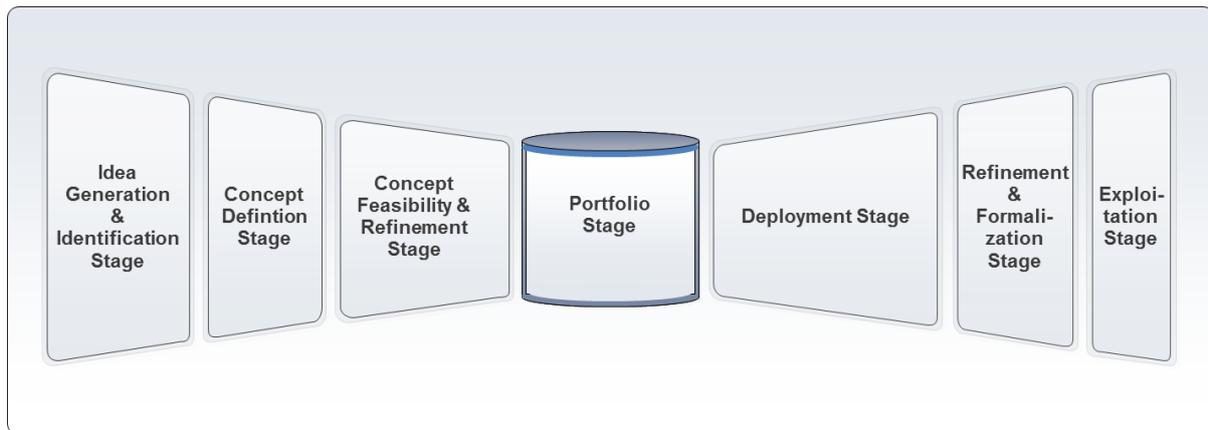


Figure 40: Portfolio Stage

The Portfolio Stage focuses on Innovation Management and the management of the different portfolios. The distribution of resources depends on the alignment of the strategic objectives and the return on investment potential. This stage deals mainly with the management of the projects and the judgment of the manager's decisions. The Innovation Portfolio Manager must decide which portfolio(s) must receive the most attention and resources. This stage needs knowledge, tools and know-how in terms of making a calculated decision on each and every portfolio. Portfolios must be weighed against each other and resources must be assigned to each portfolio by measure of weight.

At the end of this stage, it will be crucial to know the potential of the concept. This is important, because after this stage a concept will cost a considerable amount of money.

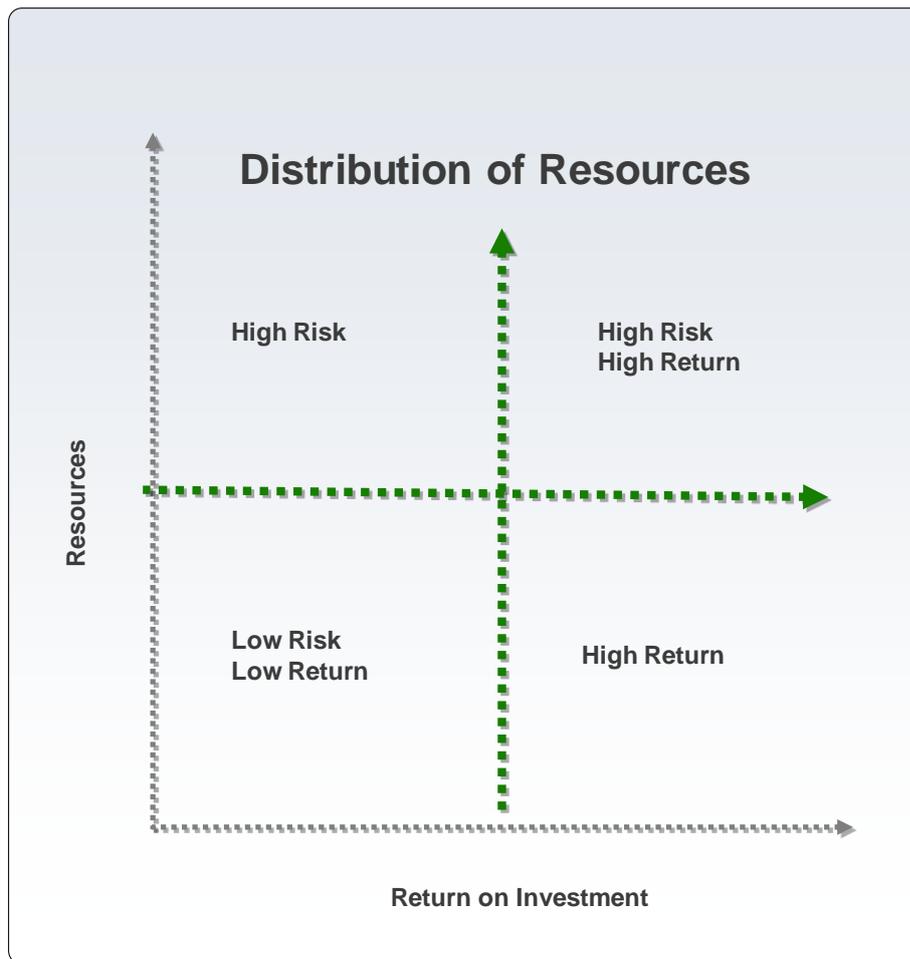


Figure 41: Distribution of Resources

4.7 Deployment, Refinement & Formalisation Stage

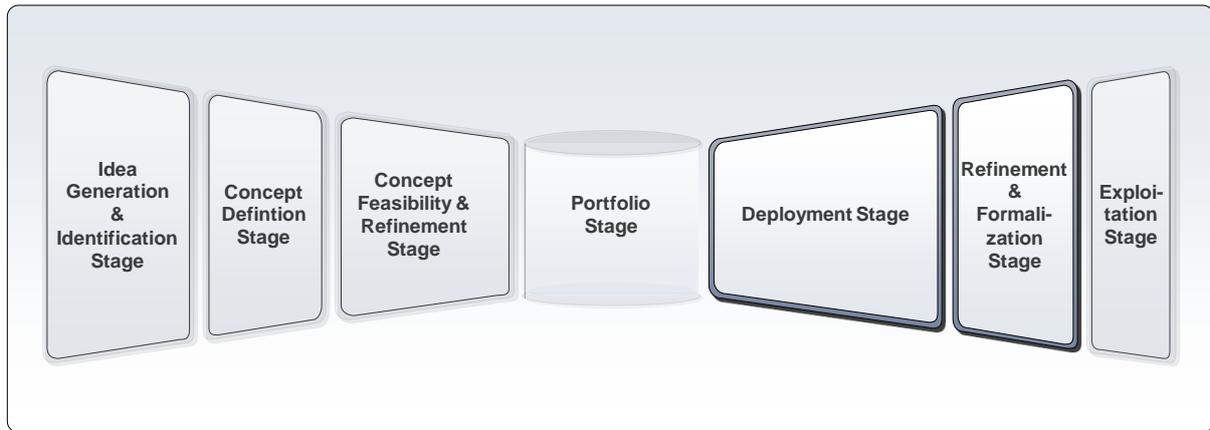


Figure 42: Deployment and Refinement & Formalisation Stage

The second phase of the FuGle model commences with the Deployment Stage. Whereas the “funnel” stage has been concerned with better defining the proposed ideas, the second half, the “bugle” stage, focuses on the actual development, deployment and extended control of the chosen projects (from the portfolio). The Deployment Stage contains the activities of detail design and project planning. It is followed by initial refinement, leading to an implementation gate, which assesses the maturity and readiness of the project and the implementation plan. It is only after the project has passed through this gate that it will be implemented.

To include the iterative nature in the design, the Deployment, Refinement & Formalisation Stage is placed in the same stage when referring to the inclusion of Open Innovation in the FuGle model of these two stages. The primary focus of this phase is to detail development, testing, implementation and then refinement of the product while it is brought into operation.

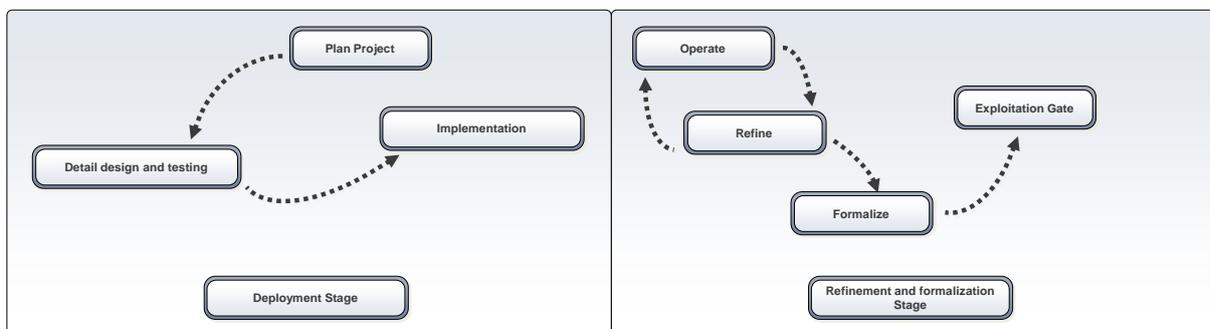


Figure 43: Outline of both stages

By looking at these two stages in conjunction with one another, it is important to break these stages up into its different components and joining them together in a functional order of appearance so that the stage can be seen in a flow diagram to better understand where and how the innovation model fits in.

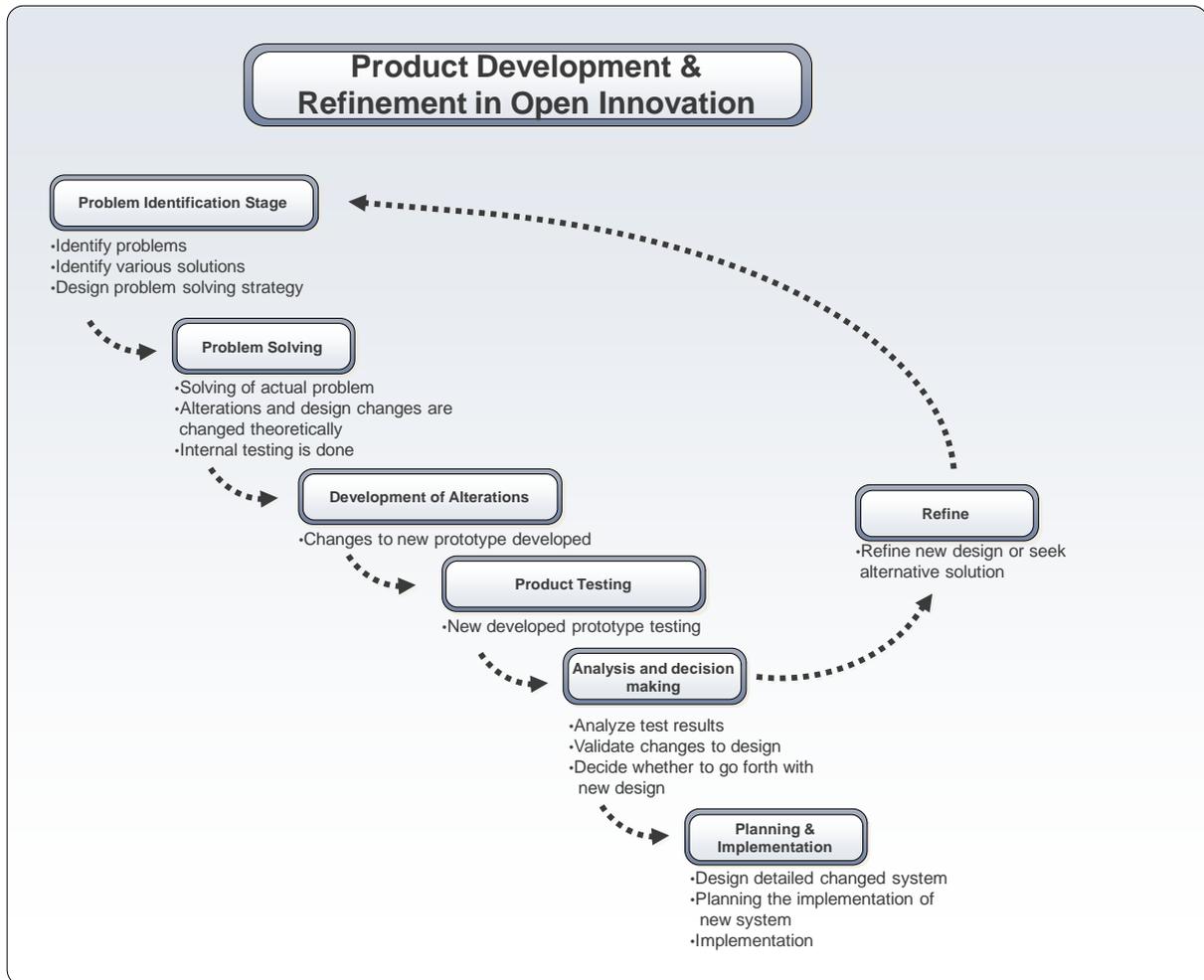
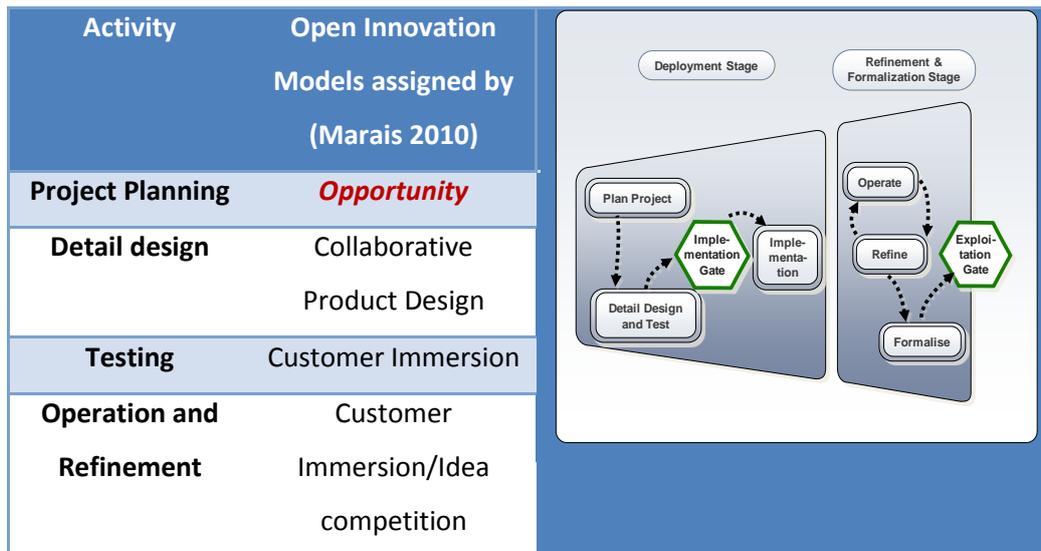


Figure 44: Product Development & Refinement in Open Innovation

The Open Innovation model assigned to the different activities in these two stages is shown in the table below.

Table 12: Deployment and Refinement & Formalisation Stage



The detail design, testing and refining can all be done by an outside organisation, or both organisations can be more open and integrate their design, testing and refining teams and go through the iteration loops together.

4.7.1 Plan Project

Initial project planning, as well as the implementation and the formalisation of the product/service, must be managed and controlled intensely. These activities are seen as the *raison d'être* of the organisation/company and gives the organisation or company hierarchical control over its customers and competitors.

4.7.1.1 Innovation Networks

If the project planning is commenced by using Open Innovative models, innovation networks will be the best suited to assist in the planning phase. An important factor is to plan for its inclusion and to ensure that the necessary resources are available to fully manage the use of the model.

4.7.1.1.1 Knowledge Flows

This phase involves planning between different organisations and each project consists of the balancing of project objectives, resources and risks. To prioritise, plan, coordinate, schedule and ensure the completion of the product are all aspects that need to be planned before launching the project. These characteristics are found in the role of the Coordinator. Opening up the innovation in the planning of the project, will see Coordinators of different organisations working together on an Innovation Network Structure.

4.7.1.1.2 Innovation Roles

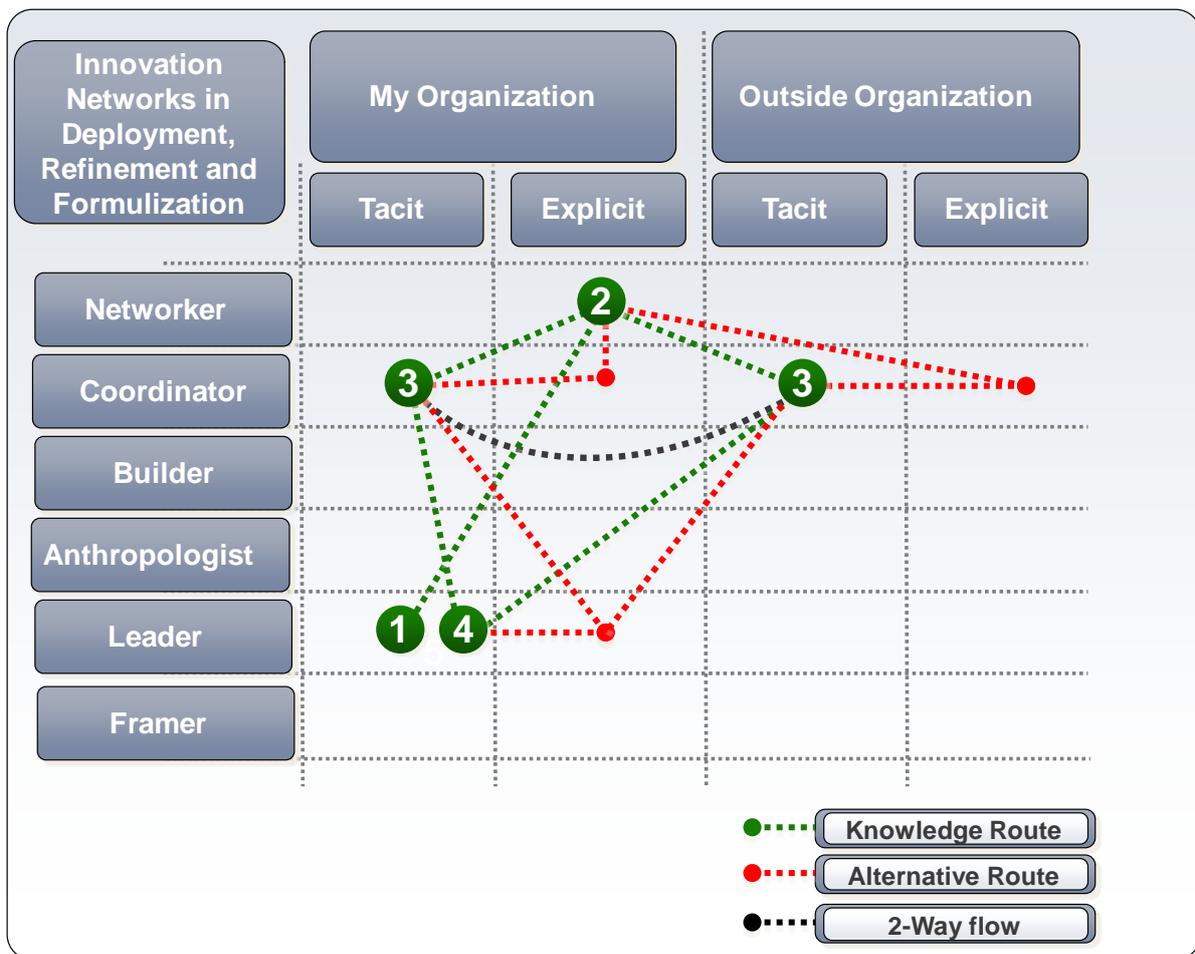


Figure 45: Innovation Networks in Deployment and Refinement & Formulation Stage

- 1- The Leader aligns activities with strategy and objectives, prioritises opportunities and ideas against a standard framework, while considering all business requirements.
- 2- All ideas and information are sent to the Networker who creates connections between internal and external individuals, teams and organisations that have common or complimentary objectives.

- 3- Planning commences between Coordinators from different organisations by balancing project objectives, resources and risks. They also prioritise, plan, coordinate, schedule, and ensure completion of the project.
- 4- Decisions made on the planning of the project are evaluated, while the Leader considers the business requirements which guides progress, monitor metrics and instigate corrective action.

4.7.1.1.3 Comments

In this phase the Networker is used again as a link between two organisations. Now he is operating as a link between the Coordinators of different organisations. It will be easier, however, if the Coordinator has certain characteristics attributed to the Networker. This problem will be addressed in the chapter conclusion.

4.7.2 Detail Design and Testing

As the project progresses to the detail design activity, it is suggested by (Marais 2010) to assign collaborative product development in order to further satisfy the detail design requirements of this phase. This model provides room for collaboration between organisations and creates the opportunity to share the responsibility of the detail design, although the organisation will still have overall responsibility.

4.7.2.1 Collaborative Product Development

The development of the following definition is based on the research done by (Marais 2010). This serves as an introductory definition of the Open Innovation model used for detail design.

“Collaborative product design and development is the technique of increasing the importance and responsibility of suppliers and customers in the product design process and supply chain to result in increased productivity to the benefit of the organisation, and eventually the customer.”

This process mainly entails outsourcing the detail design and development of product segments to different parties in the supply chain. Widespread supply chains are not a new concept to business, but the alternative twist it is given in the Open Innovation environment certainly requires a new way of thinking.

4.7.2.1.1 Knowledge Flows

By outsourcing the detail design and testing, only a certain degree of control can be maintained and the testing of the new design will only be based on parameters given by the organisation and not an imposing test result. This can lead to rejection of the design and is very time consuming.

By combining the designing teams, the communication between what we want and how we can deliver are in the same team. This speeds up the designing, testing and refining phases that take up most of the time in an iterative loop cycle.

4.7.2.1.2 Innovation Roles

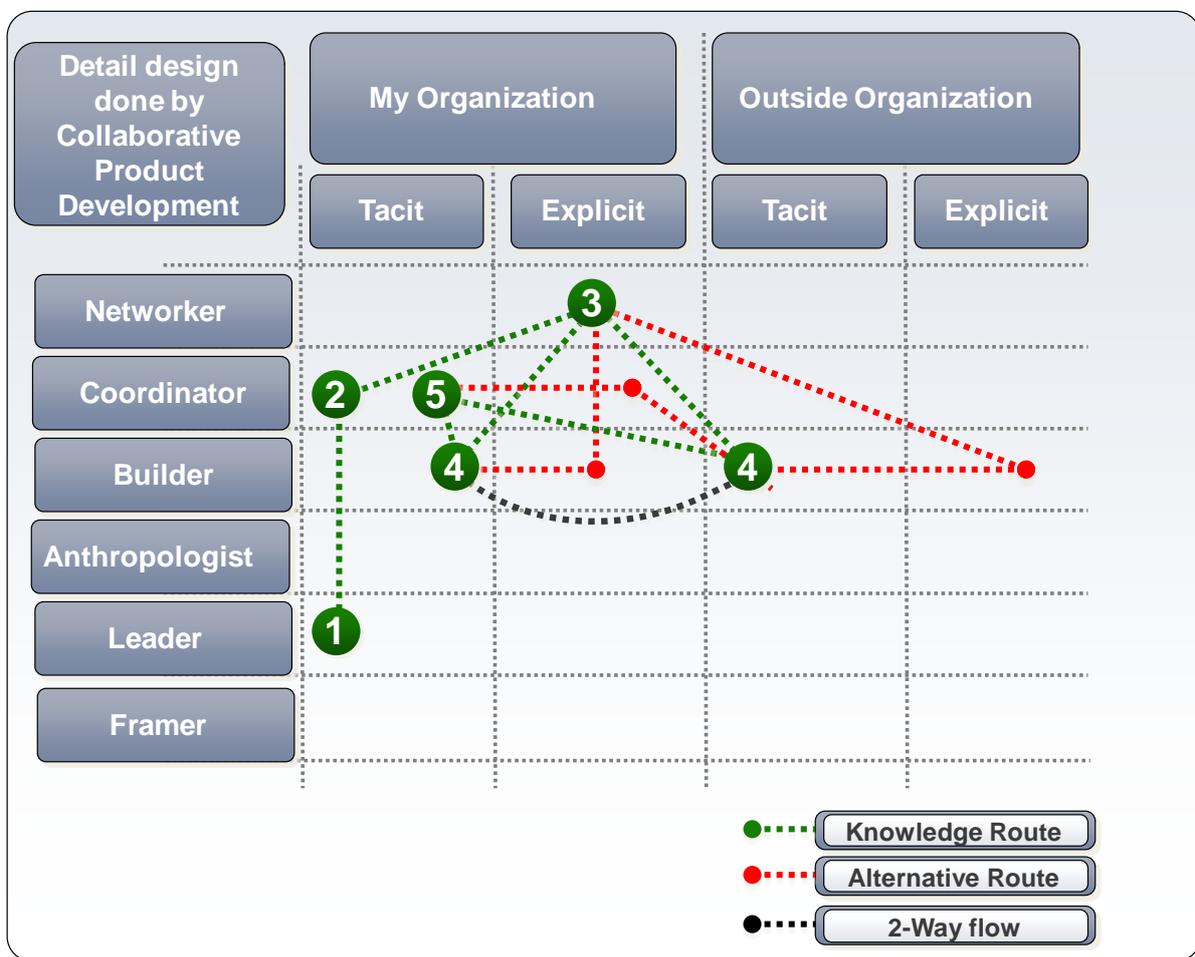


Figure 46: Detail Design done by Collaborative Product Development

- 1- The Leader aligns activities with strategy and objectives. The objective is to do a detail design to better the project/service that has already been deployed. The objective is to eliminate problems that have arisen in the first few weeks after deployment.

- 2- Information is sent to Coordinators to coordinate the project on the basis that they have already planned. This coordination can be done in an open basis again, but will not be necessary for they have already planned the project in advance. If any obstacles occur, they can be referred back to their counterparts and plan from there how they can overcome these obstacles.
- 3- The Coordinator forwards the information and project plan to the Networker who creates connections between internal and external individuals, teams and organisations which have common complimentary objectives.
- 4- The Networker joins the Coordinators and Builders by connecting them together. The Builders are in charge of the actual design of the product/service. These Builders will then function as a team and out of this team a design will emerge.
- 5- The design that emerges out of the building team will then be passed on back to the Coordinator so that he/she can coordinate the next step, which is the testing of the design.

4.7.2.2 Customer Immersion

It is also recommended by (Marais 2010) that the testing activities in this phase are done in a collaborative manner, and this manner will be through the use of customer immersion.

The research presented by (Marais 2010), assisted in the development of the following definition to better describe what the Customer Immersion Open Innovation model entails: (Marais 2010)

“Customer immersion is a technique whereby customers' inputs as to product requirements and expectations are exploited through intense customer interaction and the involvement of employees in, and their study of, the customer-product interaction process, with the assistance of new technologies”

4.7.2.2.1 Knowledge Flows

One of the advantages to the approach will be an increase of awareness and exposure before the product/service is formally launched.

The risk of exposure existing when customer immersion is used, will be minimal because the product is at this stage so far developed that it will be difficult for competitor imitations to be realised before the product is formally launched. People in the organisation can also be seen as potential customers

and may also be included in the testing phase. The main reason for using potential customers is to expose the product/service to as many people as possible while still keeping the design “safe”.

4.7.2.2.2 *Innovation Roles*

It is not possible to be selective when dealing with a specific role-player in the customer section, because of the mass of people involved, and surely an organisation will not want to be selective because of the nature of the testing phase. The testing must be done across a broad spectrum of different types of role-players, who have different thinking patterns and analytical skills to help with the testing

4.7.3 Operation and Refinement

4.7.3.1 **Customer Immersion**

Once the product/service is brought into operation, customer immersion and adapted idea competitions can be deployed to further exploit customer recommendations to further refine the product/service. The responsibility of the refinement review process lies with the organisation, although it is suggested that the customer base be included to provide the suggestions - which will be more beneficial, as they are the end-users.

4.7.3.1.1 *Knowledge Flows*

Once the product/service is brought into the refinement phase, the knowledge gained by the testing of the product/service through customer immersion and adapted idea competitions can be used to refine the concept of the product and start with the development iteration or the next FuGle stage.

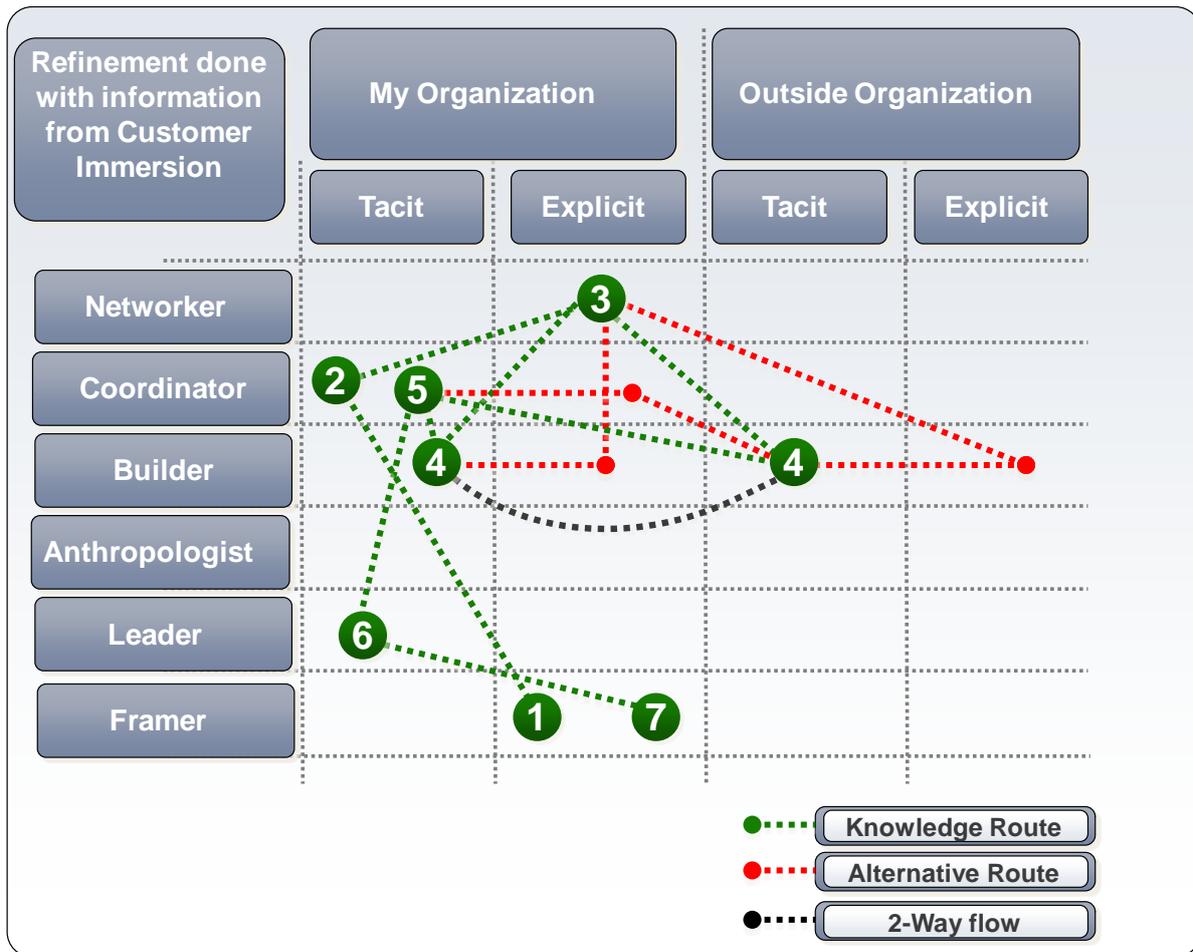
4.7.3.1.2 *Innovation Roles*

Figure 47: Refinement done with Information from Customer Immersion

- 1- The test results are captured by the Framer and are released to the Coordinator for further processing.
- 2- The Framer then gives all information concerning the testing and results to the Coordinator. These results are internalised and decisions are made regarding the effectiveness of the results and whether refinement is needed. If no refinement is needed, the design will be forwarded to the Leader to monitor metrics and general evaluation. If refinement is needed then the test result will be forwarded to the Networker.
- 3- All information about the testing and its results are sent to the Networker who creates connections between internal and external individuals, teams and organisations that are part of the refinement process.
- 4- The Networker sets up a team to refine the product/service by connecting the Builders from different organisations. The refinement commences and product/service is refined and concepts are altered and sent back to the Coordinator.

- 5- The Coordinator balances the project objectives and contextualises the concept before sending it to the Leader.
- 6- The Leader evaluates and prioritises activities related to the new concept against all business requirements and benchmarks the activities and changes made to the product/service. The iteration loop will be closed and the Leader starts the detail design, who is also responsible for the alignment of activities, strategies and objectives.
- 7- The Framer captures the information concerning the product/service.

4.7.4 Stage Conclusion

It is imminent that the Coordinator is now playing a greater role than in previous stages. This stage is more focussed on coordinating, balancing project objectives and product/service cycles. Goals are set in this stage and cycles are completed until these goals are reached and the Coordinator is satisfied and ready to pass the design to the Leader for validation.

Table 13: Deployment and Refinement & Formulisation Stage Conclusion

Activity	Open Innovation Models assigned by (Marais 2010)	Assigned Open Innovation
Project Planning	<i>Opportunity</i>	Innovation Networks
Detail design	Collaborative Product Development	Collaborative Product Development
Testing	Customer Immersion	Customer Immersion
Operation and Refinement	Customer Immersion/adapted idea competition	Customer Immersion/adapted idea competition

4.8 Exploitation Stage

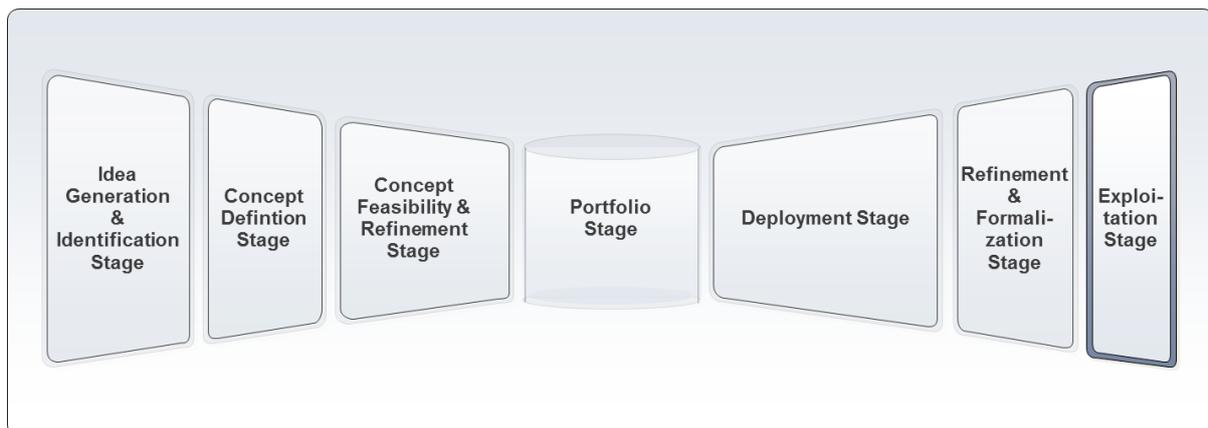


Figure 48: Exploitation Stage

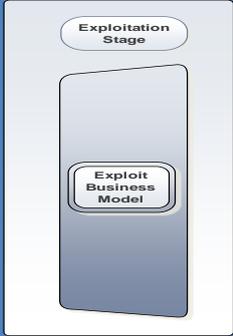
Once the solution has been formalised, the final stage is reached where the solution is further exploited through new business models and markets. The aim is, therefore, to generate more value from the solution. Before this stage is entered, an exploitation stage needs to be passed through, where decisions are made regarding which solutions must be further exploited.

Although this innovation process model appears to be a linear staged process, there are many iterative loops and overlaps between the steps within the different stages. A large number of these steps (e.g. idea generation and idea capturing) also occur concurrently. Activities such as portfolio management and the managing of information occur throughout the process (Du Preez and Louw 2008).

The last stage in the FuGle consists only of one process: exploiting the business model.

Table 14: Exploitation Stage

Activity	Open Innovation Models assigned by (Marais 2010)
Project Planning	Platforming



4.8.1 Exploiting the Business Model

The final stage of the FuGle is the exploitation stage, which is concerned with the further exploitation of the developed innovation. It is intended to increase the revenues generated from the innovation by identifying new markets, new business processes, or by altering the product to fulfil these new requirements and objectives. The Open Innovation model assigned to this stage is the Platforming Model.

4.8.1.1 Platforming

Platforming will be ideal in sustaining the increase in revenue generated from the new product. It provides a basis for all parties concerned to sustain product alterations. The Platforming Model is only introduced during the last stage of the FuGle, but the planning and actualisation must be deeply integrated throughout the entire FuGle process.

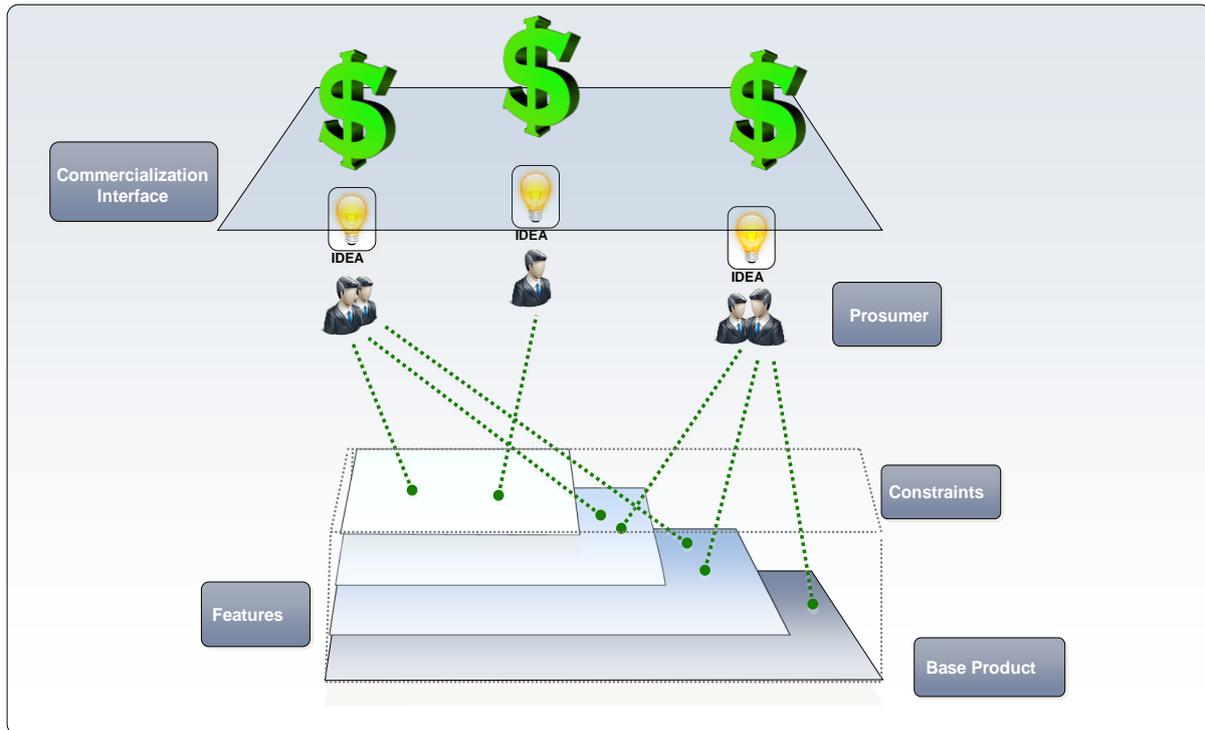


Figure 49: An Illustrative Representation of Platforming

The inclusion of the Platforming Model in the Exploitation stage has several advantages. The prosumer-generated alterations will positively influence the demand for the base product, which will result in increased sales and thus increased revenue. The increased revenue from further exploitation does not only refer to the value derived from the actual Platforming, but also to the increase in revenue from the base product.

4.8.1.1.1 Knowledge Flows

A base product, service or brand is the primary requirement for Platforming to commence. It is very important to make the various features and facets of the base product or service as accessible to the prosumer as possible. The product or service must be designed in such a way that features and facets, which will have been unreachable in a closed innovation product, can now be accessed and customised by the prosumers.

A well-suited and effective communication and collaboration medium must be employed or established to foster co-development between the organisation and the prosumer, as well as on an inter-prosumer level. This communication medium must enable prosumers to share platform developments and alterations made to the base product or service at any stage of the FuGle.

The correct infrastructure and prolonged employee involvement are essential and just as important as the abovementioned communication channels to support the facilitation process. A basis of loyal prosumers is a necessity to allow the product or service to be exploited as a platform. As is mentioned before, the value received from mass collaboration is directly related to the number of participants.

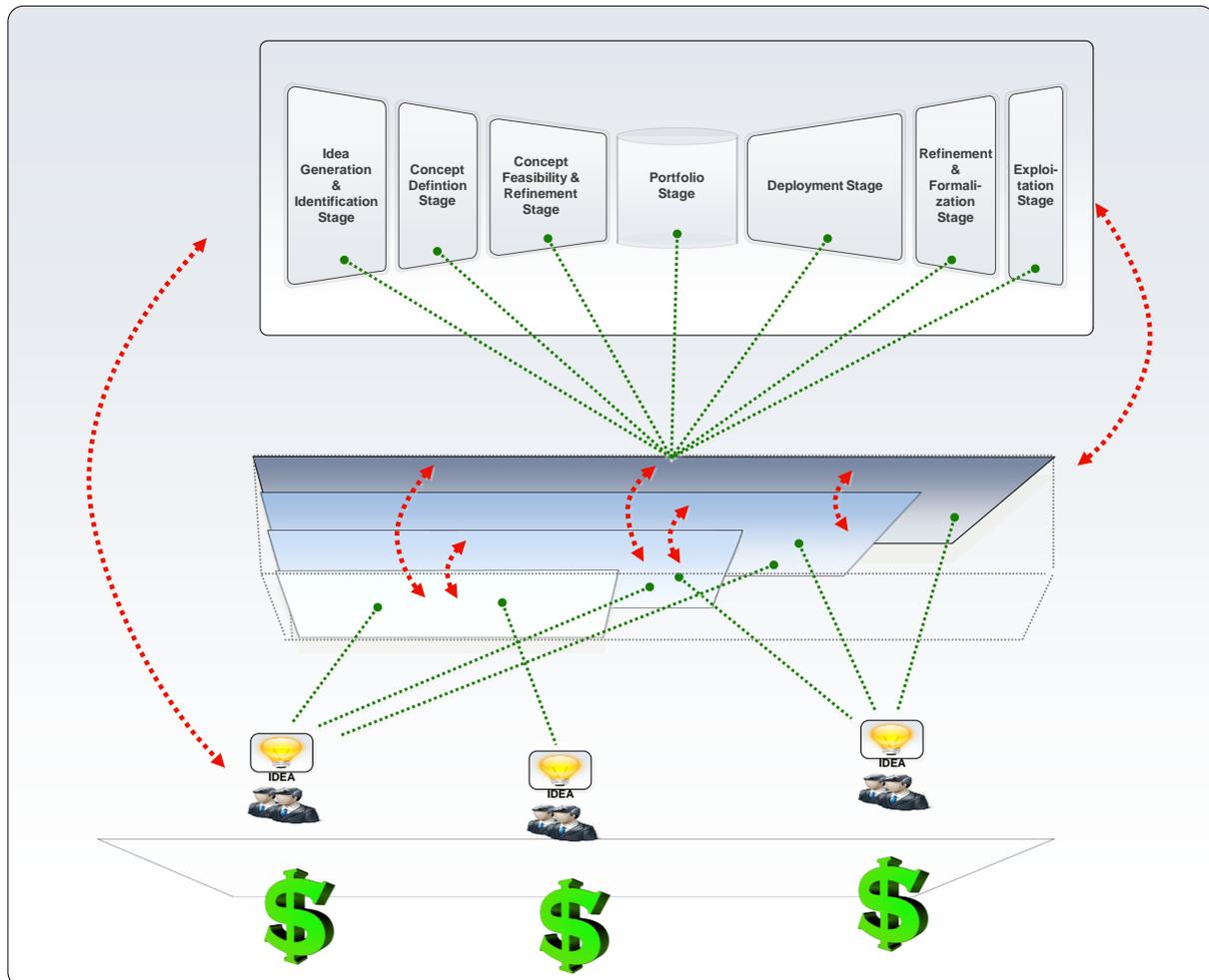


Figure 50: Open Innovative Platforming with Knowledge Flows

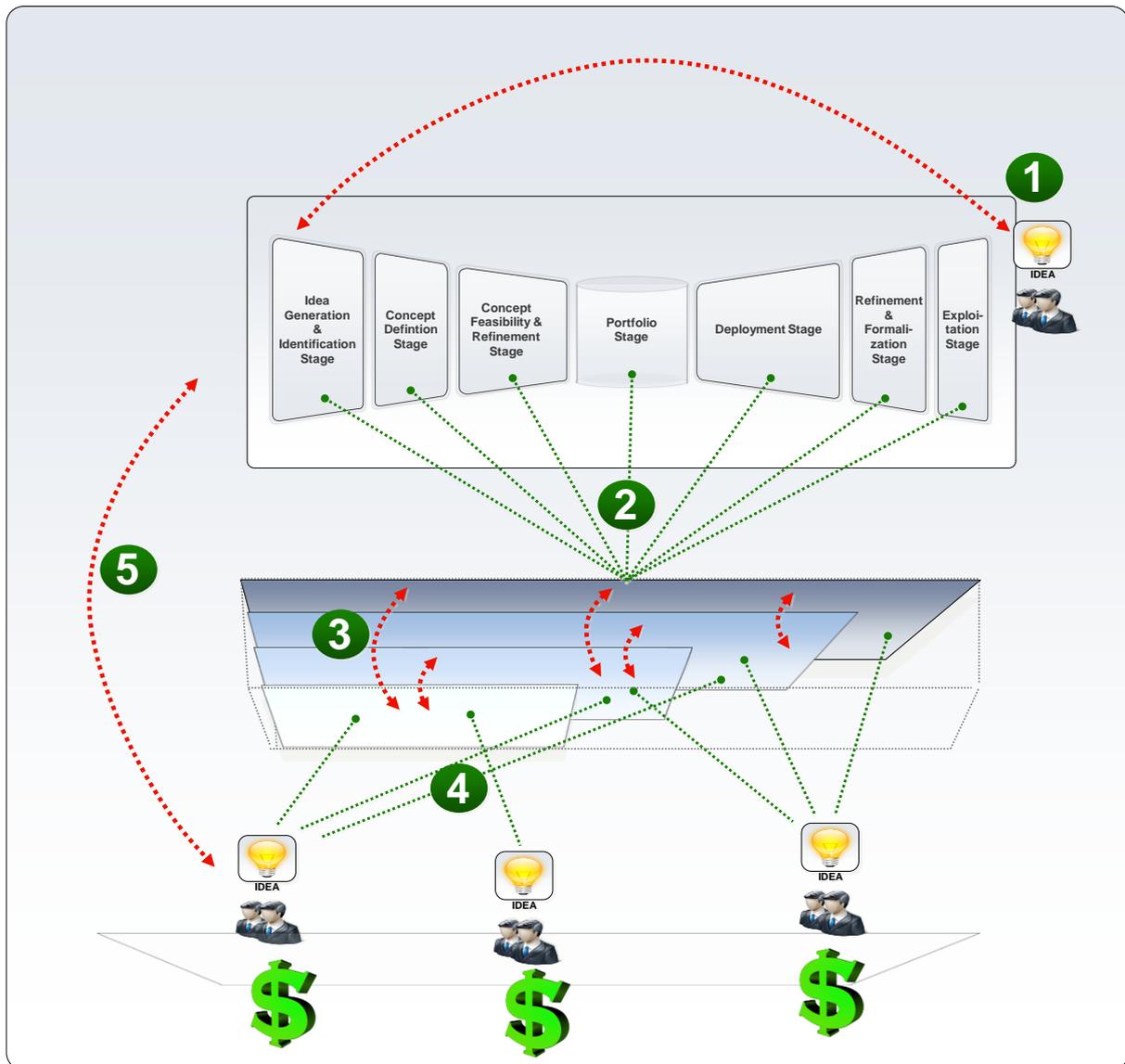
4.8.1.1.2 *Innovation Roles*

Figure 51: Knowledge Flows with Platforming

- 1- Ideas generated by the Networker concerned with Platforming will first have to go through the whole FuGle by itself to be defined, refined and deployed. The Networker makes decisions on potential futures and identifies opportunities where in the network the relevant knowledge can be generated and connections can be tied. The Networker can utilise a different company's idea generating power or refer to the public domain itself. This refers again to the first stage of the FuGle. Design complications of the base product can be altered and discussed between organisation Leaders who align the concepts with the business and innovation strategies and objectives. The Leader also validates the relevance of the new concept and prioritises innovation activities

- 2- Design complications and modifications of the base product can be altered and discussed between organisation Builders, while the concept of Platforming goes through the FuGle phases. All this information must be captured, centralised and sorted by the Framer.
- 3- The Framer is connected to a centralised data pool where every prosumer can retrieve designs and “knowledge” of the base product and communicate with each other on modifications that can be done to make the Platforming design process easier.
- 4- Ideas may arise from these communicating organisations that can lead to a spin off or another level to the Platforming model. This centralised pool of data and knowledge will function as a good generating area for new ideas.
- 5- Any new ideas that arise out of this communication about the base product and the prosumers will also pass through the FuGle stage to be defined, refined and deployed.

4.8.2 Stage Conclusion

This stage gives another dimension to the whole FuGle. An idea based on Platforming will also need to go through the FuGle. Any changes made to the design of the base product or/and the Platforming product/service must be updated while passing through the FuGle. All changes and updates must be documented and sent to the Framer so that the information and data are centralised and are accessible by all prosumers.

4.9 Chapter Conclusion

4.9.1 Alterations to Roles

In the previous chapter, a decision is made to split the role of the Leader and to add the Framer to assist the Leader. This chapter illustrates that the splitting of these roles helped immensely. The Leader is keeping the characteristics stated by (Essmann 2009) namely:

- Aligns activities with strategy and objectives. Establishes and involves teams comprising the "right" individuals at the "right" time.
- Evaluates and prioritises opportunities and ideas against a standard framework, while considering all business requirements.
- Guides progress, monitors metrics and instigates corrective action. Builds synergy into projects and the organisation.

However, with Open Innovation, the field changes and a gap is formed and creates an area where the Framer can be brought back just as (Essmann 2009)'s initial roles have been consolidated. This

gap occurs in the information capturing area, where all knowledge is centralised, evaluated, prioritised, stored and dispersed.

The role or characteristics of the Framer are defined as follows:

- Defining and deploying the frameworks by which opportunities, ideas and concepts are evaluated and prioritised, meta-data to facilitate capture, storage and retrieval of ideas and information and innovation metrics to measure innovation.

It is also clear that in this stage it will be easier to alter the characteristics of the Coordinators, by adding characteristics of the Networker to that of the Coordinator.

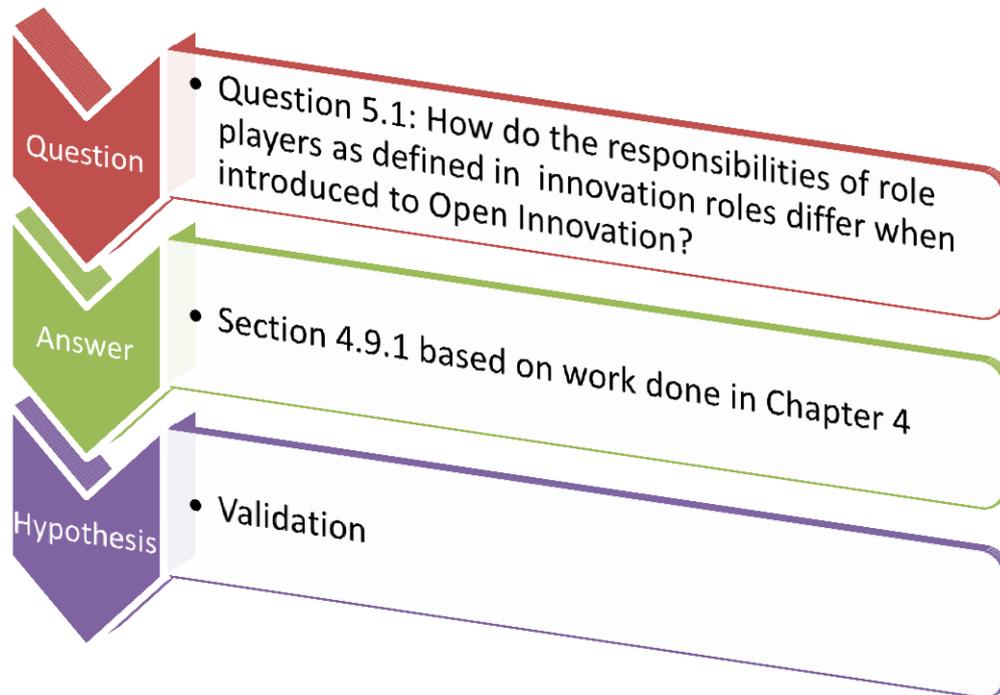
The role of the Networker is defined by (Essmann 2009) as:

- Scanning the market, industry, technology and regulatory and social trends to understand potential futures and to identify latent opportunities.
- Creating connections between internal and external individuals, teams and organisations with common or complementary objectives.

The role of Coordinator is defined as:

- Balancing project objectives, resources and risks.
- Contextualising position and promoting opportunities and concepts.
- Prioritising, planning, coordinating, scheduling and assuring the completion of projects.
- Overcoming or outsmarting obstacles faced during projects.

I agree with the allocations of each characteristic, but the Coordinator can benefit a lot more if his role includes the creation of connections between internal and external individuals, teams and organisations with common or complimentary objectives. This characteristic complements the original characteristics when balancing projects and recourses. These resources may comprise internal and external individuals and teams that then form part of the planning, balancing and coordination of projects.



4.9.2 Roles Involvement in FuGle

Figure 52 below shows the importance of each role-player's function compared with each stage in the FuGle. This is done by using the research carried out in this chapter and by first understanding the processes in the FuGle and the assigned Open Innovation model. The roles and knowledge flows are added to the Open Innovation models and FuGle processes and the following conclusions have been made regarding the importance of each role-player in each FuGle stage incorporating the Open Innovation models. Each green mark indicates the importance of the role as follows:

✓ - One mark shows that the function of the role-player features in the stage but to a lesser degree. The information or knowledge is only passed on and does not need to be internalised by the role player.

✓ ✓ - Two marks show that the function of the role-player features more and that the work done by the role-player adds to the knowledge that is passed on. The function is defined as more significant than one mark.

✓ ✓ ✓ - Three marks show that the knowledge required is specialised and critical to this stage. The knowledge added by this function determines the core of the stage. The rest of the functions are merely to act in support of the knowledge.

✓ - The red mark shows the external functions that are used in each stage and the amount of marks indicates the importance of each function compared to the FuGle stage as described above.

	Idea Generation & Identification Stage	Concept Definition Stage	Concept Feasibility & Refinement Stage	Portfolio Stage	Deployment Stage	Refinement & Formalization Stage	Exploitation Stage
Networker	✓✓✓✓ ✓	✓✓✓					✓✓✓✓ ✓✓✓
Coordinator	✓✓✓	✓✓✓ ✓	✓✓✓	✓✓✓	✓✓✓ ✓✓✓	✓✓✓	
Builder	✓✓✓✓ ✓✓✓	✓✓✓✓ ✓✓✓	✓✓✓✓ ✓✓✓		✓✓✓✓ ✓✓✓	✓✓✓✓ ✓✓✓	
Anthropologist							
Leader	✓✓✓ ✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓	✓✓✓
Framer	✓✓✓	✓✓✓ ✓	✓✓		✓✓	✓✓	✓✓✓ ✓

Figure 52: Roles Importance in the FuGle Stages

Networker

The Networker features in three stages of the FuGle. The function of the Networker is more specialised in Open Innovation than originally stated. The role being played consists of characteristics which show insight into new trends, opportunities in the market and new technologies that may be used to penetrate the market. The Networker is a creative thinker and must have the capability to generate ideas and inventions that act as the seed of knowledge which is planted in an organisation and which will lead to the growing of innovations.

The role of the Networker may be combined with that of an outside organisational Networker in the first and the last stages of the FuGle for the same reason as mentioned above. More minds thinking together will create more inventions to enter into the idea pool. The difference between the first and the last stages is that in the Exploitation Stage the openings in the market the Networker needs to exploit is based on the base product already deployed and refined by the organisation and that the Idea Generation & Identification Stage is only limited to the company's accepted business and innovation strategies and objectives.

Coordinator

The functions and responsibilities of the Coordinator are of higher importance and with additional characteristics which originally formed part of the functions of the Networker. The Coordinator's role consists of two parts. The first is present during the first two stages of the FuGle, namely the Idea Generation & Identification and the Concept Definition stages. Here the Coordinator plays the role of connecting and facilitating knowledge transfer between people on an Open Innovation platform.

The second part of the Coordinator's role is found during the following three stages: the Concept Feasibility & Refinement Stage, the Deployment Stage and the Refinement & Formalisation Stage. His functions and responsibilities focuses on coordinating, scheduling, prioritising and planning projects, while at the same time he has to balance project objectives, resources and risks. (Essmann 2009) All three stages are run like a project and are based on iterations and a set of goals which needs to be reached before the completion of the stage.

Outside organisational Coordinators are used in innovation networks during the Concept Definition Stage, when raw ideas that have been accumulated by the Framer from the outside organisation, are received, and also when combined planning is carried out during the Deployment Stage.

The Leader operates in conjunction with the Coordinator as the only two role-players in the Portfolio Stage. In this stage, the Coordinator is in charge of critical decisions, such as:

- Planning and Coordinating the innovation portfolio;
- Allocating resources appropriately.

Builder

The Builder plays a critical role throughout the FuGle and must be seen as the engine that generates creativity and inventions. All ideas are sent to the Builder to practically assemble innovations out of inventions. Knowledge is needed to help the innovation processes to progress from inventions to innovations and this is exactly what the Builder brings to the table. The Builder must have the knowledge to generate tangible concepts from ideas and to demonstrate concepts (Essmann 2009) in the Concept Definition Stage. He also has to obtain feedback from colleagues and customers, refine concepts, build, test and refine working "products" and ensure "production" readiness (Essmann 2009) in the Concept Feasibility and Refinement Stage, while striving for the initial vision of the concept with minimal compromise of design, production and delivery in the Deployment and Refinement & Formulation Stage.

All of these stages need a considerable amount of knowledge to help an invention to grow to and become an innovation. Open Innovation between Builders across organisational boundaries will enhance knowledge sharing, meaning therefore, that external and internal knowledge may be utilised.

Anthropologist

The Anthropologist plays an important supporting role in every stage. The activities in the processes defined in this chapter do not involve the Anthropologist as being the primary role-player in any of the stages in the FuGle, but only as a supporting role-player in:

- Understanding the market;
- Identifying opportunities and developing concepts.

The primary focus of the Anthropologist is indirectly linked to the innovation stages and includes:

- Continuous research
- Governance principles
- Organisational values & policies
- Organisational practices and procedures
- Championing & encouraging innovation
- Motivating, rewarding & celebrating success
- Measuring innovation
- Involving customers & suppliers in the innovation process (Essmann 2009)

Leader

The functions and responsibilities of the Leader are the most prominent in the organisation and deals with everything and anything related to the organisation and the decisions concerning it. Nothing changes when referred to the processes in the FuGle. The Leader features in every stage of the FuGle and is brought into the processes for mainly two functions:

- Aligning activities with strategy and objectives;
- Evaluating and prioritising opportunities and ideas against a standard framework considering all business requirements. (Essmann 2009)

The Leader features with the Coordinator as the only two role-players in the Portfolio Stage. In this stage the Leader is in charge of critical decisions, such as:

- Balancing the innovation portfolio, and
- Allocating resources appropriately.

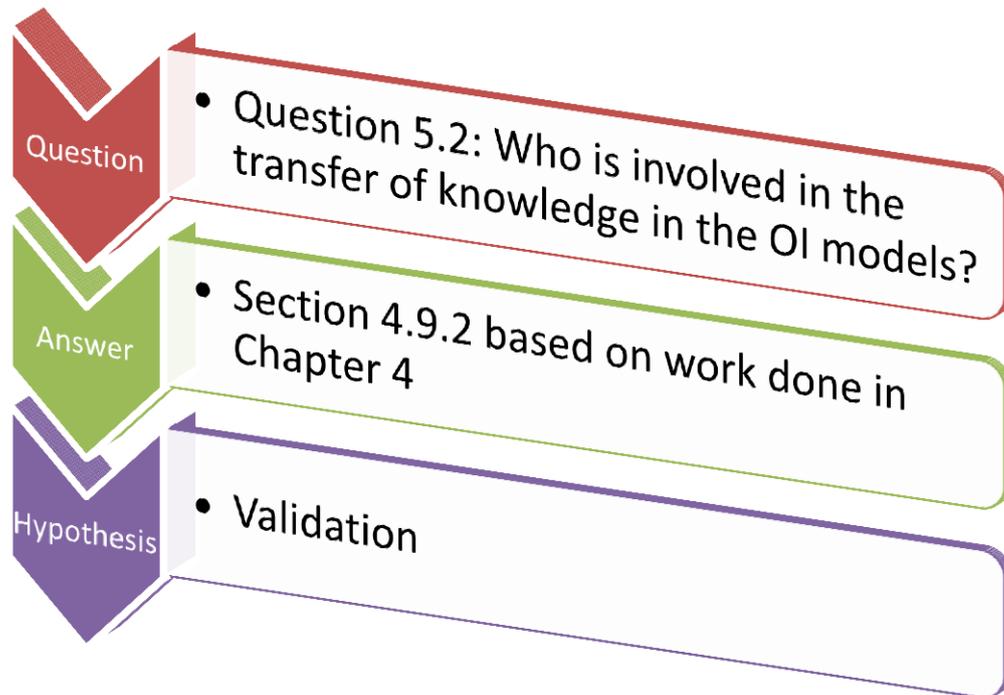
Collaboration with Leaders from outside the organisation only commences in the Idea Generation & Identification Stage, where both organisations provide information about common and current problems and combined strategies and objectives.

Framer

The functions and responsibilities of the Framer are needed in every stage of the FuGle, because of the introduction of the Open Innovation model Platforming in the Exploitation Stage. The Open Innovation model brings a new dimension to the last stage of the FuGle and ensures that a designated role-player is identified and frameworks are in place for the evaluation, prioritising and capturing of opportunities. The ideas and information are stored and must be retrievable by any Platforming company. Information about the base product must be available during any stage of the FuGle to allow Platforming companies to receive the data in time to make alterations to their designs. This is also where outside organisational Framers are used to retrieve information about their products to allow for more effective collaboration. Framers from outside the organisation are also used in the Concept Definition Stage, when raw ideas are retrieved from outside idea pools to be combined with internal organisational ideas to generate concepts.

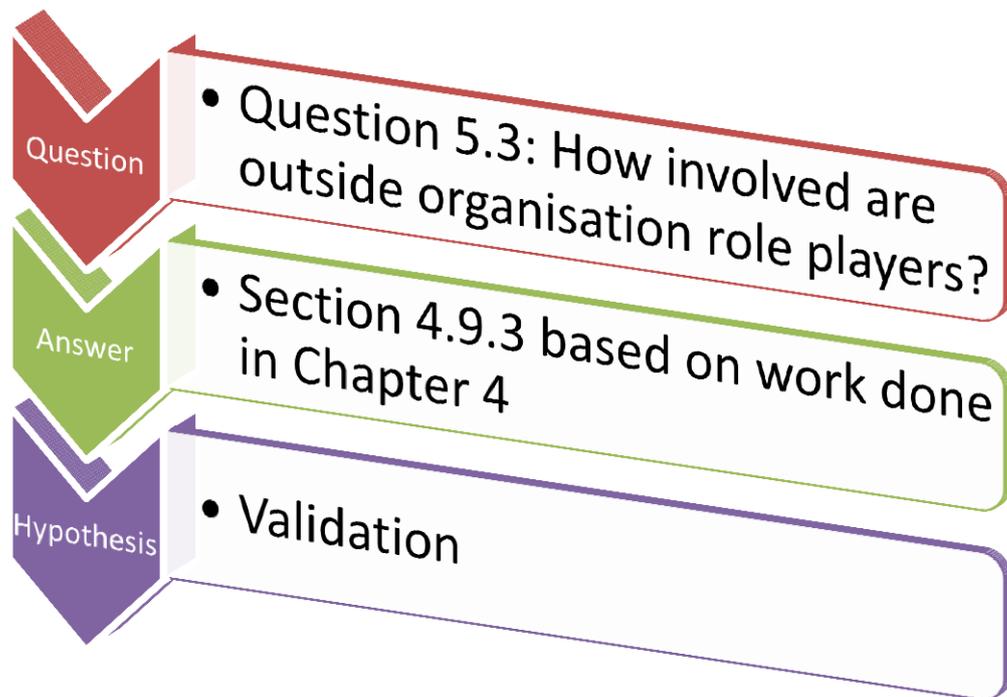
General Comments

It is difficult to assign a single function or responsibility to a single role-player or to combine all the functions and give one definition to any one role-player. This is because several role-players operate on common ground and also share certain characteristics and functions. Some functions may also include all the role-players, as is the case with identifying opportunities and developing concepts. The characteristics that are needed to carry out these functions are evident in all role-players and all role-players are able to participate in doing these functions. The difference, however, is that the responsibility to identify an opportunity rests with the Networker, while the Builder is responsible for developing the concepts. The “connector” characteristic is now based in the Coordinator who coordinates the connection and flow of knowledge. It is necessary to have the initial connection, but after the connection has been established, the role-players involved may keep the flux of knowledge sustained between role-players from different organisations.



4.9.3 Outside Organisational Role Involvement

Figure 52 clearly illustrates where Open Innovation is used in each stage of the FuGle. The importance of the role-player is also indicated. The Builder is the most prominent role-player from outside the organisation and is also crucial in providing knowledge. Most of the other role-players support the knowledge creating “engine”, however, the Builder is responsible for most of the knowledge creation, based on Figure 24. Understanding every role-player’s responsibilities or functions in knowledge generation and knowledge transfer in each process of the FuGle, will assist the organisation in knowledge management.



4.9.4 Type of Knowledge gained from the Open Innovation Processes

Each Open Innovation Role-Player has a role to play a specific FuGle stage based on the Open Innovation Model assigned. Shown below is a table that shows a summary of the type of Knowledge gained from each Open Innovation Process respective to the specific Open Innovation Role that is played:

Open Innovation Roles	FuGle Stage	Open Innovation Model	Knowledge Work Process	Knowledge level (Organisational perspective of Roles input))	Knowledge Description
Networker	Idea Generation & Identification Stage	Innovation Networks	Socialisation	Knowledge Level	Insight
	Exploitation Stage	Platforming	Socialisation	Knowledge Level	Insight
Coordinator	Concept Definition Stage	Innovation Networks	Systematisation	Knowledge Level	Managerial knowledge
	Deployment Stage	Innovation Networks	Socialisation	Knowledge Level	Managerial knowledge
Builder	Idea Generation & Identification Stage	Idea Competition	Externalisation	Data Level	Creative Ideas
		Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Concept Definition Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge

	Concept Feasibility & Refinement Stage	Customer Immersion	Externalisation	Data Level	Experience
		Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Deployment Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Refinement & Formalisation Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge
Leader	Idea Generation & Identification Stage	Innovation Networks	Socialisation	Knowledge Level	Organisational Knowledge
Framer	Concept Definition Stage	Innovation Networks	Systematisation	Data Level	Data Capturing
	Exploitation Stage	Platforming	Systematisation	Data Level	Data Management

Table 15: Type of Knowledge gained from the Open Innovation Processes

Open-ended type idea competition provides creativity in quantity which is crucial at the beginning of the FuGle. The organisation needs as many as possible ideas in the “pool” to pass through all the stages and processes.

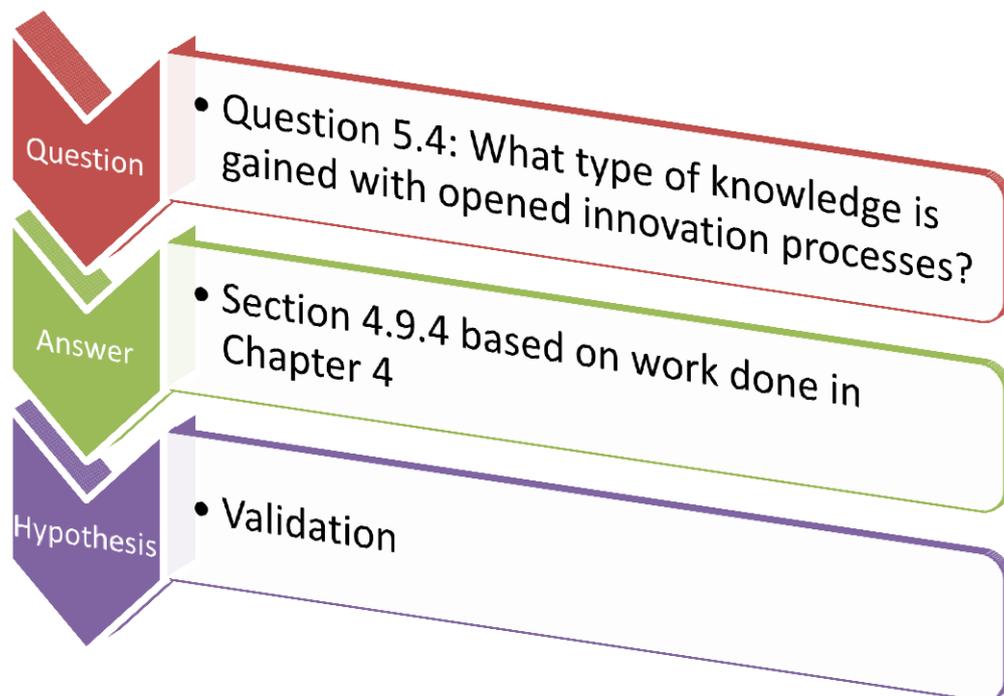
Innovation Networks bring technical knowledge in the form of technical skill and the way they deliberate, argue and solve problems. The main role-player involved in Innovation Networks is the Builder. The idea is that the Builders work in conjunction with each other based on a socialisation knowledge reference-type joining of technical skills and generating company knowledge by enacting and representing the organisation's value creating processes.

Customer Immersion brings knowledge in the form of data to assess a product that has been evaluated. Opening the process by using the Open Innovation model, helps the organisation to

retrieve a large amount of evaluations that will help the organisation to make alterations to better a certain product or service.

Collaborative product development brings the expertise of other companies into the picture. No research and development cost, and also no inside company knowledge, is gained from the processes where the Open Innovation model is used.

Platforming joins different organisations on various levels throughout the FuGle stage. Interaction in every stage is essential for the success of this Open Innovation model. The model mainly includes the management of knowledge. The process is governed by the Platforming Open Innovation model, but the internal knowledge transfer is similar to the functioning of the innovation networks.



5 Validation

5.1 Validation Method

Because the scope of the research does not cater for the practical implementation of these models in a real-life organisation, validation has been done either via by document-based assessment or an interview assessment. The selection of candidates has been based on their knowledge of a specific array of fields, which are included in the scope of this study.

The hypothesis of the research states that:

A competitive edge can be achieved through the exchange of ideas and knowledge in an Open Innovation paradigm if we understand the role of the role-players in controlling the flow of different types of knowledge between interlinked companies.

The methodology followed in approaching the validation of the research, involved assessing the validity, not only of the different Open Innovation models, but also of the knowledge flows between role-players and the level of knowledge that flows between role-players of different organisations.

It has been found that:

- the additional models successfully contribute towards each allocated stage;
- the change in role-players converted from Innovation to Open Innovation is valid;
- the level of interaction between role-players of different organisation is corroborated;
- there is a consensus on what level of knowledge is transferred between organisations;
- there is a better understanding of the transition of roles from Innovation to Open Innovation and the intricacies thereof;
- there is potential for realistic adoption and usage.

The above is beneficial to the innovation process as a whole.

It is argued in Section 3.2.6.1 that the FuGle model is a valid representation of a standard innovation process framework. Therefore, it is assumed that if the proposed contributions to the FuGle model are deemed to be realistic, it follows that it will be the case for any appropriate innovation process framework.

5.2 Validation Process

Validation of the study was split into two sub processes namely:

- Primary Validation
Validation of the research done via a document-based assessment with four experts in the specific relevant field of study.
- Secondary Validation
Validation of the validity of the research, and the potential for realistic adoption done via an interview with an innovative business leader from one of South Africa's biggest companies.

5.2.1 Primary Validation

These candidates were chosen to provide a specialised perspective on the research. Candidates were given a 40-page summarised document to provide a background perspective. It included four follow-up validation questions to help answer the main research question. This document can be found in Appendix B.

The main research question is:

Which role-players are present and what knowledge transfers are evident in Open Innovation?

To answer the Main Research Question the following Sub-Research Questions (found in section 2.3.2) needed to be answered.

Question 5.1: How do the responsibilities of role players as defined in innovation roles differ when introduced to Open Innovation?

We want to know if the same set of responsibilities used in Closed Innovation can be used for Open Innovation and if any alterations have to be made to fit the portfolio better.

Question 5.2: Who is involved in the transfer of knowledge in the Open Innovation models?

This question serves to provide an answer to whether the responsibilities of each role-player, play a primary role in the transfer of knowledge.

Question 5.3: How involved are outside organisational role-players?

Outside role-players form part of their own knowledge transfer process. The answer to this question will help us to understand which outside role-players are crucial for the gaining of knowledge through the use of Open Innovation.

Question 5.4: What type of knowledge is gained with Open Innovation processes?

This question will focus attention on what type of knowledge is transferred across organisational boundaries. In addition, it will give insight into what steps are necessary to ensure that the transfer of knowledge is carried out effectively.

The Sub-Research Questions, as answered in Chapter 4, have been subjected for validation to the validation candidates. These questions have been reformed to be more specific to the Hypothesis in Section 4.2. The Sub-Research Questions will be answered if the questions based on the Hypothesis listed below, have been validated:

Validation Question 1:

Do you agree with the proposed refinements made to the role-player definitions and the additional role-player that has been added?

Validation Question 2:

Do you agree with the level of importance that was assigned to each FuGle stage that was illustrated below? Please motivate your answer.

Validation Question 3:

- *Do you agree that external role-players only influence certain stages of the Open Innovation chain? (FuGle) Please motivate your answer.*

Validation Question 4:

- *Do you agree with the identification of the type of knowledge transferred from an outside source through each FuGle stage's allocated model? Please motivate your answer.*

Table 16: Summary of validation candidate backgrounds and objectives for inclusion

Primary Validation Candidate	Occupation /Industry	Reason for Inclusion
JD Visser	Process Engineer at PPC Cement	Innovation Expert
Dr Audrey Verhaeghe	CEO at The Research Institute for Innovation & Sustainability	Open Innovation Expert
Henno Gous	Researcher	Expert knowledge of Innovation Networks and Innovation and Knowledge Management
Dr Anthon Botha	Managing Director of TechnoScene and Executive Director of InnovationLab	Innovation Consultancy Expert

5.2.1.1 Feedback from Primary Validation

5.2.1.1.1 Validation Question 1

Validation of Validation Question 1

Do you agree with the proposed refinements made to the role-player definitions and the additional role-player that has been added?

Role Player	Traditional Innovation Role	Open Innovation Role
Networker	<p>Scanning the market, industry, technology and regulatory and societal trends to understand potential futures and to identify latent opportunities.</p> <p>Creating connections between internal and external individuals, teams and organisations which have common or complementary objectives.</p>	<p>Scanning the market, industry, technology and regulatory and societal trends to understand potential futures and to identify latent opportunities.</p>
Coordinator	<p>Balancing project objectives, resources and risks.</p> <p>Contextualising position and promoting opportunities and concepts,</p> <p>Prioritising, planning, coordinating, scheduling and assuring the completion of projects.</p> <p>Overcoming or outsmarting obstacles faced during projects.</p>	<p>Balancing project objectives, resources and risks.</p> <p>Creating connections between internal and external individuals, teams and organisations which have common or complementary objectives.</p> <p>Contextualising position and promoting opportunities and concepts,</p> <p>Prioritising, planning, coordinating, scheduling and assuring the completion of projects.</p> <p>Overcoming or outsmarting obstacles faced during projects.</p>
Leader	<p>Aligns activities with strategy and objectives. Establishes and involves teams comprising the "right" individuals at the "right" time.</p> <p>Evaluates and prioritises opportunities and ideas against a standard framework, while considering all business requirements.</p> <p>Guides progress, monitors metrics and instigates corrective action. Builds synergy into projects and the organisation</p>	<p>Continuously align business and innovation strategy and objectives. Build and involve teams of the "right" individuals at the "right" time.</p> <p>Validate the relevance of and prioritise innovation activities.</p> <p>Take ownership and responsibility.</p> <p>Guide progress, monitor metrics and instigate corrective action. Build synergy into the innovation portfolio.</p>
Framer	<p>(No role consolidation. Was integrated with Leader role.)</p>	<p>Defining and deploying the frameworks by which opportunities, ideas and concepts are evaluated and prioritised; meta-data to facilitate capture, storage and retrieval of ideas and information; and innovation metrics to measure innovation.</p>

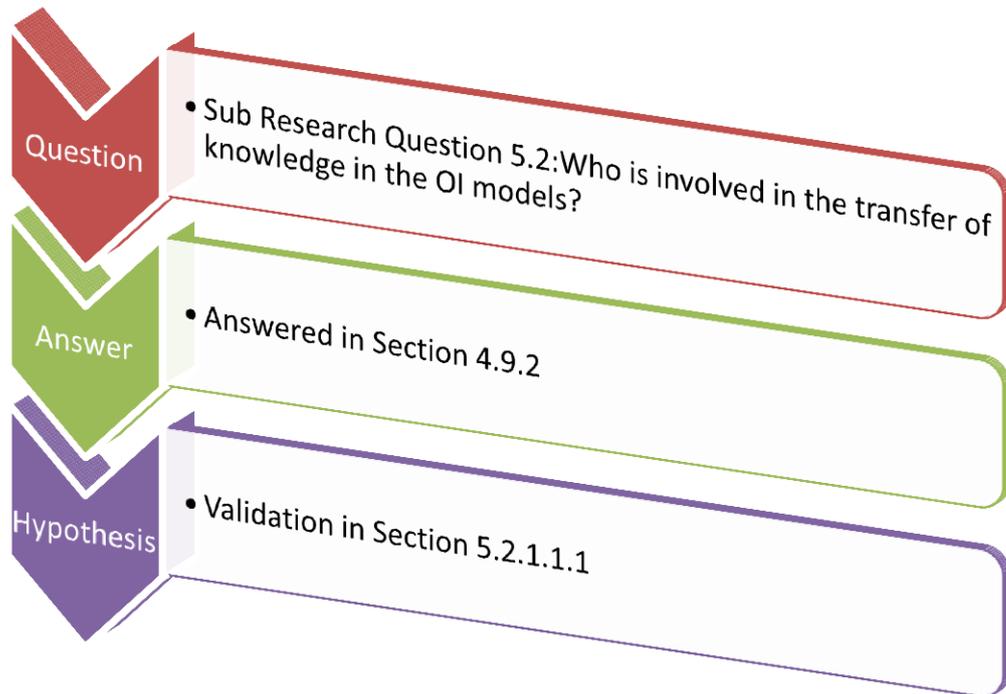
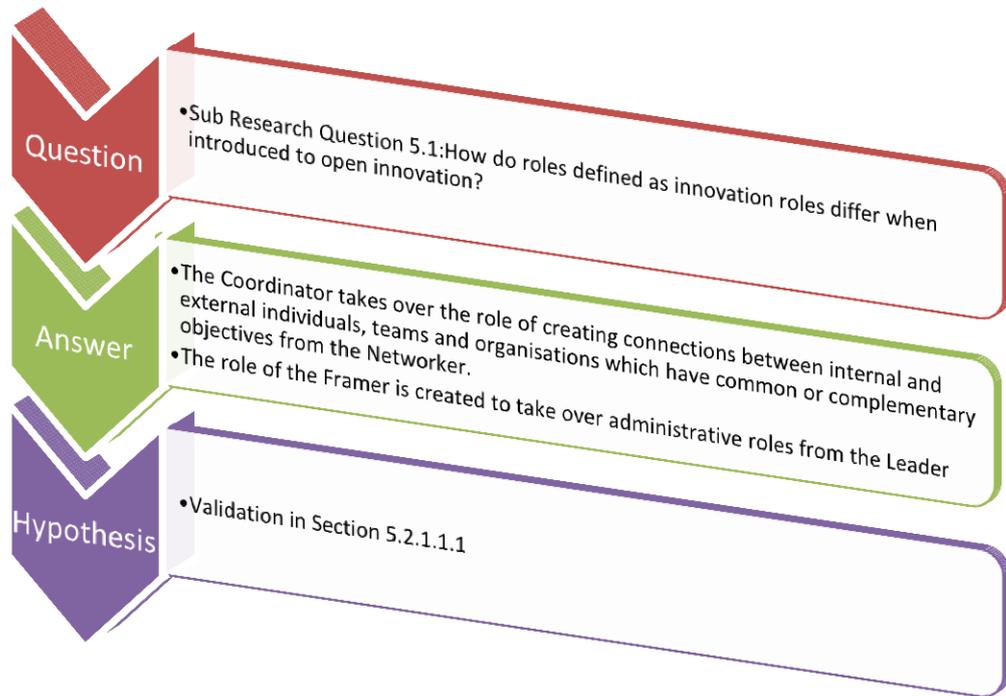
Conclusion of Validation Question 1

The validators have been asked if they agree with the proposed refinements of the role-player definitions and the additional role-player (Framer). In retrospect, the role of the Networker (creating connections between internal and external individuals, teams and organisations which have common or complementary objectives), has been shifted from the Networker to the Coordinator. In addition, the role of the Leader was split.

All the validators agree to the proposed refinements of the role-player's definitions. It is clear that the motivation for adding responsibilities to the Coordinator that have previously been allocated to the Networker, makes sense in the context of Open Innovation, given that the networking requires a greater deal of coordination than what will be expected in a closed environment. Dr Anthon Botha states that because of the removal of the connection creating functions, the role-player cannot be called a "Networker" anymore. He elaborates by saying that the environmental scanning function is crucial, and that it will be beneficial to isolate and give prominence. He suggests that "Networker" is replaced by "Sensor".

However, a concern has been raised by J.D. Visser. He states that the creating of connections between internal and external individuals, teams and organisations with common or complementary objectives, can be a critical role in the Exploitation stage. However, according to the involvement diagram shown below in Figure 53, the Coordinator does not play a role. It is suggested by J.D. Visser that the role of the Coordinator must be that of managing the created connections and not the creation of connections. DR. Anthon Botha agrees by stating that the Coordinator has to be seen as the traditional "Project Manager", with the additional responsibility of coordinating external parties and their interaction with internal participants as well. He acknowledges that this is an accepted focus shift in Open Innovation. Dr. Anthon Botha adds that the Coordinator and the Leader must work closely together to ensure that the outcomes are aligned with the strategic goals of the enterprise and that the Leader must ultimately be responsible for quality, although the metrics and day-to-day management may be delegated to the Coordinator.

The appointment of the Framer has been received encouragingly by the validators and that the introduction of the Framer to serve as a primary knowledge manager is essential in the Open Innovation paradigm. Dr. Anthon Botha suggests making the concept of knowledge management pertinent and not calling the role-player a "Framer", but a "Knowledge Facilitator". The validators state that it is important not to allow the Leader to become emerged in details. The Leader must still play a pivotal role in defining framework and evaluating ideas and ensure alignment with business strategy, which remains the main focus of the Leader.



5.2.1.1.2 Validation Question 2

Do you agree with the level of importance that was assigned to each FuGle stage that was illustrated below? Please motivate your answer.

Validation of Validation Question 2

	Idea Generation & Identification Stage	Concept Definition Stage	Concept Feasibility & Refinement Stage	Portfolio Stage	Deployment Stage	Refinement & Formalization Stage	Exploitation Stage
Networker	✓✓✓✓ ✓	✓✓					✓✓✓✓ ✓✓✓
Coordinator	✓✓	✓✓✓ ✓	✓✓✓	✓✓	✓✓✓ ✓✓	✓✓	
Builder	✓✓✓✓ ✓✓✓	✓✓✓✓ ✓✓✓	✓✓✓✓ ✓✓✓		✓✓✓ ✓✓✓	✓✓✓ ✓✓✓	
Anthropologist							
Leader	✓✓ ✓	✓✓	✓✓	✓✓	✓✓	✓✓	✓✓
Framer	✓✓✓	✓✓ ✓	✓		✓	✓	✓✓ ✓

Figure 53: Roles Importance in the FuGle Stages

JD Visser

I do agree. I feel that the role of the Builder might not be as important in the first stage. Especially with the introduction IO models where often quantity matters more than quality in the early stage his technical nature might hamper the inherent fuzzy nature of the first stage.

As Du Preez states there is often a reversal back from the exploitation stage to the refinement and formalisation stage and here connections between organisations will be critical when considering the introduction of Platforming. Therefore, I am of the opinion that either the Networker or Coordinator, whoever takes the role of creating and maintaining these connections, should play an important role in both the second-last and last stages.

Dr. Audrey Verhaeghe

I do agree, though in the case of collective Open Innovation, I will think that the Leader role of the external source will be more involved in the first stages of the FuGLE where his/hers Leader's functions will be critical to the core of the business.

Henno Gous

Mostly, yes. I think there could be cases where you need some form of external intermediary whenever there is knowledge flows originating from an external source, i.e. you always need an external framer where an external Builder is involved, etc. But I guess in most cases the external sources enter the process directly via the internal Coordinator. So perhaps there is an assumption of a certain kind of Open Innovation setup in your allocation of roles... which is fine, it could just be good to start the discussion with your view of how Open Innovation operates. I strongly suspect that that was omitted from this document for the sake of brevity, or maybe I just read through it too quickly.

Dr. Anthon Botha

Networker: Omitting the Networker (Sensor) from the Concept and Feasibility & Refinement phase may cause a discontinuity often seen in high tech companies, that is the scientists and engineers putting the solution together is removed from the functionality requirements of the outside world. There should be a strong component of knowledge transfer from the Networker (Sensor) in this stage (at least two tick marks).

Coordinator: There is consensus on the role and knowledge functions of the internal Coordinator. However, the external Coordinator role may be very necessary in the idea generation and identification stage (at least one red tick) to ensure there is harmony between internal and external coordination in the next phase, that of Concept Definition. The external Coordinator may have a role (at least one red tick) in the Refinement and Formalisation stage.

Builder: The Builder has a strong role throughout the innovation value chain, but it cannot be abruptly terminated in the Portfolio stage. The Builder knows what the product should look like and how it should operate. These are important inputs into the Project Definition phase. It is suggested that at least two green ticks should be made in the Portfolio stage to ensure continuity. The deep involvement of the external Builder role in the Concept Definition stage and the Concept Feasibility and Refinement stages may have negative intellectual property implications. The enterprise may be practicing the Open Innovation model of idea competition to generate ideas, but then may want to

make the ideas its own without too much direct involvement from an external party. This involvement may increase towards the platform model.

Note: This necessitates a comment on the generalisation of the knowledge transfer and importance of roles in the OI model discussed here: For example the role of the Builder may depend on the Open Innovation model applied and may differ significantly from model to model as well as from project to project. The roles as presented here can merely be described as typical of an Open Innovation process, but it should be clearly highlighted that specifics may change depending on the innovation model applied and the product or service developed.

Anthropologist: The Anthropologist has the role to ensure that the product or service in the innovation process is user-centred, environmentally friendly, embraced by customers, safe to use and ethically acceptable (“Develop understanding of how people interact physically and emotionally with products, services, one another and their environment”). As such its role cannot be omitted in any of the stages. There is not agreement that the anthropologist has no role in any of the FuGle stages as stated in this document. It is suggested that the following be considered: one green and red tick in the ideas generation and identification stage; two green ticks and one red tick in the Concept Definition stage and the Concept and Feasibility Refinement stage; one green tick in the Portfolio stage; three green ticks and two red ticks in the Deployment stage; two green ticks and one red tick in the Refinement and Formalisation stage and one green tick and one red tick in the Exploitation phase.

Leader: There is not agreement on the statement that the Leader and the Coordinator are the only players in the Portfolio stage. See comments above. Otherwise, the role of the Leader is correctly reflected in the diagram. The interaction with external Leaders may also become more prominent in the Deployment and Refinement and Formalisation stages, since in a platform model, this is where external organisations contribute largely to the platform created by the innovating entity.

Framer: The Framer or Knowledge Facilitator clearly plays a major role in all phases, also the Portfolio stage, since knowledge about how the portfolio was selected needs to be documented in the organisation to learn from in future. Also in the retrieval of stored ideas that may have not been valid previously, or learning’s from earlier projects, the framer plays an important role.

The statement that the functions and responsibilities of the Framer are needed in every stage (not marked as such in the diagram) of the FuGle because of the introduction of the OI model “platforming” is not correct. The knowledge management function required by all OI models (especially ideas competition) necessitates the presence of the Framer.

Conclusion of Validation Question 2

The conclusion to this question is that the validators mostly agree with the level of importance that has been assigned to each FuGle, but not without suggestions. The importance that is assigned to each FuGle by the author of this study, bases his assigning on the direct involvement of transferring and creating knowledge. Suggestions made by validators are based on a different perspective and conveys itself valuable to the aim of this study. The adapted importance diagram is illustrated in Figure 53.

The Networker: It was stated by Dr. Anthon Botha that omitting the Networker (Sensor) from the Concept and Feasibility & Refinement phase may cause a discontinuity, often seen in high tech companies and that there must be a strong component of knowledge transfer from the Networker (Sensor) in this stage. This is a valid argument, thus the Networker's inclusion in the Concept and Feasibility & Refinement phase.

The Coordinator: It is stated in 0 that the creating of connections between internal and external individuals, teams and organisations with common or complementary objectives may be a critical role in the Exploitation stage, where, according to the involvement diagram shown above in Figure 53, the Coordinator does not play a role. This will be rectified. Dr. Anthon Botha states that the external Coordinator role may be more important in the Idea Generation and Identification stage to ensure harmony between internal and external coordination in the next stage, which is the Concept Definition stage. The Author of this study understands the suggestion, but for this study it is not seen as that important to include the external Coordinator into the Idea Generation and Identification stage to ensure harmony. Based on the study, the internal Coordinator will be better suited to ensure harmony between the different roles in that specific stage.

The Builder: It is also suggested by the validators that the Builder may not be as important in the Idea Generation and Identification Stage (first stage), especially with the introduction of Open Innovation models. In Open Innovation models, quantity often matters more than quality in the early stages of the FuGle. The Builder's technical nature may hamper the inherent fuzzy nature of the first stage. Although this may be true, the question is whether the role of the Builder can also be used to generate quantity of ideas. Anybody, even a member of the public, may be used in the role of the Builder, e.g. when a member of the public participates in the Idea Competition (Open Innovation model). In fact, both quality and quantity ideas can be created by the Builder during the first stage of the FuGle. The point has been raised that the Builder must as far as possible not be abruptly terminated in the portfolio stage because the Builder knows what the product must look

like and how it must operate. These are important inputs into the Project Definition phase, therefore the internal Builder is added into the portfolio stage.

Dr. Anthon Botha and Henno Gous both highlight that the involvement of the Builder may depend on the Open Innovation model applied and may differ significantly from model to model. The roles can merely be described as typical of an Open Innovation process, but it must be clearly highlighted that specifics may change depending on the innovation model applied and the product or service developed.

Anthropologist: Dr. Anthon Botha does not agree with the exclusion of the Anthropologist in this study. He states that the Anthropologist has the role of ensuring that the product or service in the innovation process is user-centred, environmentally friendly, embraced by customers, safe to use and ethically acceptable (“Develop understanding of how people interact physically and emotionally with products, services, one another and their environment”). There is agreement on this matter and his suggestions have been included in the final validation of this question.

The Leader: The validators state that in Collective Open Innovation, the Leader role of the external source must be more involved during the first stages of the FuGle. This is where the Leader’s functions will be critical to the business. This statement is accepted. The Leader role will always be important during all FuGle stages where direction and drive are given. The interaction with external Leaders might also become more prominent in the Deployment and Refinement and Formalisation stages, since in a platform model, this will be where external organisations contribute largely to the platform created by the innovating entity.

The Framer: Dr. Anthon Botha comments that the Framer or “Knowledge Facilitator” clearly plays a major role in all phases, also the Portfolio stage, since knowledge about how the portfolio was selected needs to be documented in the organisation to learn from in future. He does not agree with the statement made in the study that the functions and responsibilities of the Framer are needed in every stage of the FuGle, because of the introduction of the OI model “platforming”. The knowledge management function required by all Open Innovation models (especially ideas competition) necessitates the presence of the Framer.

The suggested changes that have been made by the validators are included and illustrated in Figure 54.



Figure 54: Adjusted Roles Importance in the FuGle Stages

5.2.1.1.3 Validation Question 3

Do you agree that external role-players only influence certain stages of the Open Innovation chain? (FuGle) Please motivate your answer.

Validation of Validation Question 3

JD Visser

I do agree, I think the portfolio stage proves this point. At this stage external input would not add real value considering the organisation at some stage needs to reflect on its own strategy and evaluate the concepts against this, hence the prominent role of the Leader here.

Dr. Audrey Verhaeghe

I agree. External role-players will only influence certain stages which the organisation opens for collaboration. The opening of certain stages can put the organisations intellectual property at risk. It is critical to only collaborate on a certain knowledge level and to a certain extent.

Henno Gous

I think that depends on which configuration of Open Innovation the organisation is employing. If it is an institutional agreement where organisations collaborate on a continued basis and governance of the innovation process shifts to the network rather than residing with a single organisation, things might get a bit blurry. However, for the case that I think you are considering, I do agree. At some point things need to be open to benefit from external resources and in other things need to be closed simply to ensure that things get done. IP, etc. may be other reasons to close things, but in my mind a major reason to internalise the innovation process as you go down the chain is simply to ensure that projects are actually executed. Innovation is a tricky thing, and I wouldn't trust the "creative collective" to carry things through. Or at least, it would be highly inefficient.

In short, you only need one example of stages of the Open Innovation chain that have different approaches to employing outside influences to prove your point and I think the Idea Generation and Portfolio stages already does that. They are vastly different, even in the most networked cases. Even if the process isn't totally closed from the Portfolio stage onwards, the Leader and Coordinator should take control in that stage, with other roles (especially externally based ones) being more prominent elsewhere.

Dr. Anthon Botha

There is agreement with the statement, but it is very broad. As pointed out above, certain external role-players may be allowed to play a significant role in the earlier phases, but be withdrawn when open ideas are further developed through enterprise investment into establishing intellectual property. The inclusion of more external role-players towards the end of the innovation value chain is also supported. However, as said in the previous question, the Open Innovation model assigned will dictate which role and to what extent. In Platforming, for example, the participation of external role players will be much more profound than when an innovating enterprise has paid for ideas selected in an ideas competition model. Innovation networks are also mostly formed on the basis of agreed partnerships and there may be more IP sharing in such an arrangement, which will result in more external role-players being involved in more intimate stages of the innovative product or service development. The same is true for collaborative product development, so it is superficial to make a generic conclusion that external role players influence the various stages of the innovation value chain in Open Innovation.

Conclusion of Validation Question 3

The validators do agree that external role-players only influence certain stages of the Open Innovation chain. It must be highlighted that that the opening of stages for collaboration is subjected to the decision made by the organisation and is different for each company to protect Intellectual Property (IP) and that the Open Innovation model assigned will dictate which role and to what extent. It is also stated by Henno Gous that a major reason to internalise the innovation process as in later stages of the FuGle is simply to ensure that projects are actually executed.

5.2.1.1.4 Validation Question 4

Do you agree with the identification of the type of knowledge transferred from an outside source through each FuGle stage's allocated model?

(Validation Question 4 refers to the table below)

Table 17: Type of Knowledge gained from the Open Innovation Processes

Open Innovation Roles	FuGle Stage	Open Innovation Model	Knowledge Work Process	Knowledge level (Organisational perspective of Roles input))	Knowledge Description
Networker	Idea Generation & Identification Stage	Innovation Networks	Socialisation	Knowledge Level	Insight
	Exploitation Stage	Platforming	Socialisation	Knowledge Level	Insight
Coordinator	Concept Definition Stage	Innovation Networks	Systematisation	Knowledge Level	Managerial knowledge
	Deployment Stage	Innovation Networks	Socialisation	Knowledge Level	Managerial knowledge
Builder	Idea Generation	Idea	Externalisation	Data Level	Creative Ideas

Open Innovation Roles	FuGLE Stage	Open Innovation Model	Knowledge Work Process	Knowledge level (Organisational perspective of Roles input))	Knowledge Description
	& Identification Stage	Competition			
		Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Concept Definition Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Concept Feasibility & Refinement Stage	Customer Immersion	Externalisation	Data Level	Experience
		Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Deployment Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Refinement & Formalisation Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge
Leader	Idea Generation & Identification Stage	Innovation Networks	Socialisation	Knowledge Level	Organisational Knowledge
Framer	Concept Definition Stage	Innovation Networks	Systematisation	Data Level	Data Capturing
	Exploitation Stage	Platforming	Systematisation	Data Level	Data Management

Validation of Validation Question 4

JD Visser

In general there is nothing I disagree with, hence I do agree. The table a bit overwhelming; there might be a better way of displaying this information to make it easier to “digest”. Just one question: the Framer plays such a big role in the first stage where the idea competition is a relevant Open Innovation model, should he/she not be involved in externalising or “systemising” these ideas.

Dr. Audrey Verhaeghe

It took me a while to understand the table but after a long meditative process it all started to make sense. The knowledge work process describes the knowledge that is generated by the outside organisational role and is gained by the organisation, opening certain stages by implementing Open Innovation reference models, in different stages of the FuGLE. If this is the case I do agree.

Henno Gous

There is nothing in the table that I object to; perhaps the presentation of the information could just be done a little differently to ensure that the reader immediately follows the intention of the table. I immediately expected that the roles would lead the table, and hence I was looking for the knowledge work processes for each role in each of the allocated stages.

Once again, you probably have more/better information to present in your thesis and I realise that it's tough to condense a Masters study into a few pages to convey all the intention.

Dr. Anthon Botha

The table includes the different innovation models and as such provides a more complete picture of the role-players and their different ways of knowledge transfer and processes under each model. (The major concern in research question 2 was the fact that roles may differ under different innovation models. It is a good summary of what can typically be expected, but it should not be disregarded that different innovation paths for different products and services may have different mixes of knowledge transfer. Given the immensity of the task of bringing all possibilities together, this representation is a good indicator, it must just be stated that it is a typical view of the most likely situation in a general innovation chain process.

As pointed out in Fig 8 (the SECI Model), knowledge work processes are complex and interlinked and often overlap. The fact whether it is at an individual, group, organisation or inter-organisational level distributes it from tacit to explicit. Intuitively one would feel that in most of the OI models,

internalisation will be incorporated. Yet, it does not appear in the table. Especially as people start using the innovative service or product under the commercialisation phases, this is an important transfer model, one that the Anthropologist should be responsible for and the Framer should document. This is how people embrace a technological product or service.

Conclusion of Validation Question 4

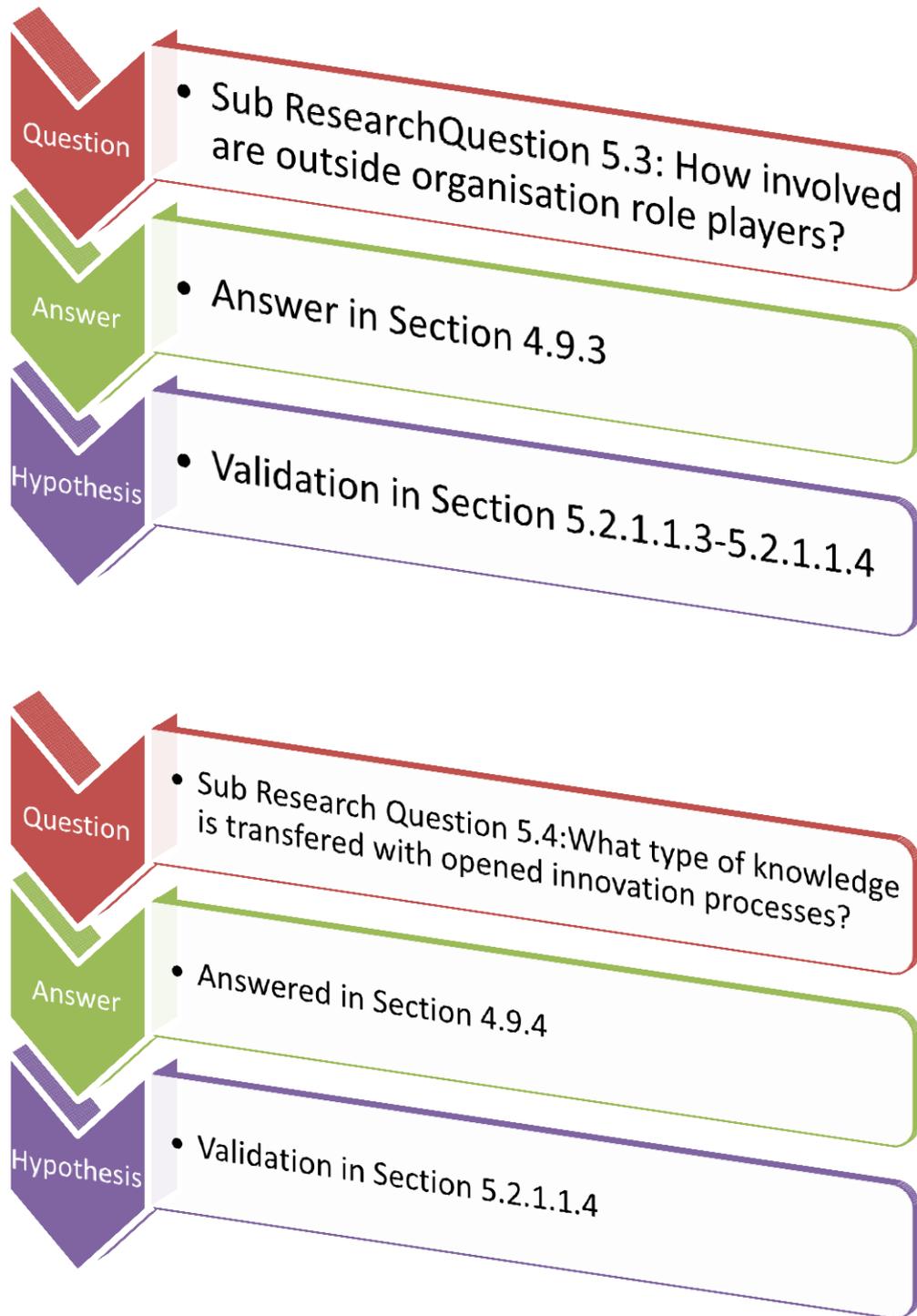
It is clear when reviewing this question that the table is a bit overwhelming and the presentation of the information may have been unclear. However, the data in the table can be seen as validated if you look at the knowledge work process that describes the knowledge generated by the outside organisational role. The organisation gains different types of knowledge from certain stages of the FuGle. This is done by implementing Open Innovation reference models during different stages of the FuGle. All the validators are in agreement with the knowledge work process, knowledge description and knowledge level assigned to each external role, based on the role-player’s involvement in each FuGle stage. It must be stated that it is a typical view of the most likely situation in a general innovation chain process. The changes made to the role-players in the different stages as presented and discussed under Research Question 2, is incorporated and the adjusted table is presented below.

Table 18: Adjusted Representation of the Type of Knowledge gained from the Open Innovation Processes

Open Innovation Roles	FuGle Stage	Open Innovation Model	Knowledge Work Process	Knowledge level (Organisational perspective of Roles input))	Knowledge Description
Networker	Idea Generation & Identification Stage	Innovation Networks	Socialisation	Knowledge Level	Insight
	Exploitation Stage	Platforming	Socialisation	Knowledge Level	Insight
Coordinator	Concept Definition Stage	Innovation Networks	Systematisation	Knowledge Level	Managerial knowledge

Open Innovation Roles	FuGle Stage	Open Innovation Model	Knowledge Work Process	Knowledge Level (Organisational perspective of Roles input))	Knowledge Description
	Deployment Stage	Innovation Networks	Socialisation	Knowledge Level	Managerial knowledge
	Exploitation Stage	Platforming	Socialisation	Knowledge Level	Insight
Builder	Idea Generation & Identification Stage	Idea Competition	Externalisation	Data Level	Creative Ideas
		Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Concept Definition Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Concept Feasibility & Refinement Stage	Customer Immersion	Externalisation	Data Level	Experience
		Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Deployment Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge
	Refinement & Formalisation Stage	Innovation Networks	Socialisation	Action Level	Technical Knowledge
Anthropologist	Idea Generation & Identification Stage	Innovation Networks	Socialisation	Knowledge Level	Insight
	Concept Definition	Innovation	Socialisation	Knowledge	Insight

Open Innovation Roles	FuGle Stage	Open Innovation Model	Knowledge Work Process	Knowledge level (Organisational perspective of Roles input))	Knowledge Description
	Stage	Networks		Level	
	Concept Feasibility & Refinement Stage	Innovation Networks	Socialisation	Knowledge Level	Insight
	Deployment Stage	Innovation Networks	Socialisation	Knowledge Level	Insight
	Refinement & Formalisation Stage	Innovation Networks	Socialisation	Knowledge Level	Insight
Leader	Idea Generation & Identification Stage	Innovation Networks	Socialisation	Knowledge Level	Organisational Knowledge
Framer	Concept Definition Stage	Innovation Networks	Systematisation	Data Level	Data Capturing
	Exploitation Stage	Platforming	Systematisation	Data Level	Data Management



5.2.1.1.5 Final Comments

JD Visser

In conclusion I do think that you have conveyed that you have a good understanding of the field, you have convinced me at least.

Dr. Audrey Verhaeghe

I'm impressed to which conceptual level this study is completed. I believe that the thesis will have a more in-depth description regards to each field of study that is mentioned in the Validation Document, which would be a very interesting script to read.

Henno Gous

My final comment is that a study like this operates on a very high conceptual level. This is something that isn't easy to do especially not with qualitative approach. I'm sure you have learned a lot and congratulations on getting this far.

5.2.1.2 Conclusion of Primary Validation Feedback

The primary validation of the research has been done via document-based assessment with three experts in the specific relevant field of study. These candidates have been chosen to provide a specialised perspective on the research. Candidates have been given a 40-page summarised document to provide a background perspective with four validation questions that followed to help answer the main research question.

The validators who have been approached to assess the validity of the study have responded encouragingly, stating among other things that the research “operates on a very high conceptual level and that this is something that is not easy to do, especially not with qualitative approach” and that the author “conveys a good understanding of the field”.

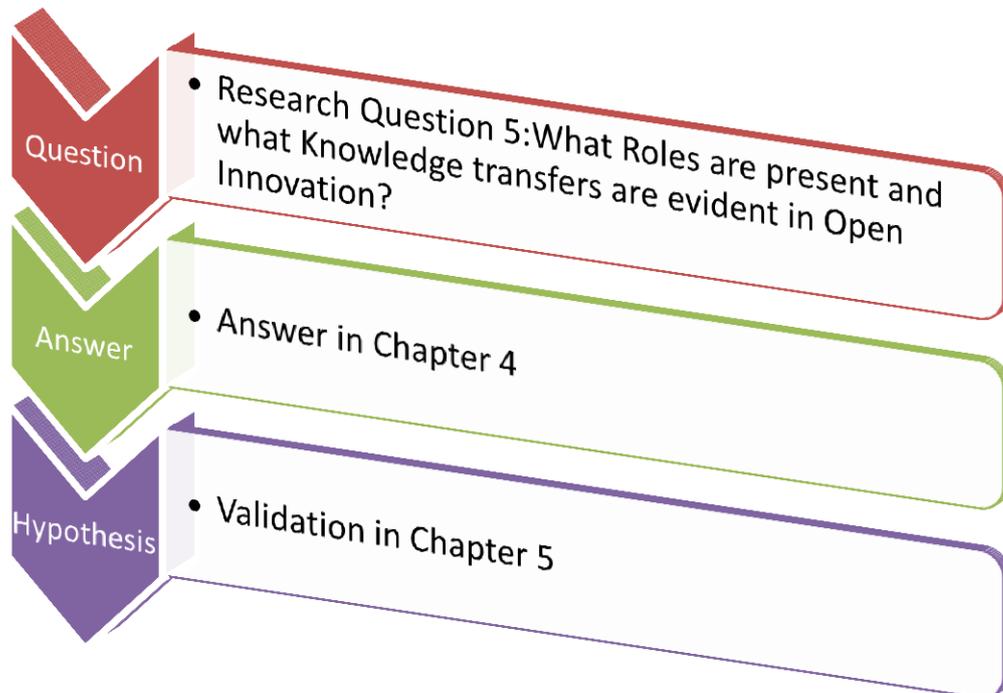
It is, however, realised that the knowledge flows between role-players in Open Innovation may at this time be limited and of a conceptual nature, but this will only be improved once the models are implemented in a realistic environment with open channels for knowledge to flow freely between organisations.

It is therefore assumed that the knowledge and insight that has been obtained in this study, together with this, specific validators that has also approved the validity of the knowledge flows and roles allocated to the proposed stages of the FuGle model.

It can be stated with fair confidence that:

- the role-players are correctly allocated crossing over from innovation role-players to Open Innovation role-players;
- that we have a better in-depth understanding of how involved external role-players are in Open Innovation;
- And that we know what type of knowledge is gained in Open Innovation via external role-players.

It can also be stated that this formalisation of Open Innovation will be beneficial to the standard innovation process and will enhance organisations' innovative capabilities in order to grow and sustain their entities and assist an enterprise to be innovative by leveraging knowledge networking and Open Innovation.



5.2.2 Secondary Validation

5.2.2.1 Main Objective

The main objective of this interview was to evaluate the potential for realistic adoption and usage, and to assess the general validity of the research. Whereas the previous validation candidates had all focused on the validity of the theoretical part of the research, this interview assumed a more holistic viewpoint on the practicality across the entire research effort.

5.2.2.2 Sub Objectives

- Investigate what Open Innovation Models are evident in the interviewee's company;
- Ensure that the interviewee has an understanding of the field of study;
- Receive feedback from the interviewee regarding the usability of the study;
- Obtain critique from the interviewee based on the work at hand;
- Address critique;
- Acquire interviewee's opinion on the potential for practical deployment.

5.2.2.3 Approach

The secondary validation of the research was done via an interview assessment with a Blue Chip Company's COO. The company is renowned for their innovative business approach and the candidate would already have a good understanding of the research domains covered in this study. The candidate was given a 30-page summarized document as background perspective. A summary of this document can be found in Appendix B. The interviewee was lead through a presentation to initiate discussions on the different areas of the study. A summary of the discussion can be found in Appendix A.

Table 19: Summary of validation candidate backgrounds and objectives for inclusion

Validation Candidate	Occupation /Industry	Reason for Inclusion
Dr Ryan Noach	Chief Operation Officer of Discovery Health	General opinion regarding the validity of the research and the potential for realistic adoption

5.2.2.4 Responses to Main Objectives

Many of the Open Innovation Models addressed in the study, had already been evident in playing an integral part as a functional role within Discovery Health. It was clear that the interviewee had a great understanding of the field of study.

5.2.2.4.1 *Open Innovation Models evident within Discovery*

Table 20: Area of business where Open Innovation Models are evident in Discovery

Open Innovation Model	Area of Business in Discovery
Idea Competition	Inspiring Excellence
Customer Immersion	Wellness
Collaborative Product Design	DQ Tracker
Platforming	Vitality

- Idea Competition
"We have a few (structures that resembles Idea Competition) but 'Inspiring Excellence' is the main one." (Noach, 2014)
- Customer Immersion
"We do this all the time. I'll give you an example regarding a wellness product that we are about to launch. We just lunched it to brokers. How we conceived the wellness product was, we created a group of mentors. We call them mentors but they are really the HR and Wellness Champions at a group of our client employers. So we got Shell, Ernest & Young, Pick 'n Pay, a whole range of Employer groups that we work with. Their HR and Wellness Champions came and sat with us and we tested our product thinking and our ideas, understood their needs and played our modules of them so it is what you call it, it is Customer Immersion, I believe. Then we iterated them and went back and tested the ideas against them again and again." (Noach, 2014)
- Collaborative Product Design
"We do have this model that you have just explained (Collaborative Product Design) with the DQ tracker device that we install in our insured vehicles. We oversaw the development of the device but we outsourced the technical issues to an engineering company who understand accelerometers and fleet tracking. We outsourced the technical component of the expertise but we retained ownership of the specifications and the IP." (Noach, 2014)
- Platforming
"Most of our products and services are linked and based on another product. As an example Vitality is a product that must be linked to a Heath or a life policy. I believe this is Platforming." (Noach, 2014)

5.2.2.4.2 *Feedback regarding the usability of the study*

Positive feedback was received from the interviewee regarding the usability of the study:

“What I like about your study is that I believe if you understand the literature you can manipulate the process by assigning designated people to certain roles and place structures in a business to either excel the process of, or to maximise the chance of getting great ideas from your employees.” (Noach, 2014)

“I think one could introduce technology and some structure to be more disciplined in certain areas of the innovation process. I like the way how your study is logical and structured so that one can understand the roles that need to be in place to help an innovative idea along its path to maturity.” (Noach, 2014)

Critique was given surrounding the rigid structure that is evident in the flow of the study. A lot of emphasis was placed on the fact that real-life innovation processes must not be too structured as it inhibits innovation.

“Theoretically what you are saying makes sense, practically when you are going to be that structured it almost stifles innovation”. “I would avoid the trap of being too structured in the execution.” (Noach, 2014)

The structured approach is a way by which the writer constructs the study. This does not portray the way the study would practically be applied. The interviewee did acknowledge that the study is based on theory and that the structured approach must be seen as a generic guide which one could either follow or measure against.

“You should be able to think outside of your role without any constraint. After the idea is generated, I believe supporting structures can be set in place with the right combination of role players” (Noach, 2014)

“I can see this is a theoretical study and in theory you need structures.” (Noach, 2014) “I agree with you by having structures in place means that you record ideas better, you merge ideas better.” (Noach, 2014)

“I believe this study is based on theory and a company would be able to score themselves against it.” (Noach, 2014)

5.2.2.4.3 *Potential for Practical Deployment*

The interviewee agrees that there is definitely potential for practical deployment:

“What I think what you are doing is you are documenting the process that happens in most innovative businesses, but it happens in life in a less structured way. This provides structure to what happens in most innovation businesses. I guess different environments do different parts and different roles better or worse than others. There are parts of the study that you described that Discovery do badly. Like the Framer role. I think we spend a lot of time rehashing ideas that have been discussed and considered many times before by different teams and individuals maybe months or years prior, and I think what we could do which you described earlier is to introduce the role of the Framer to the company.” (Noach, 2014)

5.2.2.5 *Conclusion of Secondary Validation Feedback*

Dr. Ryan Noach was interviewed to provide a secondary validation of the research done and therefore focused on the potential for realistic adoption and usage. The interviewee agreed that there was potential for practical deployment and responded encouragingly, stating among other things:

“I believe this study is based on theory and a company would be able to score themselves against it”.

It has been learned that it is difficult to convert a conceptual idea based on literature into a functioning model that can be implemented into an existing business. Companies are different from each other and are constantly changing the way in which they do business. However, it is believed that the study adds value to the subject at hand and is seen as a framework from which a company can obtain knowledge on how to manage ideas to a point of maturity. It gives insight into the structures that need to be set in place and the roles, irrespective of the individual who comprise of the characteristics, which need to be fulfilled to ensure optimum flow of knowledge in an Open Innovative paradigm.

Understanding the roles of role-players and the intricacies of controlling the flow of different types of knowledge between interlinked companies, provides an organisation with the opportunity to deploy an Open Innovation approach at appropriate points within their different processes. It can be said with certainty that this framework will assist an organisation in managing ideas to maturity.

6 Conclusion

6.1 Introduction

This study looked at the role-players and knowledge flows in Open Innovation. Knowledge flows have been tracked in Open Innovation Models that are assigned to the different stages of the FuGle Innovation Process Model. This led to the change in role-player characteristics by converting Innovation role-players to function in an Open Innovation paradigm.

In this study the following contributions are made:

- Additional Open Innovation models have been assigned to the FuGle stages.
- Innovation role-players have been conformed to the Open Innovation paradigm by adapting their roles and characteristics.
- Conception is given to what generic roles are involved in the Open Innovation Models.
- Insight is given into what type of knowledge is transferred in the Open Innovation paradigm.
- Insight is given on the involvement of outside organisational role-players in Open Innovation.

6.2 Reflection on Methodology

It is clear from the research that innovation management has a direct link to knowledge management. By sharing knowledge between organisations, not only will each organisation be helped individually, but it will also help the partners and strategic alliances to evolve and grow in stature.

Innovation is a tool that must be used to ensure the sustainability of a company and increases the organisation's ability to be competitive. Innovation is fuelled by knowledge and a lot of knowledge is required in every innovation phase. The required knowledge can be generated internally and extracted from different firms by means of Open Innovation, which in its turn sets the scene for knowledge to flow across organisational boundaries and enlarges the creative knowledge capacity and knowledge pool. The flow of knowledge must be governed by knowledge management.

The literature study in Chapter 3 provides an idea of how different identities intertwine with each other and where knowledge fits into the innovation paradigm. It also starts to ask questions about how knowledge must be managed, especially when looking at the different types of knowledge featuring in innovation.

The focus then shifted to identifying and describing a standard innovation process. The FuGle Innovation Process Model has been chosen for this role, because it offers a good representation of

the innovation process and is generic by nature. The reasoning is that, if a model is applicable to a generic innovation process, it will also be applicable to more specialised variations of innovation process models.

The research then progresses to the investigation of the different Open Innovation Models as assigned by (Marais 2010). In addition, Open Innovation Models have been added in areas of opportunity in the different FuGle stages.

Subsequent to finalising the allocation of Open Innovation Models, the study proceeds to the different role-players featuring in innovation. Their characteristics have been adapted to the Open Innovation paradigm by means of tracking the knowledge flow between different role-players from different organisations.

6.3 Outcome of Study

The tracking of knowledge in Open Innovation Models assigned to the FuGle Innovation Process Model, leads to converting Innovation role-players to function in an Open Innovation paradigm. Understanding the roles of role-players and the intricacies of controlling the flow of different types of knowledge between interlinked companies, provide an organisation with the opportunity to deploy an Open Innovation approach at appropriate points within their different processes. The hypothesis is satisfied by concluding that above stated will assist the organisation to stay competitive in an ever evolving market.

6.4 Future Work

6.4.1 Practical application of the models

The conceptual nature of the research done by (Marais 2010) leaves ample opportunity for further research into the practical application of the models. The real validity of the models that (Marais 2010) assigned along with the additional models that have been assigned in this study will only be determined via real-life implementation.

The focus of such research effort can focus on any of a number of areas, including:

- **Are the models correctly allocated?**

A real-life implementation will reveal whether the models are indeed correctly placed in the innovation process, and whether other stages of the innovation process can benefit from the developed models.

- **The further refinement of the Open Innovation models**

It is only via real-life implementation that the models can be further refined. This will include the refinement of the existing characteristics and allocations, as well as the possible identification and development of new models.

- **Determining industry-specific Open Innovation models**

Certain models may prove to be more relevant in certain industries than others. The categorisation of the differences in this respect must be thoroughly investigated.

6.4.2 Differentiation of roles in various innovation models

This study leaves sufficient opportunity for further research into the differentiation of roles in various different types of innovation models. This study is based around the typical view of the most likely situation in a general innovation chain process.

The focus of such research effort can focus on any of a number of areas, including:

- **Collaborative Product Development versus General Innovation Chain Process**

The study can look at the difference on how external role-players influence the various stages of the innovation value chain in Open Innovation.

- **Determining industry-specific Open Innovation models and their knowledge transfers**

Different innovation paths for different products and services may have different mixes of knowledge transfer. The opportunity exists to investigate the relationship between types of knowledge that is transferred in different types of Open Innovation that only exist in certain industries.

6.5 Personal Development

The author of this study shows the following personal development:

- A record of knowledge experiences, in-depth understanding and reflection based on the relevant study fields.
- Improved capacity in understanding the roles and transfer of knowledge in Knowledge- & Innovation Management and Open Innovation.
- In-depth understanding of the different types of knowledge and how it is processed.
- Knowledge has been obtained, it has been internalised, processed and the principles have been executed.
- Enhanced self-awareness of the role that Innovation and Open Innovation play in the work place and different industries.
- Value added while compiling the study that has been above and beyond attainment in the relevant study fields that have been investigated.
- The information in this study is owned by the Author.

Bibliography

- Asheim, B T, and L Coenen. *Knowledge bases and regional innovation systems: Comparing Nordic clusters*. Elsevier, 2005.
- Baker, K. A. "Management Benchmark Study, Chapter 14 - Innovation." *Office of Planning and Analysis*. 2002. <http://www.au.af.mil/au/awc/awcgate/doe/benchmark>.
- Bathelt, H, A Malmberg, and P Maskell. "Clusters and Knowledge: local buzz, global pipelines and the process of knowledge creation." *Progress in Human Geography*, 2004: 31-56.
- Bornemann, M, et al. "An Illustrated Guide to Knowledge Management." *M. Sammer Edition*. Wissensmanagement Forum, 2003.
- Chesbrough, H. "Open Innovation: A New Paradigm for Understanding Industrial Innovation." *Oxford University Press*, 2006.
- Chesbrough, Henry. *Managing Open Innovation, In uncertain markets, new metrics can help companies to play poker as well as chess*. Colorado: Industrial Research Institute, Inc., 2004.
- Chesbrough, Henry W. *Open Innovation: The New Imperative for creating Profit from Technology*. Boston, Massachusetts, USA: Harvard Business School Press, 2003.
- Coffman, B, and M Kaufman. "Innovation and Transformation: A Lifecycle Model." *InnovationLabs white paper*, 2003.
- Coombs, Rod, and Richard Hull. "'Knowledge Management Practices' and Path-Dependency in Innovation." *CRIC Discussion Paper No.2*, 1997.
- Docherty, M. "Primer on open innovation: Principles and practice." *PDMA Visions, Nr.2*, 2006: 13-17.
- Du Preez, N., Essman H, and Marais S, Schutte C Louw L. "Introduction to Innovation." October 2009.
- Du Preez, Niek D, and Louis Louw. "A Framework for Managing the Innovation Process." *PICMET 2008 Proceedings*. Cape Town: PICMET, 2008. 546-558.
- Essmann, Heinz Erich. "Toward Innovation Capability Maturity." *Stellenbosch University*, 2009.
- Fagerberg, J. *The Oxford Handbook of Innovation*. Oxford: Oxford University Press, 2006.
- Fahey, L, and L Prusak. "The Eleven Deadliest Sins of Knowledge Management." *California Management Review, vol. 40 No.3*, 1998: 265-275.

- Faulkner, W. "Conceptualizing Knowledge used in Innovation: a Second Look at the Science-Technology Distinction and Industrial Innovation." *Science, Technology and Human Science*, 1994: 425-458.
- Fleck, Wendy, and Margaret Tierney. "The Management of Expertise: Knowledge, Power and the Economics of expert Labour." *Edinburgh PICT Working Paper No.29*, 1991.
- Freeman, C, and L Soete. *The Economics of Industrial Innovation*. Pinter, 1997.
- Gaynor, G.H. *Innovation by Design*. New York: AMACOM, 2002.
- Hamel, G. "Strategy as Revolution." *Harvard Business Review*, 1996: 69-82.
- Hering, D, and J Phillips. "Innovation Roles - The People You Need for Successful Innovation." *NetCentrics Corporation*, 2005.
- IBM. "Roles for innovation: The right people at the right times, White Paper." *IBM Business Consulting Services*, 2004.
- Kaufman, M T. "Robert K. Merton, Versatile Sociologist and Father of the Focus Groups, Dies at 92." *NY Times*. 24 February 2003. <http://www.nytimes.com/2003/02/24/nyregion/robert-k-merton-versatile-sociologist-and-father-of-the-focus->
- Kelly, T, and J Littman. "The Ten Faces of Innovation: IDEO's Strategies for Beating the Devil's Advocate & Driving Creativity Throughout Your Organization." *Profile Books* , 2006.
- Leonard-Barton, Dorothy. *Wellsprings of knowledge: building and sustaining the sources of innovation* . Boston: Harvard Business School Press, 1995.
- Marais, Stephan. "The Definition and Development of Open Innovation Models to Assist the Innovation Process." Stellenbosch University, March 2010.
- Newman, Brian D, and Kurt W. Conrad. "A Framework for Characterizing Knowledge Management Methods, Practices, and Technologies." *Proc. of the Third Int. Conf. on Practical Aspects of Knowledge Management* , 2000.
- Nonaka, I, N Konno, and R Toyama. "Emergence of "BA"." *Knowledge Emergence: Social, Technical, and Evolutionary Dimensions of Knowledge Creation*, 2001: 13-29.
- Nonaka, Ikujiro. "A Dynamic Theory of Organizational Knowledge Creation." *Vol. 5, No. 1*, 1994: 14-37.

- Palmer, D, and S Kaplan. *A Framework for Strategic Innovation, InnovationPoint white paper*. 2008. www.innovationpoint.com.
- Perez-Bustamante, Guillermo. "Knowledge Management in agile Innovative Organisations." *Journal of Knowledge Management Vol. 3 No.1*, 1999: 6-17.
- Porter, M E. *The Competitive Advantage of Nations*. New York: Macmillan, 1990.
- Radjou, N, B Cameron, E Kinikin, and L Herbert. *Innovation Networks*. Forrester, 2004.
- Rothberg, R. *Corporate Strategy and Product Innovation: The Importance of Innovation*. New York: The Free Press, 1981.
- Rothwell, R. "Successful industrial innovation: critical factors for the 1990s." *R&D Management Vol. 22:30*, 1992: 221 – 239.
- Schumpeter, J. *Theorie der wirtschaftlichen Entwicklung: Eine Untersuchung über Unternehmergeinn, Kapital, Kredit, Zins und den Konjunkturzyklus*. Leipzig: Taschenbuch, 1931.
- Schumpeter, Joseph A. *Business cycles: A theoretical, historical, and statistical analysis of the capitalist process*. New York: McGraw-Hill, 1939.
- Schutte, C S L, and N D Du Preez. "Knowledge Networks for Managing Innovation Projects." *PICMET '08*, 2008.
- Schutte, C. S. L. "Executing innovation projects using the collaborative nature of integrated knowledge networks." Stellenbosch, 2010.
- Schutz, Alfred. "The Phenomenology of the Social World." *Northwestern University Press*, 1967.
- Seufert, A, G von Krogh, and A Bach. "Towards knowledge networking." *Journal of Knowledge Management, Vol 3*, 1999: 180-190.
- Shoukry, D Saleh, and K W Clement. "The Management of Innovation: Strategy, Structure and Organisational Climate. ." *IEEE Transactions on Engineering Management Vol. 40, No.1*, 1993: 14-22.
- Somers. "The Enterprise of the Future." *IBM Global Business Services*, 2008.
- Taylor, D. *The Seven Core Roles of Innovation, The Business Blog at Intuitive.com*. 14 August 2007. <http://www.intuitive.com/blog/index.shtml>.

- Tidd, J, J Bessant, and K Pavitt. *Managing Innovation: Integrating Technological, market and organizational change, Third Edition*. England: John Wiley & Sons, 2005.
- Ulwick, AW. "Turn Customer Input into Innovation." *Harvard Bus Review*, 2002: 91–97.
- Utterback, J. M. "Mastering the dynamics of Innovation." *Harvard Business School Press*, 1994.
- van Zyl, H. "Innovation Models and the Front-End of Product Innovation." 2006.
- van Zyl, H, N Du Preez, and C Schutte. "Utilising formal innovaion models to support and guide industry innovation projects. Vol.18 Issue 2." *Sabinet*, 2007: 203-219.
- Vincenti, W. "What engineers know and how they know it:Analytical studies from aeronautical history." *Baltimore: John Hopkins University Press*, 1991.
- West, Michael. A., and James Farr. "the Social Psychology of Innovation in Groups." *Innovation and Creativity at Work:Psychology and Organizational Strategies*, 1990: 309-333.
- Wilson, T. D. "The Nonsense of 'Knowledge Management'." *Information Research, Vol. 8 No. 1*, 2002.
- Zaltman, G. "How customers think: Essential insights into the mind of the market." 2003.
- Zaltman, G, R Duncan, and J Holbek. *Innovations and Organizations*. New York: Wiley, 1997.

Appendix A

Summary Table of Role Players
Primary Validation Respondent Comments
Secondary Validation Interview Transcripts

Hering and Taylor 2005	Kelly and Littman 2006	Phillips 2005	IBM 2004	Initial Role Consolidation	Description	Final Role Consolidation	Description
Scout	The Cross-Pollinator	Explorer	Strategy / Strategist	Explorer	Scan market, industry, technology, regulatory, societal, etc. trends to understand potential futures and identify latent opportunities	Networker	Scan market, industry, technology, regulatory and societal trends to understand potential futures and identify latent opportunities. Create connections between internal and external individuals, teams and organisations that have common or complementary objectives.
Connectors Connector	The Collaborator	Connector		Connector	Create connections between internal and external individuals, teams, customers, suppliers, etc. who can assist at version stages in the innovation process.		
	The Hurdler	Advocate Scrounger	Opportunity Generator	Advocate	Overcome or outsmart the roadblocks in the innovation process. Interpret, contextualise, explain, protect, position and promote opportunities and concepts.	Coordinator	Balance project objectives, resources and risk. Contextualise position and promote opportunities and concepts. Prioritise, plan, coordinate, schedule, and assure completion of projects. Overcome or outsmart obstacles faced during projects.
		Coordinator Planner		Coordinator	Put into scope, prioritise, plan, allocate, assign, coordinate, schedule, and assure completion of projects. Balance business & innovation objectives, resources, uncertainties, milestones, deliverables, etc.		
Prototyper	The Experimenter	Inventor		Prototyper	Make tangible concepts of ideas, demonstrate concepts and obtain feedback from colleagues, customers, etc., and then refine those concepts.	Builder	Make tangible concepts of ideas, demonstrate concepts, obtain feedback from colleagues and customers, and refine concepts. Build, test and refine working "products" and ensure "production" readiness. Strive towards the initial vision of the concept with minimal compromise for design, production and delivery.
	The Experience Architect	Builder	Value Creator	Builder	Build, test and refine working "products" and ensure "production" readiness. Deliver on the initial vision of the concept without compromising for production and delivery.		
Storyteller	The Storyteller The Set Designer		Change Agent	Enticer	Create the environment in which individuals can do their best work - transform the physical environment into a powerful tool to influence behaviour and attitude. Build both internal morale and external awareness.	Anthropologist	Develop understanding of how people interact physically and emotionally with products, services, one another and their environment. Transform the physical environment into a tool to influence behaviour and attitude, enabling individuals to do their best work. Anticipate and service the needs of colleagues, customers, suppliers and other stakeholders.
	The Anthropologist The Caregiver	Analyst	Customer Satisfier	Anthropologist	Develop deep understanding of how people interact physically and emotionally with products, services, one another, and the environment as a whole. Anticipate and service the needs of colleagues, customers, suppliers and other stakeholders.		
Judge		Judge Interpreter		Realist	Evaluate opportunities and ideas against a standard framework, ensuring all business functions are considered. Provide continuous input to ensure ideas progress realistically without being a barrier to innovation.	Leader	Align activities with strategy and objectives. Build and involve teams of the "right" individuals at the "right" time. Evaluate and prioritise opportunities and ideas against a standard framework considering all business requirements. Guide progress, monitor metrics and instigate corrective action. Build synergy into projects and the organisation.
Framer Librarian Metric Monitor				Framer	Define and deploy the frameworks by which opportunities, ideas and concepts are evaluated and prioritised; meta-data to facilitate capture, storage and retrieval of ideas and information; and innovation metrics to measure innovation.		
	The Director	Leader Financier	Leader Wealth Creator	Leader	Continuously align business and innovation strategy and objectives. Build and involve teams of the "right" individuals at the "right" time. Validate the relevance of and prioritise innovation activities. Take ownership and responsibility. Guide progress, monitor metrics and instigate corrective action. Build synergy into the innovation portfolio.		

Role Player	Traditional Innovation Role	Open Innovation Role	Comment from Respondent			
			JD Visser	Dr Audrey Verhaeghe	Henno Gous	Dr Anthon Botha
Networker	<p>Scanning the market, industry, technology and regulatory and societal trends to understand potential futures and to identify latent opportunities.</p> <p>Creating connections between internal and external individuals, teams and organisations which have common or complementary objectives.</p>	<p>Scanning the market, industry, technology and regulatory and societal trends to understand potential futures and to identify latent opportunities.</p>	<p>I am not sure what impact the reduction of this role will have on the capability of the Networker to perform optimally in the exploitation stages. To me the creation of connections is an important part of the Networker by definition. This could be a critical role in the exploitation stage, where according to your involvement diagram the Coordinator does not play a role.</p>	<p>Agree</p>	<p>Agree</p>	<p>By removing the function of creating connections, the role player cannot be called a “networker” anymore. The environmental scanning function is crucial, and it is good that it is isolated and given prominence. It should be kept in mind that this is exactly the reason why open innovation is introduced, to provide a much broader spectrum of market, technology, societal and regulatory exposure. Most of the external participants in OI will thus have this role. It is suggested that “Networker” is replaced by “Sensor”</p>

Coordinator	<p>Balancing project objectives, resources and risks.</p> <p>Contextualising position and promoting opportunities and concepts,</p> <p>Prioritising, planning, coordinating, scheduling and assuring the completion of projects.</p> <p>Overcoming or outsmarting obstacles faced during projects.</p>	<p>Balancing project objectives, resources and risks.</p> <p>Creating connections between internal and external individuals, teams and organisations which have common or complementary objectives.</p> <p>Contextualising position and promoting opportunities and concepts,</p> <p>Prioritising, planning, coordinating, scheduling and assuring the completion of projects.</p> <p>Overcoming or outsmarting obstacles faced during projects.</p>	<p>I agree that adding the creation of connections will add value to the other roles of the Coordinator but could it not be a role shared between the two players (Networker and Coordinator) nor should the Coordinator not play the role of managing the created connections.</p>	<p>I agree. I can see that it would be beneficial to allocate responsibilities to the Coordinator in an open innovation environment.</p>	<p>Agree.</p> <p>Motivation for adding responsibilities that have been previously allocated to the Networker makes sense in the context of open innovation, given that the networking requires a greater deal of coordination than what would be expected in a closed environment.</p>	<p>This is the traditional “project manager”, with the additional task of coordinating external parties and their interaction with internal participants as well. This is an accepted focus shift in OI. The coordinator and the leader should work close together to ensure that the outcomes are aligned with the enterprise strategic goals.</p>
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Leader	<p>Aligns activities with strategy and objectives.</p> <p>Establishes and involves teams comprising the "right" individuals at the "right" time.</p> <p>Evaluates and prioritises opportunities and ideas against a standard framework, while considering all business requirements.</p> <p>Guides progress, monitors metrics and instigates corrective action. Builds synergy into projects and the organisation</p>	<p>Continuously align business and innovation strategy and objectives. Build and involve teams of the "right" individuals at the "right" time.</p> <p>Validate the relevance of and prioritize innovation activities.</p> <p>Take ownership and responsibility.</p> <p>Guide progress, monitor metrics and instigate corrective action. Build synergy into the innovation portfolio.</p>	<p>Agree, concern below.</p>	<p>Agree. It is crucial that the Leader role is not caught up in the minor business practise but rather focus on aligning the framework to be defined and deployed by the Framer.</p>	<p>Agree</p>	<p>There may be conflict between the role of the leader and that of the coordinator, when it comes to “building teams”. This function should be clearly assigned to the coordinator, which is the <i>de facto</i> project manager</p> <p>Quality assurance along the innovation value chain has been highlighted by the FuGle model, but it has not been assigned to any of the role players thus far. It is suggested that the leader should ultimately be responsible for quality, although the metrics and day-to-day management may be delegated to the coordinator.</p>
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Framer	(No role consolidation. Was integrated with Leader role.)	Defining and deploying the frameworks by which opportunities, ideas and concepts are evaluated and prioritised; meta-data to facilitate capture, storage and retrieval of ideas and information; and innovation metrics to measure innovation.	Agree. I think this is a crucial split to avoid the Leader becoming emerged in the details. I think the Leader should still play a pivotal role in defining the frameworks by which ideas etc. are evaluated because alignment with business strategy is his focus also.	Agree	Agree. The motivation for the change makes sense, but I still expect that in some cases some of these roles may be filled by the same individual... that makes is tricky to truly distinguish and allocate responsibilities.	The introduction of the framer to serve as primary knowledge manager is essential in the OI paradigm. However, it would be preferred to make the concept of knowledge management pertinent in the role players and not call this role player a "Framer", but a "Knowledge Facilitator". Even in closed (proprietary) innovation, this role should be split from that of the leader and made prominent.
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Interview Transcript

Dr Ryan Noach

*Chief Operations Officer of Discovery Health
Interviewed at Discovery Health, Johannesburg
17 July 2014*

RvdW: What is your understanding of innovation?

RN: You could be doing the same things that you have done in the past differently or you can do completely different things. In the financial service content that we're in, a lot of the innovation is around product and service. How do we design products that disrupt the market or do what is done in the market but in a different and better way? The service innovation understands the customer's needs and innovates it in a way of radical new thinking and different thinking to deliver the value proposition smartly.

[Riaan explains the Open Innovation Model: Idea competition]

RvdW: Do you have any structure in your business that resembles this model?

RN: We have a few but 'Inspiring Excellence' is the main one. Inspiring Excellence was born out of requirement to drive innovative thinking from a senior management group. In order to qualify to enter you must be a senior manager. So it is not open to all staff. We have an ethos in our business we want people to be thinking all the time. One of our central values in the company is innovation. How do we in a systemic way continually drive waves of innovation and thinking out of the managers and reward them?

RvdW: Is this model only based on using Discovery Health employees?

RN: Yes

RvdW: So this is more focused on getting the managers to think than focused on getting the managers to generate ideas?

RN: It is a bit of both. There is a human element because we want our people to be thinking all the time, but ultimately how does the business benefit? The business benefits by great ideas that may be formed.

RvdW: How do you process all these ideas once the ideas are captured?

RN: It is quite a structured process. I think this year we got about a hundred and eighty ideas. Firstly, we try and give themes in which areas we would like the ideas. We come up with broad strategic themes. We are a force for social good so we ask for ideas around how Discovery can be socially better. We believe that we need innovation for example in the life product space, so we give that as a strategic theme.

So to answer your question we drive strategic themes, then we receive all the ideas and then there is a process of categorising all the ideas by theme and then there is a judging panel who looks at all the ideas and filters them to a point to getting them down to about ten. Once we get it to ten, those

ten are presented to our holdings Executive Committee who reviews the ideas and filter them down to three. These three ideas are presented to the entire leadership group and they get voted on.

RvdW: What happens to the ideas that get filtered out?

RN: We capture all of those ideas. Where ever there is potential in those ideas, the particular Executive Committee in who's department the idea is categorised, that executive takes ownership of that idea and either takes it into the R&D cycle if it has got potential or kills it if it has got no potential. He/she does that with the participation and involvement with the people whose idea it was - which is very important.

RvdW: Is there any management around linking ideas across different years or different topics?

RN: We do that often. There are often situations where there are two teams with different ideas but that are complementary to one another, and we then suggest that those teams come together and join into one team.

RvdW: Do you agree that the whole structure of inspiring excellence is based on the Knowledge Networks Open Innovation Model based on the specific people you use in your organisation, but still amounts to a large pool of knowledge conformed to the boundaries and structures of Discovery?

RN: Yes that is true. Clearly the idea that we are looking for must be of benefit to Discovery, but we make it as broad as we can by saying 'anything that you think Discovery could be doing'. The people we use to generate these ideas are familiar to our structures and capabilities as a company. Opening the competition for the whole company or even the public will give us more ideas for sure, but the quality of ideas will be lower and the probability of the winning idea coming from outside the company will be small. We would like the reward to go to someone in our company.

[Riaan explains Customer immersion]

Ryan: We do this all the time. I'll give you an example regarding a wellness product that we are about to launch. We just lunched it to brokers. How we conceived the wellness product was we created a group of mentors. We call them mentors but they are really the HR and Wellness Champions at a group of our client employers. So we got Shell, Ernest & Young, Pick n Pay, a whole range of Employer groups that we work with. Their HR and Wellness Champions came and sat with us and we tested our product thinking and our ideas, understood their needs and played our modules of them so it is what you call it, it is Customer Immersion I believe. Then we iterated them and went back and tested the ideas against them again and again.

RvdW: So this is using people resources outside of the company?

RN: Yes, this is exactly what it is. It is actually clients of ours.

[Riaan explains Collaborative Product Development]

RN: We do have this model that you have just explained with the DQ tracker device that we install in our insured vehicles. We oversaw the development of the device but we outsourced the technical issues to an engineering company who understand accelerometers and fleet tracking. We outsourced the technical component of the expertise but we retained ownership of the specifications and the IP.

[Riaan explains Platforming]

RN: Most of our products and services are linked and based on another product. As an example, Vitality is a product that must be linked to a Heath or a life policy. I believe this is Platforming.

[Riaan briefly explains the research done based on the Literature Study]

RN: Comment on idea generation process - "You depict it well. That happens in real life all the time, people have ideas, they don't sit and capture their ideas in a document on their own they generally go and bounce their ideas of other people in a forum or in the passage.

RN: Comment on the role players - "I saw a product recently which I asked a team to look at through a company called the ideas café. It is an ideas portal and what they do is basically socialise ideas via this portal. You ask people to upload their ideas in an open framework, totally transparent and share their ideas. So it's the individual's idea but you share the idea and other people can comment or be critical on the idea. Ultimately they vote on the idea and there is a leak table and the top ideas tend to bubble up to the surface and those ideas grow and grow and some merge with other ideas because it's all in the public space. It also provides the archive, what you called the 'Framer', the librarian of all ideas capturing ideas on the system. So it's a real life, real time ideas portal."

RvdW: Do you believe roles and specific role players can be defined in a company?

RN: In discovery we don't. We expect it from all employees all the time. Theoretically what you are saying make sense, practically when you are going to be that structured it almost stifles innovation. I can see this is a theoretical study and in theory you need structures. You get somebody who is a better networker than somebody else and you get somebody who is a builder than somebody else and you go to these people when you need their skills. One person can consist of more than one role. Referring to the Ideas portal we talked about earlier, the Framers role is represented by a system. Let me give you an example. Where we struggle is to decide how far the owner is involved in implementation. We keep the owner of the idea, as characterised as your Leader role, involved even after sign-off of the product so that he can remain involved in some implementation responsibilities. Your study addresses this situation.

RN: You should be able to think outside of your role without any constraint. After the idea is generated, I believe supporting structures can be set in place with the right combination of role players. I agree with you by having structures in place means that you record ideas better, you merge ideas better.

RvdW: For me it is about managing the whole process from idea generation to the end point. Do you think that a theoretical study can be done to sharpen the management of the whole process?

RN: Highly creative ideas orientated people are typically bad at structure and capturing ideas. Your theory shows me that the ideas need to be captured by a 'Framer' role player. I now know the next step in the process. I know that I need to assign a person or system to play that role. So yes, you can plan actions from theory to manage the process.

RN: Comment on relevancy of study- I told you that you would probably lose me when we start with the literature part of your presentation, however, I found it very logical and interesting. What I like about your study is that I believe if you understand the literature, you can manipulate the process by assigning designated people to certain roles and place structures in a business to either excel the process of, or to maximise the chance of getting a great ideas from your employees.

RvdW: Do you think that external role players must only be introduced in certain stages?

RN: External role players mould the macro product thinking. I guess no product is a good product unless it has been tested against a customer. But, when it comes to the detail I guess the detail orientated discussions should be internal. But, you'll have to test it against an external base all the time.

RvdW: Do you think there is potential for practical deployment on a theoretical study like this?

RN: What I think what you are doing is you are documenting the process that happens in most innovative businesses, but it happens in life in a less structured way. This provides structure to what happens in most innovation businesses. I guess different environments do different parts and different roles better or worse than others. There are parts of the study that you described that Discovery do badly. Like the Framer role. I think we spend a lot of time rehashing ideas that have been discussed and considered many times before by different teams and individuals maybe months or years prior and I think what we could do, which you described earlier, is to introduce the role of the 'Framer' to the company. I believe this study is based on theory and a company would be able to score themselves against it. I would avoid the trap of being too structured in execution.

RvdW: Will this study bring a difference in approach to the processes in innovation?

RN: I think one could introduce technology and some structure to be more disciplined in certain areas of the innovation process. I like the way how your study is logical and structured so that one can understand the roles that need to be in place to help an innovative idea along its path to maturity.

Appendix B

Validation Document

Role Players and the Flow of Knowledge in Open Innovation

Evaluation Questionnaire

March 2013

Department of Industrial Engineering
University of Stellenbosch

Riaan van der Walt

Your Role

Your input after reading this document and completing the questions will be much appreciated, particularly around the applicability of the study. Please provide your expertise to validate the answers on all the research questions. Your opinion and evaluation of the research questions and answers as well as the Methodology will be included in the final thesis. This document consists of an introduction stating the problem and is followed by literature answering the first part of the research questions.

The second part of the research questions are answered and explained. You are required to complete the question after each proposed response to evaluate the response on each question. Please provide motivations to your answers and comments as this will help the validation part of my thesis.

Thank you.

Riaan van der Walt
Department of Industrial Engineering
University of Stellenbosch

Introduction

Companies are under pressure to enhance their innovative capabilities in order to grow and sustain their entities. Innovation is regarded as a tool that provides an enterprise with a competitive edge to be dynamic and growing in stature. Innovation is, therefore, essential for survival because companies render themselves more competitive.

Companies are put under pressure by an ever fluctuating market and it is a survival game to stay alive in these markets. This is the case because of the increasingly competitive environment created by an ever increasing demand by consumers who have access to more information, better products and services. Innovation can give the needed competitive edge in order for them to stay in the “game”. Timing is also important. Action needs to be taken while the window of opportunity is still open and before the market is flooded with competitors and same-level technology maturity levels are reached. Many questions are posed, but few answers are provided.

Innovation and knowledge management are very closely linked as it is stated that knowledge is the cornerstone of intellectual capital and that innovation and knowledge management are linked tightly together (Perez-Bustamante 1999). Knowledge is needed to help the innovative processes to progress from an invention to an innovation and more knowledge is needed to sustain this innovation. Technology and innovation processes are formed by knowledge bases and continuous flows of information (Perez-Bustamante 1999). Information can be seen as knowledge that is passed on. This information can help in the management of the production and strategic innovation processes.

Knowledge generation is sometimes limited in an organisation and can also be costly. Internal knowledge might be insufficient therefore, external knowledge can be utilized by using innovation networks between different organisations sharing common goals. This knowledge is seen as the building blocks that are needed to help innovation progress and move forward through its life-cycle stages. These life cycle stages are best resembled by looking at the FuGLE innovation process model (Figure 1).

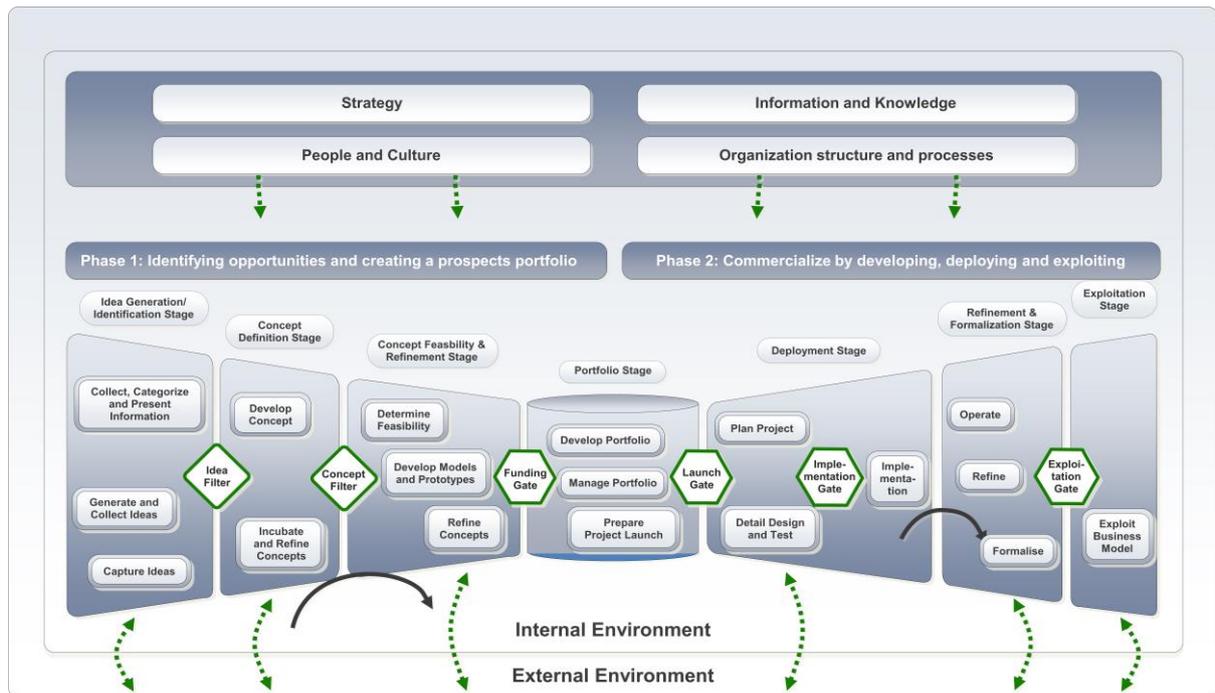


Figure 1: The FuGle Innovation Process Model

The aim of the model is to help businesses to identify, evaluate, develop, implement and exploit new products and services more efficiently and effectively. The model is centred on a generic innovation process which combines the convergent innovation front-end or funnels (identification and evaluation) with the divergent deployment and exploitation of the innovation.

The knowledge that is used to help the innovation processes will most likely be shared with other organisations seeking the same type of knowledge. These networks can be seen as a pool of knowledge shared by a number of organisations.

Internal sourced knowledge that is used to enhance the innovative processes is part of the open innovation paradigm because of the purposive inflows and outflows of knowledge that accelerate internal innovation (H. Chesbrough 2006). Technology and knowledge internally sourced and brought into the innovation system can be significantly important to the outcome of the systems output, enabling the structures to facilitate the process of substantiating and implementing ideas. More knowledge at critical times could increase the success rate for more sound outputs of ideas entering through the innovation funnelling paradigm.

Figure 2 shows an adapted version of the Innovation Funnelling Diagram which has been influenced by open innovation by means of ideas entering through the innovation funnelling paradigm.

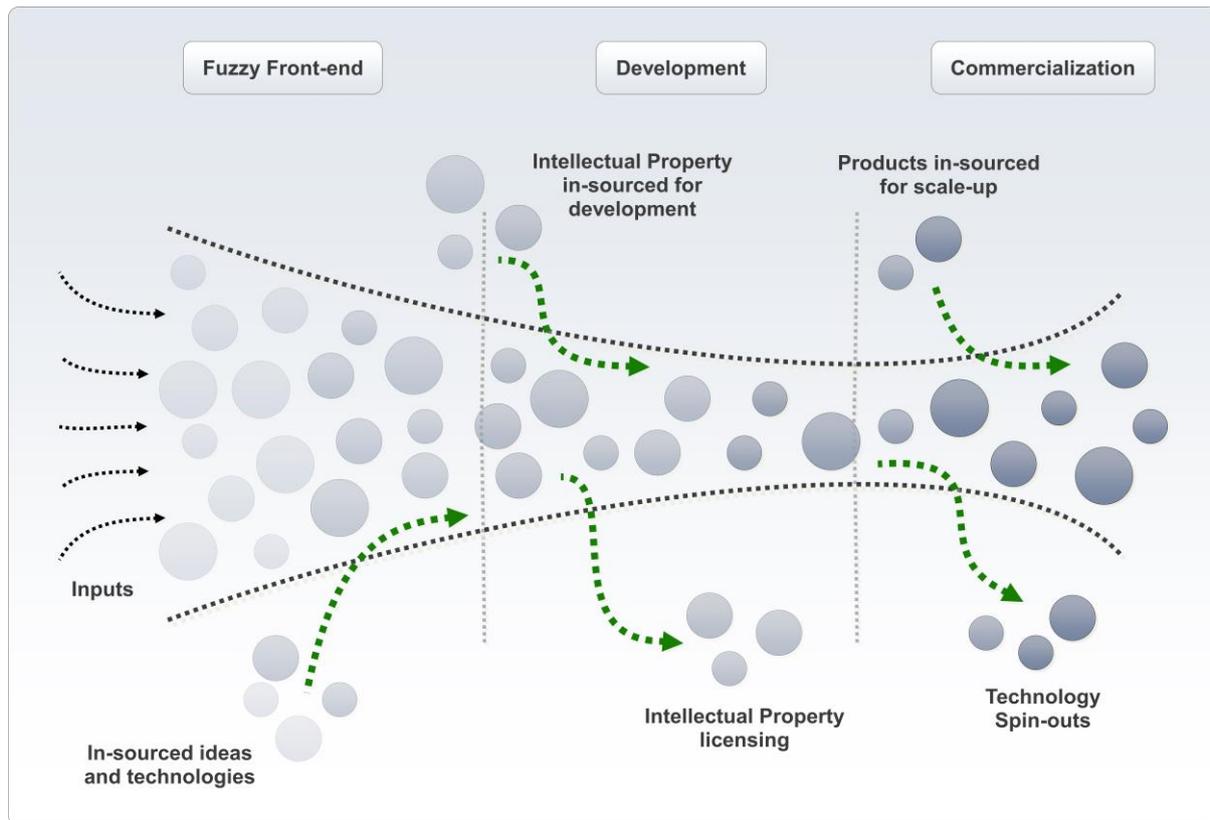


Figure 2: the Innovation Funnelling Diagram adapted from (H. Chesbrough 2006)

Innovation-related roles provide an understanding of the individual roles in (responsibility for and/or exposure to) developing organisational innovation capability.

The 5 innovation roles, presented by (Essmann, 2009) in *Toward Innovation Capability Maturity*, that have been used in this study are as follows:

- **Networker** – Scan market, industry, and technology, regulatory and societal trends to understand potential futures and identify latent opportunities. Create connections between internal and external individuals, teams and organisations that have common or complementary objectives.
- **Coordinator** – Balance project objectives, resources and risk. Contextualise position and promote opportunities and concepts. Prioritise, plan, coordinate, schedule, and assure completion of projects. Overcome or outsmart obstacles faced during projects.
- **Builder** – Make tangible concepts of ideas, demonstrate concepts, obtain feedback from colleagues and customers, and refine concepts. Build, test and refine working "products" and ensure "production" readiness. Strive towards the initial vision of the concept with minimal compromise for design, production and delivery.

- **Anthropologist** – Develop understanding of how people interact physically and emotionally with products, services, one another and their environment. Transform the physical environment into a tool to influence behaviour and attitude, enabling individuals to do their best work. Anticipate and service the needs of colleagues, customers, suppliers and other stakeholders.
- **Leader** – Align activities with strategy and objectives. Build and involve teams of the "right" individuals at the "right" time. Evaluate and prioritise opportunities and ideas against a standard framework considering all business requirements. Guide progress, monitor metrics and instigate corrective action. Build synergy into projects and the organisation.

1 Research Questions

The introduction above gives us a basis for research to be done. A literature study has been done in the following research domains:

- Innovation
- Knowledge
- The role of knowledge in innovation management
- Open innovation
- Roles in Innovation

Each question that has been answered gave direction and insight into the next question. By this manner it led to answer the main research question that in its turn solves the problem stated in the Problem Statement which is:

Companies need a framework/mechanism to help with the creating, transferring and managing of innovation-specific knowledge.

Main Research Question

Which role players are dominant and what knowledge transfer mechanisms are evident in Open Innovation during the Innovation Management Processes

Table 1: Research Questions

Research Objectives	Research Questions	Research Methodology
Find out how companies can stay competitive.	<i>Question 1: How can a company be/stay competitive?</i>	Literature (Utterback 1994) (Du Preez, et al. 2009) (Tidd, Bessant and Pavitt 2005)
Establish how innovation can be applied to help companies be more competitive.	<i>Question 2: How can Innovation help to be more competitive?</i>	Literature (van Zyl, 2006) (van Zyl, Du Preez and Schutte 2007) (Du Preez and Louw 2008 (J. A. Schumpeter 1939), (Du Preez, et al. 2009), (Baker 2002) (Hamel 1996)
Find a suitable Management Process to help the Innovation Process.	<i>Question 3: Can a formalized Innovation Management Process help the Innovation Process?</i>	Literature (Nonaka 1994), (Fahey and Prusak 1998), (Du Preez and Louw 2008) (Schutz 1967), (Wilson 2002), (Newman and Conrad 2000), (Perez-Bustamante 1999), Nonaka, Konno and Toyama,
Establish if Open innovation can be integrated with an Innovation Management Processes.	<i>Question 4: How can Open Innovation be used to create and gain more knowledge?</i>	Literature (H. Chesbrough 2004), (Fredberg, Elmquist and Ollila 2008), (H. Chesbrough 2006), (Radjou, et al. 2004) (Docherty 2006) (Marais 2010)

2 Literature Study

The Literature Study and the answering of Question 1-4 led to the following conclusion:

A company today needs to stay competitive in an ever fluctuating market. Companies are looking at innovation as a tool to help them stay competitive. Innovation serves as a way in which organizations render themselves more competitive than others. Competency can be increased by introducing Innovation Management Process Models such as the FuGle Model* to help manage innovative facets and processes.

A company can stay competitive by understanding that knowledge and the management of role players are the main driving factors in innovation and that the management and retrieval of more knowledge by means of open innovation can give a competitive advantage and aid in maintaining that competitive advantage.

Table 2 below depicts the primary focus of each FuGle stage, as well as the requirements for each stage that may prove to be relevant to the allocation of Open Innovation models.

The open innovation models have been fitted to each innovation process stage to function as a medium through which knowledge can flow from one organisation so another.

Table 2: Allocated Models Summary (Marais 2010)

FuGle Stage	Stage Requirements	Allocated Models**	Model Contributions
Idea Generation/ Identification	<ul style="list-style-type: none"> Quantity of ideas Creativity 	<ul style="list-style-type: none"> Idea competitions 	<ul style="list-style-type: none"> Increase quantity of ideas Improves customer insight
Concept Definition	<ul style="list-style-type: none"> Sharing of concept to foster refinement 	<ul style="list-style-type: none"> Idea competitions (Speculative type) Innovation networks 	<ul style="list-style-type: none"> Provides opportunity to share Receives suggestions for refinement
Concept feasibility & Refinement	<ul style="list-style-type: none"> Concept prototyping Iterative testing 	<ul style="list-style-type: none"> Idea competitions (Speculative type) Customer immersion 	<ul style="list-style-type: none"> Assists in concept development Assists in prototype testing
Deployment, and Refinement & Formalization	<ul style="list-style-type: none"> Product development Product testing Refinement 	<ul style="list-style-type: none"> Innovation networks Collaborative product development Idea competitions 	<ul style="list-style-type: none"> Assists in design problem solving, actual product development and product testing
Exploitation	<ul style="list-style-type: none"> Exploitation techniques New markets New channels 	<ul style="list-style-type: none"> Platforming 	<ul style="list-style-type: none"> Assists in capturing more value from markets

*a Summary of The FuGle Process Model is provided in Appendix A

**Background information on the allocated models is given in Appendix B.

3 Research Questions needed to be Validated in this Survey

Your input will be much appreciated concerning the applicability of the study. It is required that your expertise can help validate the answering of the research question that follows:

Research Question 5: Which role players feature and what knowledge transfer mechanisms are evident in Open Innovation?

This will be achieved through the answering of Sub Research Questions where your opinion on the Methodology as well as the answering of the sub research questions will be used in conjunction with other knowledgeable field experts' opinions to validate the study. Before we can achieve this point, a short summary of the Research Methodology follows and explains how these questions have been answered.

3.1 Identification of Roles and Knowledge Flows

To answer the main research question it has been decided to build on Marais' (Marais 2010) study as a starting point by looking at the role players involved and also the knowledge flows inside the FuGle Model. This will lead us to the functions of the role players as well as knowledge flows across organisational boundaries. Understanding these functions and knowledge flows can help an organisation manage them better.

The general structure that has been used for each FuGle stage is as follows:

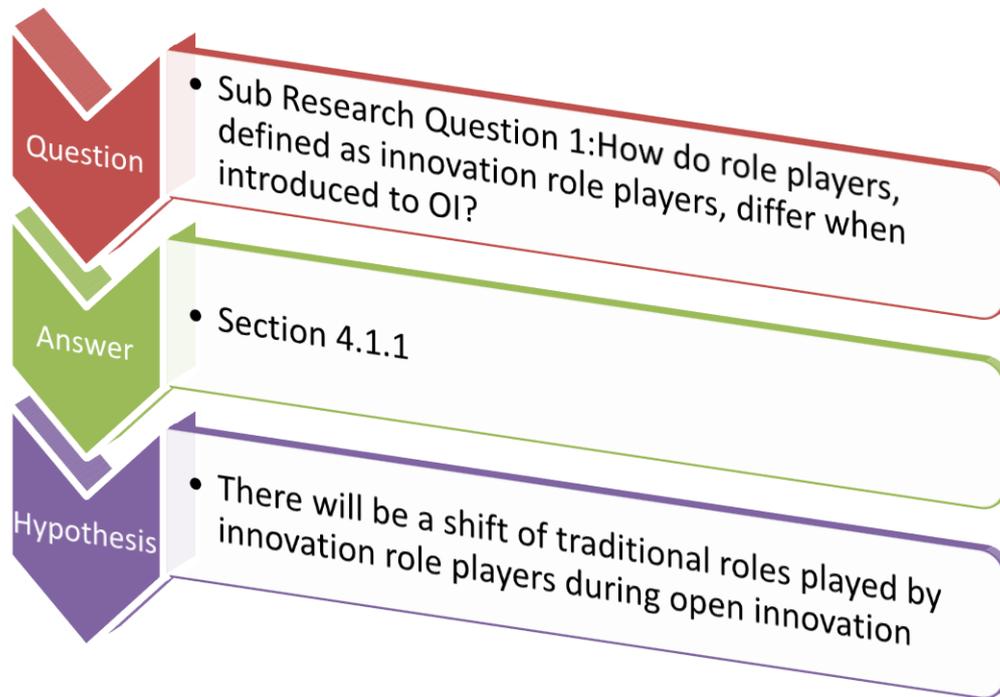
- Each stage starts with a brief summary of the processes that are present within the stage;
- For each process in each stage, the OI model has been confirmed or an additional OI model is suggested. It has also been stated whether no OI models were introduced and the process has been done internally without the aid of OI models;
- The Knowledge Flow has been discussed, as well as the innovation role players who feature in each process;
- Finally, comments have been made on each stage process.

This study is based on the typical knowledge flows based on (Nonaka, Konno and Toyama, Emergence of "BA" 2001), who worked on the four different knowledge conversion modes and highlighted the different dimensions in each stage based on the Knowledge Network Framework (Seufert, Von Krogh and Bach 1999).

Research Objectives	Research Questions	Research Methodology
Need to establish which role players play an integrate part in the transferring of knowledge and what mechanisms can be used for these transfers.	<i>Research Question 5: Which role players feature and what knowledge transfer mechanisms are evident in Open Innovation?</i>	Research Question 5 will be answered by the answering of Sub Research Questions.
Find out if innovation role player definitions will differ if identified role players are introduced to Open Innovation.	<i>Sub Research Question 1: How do role players, defined as innovation role players, differ when introduced to OI?</i>	Study Innovation role player’s characteristics and correlate role players to fit in Open Innovation Paradigm, if not what additional role players or role player characteristics are needed.
Find out what role players are directly involved in the transfer of knowledge in OI models.	<i>Sub Research Question 2: What role players are involved in the transfer of knowledge in the OI models?</i>	Apply role players to Open Innovation models. Study their involvement by looking at the knowledge transfer mechanisms with the use of the allocated models
Need to establish the role that outside organisation role players play to establish the true representation of role players in Open Innovation	<i>Sub Research Question 3: How involved are outside organization role players? (Outside organization role players refers to all participating organizations outside of their own organization)</i>	By looking at the interaction of external role players throughout the application of OI models in the FuGle.
Need to establish what type of knowledge is transferred and gained with the use of Open Innovation.	<i>Sub Research Question.4: What type of knowledge is gained with open innovation processes?</i>	See what knowledge type is transferred at what stage of the FuGle and what allocated Model was used to transfer it by.

4 Analysis Summary and Proposed Response to Sub Research Questions

4.1 Proposed Response to Sub Research Question 1



4.1.1 Role Player Definition Refinements

During the study of Innovation Role Players a decision has been made to reduce the responsibilities or functions of the Leader and to introduce an additional role, The Framer, and add these responsibilities to that of the Framer and in this way to assist the Leader. In the study it is shown that the above helped immensely. The Leader kept the characteristics stated by (Essmann 2009) namely:

- Aligns activities with strategy and objectives. Establishes and involves teams comprising the "right" individuals at the "right" time.
- Evaluates and prioritises opportunities and ideas against a standard framework, while considering all business requirements.
- Guides progress, monitors metrics and instigates corrective action. Builds synergy into projects and the organisation

However, with open innovation, the field changes and a gap forms and creates an area where the Framer can be brought back just as H. E Essmann's initial roles have been consolidated. (Essmann

2009). This gap occurs in the information capturing area, where all knowledge is centralized, evaluated, prioritised, stored and dispersed.

The responsibilities or functions of the Framers are defined as follows:

- Defining and deploying the framework by which opportunities, ideas and concepts are evaluated and prioritised; meta-data to facilitate capture, storage and retrieval of ideas and information; and innovation metrics to measure innovation.

It has been shown in the study of Innovation Role Players, that it will be easier to have the responsibilities of the Coordinators altered by adding responsibilities from the Networker to those of the Coordinator.

The role of the Networker is defined as follows:

- Scanning the market, industry, technology and regulatory and societal trends to understand potential futures and to identify latent opportunities.
- Creating connections between internal and external individuals, teams and organisations which have common or complementary objectives.

The role of the Coordinator is defined as:

- Balancing project objectives, resources and risks.
- Contextualising position and promoting opportunities and concepts,
- Prioritising, planning, coordinating, scheduling and assuring the completion of projects.
- Overcoming or outsmarting obstacles faced during projects,

This study agrees with the allocations of each role, but the Coordinator will benefit more if its role includes the creation of connections between internal and external individuals, teams and organisations which have common or complimentary objectives. This characteristic complements the original characteristics when balancing projects and recourses. These resources may be internal and external individuals and teams that then form part of the planning, balancing and coordination of projects.

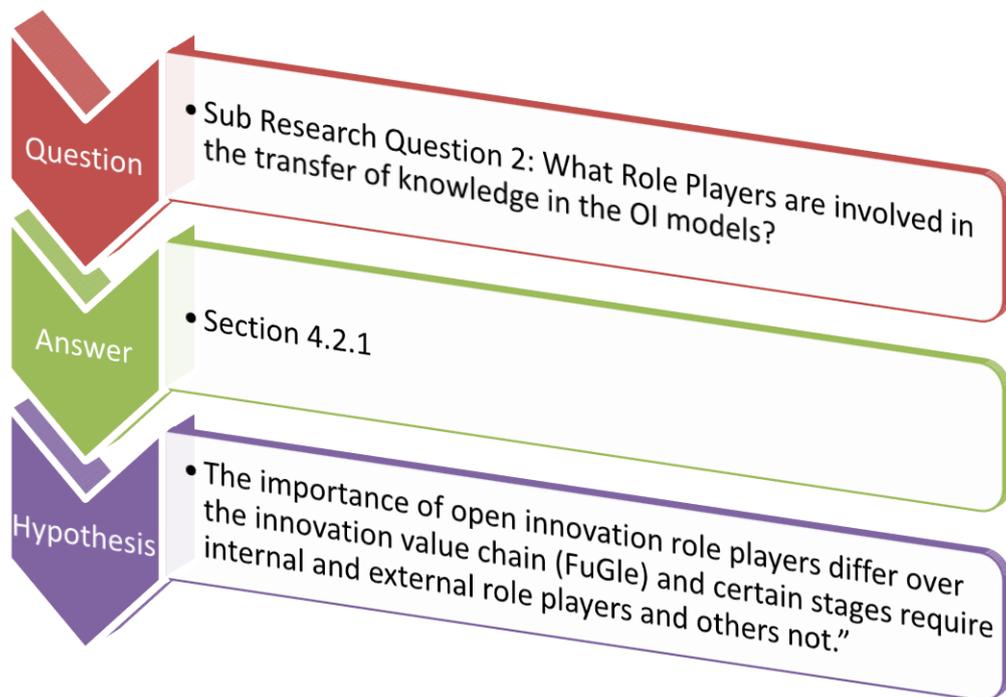
4.1.2 Validation Of to Sub Research Question 1

Do you agree with the proposed refinements made to the Role Player Definitions and the additional role player that have been added?

Role player	Traditional Innovation role	Open innovation role	Comment from respondent
Networker	<ul style="list-style-type: none"> • Scanning the market, industry, technology and regulatory and societal trends to understand potential futures and to identify latent opportunities. • Creating connections between internal and external individuals, teams and organisations which have common or complementary objectives. 	<ul style="list-style-type: none"> • Scanning the market, industry, technology and regulatory and societal trends to understand potential futures and to identify latent opportunities. 	
Coordinator	<ul style="list-style-type: none"> • Balancing project objectives, resources and risks. • Contextualising position and promoting opportunities and concepts, • Prioritising, planning, coordinating, scheduling and assuring the completion of projects. • Overcoming or outsmarting obstacles faced during projects. 	<ul style="list-style-type: none"> • Balancing project objectives, resources and risks. • Creating connections between internal and external individuals, teams and organisations which have common or complementary objectives. • Contextualising position and promoting opportunities and concepts, • Prioritising, planning, coordinating, scheduling and assuring the completion of projects. • Overcoming or outsmarting obstacles faced during projects. 	

<p>Leader</p>	<ul style="list-style-type: none"> • Aligns activities with strategy and objectives. Establishes and involves teams comprising the "right" individuals at the "right" time. • Evaluates and prioritises opportunities and ideas against a standard framework, while considering all business requirements. • Guides progress, monitors metrics and instigates corrective action. Builds synergy into projects and the organisation 	<ul style="list-style-type: none"> • Continuously align business and innovation strategy and objectives. Build and involve teams of the "right" individuals at the "right" time. • Validate the relevance of and prioritize innovation activities. • Take ownership and responsibility. • Guide progress, monitor metrics and instigate corrective action. Build synergy into the innovation portfolio. 	
<p>Framer</p>	<ul style="list-style-type: none"> • (No role consolidation. Was integrated with Leader role.) 	<ul style="list-style-type: none"> • Defining and deploying the frameworks by which opportunities, ideas and concepts are evaluated and prioritised; meta-data to facilitate capture, storage and retrieval of ideas and information; and innovation metrics to measure innovation. 	

4.2 Proposed Response to Sub Research Question 2



4.2.1 Role Player Involvement in FuGle

Figure 3 below shows the importance of each role player's function compared with each stage in the FuGle. This was done by firstly understanding the processes in the FuGle and the assigned OI model. The roles and knowledge flows were added to the OI models and FuGle processes and the following conclusions have been made regarding the importance of each role in each FuGle stage incorporating the OI models. Each green mark indicates the importance of the role as follows:

- ✓ - One mark shows that the function of the role player features in the stage but to a lesser degree. The information or knowledge is only passed on and not needed to be internalized by the role player.
- ✓ ✓ - Two marks show that the function of the role player features more and that the work done by the role player adds to the knowledge that is passed on. The function is defined as more significant than one mark.
- ✓ ✓ ✓ - Three marks shows that the knowledge required is specialized and critical to this stage. The knowledge added by this function determines the core of the stage. The rest of the functions are merely to act in support of the knowledge.

- ✓ - The red marks show the external functions that are used in each stage and the amount of marks indicates the importance of each function compared to the FuGle stage as described above.

	Idea Generation & Identification Stage	Concept Definition Stage	Concept Feasibility & Refinement Stage	Portfolio Stage	Deployment Stage	Refinement & Formalization Stage	Exploitation Stage
Networker	✓✓✓✓ ✓	✓✓					✓✓✓✓ ✓✓
Coordinator	✓✓	✓✓ ✓	✓✓✓	✓✓✓	✓✓✓ ✓✓✓	✓✓	
Builder	✓✓✓✓ ✓✓✓	✓✓✓✓ ✓✓✓	✓✓✓✓ ✓✓✓		✓✓✓✓ ✓✓✓	✓✓✓✓ ✓✓✓	
Anthropologist							
Leader	✓✓ ✓	✓✓	✓✓	✓✓✓	✓✓	✓✓	✓✓
Framer	✓✓✓	✓✓ ✓	✓		✓	✓	✓✓ ✓

Figure 3: Roles Importance in the FuGle Stages

Networker

The Networker features in three stages of the FuGle. The function of the Networker is more specialized in open innovation than originally stated. The role consists of characteristics which show insight into new trends, opportunities in the market and new technologies that may be used to penetrate the market. The Networker is a creative thinker and must have the capability to generate ideas and inventions which act as the seed of knowledge that is planted in an organization and which will lead to the growing of innovations.

The Networker may be combined with an outside organizational Networker in the first and the last stages of the FuGle for the same reason as mentioned above. The more minds thinking together will create more inventions or innovations to enter the idea pool. The difference between the first and the last stages is that in the Exploitation stage the openings in the market that the Networker needs to exploit is based on the base product already deployed and refined by the organization and that the Idea Generation & Identification Stage is only limited to the companies accepted business and innovation strategies and objectives.

Coordinator

The functions and responsibilities of the Coordinator are of higher importance and with additional characteristics which originally formed part of the functions of the Networker. The Coordinator's role consists of two parts. The first is present during the first two stages of the FuGLE, namely the Idea Generation & Identification and the Concept Definition stages. Here the Coordinator plays the role of connecting and facilitating knowledge transfer between people on an open innovation platform.

The second part of the coordinators role is to be found during the following three stages: the Concept Feasibility & Refinement Stage, the Deployment Stage and the Refinement & Formalization Stage. Its functions and responsibilities focus on coordinating, scheduling, prioritising and planning projects, while at the same time he has to balance project objectives, resources and risks. All three stages are run like a project and are based on iterations and a set of goals which needs to be reached before the completion of the stage.

Outside organizational Coordinators are used in innovation networks during the Concept Definition Stage when raw ideas that were accumulated by the Framer from the outside organization are received, and also when combined planning is carried out during the Deployment Stage.

The Leader operates together with the Coordinator as the only two role players in the Portfolio Stage. In this stage the Coordinator is in charge of critical decisions, such as:

- Planning and Coordinating the innovation portfolio
- Allocating resources appropriately

Builder

The Builder plays a critical role right through the FuGLE and must be seen as the engine that generates creativity and inventions. All ideas are sent to the Builder to practically assemble innovations out of inventions, ideas and any other incubator of innovation. Knowledge is needed to help the innovative processes to progress from inventions to innovations or from ideas to opportunities, and this is exactly what the Builder brings to the table. The Builder must have the knowledge to generate tangible concepts from ideas and to demonstrate concepts in the Concept Definition Stage. He also has to obtain feedback from colleagues and customers, refine concepts, build, test and refine working "products" and ensure "production" readiness in the Concept Feasibility and Refinement Stage, while striving for the initial vision of the concept with minimal

compromise for design, production and delivery in the Deployment and Refinement & Formulization Stage.

All of these stages need a considerable amount of knowledge to help an invention to grow to become an innovation or an idea to reach its innovation potential. Open innovation between Builders across organizational boundaries will enhance knowledge sharing, meaning therefore, that external and internal knowledge may be utilized.

Anthropologist

The anthropologist plays an important supporting role in every stage. The activities in the processes defined in this chapter do not involve the Anthropologist as being the primary role player in any of the stages in the FuGle, but only as a supporting role player in:

- Understanding the market
- Identifying opportunities and developing concepts

The primary focus of the Anthropologist is indirectly linked to the innovation stages and includes:

- Continuous research
- Governance principles
- Organizational values & policies
- Organizational practices and procedures
- Championing & encouraging innovation
- Motivating, rewarding & celebrating success
- Measuring innovation
- Involving customers & suppliers in the innovation process

Leader

The functions and responsibilities of the Leader are the most prominent in the organization and deals with everything and anything related to the organization and the decisions concerning it. The Leader features in every stage of the FuGle and is brought into the processes for mainly two functions:

- Aligning activities with strategy and objectives
- Evaluating and prioritising opportunities and ideas against a standard framework considering all business requirements

The Leader features together with the Coordinator as the only two role players in the Portfolio Stage. In this stage the Leader is in charge of critical decisions, such as:

- Balancing the innovation portfolio
- Allocating resources appropriately

Collaboration with outside organization Leaders only commences in the Idea Generation & Identification Stage, where both organizations provide information about common current problems and combined strategies and objectives.

Framer

The functions and responsibilities of the Framer are needed in every stage of the FuGle because of the introduction of the OI model platforming in the Exploitation Stage. The OI model brings a new dimension to the last stage of the FuGle and ensures that a designated role player is identified and frameworks are in place for the evaluation, prioritising and capturing of opportunities. The ideas and information are stored and must be retrievable by any platforming company. Information about the base product must be available during any stage of the FuGle to allow platforming companies to receive the data in time to make alterations to their designs. This is also where outside organizational Framers are used to retrieve information about their products so that collaboration can take place more effectively. Framers from outside organizations are also used in the Concept Definition Stage, when raw ideas are retrieved from outside idea pools to be combined with internal organizational ideas to generate concepts.

General Comments

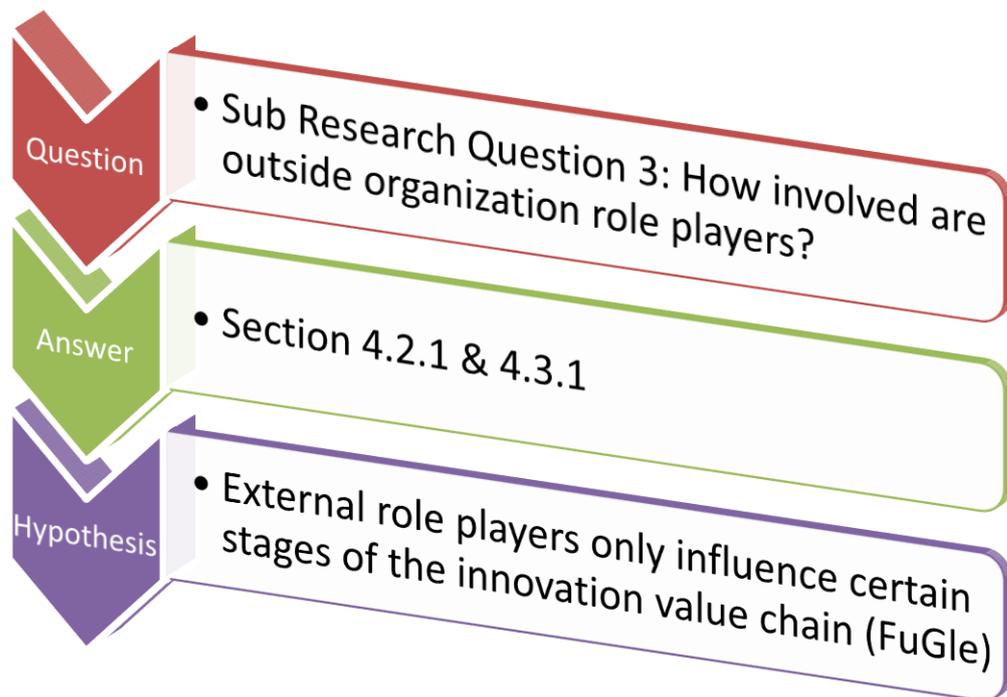
It is difficult to assign a single function or responsibility to a single role player or to combine all the functions and give one definition to any one role player. This is the case because several role players operate on common ground and also share certain characteristics and functions. One person can have more than one role and persons with these roles can work independently or in groups. Some functions may also include all the role players, as is the case with identifying opportunities and developing concepts. The characteristics that are needed to carry out these functions are evident in all role players and all role players are able to participate in doing these functions. The difference, however, is that the responsibility to identify an opportunity rests with the Networker, while the Builder is responsible for developing the concepts. The “connector” characteristic is now based in the Coordinator who coordinates the connection and flow of knowledge. It is necessary to have the initial connection, but after the connection has been established, the role players involved may keep the flux of knowledge sustained between role players from different organizations.

4.2.2 Validation of Sub Research Question 2

- 1- Do you agree with the level of importance that was assigned to each FuGle stage that was illustrated in the table in this section? Please motivate your answer.



4.3 Proposed Response to Sub Research Question 3



4.3.1 Outside Organizational Role Involvement

Figure 3: Roles Importance in the FuGle Stages illustrates where open innovation was used in each stage of the FuGle. The importance of the role player is also indicated. The Builder is the most prominent role player from outside the organization and is also crucial in providing knowledge. Most of the other role players support the knowledge creating “engine”, however, the Builder is responsible for most of the knowledge creation. Understanding every role player’s responsibilities or functions in knowledge generation and knowledge transfer in each process of the FuGle, can assist the organization in knowledge management.

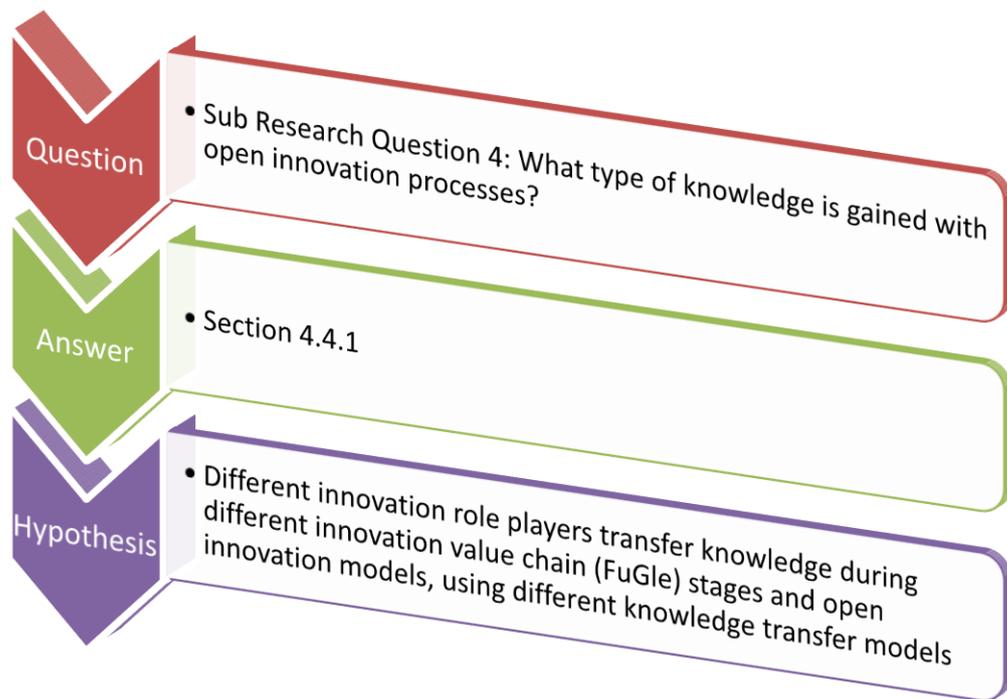
4.3.2 Validation of Sub Research Question 3

Do you agree that external role players only influence certain stages of the open innovation chain?

(FuGle) Please motivate your answer.



4.4 Proposed Response to Sub Research Question 4



4.4.1 **Type of Knowledge gained from the Open Innovation Processes**

Table 3: Type of Knowledge* gained from the Open Innovation Processes

Innovation Roles	FuGLE Stage	OI Model	Knowledge Work Process	Level of Input	Knowledge Description
Networker	Idea Generation & Identification Stage	Innovation Networks	Socialization	Knowledge Level	Insight
	Exploitation Stage	Platforming	Socialization	Knowledge Level	Insight
Coordinator	Concept Definition Stage	Innovation Networks	Systematization	Knowledge Level	Managerial knowledge
	Deployment Stage	Innovation Networks	Socialization	Knowledge Level	Managerial knowledge
Builder	Idea Generation & Identification Stage	Idea Competition	Externalization	Data Level	Creative Ideas
		Innovation Networks	Socialization	Action Level	Technical Knowledge
	Concept Definition Stage	Innovation Networks	Socialization	Action Level	Technical Knowledge
	Concept Feasibility & Refinement Stage	Customer Immersion	Externalization	Data Level	Experience
		Innovation Networks	Socialization	Action Level	Technical Knowledge
	Deployment Stage	Innovation Networks	Socialization	Action Level	Technical Knowledge
	Refinement & Formalization Stage	Innovation Networks	Socialization	Action Level	Technical Knowledge
Leader	Idea Generation & Identification Stage	Innovation Networks	Socialization	Knowledge Level	Organizational Knowledge
Framer	Concept Definition Stage	Innovation Networks	Systematization	Data Level	Data Capturing
	Exploitation Stage	Platforming	Systematization	Data Level	Data Management

*In Appendix C more information is given on the field of Knowledge Work Process if needed that describes the processes of socialization, externalization, Systemization, and internalization.

Open ended-type idea competition provides creativity in quantity which is crucial at the beginning of the FuGLE. The organization needs as much as possible ideas in the “pool” to pass through all the stages and processes.

Innovation Networks bring technical knowledge in the form of technical skill and the way they deliberate, argue and solve problems. The main role player involved in Innovation Networks is the Builder. The idea is that the Builders work in conjunction with each other based on a socialization knowledge reference type joining of technical skills and generating company knowledge by enacting and representing the organization's value creating processes.

Customer immersion brings knowledge in the form of data to assess a product that has been evaluated. Opening the process by using this OI model, helps the organization to retrieve numerous amounts of evaluations that will help the organization to make alterations to better a certain product or service.

Collaborative product development brings the expertise of other companies into the picture. No research and development cost but also no inside company knowledge gained from the processes where this OI model was used.

Platforming joins different organizations on various levels throughout the FuGle stage. Interaction in every stage is essential for the success of this OI model. The model mainly includes the management of knowledge. The process is governed by the platforming OI model, but the internal knowledge transfer is similar to the functioning of the innovation networks.

4.4.2 Validation of Sub Research Question 4

Do you agree with the identification of the type of knowledge that is transferred through each FuGle stage's allocated model? Please motivate your answer.



Thank you for your time in answering these questions

Appendix A- The FuGle Process Model

1 The FuGle

Research done by by (van Zyl 2006) and (van Zyl, Du Preez and Schutte 2007) has resulted in a summarised view of the most prominent innovation process frameworks in the landscape, categorised according to their application types and innovation process phase presence. This summary was extended by (Du Preez and Louw 2008) to incorporate a more inclusive view of the list of models initially mentioned in the FuGle Innovation Process Model.

The aim of the model is to help businesses to identify, evaluate, develop, implement and exploit new products and services more efficiently and effectively. The model is centered on a generic innovation process which combines the convergent innovation front-end or funnels (identification and evaluation) with the divergent deployment and exploitation of the innovation. (Du Preez and Louw 2008)

The FUGLE innovation process model is divided into two phases and are linked in the middle by a portfolio stage. These phases are:

- Identifying opportunities and creating a prospects portfolio
- Commercialize by developing, deploying and exploiting

The portfolio stage consists of:

- Develop a Portfolio
- Manage the Portfolio
- Prepare for the Project Launch

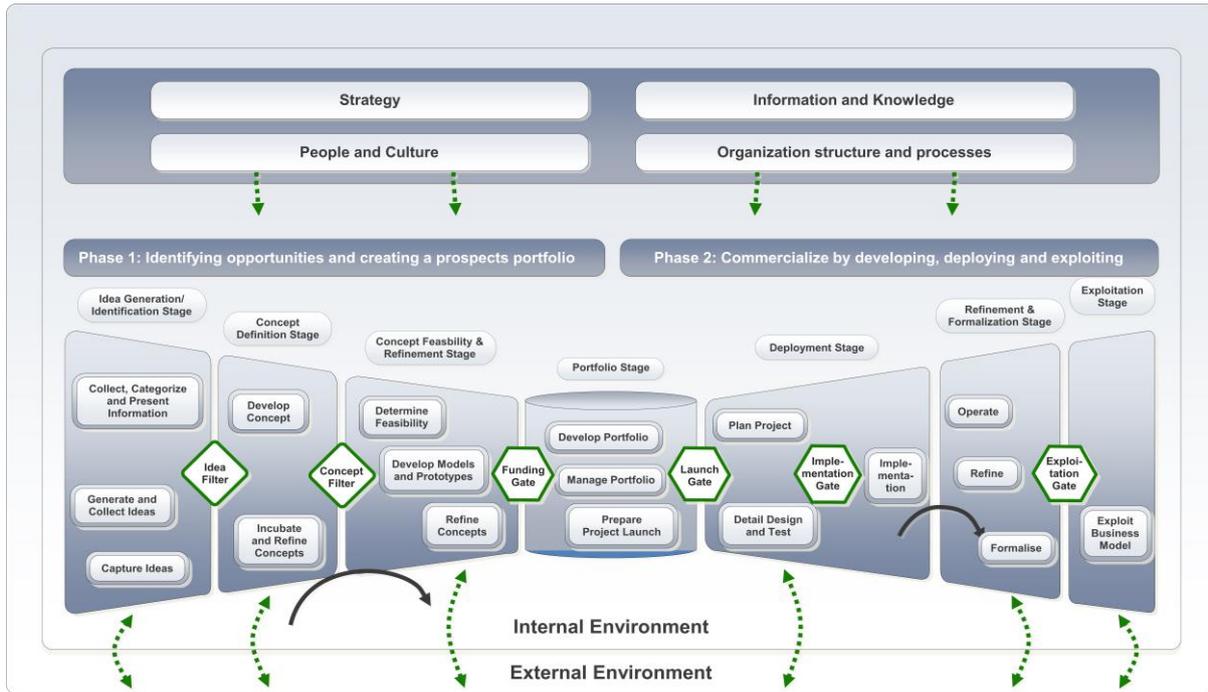


Figure 4: The FUGLE Innovation Process Model

1.1 Identifying Opportunities and Creating a Prospects Portfolio

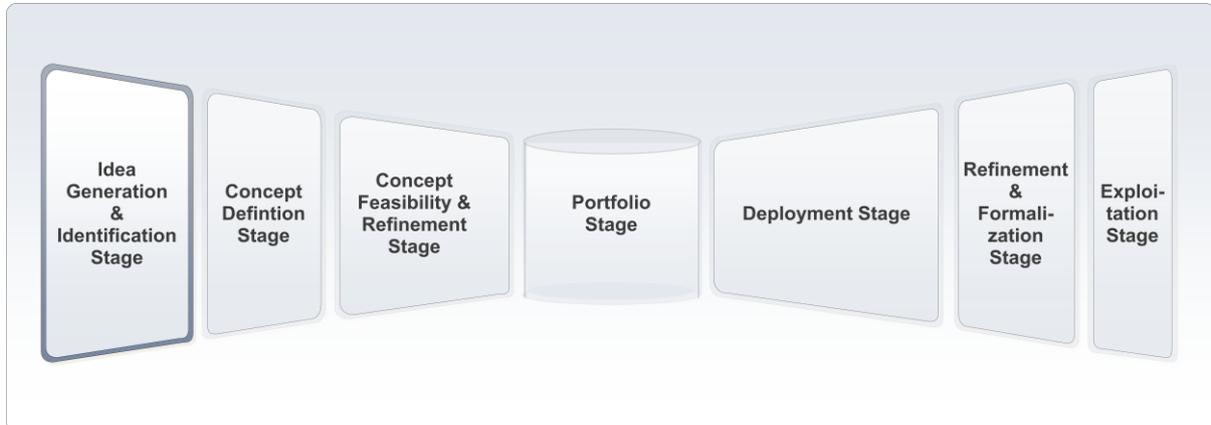
This first phase consists of stages and all is unique to the role they play in the whole model as seen in Figure 5. These stages are:

- Idea Generation/Identification Stage
- Concept Definition
- Stage Concept Feasibility & Refinement Stage



Figure 5: Identifying Opportunities and Creating a Prospects Portfolio

1.1.1 Idea Generation/ Identification Stage



This is the creative stage where new ideas are generated and new opportunities are identified. These new ideas come from brainstorming inside or outside of the company. The aim of this stage is to pro-actively generate and nurture new ideas so that they can be developed into usable ideas in the future. This stage collects, categorizes and refine ideas and needs information to do so. This information needed is:

- information about current problems or problem areas in the business,
- information about competitors
- information about clients and markets

- information about technologies
- information about company strategies and objectives (Du Preez and Louw 2008)

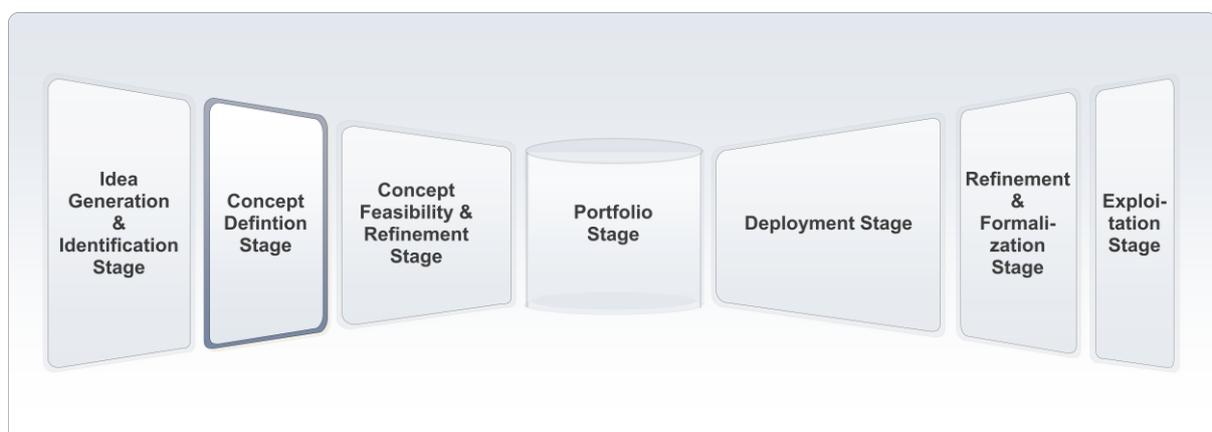
Ideas can be generated purposefully if so desired however needs hard thinking to determine it's significant. Du Preez and Louw said by making the right information available to the right people in the right manner can help to trigger new or innovative ideas.

Whether the idea was a spur of the moment thought or created in a brainstorming session, it is important to capture or frame the idea in some acceptable manner so that it can be communicated to others and developed further into a concept (Gaynor 2002). It is important to keep a history of these ideas because an idea can be unworthy at that a given moment due to current circumstances but can be more feasible in the future.

Filtering

A company's strategies should help to act as a guide for filtering new ideas. Ideas that are clearly out of line with a company's strategies can be rejected at this phase. Since it takes a considerable amount of time and resources to develop new ideas into concepts and evaluate their feasibility, the trick is to intelligently filter new ideas while decreasing the probability of rejecting good ideas. By thinking carefully it should therefore go into developing a filtering process and criteria. Rejected ideas should however be captured along with the reasons for their rejection because of future use as a spin-off.

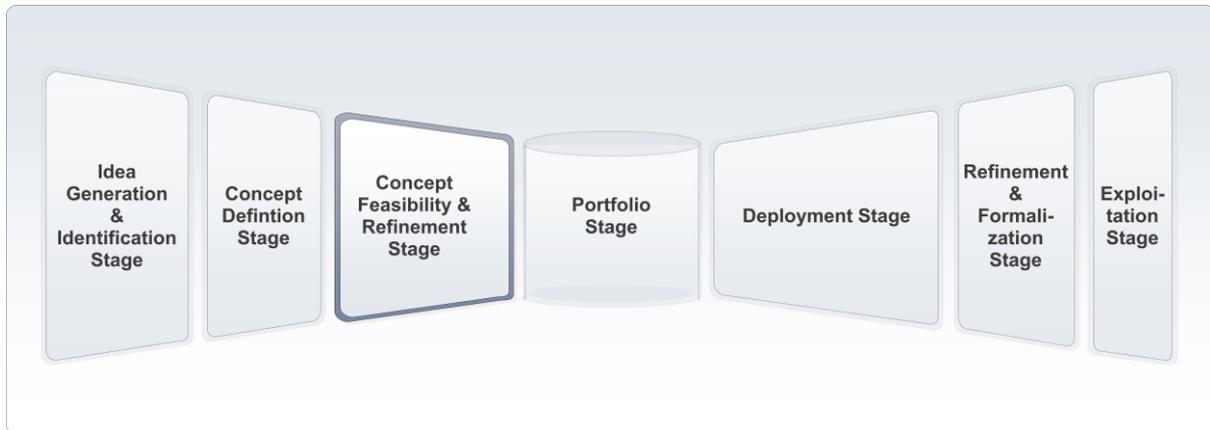
1.1.2 Concept Definition



The focus of this stage is to transform the idea into a workable concept. Concepts are often developed by combining different ideas. Once the initial concept definition is done, some time should be provided to share the concept with different people in order for the concept to incubate.

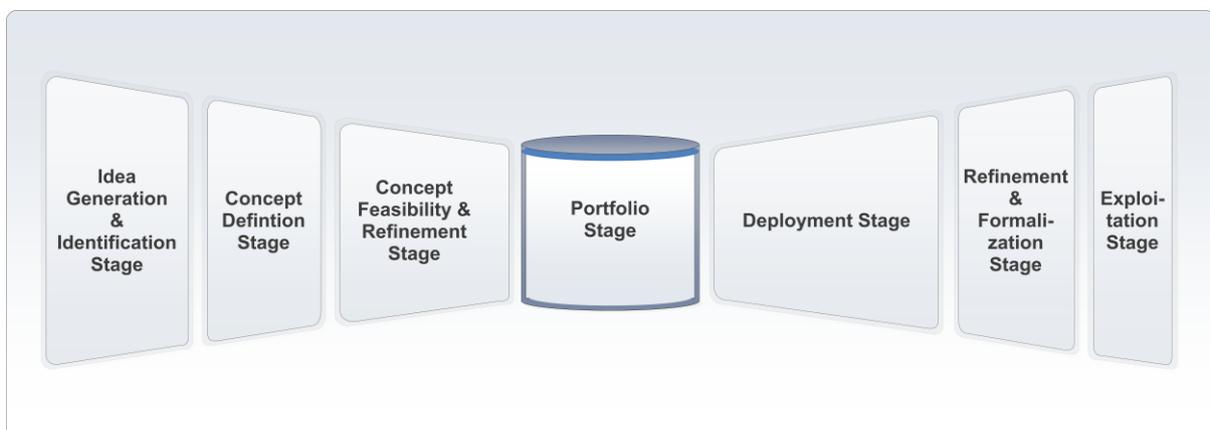
If necessary, this may lead to refinement of some of the ideas followed by another filtering process to select the concepts that are most promising for further evaluation in order to determine their feasibility.

1.1.3 Stage Concept Feasibility & Refinement Stage



The concept feasibility stage is about further investigation of the concept and collecting additional information to compliment the potentially limited information that was available during the definition stage. Modelling and prototyping also provides valuable information on concept feasibility. Iterative loops of concept refinement and evaluation will typically occur, and should be used as a learning experience. It is better and more cost effective to fail at this stage than later during the deployment stage. The funding gate at the end of the stage is used to make decisions on which concepts should be resourced and developed further, thereby producing a list of prospective innovation projects as the stage output.

1.1.4 Portfolio Stage



Innovation Portfolio Management entails the holistic management of the enterprise’s innovation initiatives and includes prioritization, scheduling and alignment of prospective innovation projects. Resource allocation is also considered during this stage, along with assignment of responsibility. Innovation initiatives should be continuously monitored to understand the aggregate effect of the innovation portfolio on the strategic objectives of the enterprise. Innovation projects progress towards deployment by determining a launch date for each individual project.

1.2 Commercialize by Developing, Deploying and Exploiting

This second phase consists of stages and all is unique to the role they play in the whole model as seen in Figure 6. These stages are:

- Deployment Stage
- Refinement & Formalization Stage
- Exploitation Stage

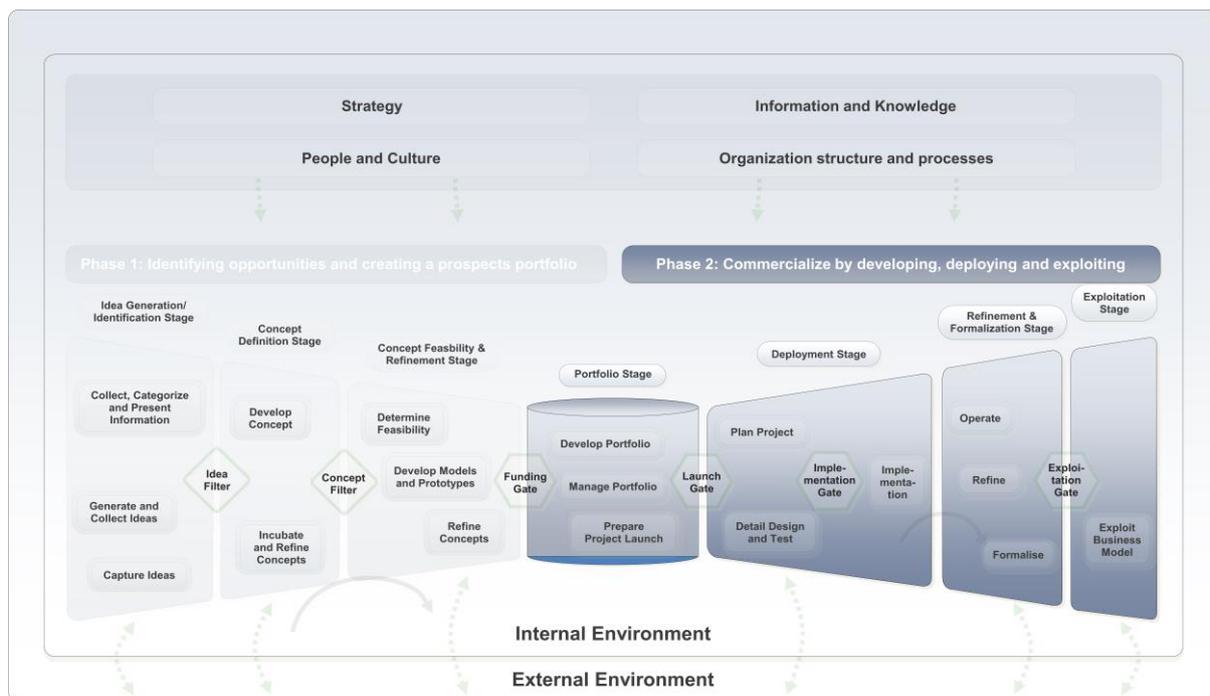
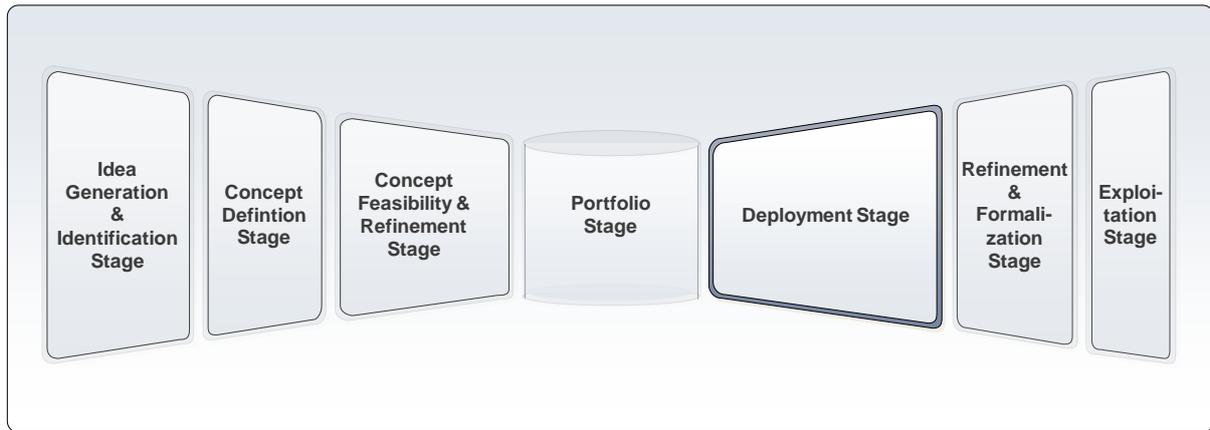


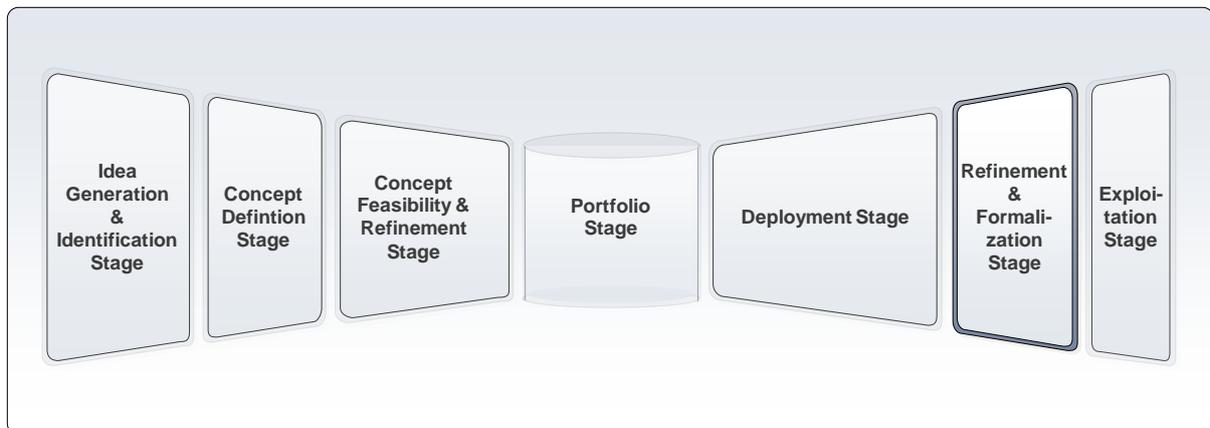
Figure 6: Commercialize by Developing, Deploying and Exploiting

1.2.1 Deployment Stage



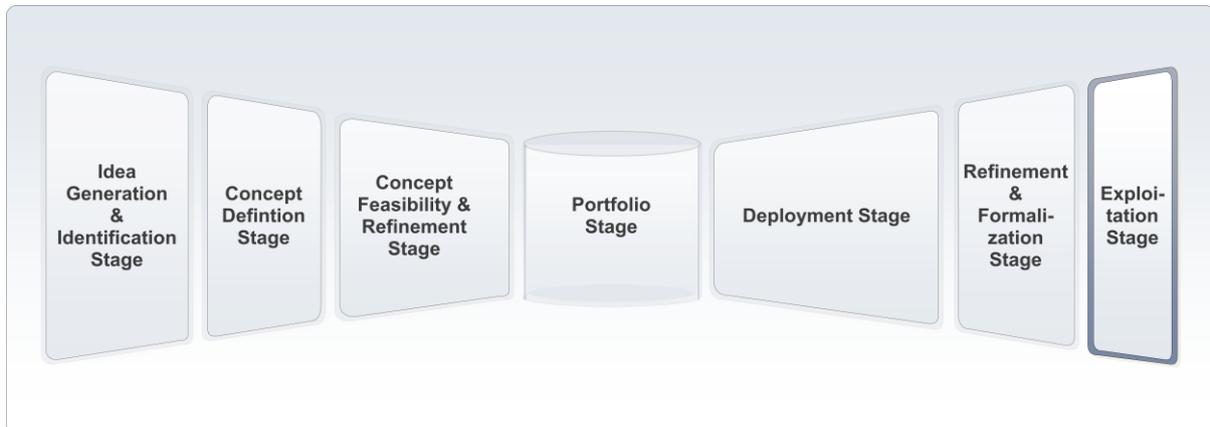
The deployment stage involves the design, implementation, and testing of the innovation solution as identified, conceptualised and decided upon during the previous stages. It includes the detail project planning and management of the design and implementation projects. After the detail design, an implementation gate is used as a final design review before implementation. Implementation of the design involves the development and roll-out of the new innovation.

1.2.2 Refinement & Formalization Stage



After initial deployment the innovation project is in operation, but will most likely not function optimally. The progress of the project should therefore be monitored, measured, evaluated and refined until it functions satisfactorily according to specifications. Once the solution is performing satisfactorily it can be formalized in terms of operational documentation.

1.2.3 Exploitation Stage



Once the solution has been formalised, this is final stage is reached where the solution is further exploited through new business models and markets. The aim is therefore to generate more value from the solution. Before this stage is entered, an exploitation gate needs to be passed where decisions are made regarding which solutions can and should be further exploited. Although this innovation process model appears to be a linear staged process, there are many iterative loops and overlaps between the steps within the different stages. Many of these steps (e.g. idea generation and idea capturing) also occur concurrently. Activities such as portfolio management and the managing of information occur throughout the process.

1.3 FuGle Summary

Most innovation process models evaluated focus mainly on the funnel part of the innovation process (i.e. identifying and filtering new ideas and concepts). Further, they mostly address product innovation as opposed to service companies that have less tangible products (e.g. insurance companies). These models also neglect or totally exclude the exploitation part of a new innovation, i.e. to successfully exploit the innovation in different markets and application areas (including exploitation of different business models for the enterprise). This is important since an innovation should at the end generate more value to the company than the cost that it is associated with. (Du Preez and Louw 2008).

Appendix B- Open Innovation Models

1 Open Innovation Models

This section will give a bit of background on the models allocated by (Marais 2010):

- Idea competition
- Innovation networks
- Customer immersion
- Collaborative product design
- Platforming

1.1 Idea Competition

The phenomenon of idea competitions is increasing in popularity. An idea competition entails an organisation or group of organisations launching a competition where individuals (researchers, designers, prosumers or normal customers) submit solutions to a problem or objective set out by the hosting organisation, in the hope of winning a reward (financial incentive, recognition or another form of value). Idea competitions have grown to become very popular with various companies in various industries. Companies having made use of the process include:

- *Peugeot Concours Design Competition*: Individuals are openly invited to design a concept car, with the hope of having their dream car become a tangible prototype. In 2008 this competition was in its fifth year.
- IKEA launched a contest called *Ingenious People*, where individuals can enter to design new storage units for home media systems. Fourteen winners were selected and invited to the
- IKEA headquarters to receive a financial reward (Palmer and Kaplan 2008)
- The *Google Online Marketing Challenge* took place for the second consecutive year in 2008, with 1 600 student teams from 47 countries participating. The aim of the competition is for student groups to run a company's online marketing presence for a specified period of time.

The winner is chosen based on the professionalism of their campaign and the increase in online presence of the participating company.

Carrol Boyes, the well-known South African cutlery designer, has since 2005 held the annual *METAL* competition, where aspiring designers can submit ideas according to set criteria. The top three designs win a financial reward.

My Starbucks Idea is a synthesis between a continuous idea competition and a modern-day suggestion box system. Prosumers are urged to submit and comment on ideas submitted by the Starbucks community, and the ideas are moderated by a Starbucks employee committee.

The advantages to the organisations responsible for the idea competitions are as follows:

- The organisation receives numerous design ideas, or possible problem solutions whilst only giving rewards and recognition to a select few of the entries.
- The competitions are usually structured that the organisation retains the rights to the entrants' Intellectual Property.
- The capital expense to the hosting organisation is minimal compared to the amount of information and knowledge received by the organisation.

The marketing and promotional aspect of idea competitions cannot be ignored. Creating a competition where entrants are creatively stimulated is an excellent method to market and promote a product or brand. Whereas a television or printed media advertisement creates and stimulates brand awareness for a very short time (a few seconds), idea competitions requires the potential customer to ponder and be creatively active for a longer period of time, while the definition and development of Open Innovation models brand remains active in the entrant's mind. This increases more and longer-lasting awareness and has a bigger impact than any other form of advertising will – all at a reduced cost to the organisation. (Marais 2010)

1.2 Innovation Networks

(Marais 2010)'s research has culminated in the following definition to describe innovation networks:

Innovation networks refer to the technique of incorporating the input from a network of contributors in the form of solutions to identified problems related to the hosting organisation in exchange for a reward in the form of an incentive.

Innovation networks thus entail the organisation posing a problem it is experiencing in its product development process to a community (network) of prosumers. These prosumers are willing to put their effort into solving the problem, because they would like to win a prize that the organisation offers in the form of an incentive relevant to the industry.

This model differs from the idea competition model in the sense that the problems posed here are more specific, detailed technical problems that need solving. (Marais 2010) Whereas idea competitions are orientated towards gaining ideas (open-ended type) or solutions (speculative-type) to broad, undefined problems, the innovation network is suited to more specific, well-defined and well-developed (almost analytical) problems, as illustrated in Figure 7

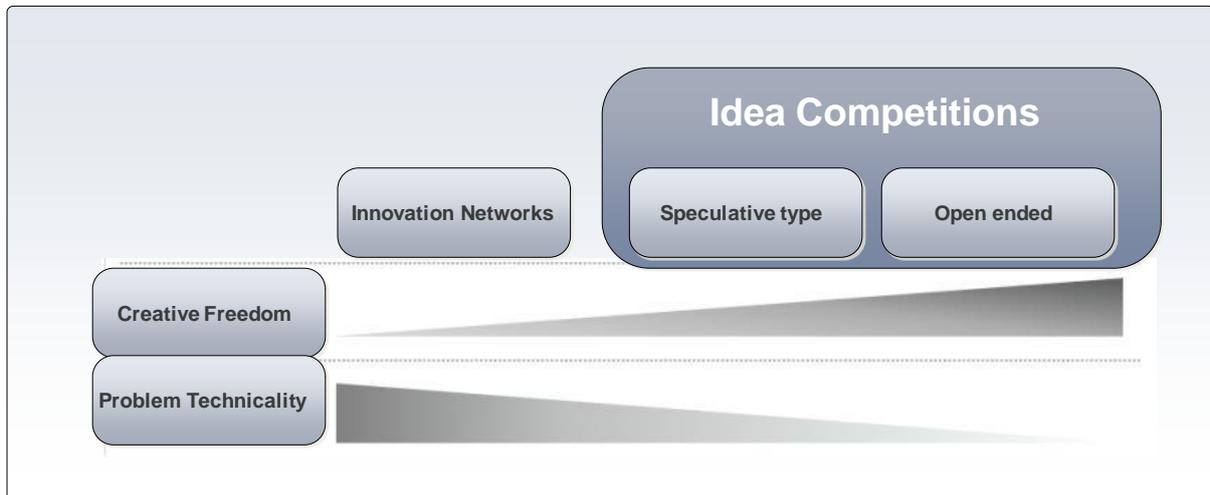


Figure 7: The Differences between Innovation Networks and Idea Competitions

1.3 Customer Immersion

Organisations have long since made use of various methodologies to acquire customer input into new product or service development. The prevalent method being used is focus groups, which was first conceived by Robert K Merton at the US Bureau of Applied Social Research. (Kaufman 2003)

Using focus groups to gain insight into customer behaviour involves interviewing or studying the attitude of a group of people towards a new product, service or brand. In many cases, the item in question is of a hypothetical nature, which makes it more difficult for the focus group attendees to evaluate and comment on it.

The accuracy and accountability of focus groups have also been questioned – it is claimed that 80% of new products and services fail within the first six months after being approved by focus groups (Zaltman 2003). (Zaltman 2003) emphasises the poor accountability of focus groups because their focus does not reflect experience but rather hypothetical choices. Their views are often forced from the attendees under circumstances characterised by misleading communication. (Ulwick 2002) argues that the approaches currently used by organisations to attain customer input into the design process are wrongly orientated. According to (Ulwick 2002), organisations are asking the wrong questions at the wrong time during the innovation cycle. An outcome-based approach to customer input is recommended.

This is in contrast to the more popular product-ideation input from potential customers allowed by organisations. The reasoning is that customers can't be trusted with providing solutions, since it is not their speciality. Rather, the *functional needs* and *wants* for a product or service is what is expected from the customer. This argument relates to Henry Ford's statement:

"If I'd ask my customers what they wanted, they'd have said a faster horse."

This then, relates to the incremental innovations customers can incubate, instead of radical innovations. Instead, (Ulwick 2002) recommends a five-step process on how to approach and introduce customer input into the innovation process:

- *Plan outcome-based customer interviews.* Deconstruct the process or activity the product or service should fulfil into identifiable steps or phases.
- *Capture desired outcomes of each step.* Have the interviewee consider every aspect of the process they go through when using the product or service. The interviewer should then reword the outcome to contain both an improvement, and a quantifiable unit of measure.
- *Organise outcomes.* Group related outcomes and remove duplicates.
- *Rate outcomes for importance and satisfaction.* Perform a survey with the interviewees to assess the importance of each specified outcome.
- *Use the outcomes to jump-start innovation.* Use this data to uncover opportunities for new innovations, products or market segmentation. (Marais 2010)

1.4 Collaborative Product Development

The development of the following definition is based on the research done by (Marais 2010). This serves as an introductory definition of the OI model.

Collaborative product design and development is the technique of increasing the importance and responsibility of suppliers and customers in the product design process and supply chain to result in increased productivity to the benefit of the organisation, and eventually the customer.

This process mainly entails outsourcing the detail design and development of product segments to different parties in the supply chain. Widespread supply chains are not a new concept to business, but the alternative twist it is given in the Open Innovation environment certainly requires a new way of thinking.

The level of detail design required by collaborative product design and development (CPDD) demands the commitment of, and absolute openness between all the parties involved (suppliers and consumers) to minimise the risk of project failure.

Whereas in the normal flow of events an organisation would be continuously scanning for market pull and technology push, with the product and value-addition flowing from supplier to customer, the Open Innovation process adds additional dimensions to the flow of a supply chain.

The organisation only fulfils the role of mediator and quality assurer – responsibilities that will prove to be of crucial importance. In terms of its role as mediator, the organisation still has the responsibility to ensure that all collaboratively developed parts (or segments) fit together to form the whole.

The responsibility of quality assurance means the organisation has to ensure that the collaborated product still meets the guaranteed quality requirements which all internally developed products have to meet.

It is the responsibility for these aspects that gives the organisation its hierarchical control over the process, and justifies its assumption of a profit-taking position in a collaborative environment.

In a recent survey published by IBM, 36% of CEO respondents stated that they are investing more heavily in serving and incorporating these “more sophisticated” customers. This proves that the concept of incorporating these “prosumers” is a reality that will influence the strategic direction and daily activities of the enterprise of tomorrow (Somers 2008)

1.5 Platforming

The concept of platforming entails an organisation developing and launching a certain product with the aim of it being a platform to which users can add customised individual value.

The platform product should be seen as a proverbial sandbox: The organisation supplies the sand, plastic buckets and shovels and then invites prosumers to come up with creations using the supplied elements and tools, resulting in the organisation and the prosumer both gaining value from it.

The essential element in this method is that the organisation should also benefit from the value the prosumer has added to the product. It defies the point if the organisation would develop a platform, but lose all control over the prosumer’s creations, thus not maximising the exploitation of the created platform. (Marais 2010)

Appendix C- Knowledge Work Process

1 Knowledge Work Process

Organizational knowledge is created through a continuous dialogue between tacit and explicit knowledge. (Nonaka 1994) Knowledge Work Processes comprise social interaction and communication processes on an individual or group level. These processes may be categorized according to the transformation that knowledge undergoes as a result of the activity (Schutte and Du Preez 2008)

- Socialization comprises the exchange of tacit knowledge between individuals in order to convey personal knowledge and experience.
- Externalization involves the conversion of implicit into explicit knowledge, and the exchange of knowledge between individuals and a group.
- Systematization transforms explicit knowledge into more complex and more systematized explicit knowledge.
- Internalization is the conversion of organization-wide, explicit knowledge into the implicit knowledge of the individual.

These four knowledge work processes combine to form a spiral representing all the knowledge creation and transfer activities within the network.

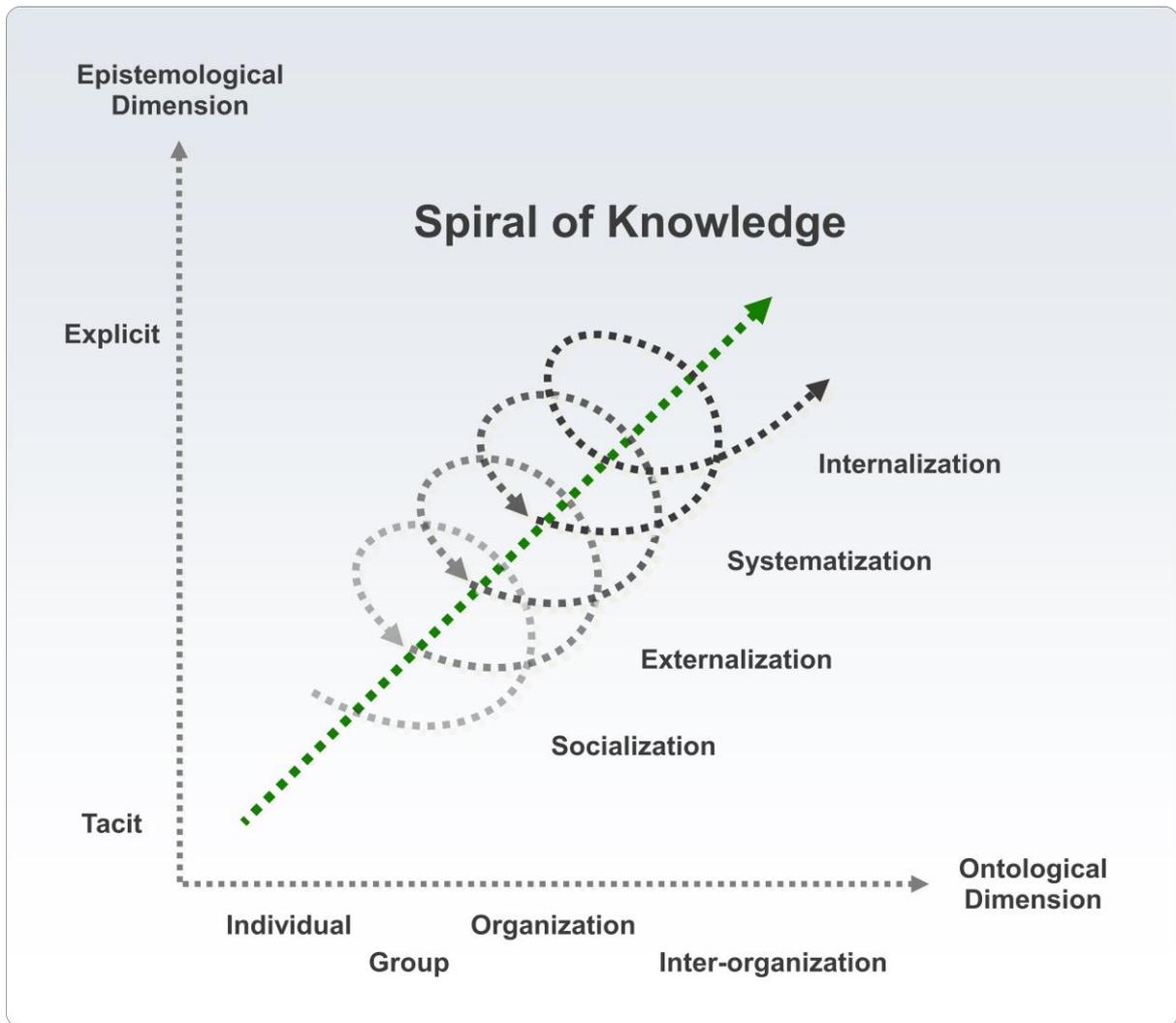


Figure 8: Knowledge Work Processes as a spiral (Nonaka and Takeuchi, 1995)

The Knowledge Work Processes is described by the SECI model in Figure 8, which describes the processes of socialization, externalization, combination, and internalization as four conversion modes from implicit to explicit knowledge (Nonaka and Takeuchi, 1995)

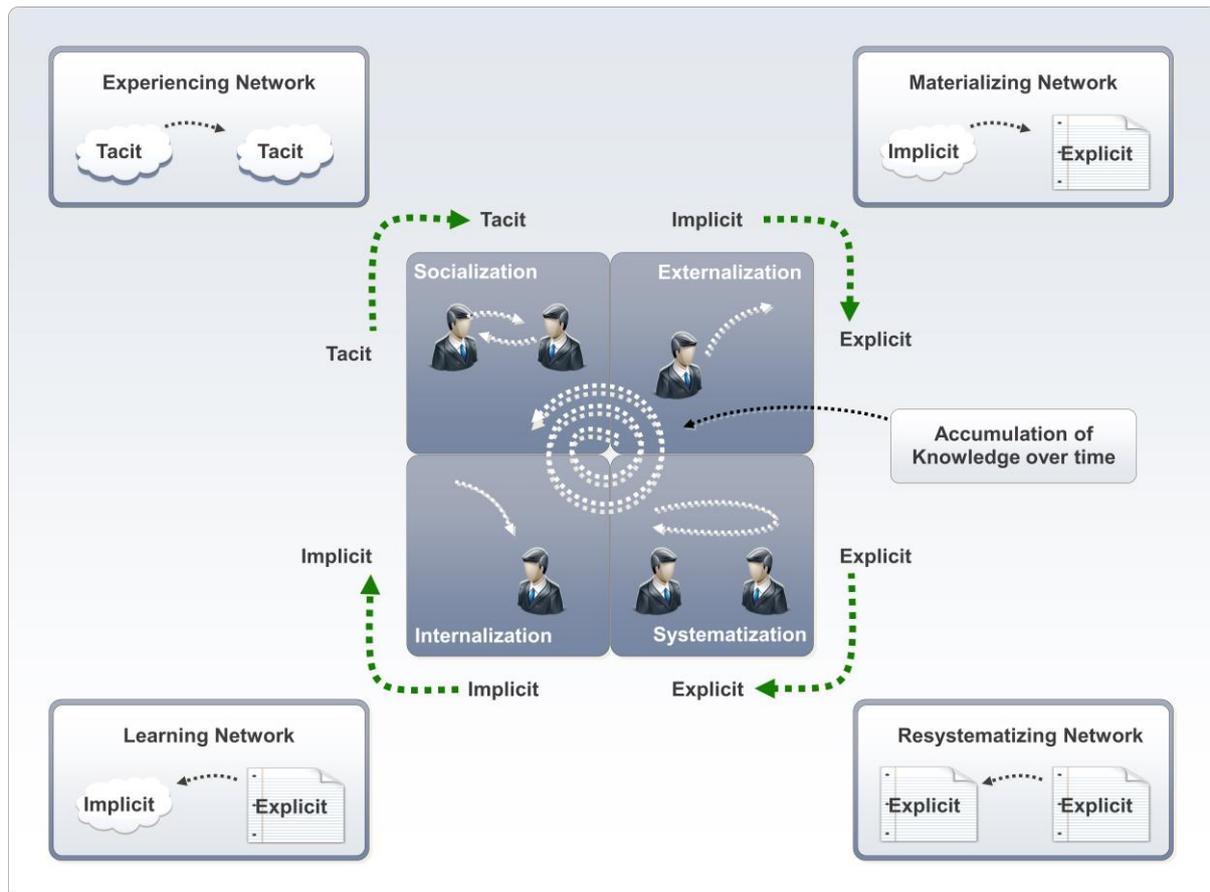


Figure 9: Organizational Knowledge Creation SECI Model adapted from (Nonaka, Konno and Toyama 2001)

Socialization

Socialization consists of the exchange of tacit knowledge between individuals in order to communicate personal knowledge and experience. The term “socialization” is used to emphasize the importance of joint activities in the process of converting new tacit knowledge through shared milieus and experiences. Since tacit knowledge is context specific and difficult to formalize, transferring tacit knowledge requires sharing the same experience through joint activities. In practice, socialization involves capturing knowledge through physical proximity. Knowledge is acquired from outside the organization through direct interactions with suppliers and customers.

Externalization

Externalization describes the transformation processes. This means the conversion of tacit into explicit knowledge, and the exchange of knowledge between individuals and a group. Through externalization, the process of articulating tacit knowledge into explicit knowledge, knowledge becomes crystallized, thus able to be shared by others, and becomes the basis of new knowledge. Through externalization, tacit knowledge is expressed and translated into such forms as metaphors, concepts, hypotheses, diagrams, models, or prototypes so that it can be understood by others. Yet,

expressions are often inadequate, inconsistent, and insufficient. Such differences and gaps between images and expressions can help promote “reflection” and interaction between individuals.

Systemization

The transformation of explicit knowledge into more intricate, complex and more systematized explicit knowledge represents the stage combination. Knowledge is exchanged and combined through such media as documents, meetings, telephone conversations, or computerized communication networks, to converge explicit knowledge into more complex and systematic explicit knowledge which is then called systemization. Reconfiguration of existing knowledge through sorting, adding, combining, and categorizing can create new knowledge. In this mode, communication, diffusion, and systemization of knowledge are the keys. Systemization can also include the “breakdown” of concepts. Breaking down a concept, such as a corporate vision, into operationized business or product concept also creates systemic, explicit knowledge. In the combination process justification of knowledge takes place so as to form the basis for agreement and allows an organization to take practical concrete steps.

Internalization

Internalization is the conversion of organization-wide, explicit knowledge into the tacit knowledge of the individual. This requires that the individual should be able to recognize personally relevant knowledge within the organization. Internalization, the process of embodying explicit knowledge into tacit knowledge, is closely related to “learning by doing.” Through internalization, knowledge that has been created is shared throughout an organization. Internalized knowledge is used to broaden, extend, and reframe organizational members’ tacit knowledge. When knowledge is internalized into individuals’ tacit knowledge bases in the form of shared mental models or technical know how, it becomes valuable assets. This tacit knowledge accumulated at the individual level is in turn shared with others through socialization, setting off a new spiral of knowledge creation.