Causal layered analysis enriching the innovation process

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Declaration

Hereby I, Hendrik Albertus Kotze, declare that this report is my own original work and that all sources have been accurately reported and acknowledged, and that this document has not previously in its entirety or in part been submitted at any university in order to obtain an academic qualification.

Hendrik Albertus Kotze 27 January 2009

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Abstract

This research report aims to show how futures studies or foresight techniques, especially causal layered analysis (CLA), can enrich the attempts of organisations to innovate.

The study discusses the importance of innovation for organisations and shows that innovation is deeply rooted in the knowledge economy. The nature of innovation is explored as well as the different types and degrees of innovation. An integrated innovation model is proposed which is used to establish some of the key challenges which arise from the innovation process. The challenges are expanded to take into consideration those challenges which arise from the approach organisations take to innovation as well as some of the innovation challenges which arise from the underlying organisational culture.

The nature of futures studies is discussed from the perspective of an approach and field of study for creating knowledge and facilitating understanding. This ability of futures studies is explored further to show how it can address some of the challenges which arise from innovation. The study further explores the ability of causal layered analysis, a foresight technique; not only to address some of the innovation challenges but to enrich the innovation process by providing depth and breadth in the analysis of the problem through creating an understanding of the deeply rooted drivers and viewing the problem from different perspectives, effectively expanding the solution set and creating a platform for identifying latent needs and opportunities.

Causal layered analysis is applied to three of the top thirty innovations of the last three decades, testing the hypothesis that successful innovation transcends and addresses needs at the deeper layers. It is shown that innovations which are able to address needs in the deeper levels get embedded in our daily lives and as a result become more enduring.

Opsomming

Hierdie navorsings projek beoog om te wys dat toekomsstudies en die tegnieke in die studie veld, spesifiek “causal layered analysis”, waarde kan toevoeg tot die innoverings probeerslae van organisasies.

Die studie bespreek die belangrikheid van innovering vir organisasies en wys dat innovasie diep gewortel is in die kennis ekonomie. Die aard van innovering word ondersoek sowel as die verskillende tipes en grade daarvan. ‘n Ge-integreerde innoverings model word voorgestel en word gebruik om van die belangrike uitdagings in die innovasie proses te identifiseer. Daar word uitgebrei op hierdie uitdagings deur in ag te neem die benadering wat organisasies neem tot innovering asook die uitdagings wat voortspruit uit die onderliggende kultuur in die organisasie.

Die aard van toekomstudies word bespreek uit die oogpunt van die benadering van die studie veld om kennis te skep en begrip te bewerkstellig. Die vermoë van toekomstudies om die uitdagings wat deur innovasie onstaan word verder ondersoek. Die studie ondersoek ook die vermoë van “causal layered analysis”, as ‘n toekoms tegniek, nie net om die innoverings uitdagings te adresseer nie, maar ook deur die verryking van die innoverings proses waardeur begrip geskep word. Begrip volg deur die diepte en wydheid van die analise van die probleem, asook deur die probleem vanuit verskeie oogpunte te benader. Hierdeur word daar meer moontlike oplossings blootgelê en word daar geleentheid geskep om nuwe geleenthede te identifiseer.

“Causal layered analysis” word ook toegepas op drie van die top dertig innovasies van die laaste drie dekades om die hipotese te toets dat suksesvolle innovasies, behoeftes in al die lae aanspreek, spesifiek in die diepliggende areas. Die studie wys dat innovasies wat behoeftes in die diepliggende areas aanspreek deel word van ons alledaagse lewe en sodoende meer langdurig word.

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CHAPTER 1
INTRODUCTION

"Those who live by the sword will be shot by those who don't" Gary Hamel (2002)

1.1 Background

Innovation is not a new management concept and the understanding of the economic benefits it holds were described by Schumpeter (Weller, Green & Fernie, 2004: 1) as early as 1939. These economic benefits are evident from history and Ayres shows how these coincide with the long term economic cycles, as defined by Nicholas Kondratieff, with a marked increase in invention and innovation, especially during the contraction stage of the economic cycle (Futures Studies, 2008: 21).

But things are changing. Walking into a management board meeting these days, chances are that somewhere in the discussion innovation will be touched on in some way or form. There is a renewed interest in the benefits that innovation holds and the basis for the discussion will be around the want to start doing it, the need to do more of it, wanting to do it differently, a celebration of the successes due to it or in many cases a review of why it has failed. Innovation is not that "thing" anymore that happens at the end of era's or economic cycles. This renewed interest is very evident from business periodicals like the Harvard Business Review in which more than 50% of the 2 175 articles published on innovation have been since 2007 (HBR, 2009).

The mantra for many management boards has become: "Innovate or die" (Hamel, 2002).

This mantra is informed by the mandate handed to the management boards, by shareholders, to deliver ongoing growth and return on their investment. This is described by Tucker (2002: 14) as the growing "growth gap" that organisations face. He argues that innovation is an important, if not the only way, for organisations to continue to deliver sustainable future growth, as traditional methods, will not necessarily hold in

future. These traditional methods depend primarily on the increase of marketing and sales, betting on the industry growth, cutting cost, diversifying the products and services offered or through acquisitions and mergers.

The impact and sustainability of these methods are limited due to the proliferation and increase in competition.

A study conducted by the American Management Association (2006: 10-11) found the following reasons behind many organisations' drive for innovation:

Table 1.1: Reasons for innovation

Internal Reasons	External Reasons
Responding to customer demands	Customer demands
Increase operational efficiency	Technology
Increase revenue and profit margins	Pace of change
Develop new products or services	Collaboration / alliances with customers
Increase market share	Availability and cost of talent
Better use of new technologies	Globalisation / Increased competition

Source: American Management Association, 2006: 10-11

Although increased competition is seen as one of the external reasons for innovation, it is in essence one of the main driving forces. One can argue that the increase in competition has created demanding consumers through a culture of choice and constant change, therefore stimulating the need for organisations to develop always newer products and services. This is all done in an effort to have the consumer or customer build an emotional connection with the brand. Competition also drives the availability and cost of talent by reducing the supply of available talent pipeline.

Competition therefore becomes a key driver for organisations to innovate in an effort to survive and avoid the convergence and hyper competition gap (de Coning, 2009; 18).

Increased convergence in competition puts downward pressure on the organisation's margins (Lord, deBethizy & Wager, 2005: 20-21) through organisations trying to

differentiate purely on price, significantly increasing the risk of commoditisation of their products and category (Korth, 2006: 19).

Whaley (2008: 13) and Crane (2006: 10) both argue that the competition threat will not only continue in future but escalate to a hyper competitive environment (de Coning, 2009; 18). The increased threat will be predominantly coming from emerging markets, who are investing in higher education and scientific research, creating a framework for spring-boarding their innovation programmes (Crane, 2006: 10). Emerging economies do not stop there, they also offer other incentives like the example of China who provides tax deductions of up to 150% of the research and development cost incurred (Crane, 2006: 10).

Lord, *et al*, (2005: 20-21) adds two further reasons for the renewed attraction that innovation holds. The first, he argues is the failure of the old innovation model. Simply introducing an innovative product to market will not sustain the organisation into the future, being first does not secure the business. Consumers have become demanding and require constant reinvention of their products. The second reason is that the new thinking and fresh approaches to innovation is adding some useful techniques to the innovations toolbox.

Given that innovation is then the proverbial “silver bullet”, why then, do so many organisations experience the innovations journey as their Nemesis and are left disillusioned by it?

1.2 Problem description

A report by the Boston Consulting Group highlights that only 43% of the organisations researched were satisfied with the payback on the investment made into their innovation programmes, a percentage which has been falling in recent years (Innovation Metrics, 2009: 35).

In an effort by organisations to increase the likelihood of success for innovations, measurements have been defined in an attempt to manage the process better and gain

key insight to adept the process to gain better success levels. A McKinsey survey reports that seven key metrics are used in about 40% of the organisations (Innovation Metrics, 2009: 35). These measures include R&D spending as a percentage of sales, the total number of patents filed, pending or awarded, the total R&D headcount, the current year percentage sales due to new products released in the past n years, the number of new products released, the number of products or projects in active development and the resources invested or dedicated to the new product development (Innovation Metrics 2009: 36).

These measures focus predominantly on the output of the innovation process or the activities involved. Lacking on measurement for the entire spectrum of inputs and not assessing the entire process form end-to-end.

We are therefore still left with a number of questions:

1. Why do some innovations succeed and others fail?
2. Why are some organisations more successful than others turning out one successful innovation after the other?
3. What's the recipe for achieving success or at least increasing the chances of getting it right?

What is evident is that the nature of innovation is uncertain. This uncertainty arises mainly due to application of some new processes or technology to solve some problems where the impact of these solutions will only be measured at some time in the future, a future where change has become the norm and the level of change has escalated. Consider the sub-prime crisis experienced in 2008 catapulting the world into a global financial crisis and recession.

But since we do not know what the future holds, one can beg the question as to whether or not getting innovation right does not just come down to pure luck.

InnovationPoint (2009a) puts forward the following argument:

"While it's impossible to forecast the future, it is possible to make a series of opinions about the future, and test these opinions against future scenarios that are grounded in

an understanding of emerging and converging industry trends. Without a creative view of the future, companies are limited by the strategies and opportunities of the past."

By creating views of the future and treating these as certainties it becomes easier to build strategies to exploit possible opportunities or mitigate potential risks which might arise.

So, can one therefore use futures approaches to hedge against the inherent risk innovation holds and increase the probability of launching successful innovations?

1.3 Research objectives

This research report seeks to explore the future orientated nature of innovation and to show that focusing innovation efforts here can provide organisations with a platform for more focused and sustained innovations by understanding the customer needs now and in the future.

It is this understanding of the true customer needs, now and in the future, that can provide the identification of opportunities as well as provide a structure for selecting customer relevant innovations. This understanding, however, needs to be at a deeper level for the innovation to be enduring and sustainable.

This is encapsulated by Henry Ford, who said: "If I had to ask them what they wanted they would have told me a faster horse." Henry Ford understood that people were not really looking for a faster horse but for a quick, safe and comfortable way to move from point A to point B.

The objectives for this research report are therefore to

1. understand the innovation process;
2. understand futures studies or foresight as a knowledge discipline;
3. understand how foresight techniques can enrich the innovation process; and

4. explore the use of causal layered analysis (CLA), a futures technique developed by Inayatullah (1998), as a method for deeper understanding of customer needs to shape and enrich the innovation agenda.

1.4 Methodology

The research conducted will be based on a comprehensive literature study through consulting a range of sources, including books, local and international periodicals, local and international journals and published material on the internet.

The ideal design for this type of study is a longitudinal study, applying the proposed techniques and tracking the success on a number of innovations. Due to the scope and timeframe for the research paper this will not be possible. It is, however, the belief of the author that although the research study is not based on this approach there will still be key points established which could be taken through a process of rigorous research to establish the hypothesis beyond all doubt.

The research approach will try to approximate a longitudinal study through applying a post-analysis of CLA on some innovations which are generally accepted as the great successes and failures of the last decade. This will be able to provide some directional results but will not be able to prove the hypothesis beyond all doubt.

1.5 Layout of the study

The research paper will follow a structured approach where each of the relevant components relevant to this study will be analysed chapter by chapter.

Chapter 2 will focus on innovation. The chapter will start by defining innovation as a concept, providing a base understanding of what it is all about. It will also explore in more depth the importance of innovation for organisations. The innovation process will then be looked at in more detail exploring each of the steps. The chapter will conclude by taking a look at the pitfalls and opportunities for enhancing the innovation process.

Chapter 3 will explore futures studies or foresight as a discipline and the opportunities it holds for the innovation process by addressing some of the pitfalls or opportunities identified for enhancing the process. Some time will be spent exploring and discussing the methods already applied by organisations to enrich the innovation process.

In chapter 4 Causal Layered Analysis (CLA) will be defined and the method will be discussed in more detail. The chapter will conclude with a discussion on the application of this technique in the innovation process to enrich it by providing a platform for better understanding customer needs, enhancing opportunity identification as well as provide a basis for analysing proposed innovations as to their relevance in addressing the identified needs.

Chapter 5 will assess some the top three innovations which was identified as part of research conducted by Knowledge@Wharton to identify the “Top 30 Innovations of the last 30 years” (Knowledge@Wharton, 2009). The Causal Layered Analysis (CLA) method will then be applied to these identified innovations to test the viability of the technique in the innovations process. The chapter will conclude by an opinion of the plausibility of the hypothesis.

Chapter 6 will summarise and conclude on the findings as well as some recommendations for further exploration and research.

CHAPTER 2
DEFINING INNOVATION

"It is not the strongest or most intelligent that survive, but the ones that are most responsive to change" Clarence Darrow (1987)

2.1 Introduction

The world has become smaller and more integrated as a result of globalisation. While globalisation has opened new markets for businesses, it also increased the competitor threat to many organisations. Barriers to entry are slowly but surely broken down and the sustainability of many organisations are under threat. To add to the pressure, shareholders want higher and sustainable return on investment every year or they will take their money somewhere else.

Tucker (2002: 14) defines this as the growing "growth gap" which necessitates organisations to start innovating. Organisations that continuously deliver on the profit growth expectations of shareholders are recognised for it. A study by Mercer (2005) found that organisations delivering growth through value innovation are rewarded a 26% compounded annual growth rate in terms of their market value. While, those organisations which deliver higher profit growth through mainly cost cutting initiatives are only awarded a 16% compounded annual growth rate. Davila, Epstein and Shelton (2006) support these findings and argue that innovation is the key to unlocking top-line growth, resulting in increased bottom-line results.

A study by Kim and Mauborgne (2007) found that top and bottom line growth were essentially made up of incremental improvements and value added innovations. Incremental improvements, which include cost cutting initiatives, accounted for 86% of activities, 62% of revenue and 39% of profits. Value added innovations on the other hand, accounted for the remaining 14% of activities, 38% of revenue and 61% of profits.

However, the need for organisations to innovate does not only stem from the need to deliver sustainable profits, that is closing the growth gap, but recently also started to arise from societal and government pressure to act responsibly. This is a key requirement to subsequently secure the business' license to operate. Although many organisations view the sustainability or responsibility agenda as a barrier to innovation, a report by KPMG (2007: 1-3) highlights that these challenges could hold substantial opportunities for organisations. The report shows how companies like General Electric, Toyota and Wal-Mart delivered against the growth agenda by addressing the sustainability or responsibility agenda, changing their business models and effectively changing the rules of the game for competitors. The report highlights that 53% of the 1600 of the world's largest companies surveyed are driven by the sustainability or the corporate social responsibility agenda to innovate.

Business model innovation is not something attempted light heartedly; however, Gopalani (2009: 3) argues that this can deliver revenue growth of between 15% and 40%, adding between 15% and 25% more to the bottom line of the organisation.

Although many organisations still use innovation only as a differentiation strategy (Vila & Kuster 2007: 17-18) it needs to be seen to form part of the bigger business strategy, impacting on the product offering, the processes, the target market and even the structure of the organisation. Innovation is an enabler to the business strategy.

Kim and Mauborgne (1997: 103-104) conclude after a five year study that the key to success for high growth companies are their approach to strategy. They argue that while many organisations use their industry or competitor conditions as input to set their strategic direction, and subsequently innovate as a response to competitor action, many successful organisations drive value innovation to render the competition irrelevant.

CNN is considered a key example of the changing face of news broadcasting. CNN is able to bring people news 24 hours a day, at a lower cost than most network stations can provide news based on the "news anchor" model (Kim & Mauborgne 1997: 103-104).

2.2 The essence of innovation

To really understand what innovation is about, it is important to define what is meant by it.

Starting with a very simplified definition as proposed by Tucker (2002: 18), innovation can be described as: “bringing new ideas to life”. Although this definition describes the essence of innovation, being simplistic has caused confusion and the term innovation is in some instances used interchangeably with terms like invention or change.

Change by itself does not constitute innovation, but innovation presupposes change (Johannessen, 2009: 160). Change can happen in the absence of innovation. Just consider the discontinuation of one’s favourite coffee brand. This is not innovation but will require a change in behaviour of adopting a new coffee brand. On the other hand, by introducing an innovation there needs to be a change in behaviour for the innovation to be successful. Consider the introduction of the iPod, it changed the music listening culture from where, when and how we listen to our favourite tracks.

Differentiation between innovation and invention is provided by Weller, *et al*, (Weller, Green & Fernie 2004: 1-2) quoting the working of Schumpeter (1934) as: “Innovation possible without anything we should identify as invention, and invention does not necessarily induce innovation”. Invention is therefore focussed around coming up with new ideas, while innovation can be as simple as applying an old idea in a new way. The only requirement, however, is that the applied idea needs to be considered new by those who adopt it.

A more comprehensive definition of innovation is provided by Luecke and Katz (Mundt 2007: 4) who introduce what one can describe as a knowledge based definition: “Innovation is the embodiment, combination, or synthesis of knowledge in original, relevant, valued new products, processes, or services”.

This idea of innovation being a knowledge based process is also proposed by Johannessen (2009: 159), who follows a systems approach and describes innovation as an interactive model where relationships are formed, researched and developed,

consisting of components like structural links, tacit knowledge, interactive learning, a cultural context and social processes amongst other.

Innovation is therefore driven by a knowledge based process, within the context of a system; with the objective of developing an idea and applying it in such a new way that it results in an increase in value for the adopter. It is the knowledge based and systems dimensions of innovation which creates linkages to futures studies and will be further explored in Chapter 3.

To gain a deeper understanding of innovation, it is also necessary to understand the attributes of innovation relating to the nature, types, degrees and the process of innovation.

2.3 The nature of innovation

The first aspect for consideration in terms of the nature of innovation, is that it is a process and not a once off event, which follows directly from the definitions of innovation as proposed by Luecke and Katz (Mundt 2007: 4) and Johannessen (2009: 159). The process is characterised by an iterative loop of learning, understanding and discovery throughout each step of the process (von Stamm, 2009: 15). At each step knowledge is gained and re-applied to refine and improve the concept. This is continued until the point where the idea becomes a value adding and commercially viable product, process, market or structure. Inovo (2008) proposes that the process relies on iteration and abstraction which arise from the synthesis of knowledge and consists of mainly three stages:

1. Iterative deepening
2. Searching and exploration
3. Knowledge synthesis

The iterative deepening stage is about the development and refinement of knowledge, leading to the next stage which is an evidence-based process of search and discovery.

During the last stage the knowledge acquired through the previous two stages are assimilated through pattern recognition and inductive reasoning.

The nature of innovation is not necessarily good. The “good” or “bad” nature of innovation arises from two areas, namely, the intention and secondly the unintended consequences following from the application of the innovation. The intended use of innovation can be for “good” or “bad”. Hughes (2006: 21) highlights the “bad” intended application of innovation through providing the creation of weapons of mass destruction as a key example. Despite that fact that the intention of the innovation might be for “good”, the unintended consequences which follows from the implementation might be considered “bad”. Our history is littered with examples of these types of innovations. Consider the multitude of pharmaceutical “failures” where innovations in medicine to cure specific diseases had unintended consequences, like resulting in birth defects.

Another attribute in the nature of innovation is its future orientation. Morris (2008) describes innovation as “a venture into the unknown”. Innovation attempts to address some current or future need to deliver some future profit growth. The future orientation of innovation also follows directly from the consequences that innovation holds as well as the uncertainty associated with the success and sustainability of the innovation. The future is an uncertain place and assumptions consider relevant today might change overnight due to some change in the environment. The sub-prime crisis which started in 2008 triggered a global recession. Since innovation is a knowledge based process, knowledge about the future is therefore a key input into the process and ignoring it has left many organisations disillusioned.

Innovation is also a process of “creative destruction” (Quere 2008: 138). The innovation process can be also described as a creative process, whereby the creative application of an idea, to solve a problem, brings innovation to life. By creating something new and applying it, the old products, services, processes or markets are partly or in their entirety destroyed. An example of this is the development of Windows, which replaced the old text-based DOS operating system. De Coning (2009) also argues that if organisations want to be successful they should “destroy” non-value adding processes or products to deliver the value to the organisation.

Innovation must be value adding. This follows from the definition of Luecke and Katz (Mundt 2007: 4), who states that innovation must be valued by those who adopt it. It is this value creation for the adopters that allows the innovating organisation to commercialise the idea and drive bottom line growth. It therefore becomes a key requirement for innovation to be successful. Crane (2006: 13-14) argues that it is innovation which has left us better off than our grandparents. Not by having more but by having access to higher valued goods and services.

2.4 Types of innovation

It is easy to identify examples of product innovation, but innovation can be more than just product focussed. In addition to product innovation, Vila and Kuster (2007: 20-21) proposes three more types of innovation which is based on the work of Henard and Szymanski (2001), which include strategy, process and market innovation.

While product, strategy and process innovation is internally focussed, market innovation is focussed externally to the organisation.

An organisation which has been successful in integrating all four innovation types is Apple. With Apple's launch of the iPod, they were able to deliver a MP3 player through an innovative product in the way it looks and works. This was achieved not by adding more functionality but by reducing the complexity and user-friendliness. They went further and were also able to redefine their business model through strategy innovation, delivering not only a product, but giving the iPod user access to special services through the iStore concept. Music and movie lovers are now able to buy their favourite music and movies online. To enable all of this they had to re-invent their processes and introduce new ones to support the new product and service offerings. Apple was able to move from being a hardware and software business into the servicing industry. Through this transformational innovation, Apple was able to do market innovation, accessing new market segments which would previously never have considered buying a traditional MP3 player. This innovation accounted for more than 50% of Apple's revenue in just three years and moved Apple's market capitalisation from $1 billion in 2003 to $150 billion by 2007 (Johnson, Christensen & Kagermann, 2008: 51).

Johnson, *et al* (2008: 54), uses Hilti as a good example of strategy innovation achieved through the change in their business model. Hilti focused on manufacturing and selling high quality tools, mainly to construction workers. But with increased competition, especially from the East, being able to provide similar or slightly lower quality products at significant lower costs, Hilti was forced to rethink their future. Through gaining a deeper understanding of their customer's needs they were able to redefine their business model from manufacturing and selling tools, to manufacturing and leasing tools. They realised that their customers did not make money through owning tools but through putting them to use. This change resulted in the need to innovate the supporting business processes and structure of the organisation to enable the new service offering. It also required new skills from the employees, representatives now needed to have a deeper understanding in contracts and leasing agreements.

2.5 Degrees of innovation

Not all innovation is equal, the degree to which it contributes to the organisation's bottom line and the level of change it brings about, differ from innovation to innovation. Von Stamm (2009: 14) defines two levels of innovation, incremental and radical innovation. However Tucker (2002: 24-29) proposes a third level which he terms substantial innovation and finds its place between incremental and breakthrough innovation.

Tucker (2002: 25) proposes that there exists a relationship between the degree of innovation and the level of change involved. This level of change is either as a result of the change required to bringing the innovation to life or through the impact or consequences it has and level of change required by the adopters.

The different degrees of innovation is not limited to any specific type of innovation, as defined in the previous section, but exist for each type.

First, let us consider incremental innovation. Incremental innovation usually requires very little change and the resultant impact to the bottom line of the organisation is not

significant (Tucker 2002: 24). It also does not drastically change the perceived value experience of the customer. For process type innovation this level of innovation is very often associated with establishing efficiencies in the process. Car manufacturers introducing face-lifts to their current model range to boost sales, is an example of incremental innovation.

Substantial innovation is a step up from incremental innovation, in that the perceived value delivery to the customer is more and results in a significantly higher bottom-line impact for the organisation (Tucker 2002: 26). This type of innovation also allows the organisation to charge a premium for it due to the customer's willingness to pay more for the additional value delivery. In the tobacco industry, an example of this degree of innovation is menthol thread technology. Menthol application has traditionally been done through direct menthol application to the foil insert, allowing the tobacco to absorb the flavour. Menthol threat technology on the other hand consists of a thin menthol threat inserted into the filter. This allows for a more consistent menthol delivery to the consumer, a better smoking experience and increased value resulting in the manufacturer being able to charge a slight premium.

The last level is breakthrough innovation, which is in essence the game-changing innovation. Tucker (2002: 27) describes this degree of innovation as "giant leaps forward". The level of change associated with breakthrough innovation is substantial, but so also is the increase in the bottom line (Kim and Mauborgne 2007) due to the significant increase in the perceived value by the customer. One of the innovations of the twentieth century which has had a significant impact on the world was air travel. The level in change was significant. This change was not only from a travel experience point of view but also from a knowledge and cultural sharing perspective. However, as discussed earlier, some of the unintended consequences of air travel is evident from the spread of diseases, as we are currently experiencing with H1N1 influenza pandemic. This influenza would have been probably limited to a specific area or continent, but air travel has given it the "wings" to spread into a pandemic threatening multiple continents.

2.6 The innovation process

As discussed earlier, innovation is not a once of event but a process of taking an idea through iterative stages of development to the point of commercial exploitation.

Von Stamm (2009: 13) suggests that the innovation process consists of three stages namely searching, selection and implementation. Weller, *et al*, (2004: 2) references the work of Rogers (1995), who argues that there is a fourth stage namely innovation diffusion which is the theory of how innovation spreads and is taken up by society.

Based on the work of von Stamm (2009), Palmer and Kaplan (2007), Roger (1995) and Morris (2008) an integrated innovation model is proposed, graphically represented in Figure 2.1.

The starting point for the innovation process is the strategy of the organisation. Morris (2008) terms this strategic thinking and Palmer and Kaplan (2007) terms it strategic alignment. This allows the creation of a shared vision of what needs to be achieved and ensures alignment throughout the organisation (Palmer & Kaplan, 2007: 8-9). Morris (2008: 4) argues that this is where the goals for the organisation are set and the platform is created for the initiation for the search of ideas. The focus of this section is not on how existing technologies can be retro-fitted to current problems but rather taking an external view focussing on what it is that people want (Inovo, 2008). Strategic alignment does not form part of the innovation process but is the trigger for the organisation to become innovative.

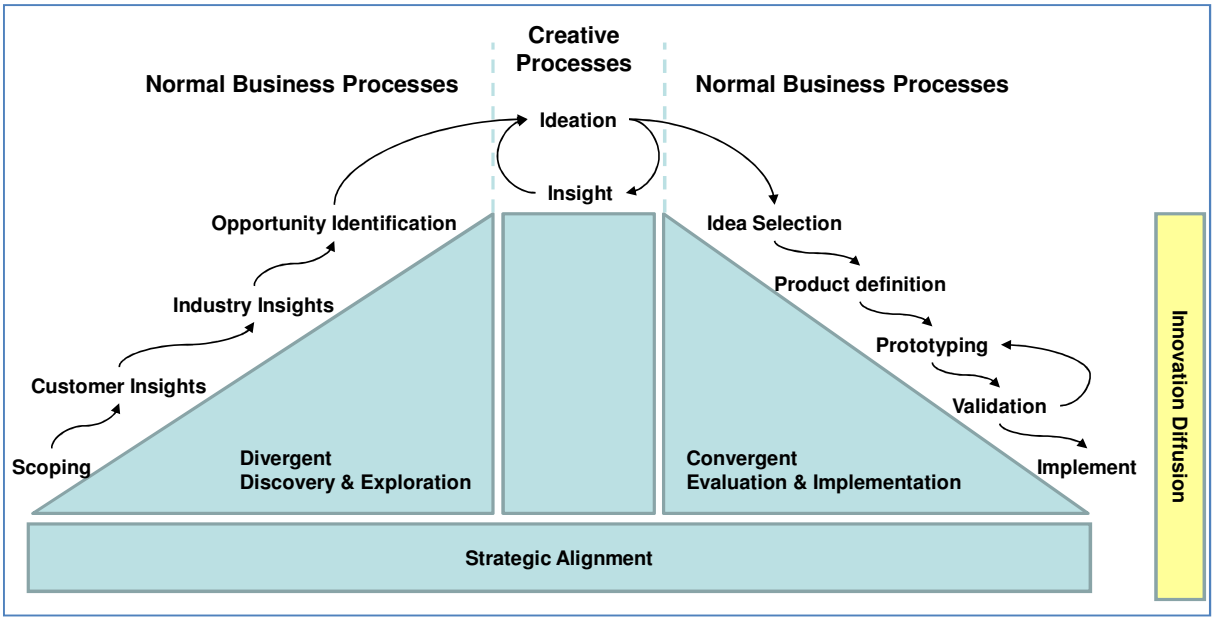

Figure 2.1: Innovation process
Source: Author (2009), Palmer and Kaplan (2007), Morris (2008), Rogers (1995) and von Stamm (2009)

The innovation process consists of two areas: the business process area and the creative process area. Based on work by Synectics (Luten, 2009) these two areas are distinct and cannot overlap when transformational innovation wants to be achieved. The business process area is characterised by entrenched processes and governance structures which is restrictive and not conducive to creative ideas. This is required for the business to operate. The example provided by Luten (2009) is that of an airline pilot flying a plane. In this situation one wants the pilot to operate purely in the business process areas with strict control and governance in place, not allowing the pilot any leeway in terms of flying the plane "creatively". The creative process on the other hand must be characterised by as little as possible constraints to ensure that the ideas, which seem impossible at first glance, are given the opportunity to be explored and developed.

The business process area consists of two ways of thinking namely divergent and convergent thinking. The divergent part is about discovery and exploration (Palmer & Kaplan, 2007: 7-8). Here the participants are encouraged to explore all the possibilities taking a multiple perspective approach to the problem. The divergent thinking escalates as it nears the creative process which is all about divergent, "blue sky" thinking. Palmer & Kaplan (2007: 7) argue that it is this type of thinking, which leads one to breakthrough ideas. Convergent thinking is about the application of traditional business tools

providing governance structures and a basis for sound business decision making and managing the risk (Palmer & Kaplan, 2007: 8).

The steps in the divergent thinking area include scoping, customer insights, industry insights and opportunity identification.

Scoping and planning the process which will be followed, as well as identifying the participants involved is only the starting point. Having the right people on board from the beginning can help in gaining stakeholder buy-in and ensuring alignment in the organisation. Those individuals involved also needs to be carefully selected, because having too many closed-minded individuals involved in the process can also hamper the discovery of those breakthrough ideas (Palmer & Kaplan, 2007: 9).

Understanding the customer or consumer and gaining insights at a deeper level, both from an articulated and unarticulated needs perspective can open up undiscovered opportunities, providing the organisation with a competitive edge (Palmer & Kaplan, 2007: 11). Both Morris (2008) and von Stamm (2009) view this as a critical step in the innovation process. This step is about building both explicit and tacit knowledge (Morris 2008: 8). Explicit knowledge is knowledge we can easily articulate while tacit knowledge includes the values and belief systems of societies which is seldom articulated.

Deepening ones understanding into industry trends can also lead to “white space” opportunities brought about by regulation, environmental, technological and social trends amongst other (Palmer & Kaplan, 2007: 10).

Given the insights gained the organisation might identify a large number of potential opportunities to pursue. A decision is required at this stage on which of the opportunities will be further explored and move into the creative and ideation phase. Potential questions to help provide some direction for the opportunity selection include the following:

1. What is the customer need that has been identified?
2. Is it a current or future opportunity?
3. What are the potential size, volume and value of the opportunity?

4. Will this opportunity provide “first mover” advantage?
5. What are the barriers to entry for opposition?
6. Will it provide a competitive advantage?
7. How difficult will it be and how long it take to develop the opportunity?

The danger, however, is that those opportunities which are pursued are those considered easy for the picking and will deliver on the short term objectives of the organisation while the breakthrough opportunities are overlooked and seen as too difficult, something organisations must guard against.

The next phase is the creative process where ideas on potential solutions are generated for the identified opportunities. This is where the knowledge gained in the previous stages is assimilated to gain an understanding of the implications and how this can solve current and potential future problems (Morris: 2008: 9). Based on the work by Synectics (Luten, 2009), the ideas should not be constrained and the participants in this process are encouraged to think impossible, immoral and illegal, in an effort to open up the thinking of the participants. During the process all ideas are provided with an equal opportunity to be selected and the identified ideas are systematically worked from the impossible to feasible solutions. This is achieved by focusing on the preferred features of the ideas and searching further for solutions to overcome those features that will make the idea not feasible.

Once a set of feasible ideas have been identified another decision point is encountered which is termed “idea selection” (Tucker, 2008). Organisations are constrained by limited resources to pursue innovation ideas and therefore not all ideas can be pursued. Tucker (2008) identifies effective idea selection as a critical point in the innovation process and suggests that organisations develop criteria to select ideas, treating every idea of equal value. Effective selection criteria will help counter the development to idea bottlenecks (Tucker, 2008). Von Stamm (2009), however, warns that organisations should steer clear of standard selection criteria as this could kill the most radical game-changing ideas. For this reason the idea selection should take place as part of the creative process and not within the normal business processes.

Heerkens (2006: 385) identifies a number of phases in the decision making process of idea selection and argues that the importance assessment process is the one which holds the most opportunity for improvement. This is due to the decision maker not having relevant past experience to base the decision on which could lead to subjective decisions based on personal preferences (Heerkens, 2006: 385).

Tucker (2008) however warns that effective idea selection will not guarantee that the best solution is selected.

Once the ideas have been selected, the process moves back into the normal business process area. The identified ideas move into a process to define what the business or product solution can look like. The defined solution is then prototyped and validated with customers or consumers through testing and research. The insight gained during the validation process is then used to refine and improve the prototype. This process is repeated until a commercially viable solution is found. In the final phase, forming part of the business process, the idea is implemented or taken to market.

Based on the experience of the author, the iterative process to refine the prototype must also contain key decision points to ensure that scarce resources are not wasted on a solution which seemed viable and is no longer. This usually occurs in situations where those driving the innovation have become so emotionally attached to it that they want to make it succeed at all cost.

The last phase in the innovation process happens externally to the organisation and it is here where the success or failure of the innovation manifests. Roger (Weller, Green & Fernie 2004: 2) defines this phase as the innovation diffusion phase and entails the process by which customers or consumers adopt new innovations. The steps in adopting innovation are defined by Roger (Weller, Green & Fernie 2004: 2) as knowledge, persuasion, decision, implementation and confirmation.

During the knowledge stage, the individual becomes aware of the innovation but is not actively seeking information about it. Once the individual becomes interested in the innovation they move to the persuasion stage, where they actively seek information about the innovation. Once the individual has gained sufficient information they will

choose to either accept or reject the innovation. Three levels of innovation decisions exist, namely, optional, collective and authority decisions. These decisions range from the individual, to a collective decision or lastly where the decision is taken for the social system.

If the decision has been taken to implement the innovation, the individual employs the innovation and determines it usefulness. At the next stage, confirmation, another decision point is encountered where the individual decides to continue and entrench the innovation or reject it. It is this point at which one can really only comment on the success of innovation, that is whether sufficient people have adopted the innovation.

2.7 Innovation challenges

Despite all the literature and case studies available on innovation best practice, innovation still leaves many organisations disheartened. Failure rates of new products are still high and it is estimated that 50%-90% of new innovations fail (Olson, Waltersdorff & Forr, 2008: 1). The challenges that organisations face to get innovation right lies in three main areas, namely, the approach the organisation takes towards innovation, the inherent challenges to the process and the organisation's culture which underpins the entire approach and process.

Tucker (2002: 4-9) proposes five key principles that organisations need to consider in their approach to innovation. Firstly, innovation must be approached as a discipline which means that a structured approach is required to a creative process. Although it seems counter intuitive, the structured approach allows those involved in the innovation process a platform from which innovation business cases can be put together, getting sign off and implemented. Due to the structured approach it also allows for the tracking of the process. Based on the author's experience, it is important that the structured approach be different from the business as usual processes. Due to the rigidity of the governance structures in the business as usual processes, many transformational ideas will potentially be stopped due to the strict requirements it will need to adhere to.

Innovation must also be approached comprehensively (Tucker, 2002: 4-9). This comprehensive approach is on two levels. First, a systemic approach to innovation through understanding the innovation at the strategy, the structure, processes, products, customers, employees and the environment level. Many organisations try and deliver new products or services through old business models and process which is not supportive or optimal for the new direction the organisation has taken.

Innovation must include an organised, systematic and continual search for new opportunities (Tucker, 2002: 4-9). Innovation is not a once off event, especially in today's fast paced ever changing environment. By gaining a competitive "first mover" advantage through the innovation is not going to make the competition give up, and they will react and try and close the performance gap created by the innovation driving again convergence in the competitive environment (de Coning, 2009). To stay ahead of the pack will require the business to continually scan the environment for new opportunities and embed a culture of innovation, constantly seeking to enhance the value in the business through applying new ideas.

To ensure the buy-in into the value innovation strategy approach and to leverage the collective knowledge and insights in the organisation, the innovating organisation should strive to involve people at all levels of the organisation (Tucker, 2002: 4-9). Disney, through its "gong" event has been able to successfully leverage ideas formed at the periphery of the organisation. This is how the concept of Disney's retail outlets came about through an idea from a low level employee who worked in one of the theme parks.

Innovation must be customer centric (Tucker, 2002: 4-9). Johannessen (2009: 168) supports this view and highlights that customer closeness is required to make transformational innovation possible. He argues that: "Customers affect the innovation process through their wishes, needs and idea material". For innovation to have the best possible opportunity for success the customer needs, impact and value add should be taken into account throughout the entire process. If the customer needs is not addressed the innovation will not be relevant to the consumer and through the diffusion process they will reject the innovation. The customer must therefore be kept in mind throughout the process. Kim and Mauborgne (1997: 106) suggest that value innovation

should be focussed on the commonalities in the features that customer's value and not segmenting the customer base to focus on the finer differences. The information technology environment has many examples of software, which from a technical perspective is very advanced but fail on being user friendly, ending with the end-user rejecting it for a less sophisticated software package.

Organisational culture can springboard or hamper the innovation process. This can take on multiple forms but centres around the attitudes of the people in the organisation towards innovation and change. Gopalani (2009: 10-11) identifies four key areas which becomes important in the implementation of an innovation culture in an organisation, namely, the commitment of the senior leadership in the organisation to making innovation work, the culture and values of the organisation, the skills available within the organisation and the focus on customer insight throughout the entire service value chain. Johannessen (2009: 160) also highlights the importance of the structural links from a cultural perspective, in terms of information, communication and the learning processes within the organisation.

A prerequisite for innovation to be successful is the commitment from the senior leadership team in the organisation. Without this focus from the top, the proposed innovations will struggle to receive the needed resources and investment required for bringing the ideas to life (Gopalani, 2009: 10). It will also determine to what extent the senior management in the organisation will listen to new ideas and take the risk in bringing them to life.

The culture in the organisation must also be conducive to innovation (Gopalani, 2009: 10). An innovation culture requires an open culture and value system where employees can feel safe to voice their opinions and also to take on responsibility and not fear failure. It is, however, important to distinguish between failure due to not following due diligence and failure due to the uncertain nature of innovation. Failure due the first instance will come with consequences while the latter should be seen as a learning experience and form part of the experimentation process. Innovation is uncertain and therefore risky and requires experimentation.

Striving for innovation may bring with it a requirement for a new set of skills or resources. On the one side, new skills will be required to enable the innovation process and is centred on technical skills and potentially differentiated insights for opportunity identification or the creation of breakthrough ideas. On the other hand, once the innovation is implemented through the new business models, new products, new strategies or new processes, a differentiated skill set may be required (Gopalani, 2009: 11). The change in Hilti's business model required new skills by the representatives of the organisation, like managing lease contracts.

Inherent challenges to the process are plentiful, but all stem from the fact that the process is a knowledge based process. Johannessen (2009: 169) argues that the importance of knowledge as a determining factor in value innovation has not received the due focus by neo-classical economics. The key areas which could be improved are in the development of a robust understanding of the current and potential future customer needs, both articulated and unarticulated. Zaltman (2009) proposes that only 5% of thoughts occur consciously while 95% is considered hidden knowledge. The opportunity also exists for a better understanding of the impact and consequences of the innovation, taking a systemic approach to innovation. The need also exists for a robust approach to establishing the criteria for opportunity and idea selection. The big challenge is how to tap into the tacit knowledge that can enrich the opportunity identification and decision making process but still limit the subjective approach to the decision process by the decision maker. This subjectivity arises from the decision maker's little to no experience in this new approach to base the decision on (Heerkens, 2006: 385).

2.8 Conclusion

The ability of organisations to continue to deliver against shareholder expectations for sustainable growth is under threat. This threat is brought about by an unstable and changing world brought about by globalisation and increased competition. To compound the pressure under which the organisation already operates is the increased regulatory and societal expectations, in terms of the sustainability and responsibility agenda, in exchange for ensuring the organisation's license to operate.

Innovation has become the “silver bullet” for many organisations to enable their strategy and to deliver on the expected growth, while staying in step with societal and regulatory expectations. But the success rate for many organisations when it comes to innovation is dismal and the process of innovation has left many organisations disillusioned by it.

The innovation process is a knowledge based process of convergent and divergent thinking in the business as usual business process area, coupled by a creative process.

The challenges that innovation face centres around three areas, namely, the approach to innovation, the process itself and the culture of the organisation. Taking into consideration that innovation is essentially a knowledge based process, one can argue that by increasing the scope and levels of understanding and knowledge can allow the organisation to improve the innovation process and potentially increase the chances of innovations being successful. This success stems from an ability to address the real customer needs and deliver to the organisations bottom line. The one key challenge that is faced is the building of a knowledge capacity to enable the process, especially since the innovation is future orientated. We do not have knowledge about what will happen in the future, but we can develop opinions and knowledge about what could be in the future through taking into consideration the potential, probable and preferable futures (Bell, 1997: 42).

In the following chapters the application of futures studies or foresight as a discipline will be explored, showing how this area of study can enrich the innovation process through building a knowledge capacity about the future.

CHAPTER 3
FUTURES STUDIES AS A PLATFORM FOR INNOVATION

"Three main kinds of attempts to understand the future have been with us throughout history: astrology, prophecy, and forecasting." Sohail Inayatullah (2005)

3.1 Introduction

Human beings have always had an insatiable craving to know what the future will hold. Roman and Greek history tells stories of rulers and common folk alike, consulting with oracles and sibyls to take a peek into the future and what it has installed for them in terms of their lives, love and the outcomes of war. Many, if not all, of these predictions were considered prophecies or messages from the gods who "knew" the future.

Our need to know the future stems predominantly from the fact that we would like to control our own destiny, but by knowing the future we can simply react to whatever is coming our way. If we were know of an impending danger we would be able to take preventative action to avoid to or make peace with the outcome of it. Today, more than ever before, this need is fuelled by the ever accelerating changes, complexities and uncertainties we have to deal with, driving people to seek out more information and knowledge (Ackoff, 1984: 1). The power to influence the outcome of what we know does not stem from knowing, but from understanding. Understanding is an explanatory process which describes the behavioural aspects of the system we operate in, highlighting the potential areas for influence and change (Ackoff, 1984: 1).

As we have gained some understanding of the world around us, we have also realised that the future is not knowable. The future is therefore not an object available for scientific exploration (De Jouvenel, 2005). We can however build an understanding of the future. Building a knowledge capacity and understanding of the future, allows for the opportunity to move from reaction to action. Instead of reacting to the future, we can plan, and as such, become the creators of our own futures, enabling us to have some control over our destiny (De Jouvenel, 2005). Understanding of the future and the

creation of images or projections of what that future might hold becomes a strong motivating factor and a call to action (De Jouvenel, 1967: 27-28).

Slaughter (2001: 413) argues that it is this social, historical and civilisational need to understand the future, its opportunities and dangers, which has given birth to the field of futures studies. Futures studies or foresight therefore becomes preoccupied with understanding the alternative images of the future, the driving forces behind them, the implications and consequences, as well as how this knowledge and understanding should be translated into action, in an effort to create and design the preferable future (Bell, 1997: 42-45).

3.2 Futures studies: enabler for knowledge creation and understanding

To enable the understanding of the future as described by Ackoff (1984: 1) and Bell (1997: 42-45), requires a deeper and broader level of understanding. It is not merely enough to understand the change but it is imperative that we also seek to know and understand the causes of change. Futures studies aim to address this deeper and wider understanding through the structure it provides for thinking about the future.

Inayatullah (2004: 5-8) argues that futures studies firmly rests and build the understanding of change based on five pillars, each with its own function. The five pillars collaborate, not only to enhance and build a knowledge capacity, but also to facilitate understanding. Foresight therefore forms part of the value chain of information, knowledge and understanding and it understanding which will contribute the real value (Horton, 1999: 54-57). The five pillars include what is termed macro history, anticipation, alternatives, “ways of knowing” and transformative knowledge (Inayatullah, 2004: 5-8).

Macro-history assists us in building an understanding of the “contours of change” (Inayatullah, 2004: 5-8). By building an understanding of the history and the present, we can start to build some level of understanding of the shape of the future. The shape of the future stems from understanding what could happen should these patterns continue, as well as what discontinuities we have witnessed in the past and what discontinuities can we expect in the future. To truly enrich the understanding, Bell (1997: 42), argues

that we should take an unconventional view of the past and present and view any obstacles and limitations as transcendable, which results in an expansion of our potential futures.

Anticipation builds from our understanding of macro history through forecasting. Forecasting, based on historical trends, works from the assumption that whatever holds true for the past, will continue into the future. This however does not enable the identification of discontinuities (Kurian, 1996: xxxii) or new emerging trends. The basis for the forecasts should not only be based on the projection of historical trends, but also through projecting what could be for which we have no historical trends. This is achieved through a structured process of continuous environmental scanning in an attempt to identify potential disruptive technologies and what the next big thing could be. It is about identifying the "dots on the horizon" and keeping track of them. Through scanning the environment we are also able to not only to identify new emerging trends but any potential discontinuities that might arise.

Alternatives refer to the building of scenarios and the exploring of alternatives futures. One of the key challenges faced in the transfer of information is "information stickiness", especially when considering tacit knowledge. This stickiness is grounded in the assumptions, conditions and limitations in a personal context. Scenarios have shown to be effective in eliciting tacit knowledge (Chermack, 2003: 25). Scenarios can be either strategic or wisdom based. Strategic scenarios explore the best and most plausible pathways to proceed through measuring and testing planned actions for appropriateness against the alternative futures (Harman, 1976: 16). Wisdom based scenarios introduce ethical futures to the equation, which provides the basis for understanding, bridging the gap of our decisions today and the consequences for the future. Bell (1997: 43) stresses the importance of assessing the desirability of the alternative futures through the application of human goals and values.

"Ways of knowing" challenges our mental models or the way in which we view the world. This view we hold of the world is also known as the "gestalt" and informs our decisions (Simmonds, 1997: 18). Through challenging what we know, or think we know, we are able to gain a deeper understanding of the world we live in or as Inayatullah (2004: 5-8) describes it: "understanding how epistemes create ontologies".

Bell (1997: 4) argues that it is the manner in which we view the future that shape our views on the past, and that history is the story we tell ourselves about who we want to be. Giri (2002: 103) proposes that merely learning merely new concepts, methods or new ideas is not sufficient, but learning new ways of thinking are required. Reinterpreting our view of the world, the future and the past allows for a deeper understanding, from which emerge a more authentic and potentially more sustainable alternative futures. Two approaches which enable different "ways of knowing" are causal layered analysis, a technique developed by Inayatullah, and Ken Wilbur's four quadrant approach (Inayatullah, 2004: 5-8). Causal layered analysis explores the present and future through deepening questions, viewing it from four levels namely the litany level, the system level, the worldview and lastly the myth or metaphor level (Inayatullah, 2004: 5-8). In chapter 4, causal layered analysis, will be explored in more detail. Wilbur's four quadrant approach questions the world and the future through examining the external organisational and individual behaviour in conjunction with the internal organisational and individual meanings and consciousness (Inayatullah, 2004: 5-8). Slaughter (2002: 495) however suggests that breadth is also important and expands horizontally on the layered futures approach by introducing six questions which explores the problem in a broader sense.

Transformative knowledge is created through envisioning of alternative and desired futures and a process of backcasting, providing a platform for action learning (Inayatullah, 2004: 5-8). Bell (1997: 43) argues that it is the images we hold of the future which are among the causes that shape our behaviour today, either through acting to avoid an undesirable future or in an effort to create the future we want. Visioning articulates the desired or undesired futures through making the underlying assumptions to those futures explicit (Harman, 1976: 10). Although the future is unknown (De Jouvenel, 1967: 41), making the assumptions regarding the future explicit is necessary as it provides the boundary conditions of time and place which makes the future a definable entity (Kurian, 1996: xxi). It is this definable entity to which we can add meaning and make sense of (Kurian, 1996: xxi). Having a defined future vision allows us to backcast the steps necessary to avoid or create the undesired or desired futures.

It follows from the above that futures studies not only provides us a platform for holistic analysis of trends, social systems and futures problems; but also enables us to build an

understanding of these types of problems in a broader sense, by expanding the horizons, and a deeper perspective through drilling through the manifestation of a trend to understand the underlying drivers, settled in some basic human truths.

Futures studies therefore provide a framework for making sense of knowledge, a key component in the development of innovation (Kurian, 1996: xxvii). This is achieved through a three stage process consisting of the collection and summarisation of information, translation of the information to knowledge to facilitate understanding and the assimilation and evaluation of the knowledge and understanding, providing a basis for action (Horton, 1999: 54-57). Slaughter (2001: 410) proposes a four stage process of selecting and applying futures methodologies, assembly of the raw results, interpreting the results lastly to evaluate the results for social confirmation or rejection. Futures studies therefore provides insight through understanding change which Kurian (1996: xxviii) argues is imperative for innovation.

3.3 Futures studies providing solutions to innovation challenges

Futures studies is uniquely positioned to enhance the innovation process and addressing the challenges organisations face when dealing with innovation (Hines, 2002: 338-343). Horton (1999: 53) argues that foresight is a business skill which is part of the knowledge economy and has direct links to business areas like innovation and Hines (2002: 338-343) proposes that organisations will look more towards futures studies in an effort to enrich their innovation processes. Hines (2002: 338-343) identifies four key needs which organisations will look to fulfil namely, a need to be more future orientated, to think more deeply and systematically about the future, to be more creative and deal better with change.

In Chapter 2, the innovation process was described and a model for innovation was proposed (Figure 2.1). Some key challenges which can constrain the innovation process were identified and explored. These challenges are summarised in the Table 3.1 under the three broad categories of the approach to innovation, the challenges in the process and the challenges stemming from the organisational culture. For the

remainder of this section the ways and means through which futures studies can address these challenges will be explored.

It must however be noted that futures studies will not be able to address all the challenges that arise from the innovation journey and is by no means a guarantee for success due to human unpredictability, perverseness and creativity (Harman 1976: 14-15).

Table 3.1: Challenges in innovation

Approach to innovation	**Process challenges**	**Organisational Culture**
Disciplined approach	Needs identification	Commitment from the top
Comprehensive approach	Understanding the impact	Open minded culture
Seeking opportunities	Idea selection	Changing skills
Buy-in into the process	Tapping tacit knowledge	
Customer centric	Subjectivity in decisions	

Source: Gopalani (2009), Heerkens (2006), Johannessen (2009), Kim and Mauborgne (1997), Tucker (2002), Zaltman (2009)

Following a disciplined and comprehensive approach to innovation cannot be addressed through the application of foresight techniques and must be addressed in the design and approach the organisation will take towards innovation, being cognisant of the role and place of innovation in the bigger business strategy and processes. It can be argued, and will be showed in this section, that futures studies approaches must be considered in the design to assist the organisation in overcoming the challenges stemming from this innovation journey.

Seeking for new opportunities to exploit is not a once off event and therefore requires a constant scanning of the environment. Foresight scanning techniques can assist in making the scanning process more divergent and holistic by scanning the environment for trends and emerging ideas outside of the normal scanning horizon. To identify new opportunities one must be scanning the environment and constantly asking the questions: “how is this relevant for me?” and “what opportunities arise from this?”.

To gain buy-in into the process, more often than not, require people to form part of the process. This holds true for most organisational processes and buy-in. In the innovation process this involvement can be achieved through the introduction of foresight techniques like scenarios and visioning.

Being customer centric will also not be addressed through the application of foresight techniques but is embedded in the philosophy of the innovating organisation to start with the customer in mind. Foresight techniques can however assist in providing a deeper understanding of customer needs which will be covered as part of the discussion on the innovation process challenges.

It is evident that foresight techniques cannot address fundamental philosophical and design challenges which arise from the approach organisations follow to innovation. Where it can however assist is involving people throughout the organisation in sessions like scenarios and visioning tapping into the collective wisdom within the organisation.

The main area where foresight can add value to innovation is by addressing key innovation challenges stemming from the innovation process itself. The first of these is the ability or challenge to identify true customer needs. Identifying the customer needs is in essence defining the futures problem. Innovation problems like futures problems tend to be imprecisely defined or unstructured and therefore have the potential to identify and solve the wrong problem. If one identify the wrong need the innovation is not likely to succeed. Foresight allows for the deeper understanding of customer needs through drilling down and exploring the motivating drivers behind these needs. Foresight also allows not only for the identification of current needs but can provide the platform for understanding how the customer's needs might change in the future. Through this understanding a pro-active approach can be taken and latent customer needs can be developed which will allow for significant competitive and first mover advantage. Foresight techniques like causal layered analysis and Wilber's four quadrant approach are some of the critical techniques that can be considered.

As the world is moving towards a more responsible approach to business, as is evident through the World's Top 100 sustainable companies, comprising of many of the S&P 500 companies, as well as the growing importance of triple bottom line reporting, it has

become vitally important for organisations to understand the potential future impact and consequences of new product introductions. This concern with the future impact of our decisions today and in the future on generations to come is a key theme in futures studies. Bell (1997: 44) argues that futures studies must contribute to make the world a better place for all, today and in the future. Foresight techniques allow for a holistic approach to problems through the application of systems thinking since the world we operate in can be considered a system. Systems can only be understood in the environment they operate within, have impact on and are impacted by the said environment (Gharajedagh, 1999: 29-30).

Having identified the “right” opportunities to pursue and having come up with a set of potential innovative solutions which will allow us to exploit the opportunities, the challenge is to identify the “right” idea to develop further. Futures studies can address this need through the integration and assimilation of the understanding of customer needs and the intended and potential unintended consequences of the ideas put forward. Through matching ideas to the needs and evaluation of the ideas against their future impact will allow for a more objective platform to take decisions against.

Throughout the innovation process the challenge arise on how to tap into the tacit and collective knowledge and wisdom within the people in the organisation. Futures techniques bridge the gap through a holistic approach of not only understanding the world “out there” but also references the world “in here” (Slaughter, 2002: 493) which can be considered tacit knowledge. As discussed in the previous section, “alternatives” or foresight techniques like scenarios and visioning provide platforms from which tacit knowledge can be elicited and the underlying assumptions articulated providing more depth and insight to the process.

The innovation process, like many other decision making processes, is biased or subject to value judgements in decision making. Decision making is a subjective process and Gharajedagh (1999: 37-38) described choices as consisting of three aspects, namely the rational or self interest component, the emotional providing the excitement and basis for risk taking as well as the cultural component. As discussed with idea selection and opportunity identification, the insight generated through the foresight process and the creation of preferable futures creates a platform to measure

decisions against, removing some of the subjectivity involved when decisions have to be made, especially in situations for which we have no previous experience. But even if we did have previous experience, the basis for that experience might not be valid in future.

When considering organisational culture, the impact and influence that futures techniques have are limited. Commitment from the top can potentially be achieved through the involvement in these key stakeholders from the onset of the process. Their participation in scenario and visioning sessions could assist in gaining their alignment and commitment. Having an open culture in the organisation will require more change management intervention. But, as discussed in the previous section, transformative thinking through visioning and scenario modelling can potentially contribute to a shift in mental models.

Lastly, closing the current skill gap within the organisation cannot be achieved through the application of foresight techniques. However, the identification of the future organisational skills required can be achieved through techniques like backcasting which allows for the specification and articulation of skills, processes, and technological requirements to achieve the set objective or vision. It further follows from this section that enlisting foresight skills can assist the organisation the innovation effort.

3.4 Conclusion

Futures studies, like innovation, operates from a premise of information, knowledge, understanding and action. This common knowledge platform provides a basis to address some of the challenges which are faced by innovation, especially in the process, through the application of foresight techniques, creating knowledge, insight and foresight.

Hines (2002: 338-343) also argued that the need for organisations to become more innovative will therefore require greater insights at a deeper level and be more systematic in nature. Here, futures studies are uniquely positioned to address these needs through techniques like causal layered analysis, which allows for the systematic

exploration of problems at deeper levels. Causal layered analysis as a technique provides a deeper understanding of problems and will be explored further in Chapter 4.

CHAPTER 4
EXPLORING CAUSAL LAYERED ANALYSIS

"Yet it is here in the human world of needs, symbols and purposes that all innovations and changes have their origin" Richard Slaughter (2004)

4.1 Introduction

In the previous chapter it was established that foresight techniques allow for not only a holistic understanding, but for a broader and deeper understanding of human needs. Slaughter (2004: 81) proposes that it is this understanding of the underlying human needs and forces like power struggles, values, languages and epistemologies that drive the change and innovation in the physical world of structures, buildings, technologies and the environment.

While foresight techniques like trend analysis, forecasting, scenarios and visioning take an external view, techniques like critical futures, Wilber's four quadrant approach and causal layered analysis take an integral approach by trying to balance the inner and external worldviews (Slaughter, 2001: 413-414).

This chapter will explore the value of gaining a deeper understanding and provide an overview of causal layered analysis and how the technique can add value to the innovation journey of organisations.

4.2 The value of deeper foresight

Layered futures thinking focuses on depth and is informed by post-structuralism; that is the future is viewed as a resource having multiple uses or applications, constructed through data, meanings, systems and myths (Inayatullah, 2004: 3).

Slaughter (2002: 495-506) proposes four layers of analysis namely pop futurism, problem orientated, critical and epistemological futures studies. Pop futurism can be

considered “superficial” futures work. It lacks a strong theoretical basis and insight. Slaughter (2002: 495-506) proposes that this type of futures work is characterised by the ease with which it can be marketed as it focuses on the “flavour of the day” and is compromised by its marketing interests it usually pursue.

Starting to move deeper, the second level, problem orientated futures work, is where the bulk of futures work is conducted. Problem orientated futures work operates from a strong theoretical basis and sound insight. The problems addressed in this level focus on predominantly practical and near term challenges. This level is where part of the picture starts to form and is pre-occupied with the external world or dimension, missing the internal dimension. This is also the layer in which organisational or business innovation is focussed (Slaughter, 2002: 495-506).

Critical futures work attempts to move even deeper through exploring the world views of societies and how they are formed through exploring the internal dimensions. The world view or paradigms are deconstructed and reconstructed resulting in a balance and synthesis of methods viewing both the internal and external dimensions (Slaughter, 2002: 495-506).

Epistemological futures work probes into the foundational and hidden recesses through exploring the philosophical, ontological, macro-historical dimensions (Slaughter, 2002: 495-506). These hidden dimensions are the foundational building blocks that form and inform our structures of interpretation and mental models.

Slaughter (2002: 505-506) offers three more reasons to extract value from futures studies by going deeper. First, by going deeper also implies going wider and letting go of one’s own world views and ways of understanding to embrace the richness of insights across cultures, people, concepts and social arrangements. Mainstream futures work lacks different ways of knowing and has limited value for organisations or entities driving towards unsustainable futures. Deeper futures work allows for the examining of the reasons for doing while questioning the “wisdom” in doing so.

Slaughter (2002: 505-506) argues that for futures work to be truly successful, it must transcend all the levels, learning from each level to form a consistent whole picture balancing the external and internal views.

4.3 Deeper foresight through causal layered analysis

Expanding and building on the critical futures research work by Slaughter (2002: 495), Inayatullah (1998) offers causal layered analysis (CLA) as a futures research method to critically analyse the past and present to open up richer alternative futures. This is achieved through navigating through the layers by drilling into the manifestation of trends or the so called “surface phenomena” to reveal the driving forces of human values and world views.

The use of causal layered analysis has been shown to bring together people from diverse backgrounds, eliciting the wealth of tacit knowledge and different world views or ways of knowing through its “non-textual and poetic/artistic expression” (Inayatulluah, 2005: 1). Causal layered analysis introduces richness to scenarios through navigating the vertical social context of participants, exposing the layers of positions from the obvious to the deeper (Inayatullah, 2005: 1).

Inayatullah (2005: 2) places causal layered analysis within what is considered critical futures research. Inayatullah (2005: 2) writes:

“This tradition is less concerned with the disinterested pursuit of knowledge, as in the empirical, or with creating mutual understanding, as in the interpretive, but with creating distance from current categories. This distance allows us to see current social practices as fragile, as particular, and not as universal categories of thought. They are seen as discourse, a term similar to paradigm but inclusive of epistemological assumptions.”

Through establishing distance and introducing different ways of knowing, the problem can be redefined. Redefining the problem allows for the exploration of new and alternative possibilities, ideas and solutions whilst testing their validity against the norms and values of society (Inayatullah, 2005: 2-3).

Causal layered analysis therefore starts with two key presuppositions; the way in which we define the problem determines the potential solutions and stakeholders, which are determined through our view or layer under consideration, be it deep, shallow or wide, of the past, present and the future (Inayatullah, 2005: 3-5).

Causal layered analysis consists of four layers, each a step change deeper than the previous. The first or the “litany” layer is concerned with obvious trends, the second explores social causes, the third drills into the discourse or worldviews and the fourth the hidden stories or myths or metaphors (Inayatullah, 2005: 5).

The “litany” layer is characterised by quantitative trends and problems, exploited by politicians and the media creating high visibility for these trends (Inayatullah, 2005: 5). Due to its political nature these trends or problems also tend to quickly fall out of fashion as they are replaced by some new hot topic. Little to no analysis is done and trends and data are accepted as fact.

The second layer is also characterised by quantitative trends and data like economic, political and historical factors. Unlike the “litany” level, the second level explores the trends and data in an effort to develop an understanding through interpretation rather than blind acceptance. This layer is characterised by the application of technical techniques and models built on a strong academic foundation (Inayatullah, 2005:5).

Going even deeper, the third layer endeavours to explore the worldviews underlying the trends and problem definitions in the second layer. This layer allows for the opportunity to redefine the problem in the “litany” layer through not only understanding how the different discourses cause and sustain the trends but also legitimise and reinforce them. This level is less about the technical analysis but rather about how factors like culture, political views and religion influence our views about the world. This layer, unlike the second layer with strong technical grounding, uses language as a key for unlocking the meanings and different ways of knowing (Inayatullah, 2005: 5).

The fourth layer explores what is termed the myth or metaphor layer. This layer is about discovery of the deeply rooted, unarticulated, highly emotional and unconscious stories behind the story. This layer attempts to deconstruct the worldview into images which

can transcend into other structures of interpretation. Images become the key to this layer due to the limitations of language (Inayatullah, 2005: 5).

The richness that causal layered analysis brings to scenarios follows from moving up and down and within layers providing different perspectives on the problem, even challenging whether or not the right question or problem is being considered and who owns the problem, opening up a multitude of alternative solutions.

4.4 Causal layered analysis enriching innovation

In the previous chapter it was shown how foresight techniques can add value to the innovation process through addressing some of the key challenges stemming from the approach to innovation, the innovation process and the organisational culture.

Causal layered analysis, unlike other foresight techniques, has the ability to bring a different dynamic and richness to the innovation process. This richness follows from the unique way in which causal layered analysis views the problem from different perspectives, even questioning whether or not the right problem is being considered. Through viewing the problem from different perspectives expands the solution space and therefore increases innovation opportunities and or solutions as well as potentially identifying latent needs.

Moving up and down through the layers also provides a platform for validating the different potential solutions. At the “litany” level the solution can be checked for social acceptance, while considering the social impacts and testing whether or not the innovative solutions are addressing the underlying needs while being aligned to the value basis. This therefore allows for another platform to assist in the idea selection process.

The ability of causal layered analysis to transcend language and cultural barriers, and bring people from different backgrounds together, positions it well to overcome not only the challenges around open mindedness but also the challenges stemming from

information stickiness, providing a platform for eliciting and capturing the wealth of tacit knowledge held by the participants.

Causal layered analysis, like scenarios, allows for a space where participants can actively get involved in crafting the solution and policies, therefore building a capacity for buy-in into the process.

4.5 Conclusion

Causal layered analysis, like other foresight techniques is not able to predict the future, but as a technique it has the unique ability to bring people from different backgrounds, together exploring the richness of their mental models and eliciting the tacit knowledge and collective wisdom. Through this unique questioning of the problem and viewing it from different perspectives allows causal layered analysis to enrich the innovation process, culture and approach to innovation through addressing some of the challenges organisations' face when embarking on the innovation journey.

In the next chapter some well-known innovations are evaluated through applying causal layered analysis, testing how these successful innovations address a problem in a unique manner or needs identified at deeper layers.

CHAPTER 5
APPLYING CASUAL LAYERED ANALYSIS TO INNOVATIONS

"Innovation arises from ongoing circles of exchange, where information is not just accumulated or stored, but created. Knowledge is generated anew from connections that weren't there before." Margaret Wheatley (2006)

5.1 Introduction

Daily new innovations come into existence. Some fail dismally while other stand the test of time and expand into everyday phenomena, being accepted as part of daily lives, leaving us many a time wondering what we ever did before this innovation came along and changed our lives.

In 2009 the Wharton School of the University of Pennsylvania in partnership with the Nightly Business Report set out to determine the "Top 30 Innovations of the Last 30 Years" (Knowledge@Wharton, 2009). Each one of the identified innovations was assessed by a panel of judges to determine and rank the top thirty innovations that shaped the world over the last three decades.

For the purposes of this research paper the top three innovations identified as part of the "Top 30 Innovations" will be analysed using causal layered analysis. This will test whether or not these innovations transcend all four layers entrenching into daily life. The top three innovations which were identified through the research are: the internet, personal or notebook computers and mobile phones (Knowledge@Wharton, 2009).

5.2 The Internet

The internet was developed in 1969 through military funding to do advanced research and transport unclassified military messages. It also connected five universities across the Unites States as part of the research project (PCWorld, 2009). The internet has evolved from being a military project and a way of connecting a few scientists to the

World Wide Web, an innovation that has entrenched itself into not only the business world but has become part of the personal lives of billions of people globally. Finland was the first to declare broadband access a legal and fundamental right for every person in the country. This gives broadband access the same status as the right of access to education and healthcare (Information Policy, 2009).

The internet has evolved from a network infrastructure, used as a tool for moving data packets electronically between two points, to a self perpetuating entity, the World Wide Web, with a virtual economy, societies, culture and language.

At the “litany” layer, the internet addresses the problem of moving data electronically over vast distances almost instantaneously.

At the second layer, the ability of the internet to move data electronically has allowed for businesses to become more efficient and effective in not only transferring data, but to communicate with staff, suppliers and customers, as well as gain a public and global presence through websites, fuelling globalisation. This has allowed businesses to enter new markets as well as creating new virtual businesses.

In the third layer, the internet has not only become entrenched in our lives but started shaping the lives of individuals through the access gained to a wealth of knowledge and information. At the third level the internet addresses the need of individuals to explore and gather knowledge. Through accessing and exploring worlds, cultures and having access to others viewing the world different to ourselves, the internet has started shaping and challenging our structures of interpretation and expanding our *Gestalt*.

At the “myth or metaphor” layer the internet has also been able to address some of our deepest human needs. The internet has created not only a platform for people to stay connected, but also allow people to find a sense of belonging which is evident from the remarkable growth of social networks, allowing people to connect with like minded people all over the world.

The success of the internet has been its ability to address problems or needs across all four layers, not only vertically but expanding horizontally within each layer as it brings into being new industries addressing more needs at each layer.

5.3 Personal and notebook computers

Computers have developed from the 1937 vacuum tube processors, weighing more than 275 tons, to being able to fit into and being integrated into hand held devices like mobile phones (History, 2007). Micro processor computers like the 1980 personal computer (PC) model from IBM have leapfrogged the impact of computer technology, today being integrated into our business and personal lives.

While personal computers have very much kept to the original outer design, they have also spawned more portable versions like to laptop or notebook. It is the combination of these two tools, PCs and notebooks, which have become entrenched in our lives.

At the “litany” layer personal computers or notebooks address the need for storing and processing vast amounts of electronic data and has become the gateway or portal to access the internet.

In the second layer personal computers and notebooks address the needs of business to become more efficient and effective, through being able to store and access customer and transactional data in an efficient manner. It also allows for the ability to analyse the information to become more effective at servicing customer needs.

In the third layer personal computers and notebooks have become extensions of individual’s lives, integrating personal and business lives, being able to work longer hours and from anywhere. It has become more than a data processing and storage unit through morphing into an entertainment system as well.

In the fourth layer personal computers and notebooks are technological artifacts, at this stage, which provide us the means and portal to address our deep human needs

through accessing the internet. If it was not for this connection, it is likely that the role of personal computers and notebooks would have ended at the third layer.

The role that PCs and notebooks fulfil in the third and fourth layer, that is a conduit to the internet, is under threat by mobile phones as the technology becomes better, faster and cheaper, enabling mobile phones to fulfil the same role but at a even more compact level, a computer in your pocket.

5.4 Mobile phones

Like the previous two innovations, mobile phones have also come a long way, continuously adapting and developing. From the first mobile phone, installed in 1910 in the car of Lars Ericsson, to today where almost everybody own a mobile phone today. Research shows that even in developing countries, like South Africa, mobile phone penetration is in excess of 96% (Mobile Active, 2009). Mobile phones have become part of our daily lives and are constantly changing and becoming more powerful. Mobile phones are also considered the technology which will bring the internet to Africa.

At the “litany” layer, mobile phones were addressing mainly a security need. For example, if the car broke down one would be able to make call and get help.

Mobile phones soon moved beyond this into the second layer, as a tool for driving business efficiencies, always being contactable and being able to contact others, increasing productivity in many businesses. Recent research has shown a direct correlation between mobile phone penetration and economic activity. It was found that for every 10% increase in mobile penetration there has been a 0.6% increase in gross domestic product (GDP) of that country (Priyo, 2009). This becomes especially true in developing countries where fixed line infrastructure is not available or consistently being damage through conflict or crime.

Moving into the third layer we find that mobile phone technology addresses numerous needs of individuals. Some of these needs are for example the need of people to stay connected, not only through voice calls but through text technology and push email like

Blackberry. It has also become an entertainment tool, storing music, taking pictures and watching movie clips. Mobile technology has the ability to bring the internet to the billions of people in developing countries where the infrastructure does not yet exist.

At the fourth layer, mobile phones have become another tool to access the internet and social networks, challenging the position of personal computers and notebooks in this area. Mobile phones have also become a status symbol through addressing our need in the western world to be individualistic and stand out, moving beyond a telecommunications tool to becoming a fashion accessory.

As computing power becomes more powerful at ever smaller scales, the position of mobile phones in addressing the needs of individuals and business, which are currently being fulfilled by PC's and notebook computers, will threaten the future of especially notebook computers.

5.5 Conclusion

Causal layered analysis has been applied, though at a limited extend, to the top three innovations to test the viability for application in the innovation journey. Although the technique has been applied after the fact it has highlighted some interesting threats, especially for personal or notebook computers. The technique has shown that the success of personal and notebook computers are intrinsically linked to the internet. It highlighted how mobile phones threaten the position of personal and notebook computers in the third and fourth layers.

What has also become evident was that if innovations address needs at the fourth layer it entrenches and gains widespread application in a shorter period of time evident by the quick expansion of social networks.

What is also evident from the analysis is the sustainability of innovations which address needs at the deeper layers since they entrench themselves into human needs and cultures.

Although the application of causal layered analysis has been limited due to the scope of this research project, the technique has shown some promising application in the innovation process for understanding customer needs, assisting in the identification of opportunities, as well as a platform for idea selection. It is recommended that the technique be applied in more depth and in with a wider range of innovations to firmly establish the value of the application of causal layered analysis in the innovation journey of organisations.

CHAPTER 6
CONCLUSION

"If I had to ask them what they wanted they would have told me a faster horse." Henry Ford

6.1 Foresight and causal layered analysis showing promise

In today's world, with accelerating change, smarter and more demanding consumers, increased competition and even more demanding shareholders, many organisations are faced with a growing growth gap. To fill this gap with the current product and service portfolios become a mere impossible task due to competition driving convergence placing significant downward pressure on the margins of organisations through essentially moving into a price war situation. Due to this many organisations are forced to consider alternative growth strategies and innovation is considered the enabler for many of these strategies due to the fact that it drives margin development and widens the gap with competitors.

Many organisations are, however, left disillusioned as they quickly come to the realisation that successful innovation is not easily obtainable. Innovation is not merely coming up with ideas, but bringing those ideas to life and making it commercially viable. This is however a challenge due to the uncertain and future orientated nature of innovation. Innovation must therefore be approached holistically and as a discipline always keeping the customer's needs of not only today, but tomorrow into account.

By truly understanding the customer needs and where they stem from will enable organisations to identify opportunities and develop innovations that have a better chance on success and are more enduring through not only being relevant today but also in the future.

Chapter two set out to define innovation and showed that innovation is deeply rooted in the knowledge economy. Building on this understanding an integrated innovation model was proposed from which a number of challenges, inherent to the process, were

identified. The challenges were expanded to take into consideration challenges which arise from the approach organisations take in terms of innovation as well as challenges which stem from the underlying organisational culture.

In Chapter three, the “knowledge” link between futures studies and innovation was explored and it was shown that futures studies can not only address some of the challenges organisations face when embarking on the innovation journey but also enrich the innovation process. Futures studies is able to achieve this through creating a platform for building a knowledge capacity and understanding. Futures studies therefore enable organisations to develop insight and foresight of customer needs through taking a holistic and systems approach, applying breadth and depth of analysis.

Causal layered analysis, a foresight technique developed to specifically address breadth and depth in analysis of future problems, was described in Chapter four. It was shown that the technique is able to address some of the key challenges, not only in the process itself, but also challenges which stem from the underlying organisational culture and the organisation’s approach to innovation. It was discussed that causal layered analysis is able to transcend language and culture barriers, penetrating and building understanding of the deep human driving forces, effectively expanding the possible solution set for a specific problem or identifying new opportunities through this deeper and broader understanding.

The ability of causal layered analysis to enrich the innovation process was tested through applying the technique to the top three of the top thirty innovations of the last three decades. Although the results of the application of the technique are not definitive, due to the limited and focused scope of this research project, it has highlighted some key considerations for innovations. It was shown that innovations that address needs at all four layers entrenches itself into daily life, like the internet. Further to this is showed that innovations, for example notebooks and mobile phones, which are not really addressing needs at all four layers, but reach the third and fourth layer, through dependency on another innovation is at risk of being replaced. Innovations which therefore address needs at all four layers become more sustainable and not just fads in the first layer.

6.2 Recommendations

Given the limited scope of this research report it is recommended that causal layered analysis be applied to a wider range of innovations, both successes and failures, to fully test the viability of the technique to enrich the innovation process. It is also recommended that the technique be applied to new innovations and that the progress of these innovations is tracked to see whether or not the technique can provide a platform to distinguish between innovations which will have a better chance to be successful than those that don't.

Further to this it is recommended that the technique should be tested against other foresight techniques to establish if the technique can truly identify a wider range of opportunities by moving vertically across and horizontally within layers, as well as move beyond language to elicit the wealth of tacit knowledge hidden within many of the groups tasked with identifying and creating new innovations.

Lastly, like all techniques it must be noted that causal layered analysis forms part of an array of foresight tools, each with its own strengths and weaknesses, and each technique must be considered and applied within the context of the problem. It is also no guarantee that through the application of foresight techniques that innovations will be successful, but by building a better understanding, insight and foresight, that the chances of success is enhanced.

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