

Improbable Circumstances Strategic Framework

By

Denzil Kennon

Student number: 14411555

Thesis presented in partial fulfilment of the requirements for the degree
of Master of Science in Engineering

at
Stellenbosch University



Studyleader: Dr. Corne Schutte

Co-studyleader: Dr. Stephen Bosman

Department of Industrial Engineering

March 2010

DECLARATION

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the owner of the copyright thereof (unless to the extent explicitly otherwise stated) and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: 23 February 2010

SUMMARY

“In all affairs it's a healthy thing now and then to hang a question mark on the things you have long taken for granted.” – Bertrand Russell

The research documents the development of a conceptual framework, the improbable circumstances strategic (ICS) framework, which guides organisations in the preparation for improbable circumstances.

Four fields include: strategic management, innovation, systems thinking and complexity theories (black swans). The *black swan* principle was introduced with its applicability to the 2008 economic crisis. The black swan is an event which is retrospective in its predictability, highly improbable and carries extreme impact. There are various principles to cope with black swans which will now play a role in strategic management.

Strategic management is studied from a *systems thinking* perspective which is a school of thought that strategy is a process which an organisation should follow from analysis, synthesis, implementation through to the operation phase. Some tools applicable to the analysis and synthesis phases were studied to give a greater understanding of the current field of strategic management. Innovation is an underlying principle which supports the strategic process.

Innovation is a field which is currently not playing a large role in the strategy process. The principles of the innovation life cycle, innovation management and open innovation were studied to support the framework as well as create awareness around the advantages thereof within the field strategy.

The dissertation uses aspects of these four fields to form the ICS framework. The framework consists of four phases: the analysis phase; the improbable event creation phase; the fragility analysis phase; and the synthesis phase. The first three phases run parallel with the current analysis phase of strategic management as the ICS framework is not designed to replace the strategic management process, but to add to it. The synthesis phase is where the design of the strategic plan for improbable circumstances takes place. Each phase sets out the inputs, requirements and deliverables needed for the successful implementation of the framework. Some tools for each of the phases are given, but they are given merely as a guideline as different organisations have the infrastructure for different tools. The framework is partially validated by being able to apply various tools to each phase, but the framework's place in the field of strategy should be validated.

The validation is done through interviews with eight industry experts in the four fields of study discussed. The results show a positive response with a call for future study through implementation, a tracking of the framework through this implementation and critical factors that arise from that.

OPSOMMING

"Yster roes as dit nie gebruik word nie, water verloor sy skoonheid as dit stilstaan en vries in koue weer; net so laat onaktiwiteit die mens se gees sterf." - Leonardo da Vinci

Hierdie navorsing beskryf die ontwikkeling van 'n moontlike raamwerk; die onverwagte omstandighede strategie (ICS) raamwerk, wat organisasies met die voorbereiding vir onverwagte gebeure kan help.

Vier areas word beskryf wat insluit: strategiese bestuur, innovasie, stelsels denke en kompleksiteitsteorie (swart swane). Die swart swaan beginsel is gebruik weens die toepasbaarheid daarvan op die ekonomiese krisis van 2008. 'n Swart swaan is 'n gebeurtenis wat terugwerkend voorspelbaar is, baie onwaarskynlik en 'n groot impak het. Daar is verskeie beginsels om swart swane te hanteer wat vorentoe 'n rol in strategiese bestuur kan speel.

Strategiese bestuur word vanuit 'n stelsels denke oogpunt bekyk wat strategie as die proses sien wat 'n organisasie moet volg van analises, saamvoeging en implimentering tot die bedryfsfase. Sommige tegnieke wat op analises en sintese gerig is, is ondersoek om 'n groter begrip van strategiese bestuur te gee. Innovasie is die onderliggende beginsel wat die strategiese proses ondersteun.

Innovasie speel tans nie 'n noemenswaardige rol in die strategie proses nie. Beginsels van die innovasie siklus, innovasiebestuur en oop innovasie is ondersoek om die raamwerk te ondersteun asook om 'n bewuswording van die voordele daarvan in strategie uit te wys.

Hierdie verhandeling bespreek vier fases van die ICS raamwerk: analises; die onverwagte gebeurtenis skepping; kwesbaarheids analises; en sintese fases. Die eerste drie fases word parallel met die bestaande analitiese fases van strategie bestuur as die ICS raamwerk gedoen en is nie ontwerp om die strategie bestuurs proses te vervang nie, maar om daartoe by te dra. Gedurende die sintese fase word die ontwerp van die strategiese plan vir onverwagte gebeure gedoen. Elke fase beskryf die toevoer, benodighede en aflewerbares nodig vir die suksesvolle implimentering van die raamwerk. Sommige hulpmiddels vir elk van die fases word gegee, maar slegs as 'n riglyn want verskillende organisasies het die infrastruktuur vir verskillende hulpmiddels. Die raamwerk word deels gekontroleer deur dat dit moontlik is om verskeie hulpmiddels op elke fase toe te pas, maar die plek van die raamwerk in die area van strategie moet gekontroleer word.

Kontrole is gedoen deur dit met agt industrie kenners in die vier studie velde te bespreek.

Die resultate toon 'n positiewe reaksie vir toekomstige navorsing deur implimentering en die navolg van die raamwerk deur hierdie implimentering en die kritiese faktore wat daaruit mag voortvloei te doen.

ACKNOWLEDGEMENTS

"I will never forget that the only reason I'm standing here today is because somebody, somewhere stood up for me when it was risky. Stood up when it was hard. Stood up when it wasn't popular. And because that somebody stood up, a few more stood up. And then a few thousand stood up. And then a few million stood up. And standing up, with courage and clear purpose, they somehow managed to change the world." – Barack Obama

I would like to extend my sincerest gratitude to the people who have walked, through text and time, with me through the last two years.

Corne Schutte, thank you for keeping the door ajar when my spirit needed a lift. Your optimism, vision and open mind gave a young man hope when little could be found. You were my rock in a desolate place.

Dr. Stephen Bosman, thank you for your precious time, inputs and advice throughout. I always listened to you in awe, every meeting venturing to the limits of my psyche. I tried to drink a cup of tea once, just because of you.

Dr. Karen Marais, thank you for awakening the academic in me. You always greeted any task with a passion to succeed, a lesson of which experience is the only master.

Van der Spuy Brink, no words could ever explain the thank you I should give. You give constant hope, reason and time. You head so many calls, but I would trade them all for you to just be my friend.

Prof. Mellet Moll, thank you for being giving me enough ammunition to continue where so few can go. My shell broken, the chisel stuck in your hand.

My parents and Ingrid Roos, thank you for your support throughout. No man can stand without a foundation and I have been blessed with groundwork like no other.

You are, therefore I am,

Denzil Kennon

TABLE OF CONTENTS

DECLARATION	2
SUMMARY	3
OPSOMMING	4
ACKNOWLEDGEMENTS	5
1. INTRODUCTION	13
1.1 BACKGROUND	13
1.2 PROBLEM DEFINITION	15
1.3 RESEARCH QUESTIONS	16
1.3.1 <i>Main research question</i>	16
1.3.2 <i>Sub- questions</i>	16
1.4 RESEARCH OBJECTIVES	16
1.5 DELIMITATIONS AND LIMITATIONS	17
1.5.1 <i>Delimitations</i>	17
1.5.2 <i>Limitations</i>	18
1.6 RESEARCH METHODOLOGY	18
1.7 DOCUMENT OUTLINE	22
1.8 CHAPTER CONCLUSION	23
2. INDUSTRY DYNAMICS	24
2.1 THE MARKET CRISIS OF 2008	24
2.2 THE EFFECT OF THE 2008 CRISIS ON SOUTH AFRICA	29
2.3 CHAPTER CONCLUSION	34
3. THEORETICAL FOUNDATION	35
3.1 STRATEGY	36
3.1.1 <i>Systems approach</i>	38
3.1.1.1 Feedback	39
3.1.1.2 Simulation	42
3.1.1.3 Brainstorming & 635 method	45
3.2 STRATEGIC MANAGEMENT	47
3.2.1 <i>Strategic analysis</i>	50
3.2.1.1 Scenario planning	51
3.2.1.2 Sensitivity analysis	55

3.2.1.3	Swot analysis	56
3.2.1.4	Porter's five competitive forces	56
3.2.1.5	PEST analysis	58
3.2.1.6	Game theory	58
3.2.2	<i>Synthesis</i>	60
3.2.2.1	Risk and uncertainty management	60
3.2.2.2	Diversification strategy	66
3.2.2.3	Blue ocean strategy	67
3.2.2.4	Complexity theory	70
3.3	BLACK SWAN THEORY	72
3.3.1	<i>Coping with black swans</i>	75
3.4	INNOVATION	78
3.4.1	<i>Innovation life cycle</i>	80
3.4.2	<i>Configuring an enterprise for innovation</i>	81
3.4.2.1	Assessing and improving innovation capability	84
3.4.3	<i>Open innovation</i>	85
3.4.3.1	Open innovation models	85
3.4.3.2	The advantages of open innovation	87
3.4.3.3	The disadvantages of open innovation	88
3.4.4	<i>Opportunities in innovation and risks</i>	88
3.5	DESIGN CRITERIA	91
3.6	CHAPTER CONCLUSION	91
4.	DEVELOPING THE FRAMEWORK	92
4.1	FIELDS OF CONCERN	93
4.1.1	<i>Black swans</i>	94
4.1.2	<i>Systems thinking</i>	94
4.1.3	<i>Strategy</i>	95
4.1.4	<i>Innovation</i>	96
4.2	STRUCTURING THE FRAMEWORK	97
4.3	CHAPTER CONCLUSION	99
5.	THE FRAMEWORK	100
5.1	ANALYSIS	101
5.1.1	<i>Inputs, deliverables and requirements</i>	102
5.1.2	<i>Example</i>	103
5.1.2.1	SWOT analysis	103
5.1.2.2	Porter's five forces	104

5.1.2.3	PEST analysis	104
5.2	IMPROBABLE CIRCUMSTANCE CREATION PHASE	105
5.2.1	<i>Inputs, deliverables and requirements</i>	106
5.2.2	<i>Example</i>	109
5.2.2.1	Scenario planning	110
5.2.2.2	Open innovation	112
5.3	FRAGILITY ANALYSIS PHASE	113
5.3.1	<i>Inputs, deliverables and requirements</i>	114
5.3.2	<i>Example</i>	115
5.3.2.1	Simulation	116
5.4	SYNTHESIS PHASE	117
5.4.1	<i>Inputs, deliverables and requirements</i>	118
5.4.2	<i>Catastrophe preparation</i>	120
5.4.3	<i>Miracle positioning</i>	123
5.4.4	<i>Feedback - cybernetics</i>	128
5.5	FRAMEWORK SUMMARY	130
5.6	INHIBITORS TO SUCCESS	132
5.7	CHAPTER CONCLUSION	132
6.	VALIDATION OF THE FRAMEWORK	133
6.1	TYPES OF VALIDATION	133
6.1.1	<i>Interviews with experts</i>	133
6.1.2	<i>Implementation</i>	134
6.1.3	<i>Case studies</i>	134
6.1.4	<i>Result</i>	135
6.2	INTERVIEW WITH EXPERTS	135
6.3	INTERVIEWEES	136
6.3.1	<i>Indutech (Pty) Ltd</i>	138
6.3.2	<i>Altech</i>	138
6.3.3	<i>GijimaAST</i>	138
6.3.4	<i>Third Circle Asset Management (Pty) Ltd</i>	139
6.3.5	<i>Corvus Dreammaker</i>	139
6.3.6	<i>Safripol (Pty) Ltd</i>	140
6.4	RESULTS AND DISCUSSION	140
6.4.1	<i>Does the framework, if implemented correctly, allow for better preparation for improbable circumstance for an organisation?</i>	140
6.4.2	<i>If not, where does the difficulty lie?</i>	140

6.4.3	<i>Do you see any factors to consider when implementing any of the four phases?</i>	141
6.4.4	<i>What does the framework add to the field of strategic management if implemented correctly in an organisation's strategy?</i>	142
6.4.5	<i>Would you apply the framework to your organisation?</i>	142
6.4.6	<i>General comments & recommendations</i>	143
6.4.6.1	General comments	143
6.4.6.2	Recommendations	144
6.4.7	<i>Altech's strategy</i>	145
6.5	CONCLUSION	147
7.	CONCLUSIONS AND FUTURE WORK	149
7.1	OVERVIEW	149
7.2	THE FRAMEWORK	151
7.3	FUTURE WORK	152
8.	REFERENCES	154
	APPENDIX A – OPEN INNOVATION MODELS	160
8.1.1.1	The advantages of open innovation	160
8.1.1.2	The disadvantages of open innovation	161
	APPENDIX B – INTERVIEW PRESENTATION	163
	APPENDIX C – INTERVIEW TRANSCRIPTS	168
	INTERVIEWEE – ANDRIES MANS	168
	INTERVIEWEE – BERNARD KATZ	172
	INTERVIEWEE – HEINZ ESSMANN	176
	INTERVIEWEE – PROF. MELLET MOLL	182
	INTERVIEWEE – VAN DER SPUY BRINK	186
	INTERVIEWEE – WESSIE VAN DER WESTHUIZEN	187
	INTERVIEWEE – DR. STEPHEN BOSMAN	193
	INTERVIEWEE – DR. WILLEM BARNARD	195

LIST OF FIGURES

FIGURE 1: THE SCOPE WITHIN WHICH THE MODEL WILL FUNCTION	17
FIGURE 2: A TYPOLOGY OF RESEARCH DESIGN TYPES ADAPTED FROM MOUTON (2008)	19
FIGURE 3: RESEARCH MAPPING ADAPTED FROM MOUTON (2008)	20
FIGURE 4: FLOW OF REAL WORLD PROBLEM SOLVING	21
FIGURE 5: RESEARCH METHOD ADAPTED FROM BOSMAN (1998)	22
FIGURE 6: STRUCTURE AND OUTLINE OF DOCUMENT	23
FIGURE 7: THE S. & P. 500 AND DOW JONES INDUSTRIAL AVERAGE PLOTTED AGAINST 2008 CRISIS TIMELINE [SOURCE: WWW.PREMIUMDATA.NET]	25
FIGURE 8: ECONOMIC GROWTH RATES AS ESTIMATED BY THE IMF ADAPTED FROM INGLESÌ (2009)	30
FIGURE 9: INFLATION AS ESTIMATED BY THE IMF ADAPTED FROM INGLESÌ (2009)	31
FIGURE 10: EXAMPLE OF A SIMPLE FEEDBACK SYSTEM ADAPTED FROM FRANKLIN ET AL. (2006)	40
FIGURE 11: OUTPUT SIGNAL VERSUS TIME IN AN OPEN-LOOP FEEDBACK SYSTEM	40
FIGURE 12: WAYS IN WHICH TO STUDY A SYSTEM ADAPTED FROM LAW (2005)	41
FIGURE 13: GENERIC BRAINSTORMING PROCESS	46
FIGURE 14: STRATEGY CONNECTING CURRENT STATE WITH FUTURE INTENT	48
FIGURE 15: CONTEMPORARY STRATEGY ADAPTED FROM GRANT (2008)	49
FIGURE 16: DEPICTION OF SCENARIOS	51
FIGURE 17: MARKOV WITH PROBABILITIES	52
FIGURE 18: SCENARIO PLANNING PROCESS AS ADAPTED FROM SUNTER ET AL. (2001)	54
FIGURE 19: PRESSURE TO INNOVATE DUE TO INTERNAL AND EXTERNAL FACTORS ADAPTED FROM [EE TEXTBOOK, 2009]	79
FIGURE 20: GENERIC INNOVATION LIFE CYCLE ADAPTED FROM [EE TEXTBOOK, 2009]	81
FIGURE 21: INNOVATION ADOPTION LIFECYCLE ADAPTED FROM MOORE (2004)	89
FIGURE 22: OPPORTUNITY TAKING CURVE	89
FIGURE 23: OPPORTUNITY TAKING CURVE VERSUS REWARDS	90
FIGURE 24: ICS FRAMEWORK'S FIELDS OF CONCERN	93
FIGURE 25: THE FRAMEWORK'S PLACE IN STRATEGIC MANAGEMENT	95
FIGURE 26: QUESTIONS IN PREPARATION OF IMPROBABLE CIRCUMSTANCES	98
FIGURE 27: IMPROBABLE CIRCUMSTANCES STRATEGIC FRAMEWORK	100
FIGURE 28: ANALYSIS PHASE AS INITIAL STEP IN THE ICS FRAMEWORK	102
FIGURE 29: REQUIREMENT FOR ANALYSIS PHASE WITH POSSIBLE TOOLS	103
FIGURE 30: IMPROBABLE CIRCUMSTANCE CREATION PHASE	105
FIGURE 31: EXTERNAL FACTORS COMBINED TO FORM SCENARIOS	106
FIGURE 32: STEPS IN IMPROBABLE CIRCUMSTANCE CREATION	107
FIGURE 33: STEPS IN IEC PHASE WITH POSSIBLE TOOLS	110

FIGURE 34: BRAINSTORMING APPLIED TO SCENARIO PLANNING PROCESS	111
FIGURE 35: MARKOV WITH PROBABILITIES	112
FIGURE 36: FRAGILITY ANALYSIS PHASE	113
FIGURE 37: REQUIREMENTS OF FRAGILITY ANALYSIS PHASE AND POSSIBLE TOOLS	116
FIGURE 38: THE SYNTHESIS PHASE WITHIN THE ICS FRAMEWORK	117
FIGURE 39: PROBABLE TOOLS TO FIT THE REQUIREMENTS OF CATASTROPHE PREPARATION	122
FIGURE 40: OPPORTUNITY TAKING CURVE WITH REWARDS	125
FIGURE 41: MARKET SHARE VERSUS OPPORTUNITY TAKEN	126
FIGURE 42: PROBABLE TOOLS TO FIT THE REQUIREMENTS FOR THE MIRACLE PREPARATION PHASE	128
FIGURE 43: FEEDBACK FROM THE SYNTHESIS TO THE FRAGILITY ANALYSIS PHASE AND BACK TO ANALYSIS	129
FIGURE 44: THE ICS FRAMEWORK AND REQUIREMENTS	131
FIGURE 45: ENTERPRISE ENGINEERING CUBE	146
FIGURE 46: THE ICS FRAMEWORK	151
FIGURE 47: PROPOSAL OF ICS MATRIX	153

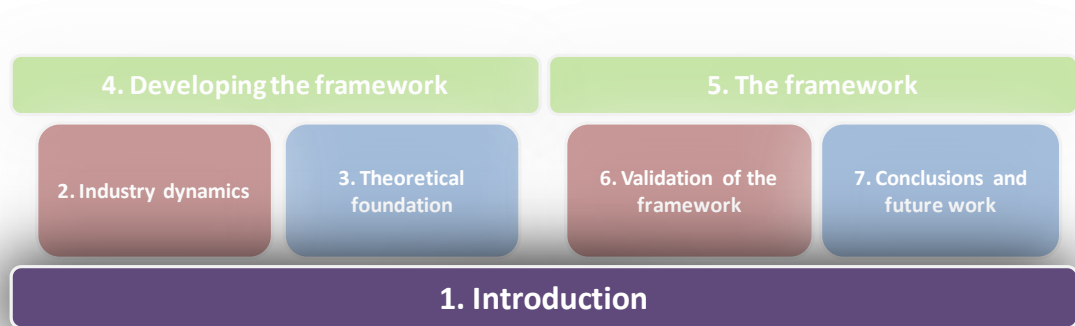
LIST OF TABLES

TABLE 1: WORLD TRADE VOLUME ESTIMATIONS ADAPTED FROM INGLESÌ (2009)	32
TABLE 2: ROLES OF STRATEGY ADAPTED FROM MINTZBERG (2009)	37
TABLE 3: COMPETITIVE FORCES INFLUENCED BY UNDERLYING FACTORS	57
TABLE 4: SOME ISSUES WHEN CONSIDERING PEST ANALYSIS	58
TABLE 5: SIX MAIN TYPES OF RISK [KLINKE AND RENN, 2001]	61
TABLE 6: RISK MANAGEMENT STRATEGIES AS PROPOSED BY KLINKE AND RENN (2001)	62
TABLE 7: TWO WAY TYPOLOGY OF WAYS TO MANAGE UNCERTAINTY AS PROPOSED BY DE NEUFVILLE (2004)	64
TABLE 8: EXAMPLE OF HOW TO USE THE TWO WAY TYPOLOGY TABLE AS DONE BY DE NEUFVILLE (2004)	65
TABLE 9: RED OCEAN VERSUS BLUE OCEAN STRATEGY ADAPTED FROM [KIM ET AL., 2004]	69
TABLE 10: DEFINITIONS OF OPEN INNOVATION MODELS ADAPTED FROM MARAIS ET AL. (2009)	86
TABLE 11: PROFESSIONALS INTERVIEWED	137
TABLE 12: OPEN INNOVATION MODELS ADAPTED FROM MARAIS ET AL. (2009)	160

1. Introduction

“A person who never made a mistake never tried anything new.” – Albert Einstein

The purpose of this chapter is to introduce the need for the research and outline the approach taken to conclude this study.



1.1 Background

History is lined with circumstances that have drastically changed the world in a blink of an eye. The philosophy behind chaos can be seen in our every day lives. The slightest change in the initial condition and the outcome varies drastically. In business, one circumstance changes the way an industry is operated and, through a series of domino effects, the course of other industries. The internet is one that has changed the world forever. Information now waits at our fingertips and complex problems are solved at the click of a button. One man’s wisdom is now freely attainable within the time it takes to type a sentence. We are living in a global village where documents, images and videos are sent to someone in a country on the other side of the world within seconds.

There have been many circumstances such as these in the past century:

- James Watt and the steam engine;
- the Great depression of 1934;
- Einstein’s theory on relativity;
- Black Monday in 1987;

- the 9/11 terrorist attacks;
- the global economic crisis of 2008.

These are but just a few of what is a long list of fortunes and misfortunes and these are just the large ones. There are unfortunate events that have a direct effect on just one industry which then ripples down to the rest. The interconnectedness of the world, due to the internet explosion of the last two or three decades, leads to a new invention reaching almost all the corners of the earth. A great difficulty of this internet era has also led to disaster being spread within seconds. A virus can be sent which crashes an organisation's IT-service and this is but a small example of an organisation succumbing to a lack of protection against these types of disasters.

One of these circumstances, the global economic crisis (2008), is proving to be a great storm at sea, but no one has a clear map for the navigation of sailing through it.

The current global economic crisis has ensured that strategic management arises as a new old-buzzword. The environment is the big thing that has changed. Strategists are getting increasingly concerned that the priorities emerging from the annual planning rituals won't address the demands of today's tumultuous environment. Markets are fluctuating more and more and the linear trend extrapolation exercises are now a thing of the past. Disaster scenarios are now being created in every executive boardroom, scenarios that would have been deemed unthinkable and the current trend looks to the preservation of cash as integral to any strategy [Dye et al., 2009].

Scenario planning is coming to the forefront as a well-established technique for coping with uncertainty, but executing this tool has never been as challenging as in times like these [Dye et al., 2009]. Most organisations have to consider more variables, include more decision makers and they need to place a greater emphasis on measurement. These frequent measurements are the only way to recognise when changing conditions merit quick strategic adjustments. Importance should not be on the current scenarios, but they should aid and look to enhance relevant long-term trends and existing strategies.

Scenario planning is an old strategic tool which is being rekindled through texts like the McKinsey Quarterly in these tumultuous environments, but new principles have arisen. The world is

becoming more complex by the second and new eyes are needed to cope with these drastic changes.

The black swan principle was introduced by Nicholas Nassim Taleb in 2007 which opened up a new thought of looking at probabilities and the impact they carry. The term “Black Swan” comes from the assumption that 'All swans are white'. In that context, a black swan was a metaphor for something that could not exist. The 17th century discovery of black swans in Australia metamorphosed the term to connote that the perceived impossibility actually came to pass. Black swan theory forces the notion that you cannot be 100% sure that black swans do not exist, because that type of census falls outside any human capabilities.

The black swan is an event which has three main characteristics (Taleb, 2007):

1. It is an outlier outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility (rarity);
2. it carries extreme impact; and
3. even though it is an outlier, human nature makes us connect explanations for its occurrence after the fact, making it explainable and predictable (retrospective predictability).

Theories such as these have made place for a new look, and given a new home to some old forgotten strategic management models. The changing environment together with the fall of age old organisations and the supernatural rise of new ones have left a gap in the field of strategy.

1.2 Problem Definition

Any organisation in these trying times is looking to survive the turbulent business climate. The current frame of thought in which these organisation’s strategic minds finds themselves in makes it difficult for them to design a strategy to ensure they reach their objectives. A strong case for research in the strategy field is needed to fill the gap to prepare for improbable circumstances.

1.3 Research questions

The key research questions are of a qualitative nature. They will focus on theories and conceptual models.

1.3.1 Main research question

The main research question of the dissertation is:

How can organisations adequately prepare for improbable circumstances?

1.3.2 Sub-questions

The sub-questions to the main research question are:

- What is an improbable circumstance?
- What is an unfortunate improbable circumstance?
- What is a fortunate improbable circumstance?
- How does strategic management currently guide an organisation to prepare for improbable circumstances?
- How can improbable circumstances be predicted?
- How can organisations prepare for unfortunate improbable circumstances?
- How can organisations prepare for fortunate improbable circumstances?

1.4 Research objectives

The research will aim to adequately answer the questions as highlighted in the previous sections. This offers a means to develop a framework to highlight weaknesses which would jeopardize an organisation's future and/or position an organisation to prosper in times of improbable circumstances.

1.5 Delimitations and limitations

Theories and models are ineffective if they make implausible claims on reality, if they make claims that are not testable and vague, or that are conceptually incoherent, inconsistent and confusing [Mouton, 2008].

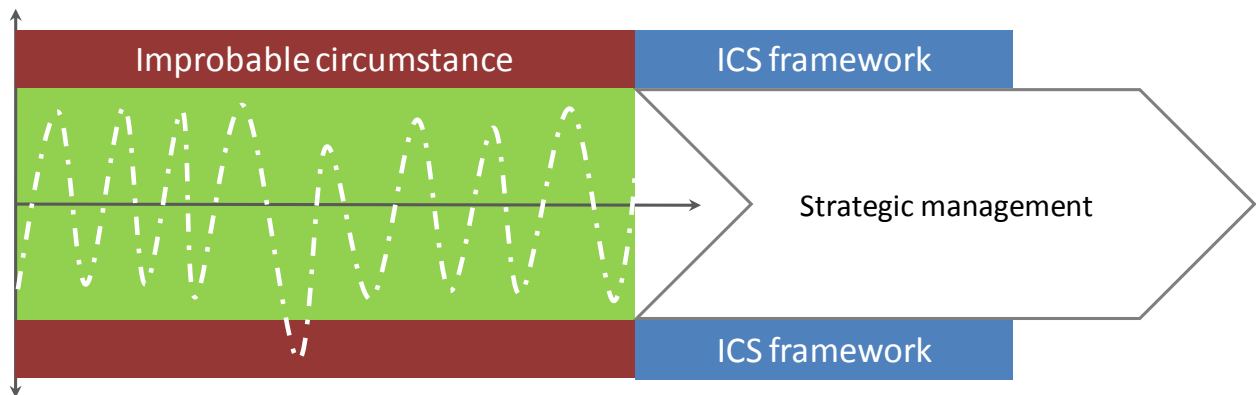


Figure 1: The scope within which the model will function

The model will focus on circumstances which do not adhere to every day environmental business conditions as shown with the white line within the green space, Figure 1. The green space has always been the focus of strategic management, but the ICS framework focuses on those outliers (dark red area) in the every day events.

This sub-chapter aims to put forth the delimitations and limitations to set out a scope within which we work.

1.5.1 Delimitations

- The research will only be focussing on circumstances which fall outside the normal “day at the market”, the dark red area in Figure 1;
- it will propose a framework which will enhance an organisation’s strategy by preparing and exploiting for the effects of rare circumstances;
- the framework will allow users to use their own creativity and resources in each of the phases of the framework;

- it will concentrate around the analysis and synthesis phases of normal strategic management and add to it; and
- it sets up a new field of study for an improved thinking on improbable circumstances.

1.5.2 Limitations

- The research will not replace any organisation's strategy;
- it will not include an empirical or analytical study as strategy formulation is a conceptual idea;
- it will not focus on the implementation or operation phases of a strategy;
- it will not be looking at common strategic processes as it does not focus on normal run-of-the-mill market operations; and
- an application of the research will not be possible as it takes years for strategies to show their value.

1.6 Research methodology

This sub-chapter is based on the research design map development as proposed by Mouton (2008).

A broad classification of the main design types are shown to narrow and head the research into the appropriate direction, Figure 2.

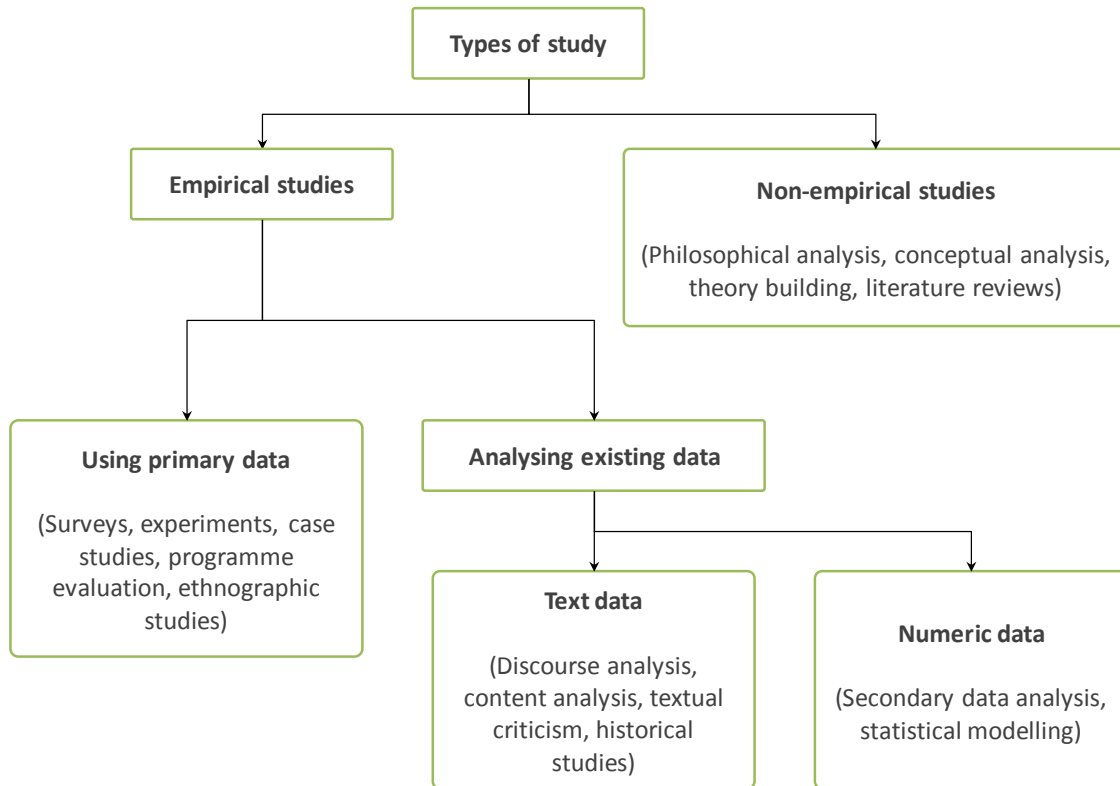


Figure 2: A typology of research design types adapted from Mouton (2008)

The research will be focussing on non-empirical studies which can be broken down into an empirical study in later research. The above mentioned typology is used to map out the following four dimensions in research design:

- Empirical versus non-empirical studies;
- using primary data versus the analysis of existing or secondary data;
- the nature of the data: numerical- versus textual data; and
- the degree of control: highly structured conditions versus natural field settings.

The first two dimensions form the map presented in Figure 3.

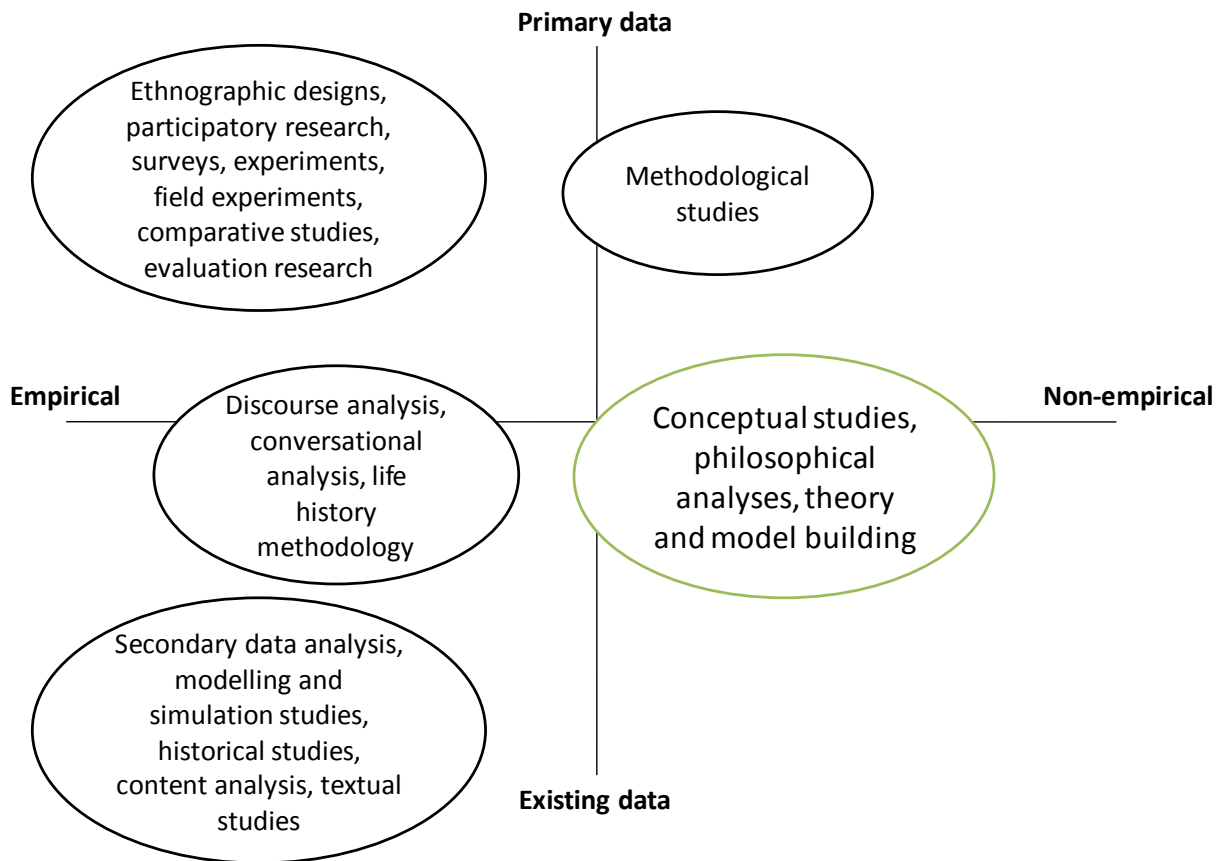


Figure 3: Research mapping adapted from Mouton (2008)

The research focuses on the green highlighted area. Existing data will be used on a non-empirical study.

“If I had one hour to solve a problem and my life depended on it, I’d spend 40 minutes studying it, 15 minutes reviewing it, and 5 minutes solving it.”– Albert Einstein

Einstein understood how analysis takes the longest time in problem-solving. One cannot solve something that is not wholly understood. We use this knowledge to model the problem to see its systemic impact as a whole. A problem that arises in a system can be complex. The key to solving a problem, Figure 4, is to understand it. A system problem as a whole (first quadrant) might be complex, but by breaking it down into smaller sub-problems (second quadrant) a greater understanding is gained of where the problem(s) lie. The sub-problems are easier to solve and an assortment of sub-solutions (third quadrant) is created. These sub-solutions are then pieced together to find a whole solution (fourth quadrant) to the problem detected in the whole system.

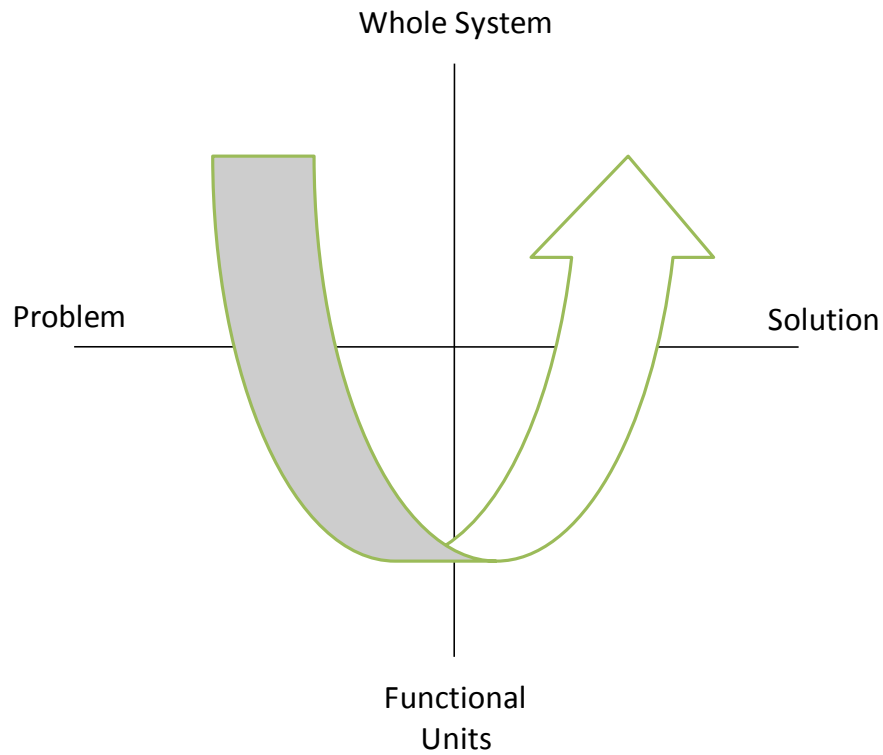


Figure 4: Flow of real world problem solving

Relating to the research, the main research question, chapter 1.3.1, is broken down into sub-questions, chapter 1.3.2. These sub-questions are answered and systematically put back together to form a solution.

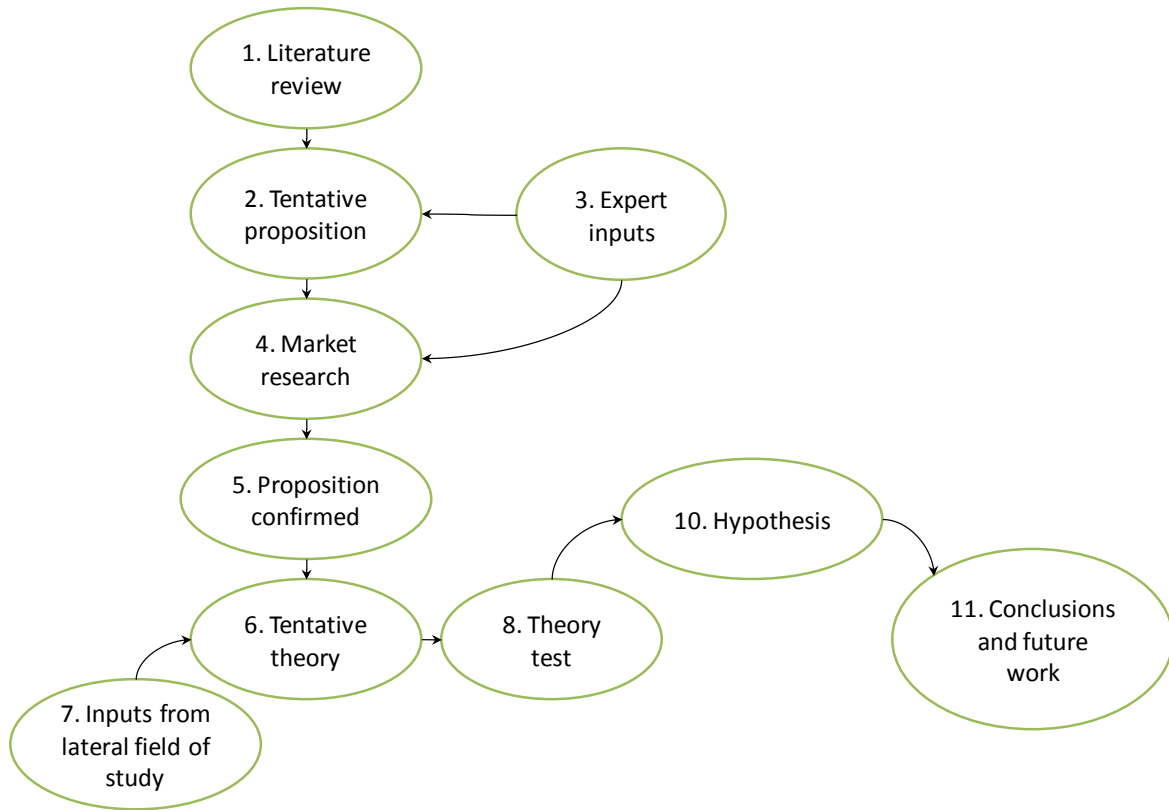


Figure 5: Research method adapted from Bosman (1998)

The research method, Figure 5, shows how a *review of the literature* in the strategic management field was done together with discussions with *experts* and their inputs. The *expert* opinion will give a real world form of objectives and *propositions* in reply to a study of the literature. A *market research* is conducted to validate a gap of research in the market. The *confirmed proposition* and *diverse fields of study* builds into a *tentative theory* to gain new insights into the field. The *tentative theory* is *tested* through interviews with experts to *confirm the theory*. The theory test will also result in a *set of hypotheses* which will form the *conclusions and future research* which results out of this research.

1.7 Document outline

Figure 6 shows the structure of the document.

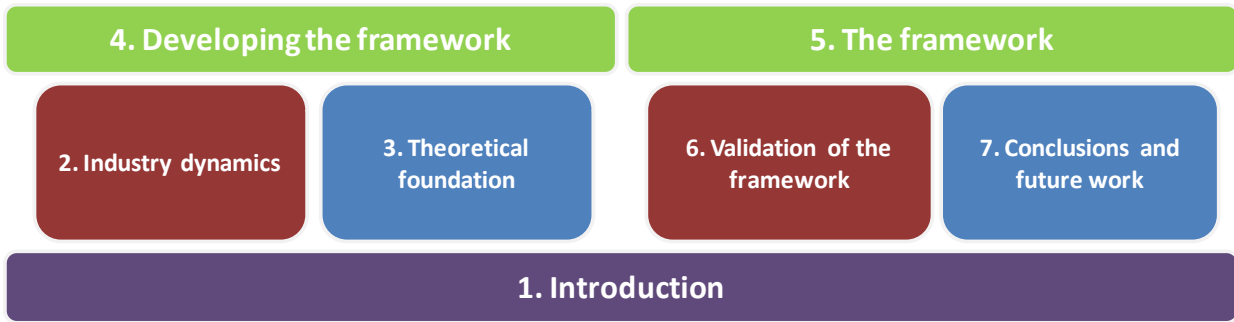


Figure 6: Structure and outline of document

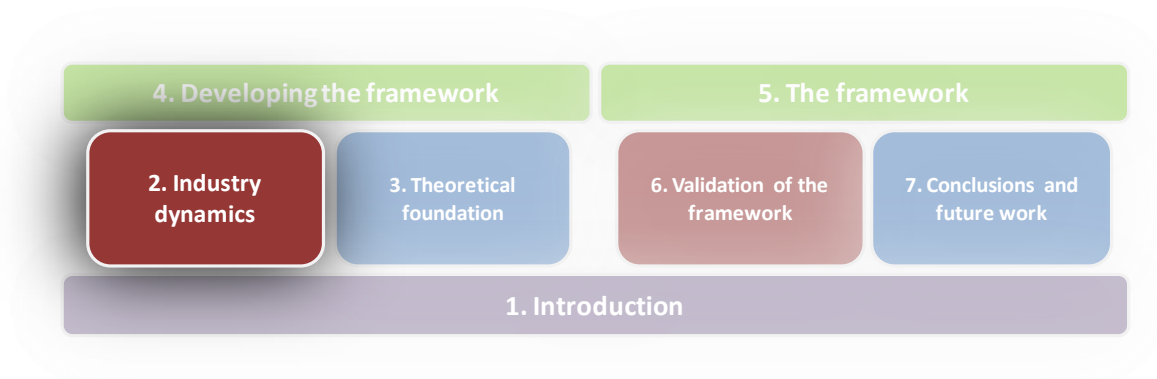
Chapter 1, the introduction, will take the reader through the basic research methodologies, the research objectives and what steps were taken to reach these objectives and thus an overview of the research. Chapter 2, industry dynamics, will give an overview of the industry and how it has taken shape after a market crisis. Chapter 3, theoretical foundation, will give the theory needed to ensure the reader understands the components as they are pieced together in chapter 4, developing the framework. Now that the framework has been developed, it will be discussed in chapter 5, the framework. Chapter 6, validation of the framework will show the means and the results to validating the framework. Chapter 7 will conclude the document and highlight some future work that can be done.

1.8 Chapter conclusion

This chapter has provided the context for the dissertation, both in terms of reasoning and layout. It has set the objectives of the study, the approach taken to achieve these objectives and the roadmap for the structure of the dissertation itself.

2. Industry dynamics

“Trend is not destiny.” – René Dubois



The purpose of this chapter is to give the reader some insight into the catastrophe that was the global economic crisis of 2008 and how it affected the world economy.

2.1 The market crisis of 2008

Mortgage lending excesses in the early years of this decade ultimately took a toll on the financial sector, bringing down American lenders such as Countrywide Financial and Wall Street icons like Bear Stearns. As confidence ebbed, credit tightened, and central banks took steps to limit the damage to the economy and the financial system.

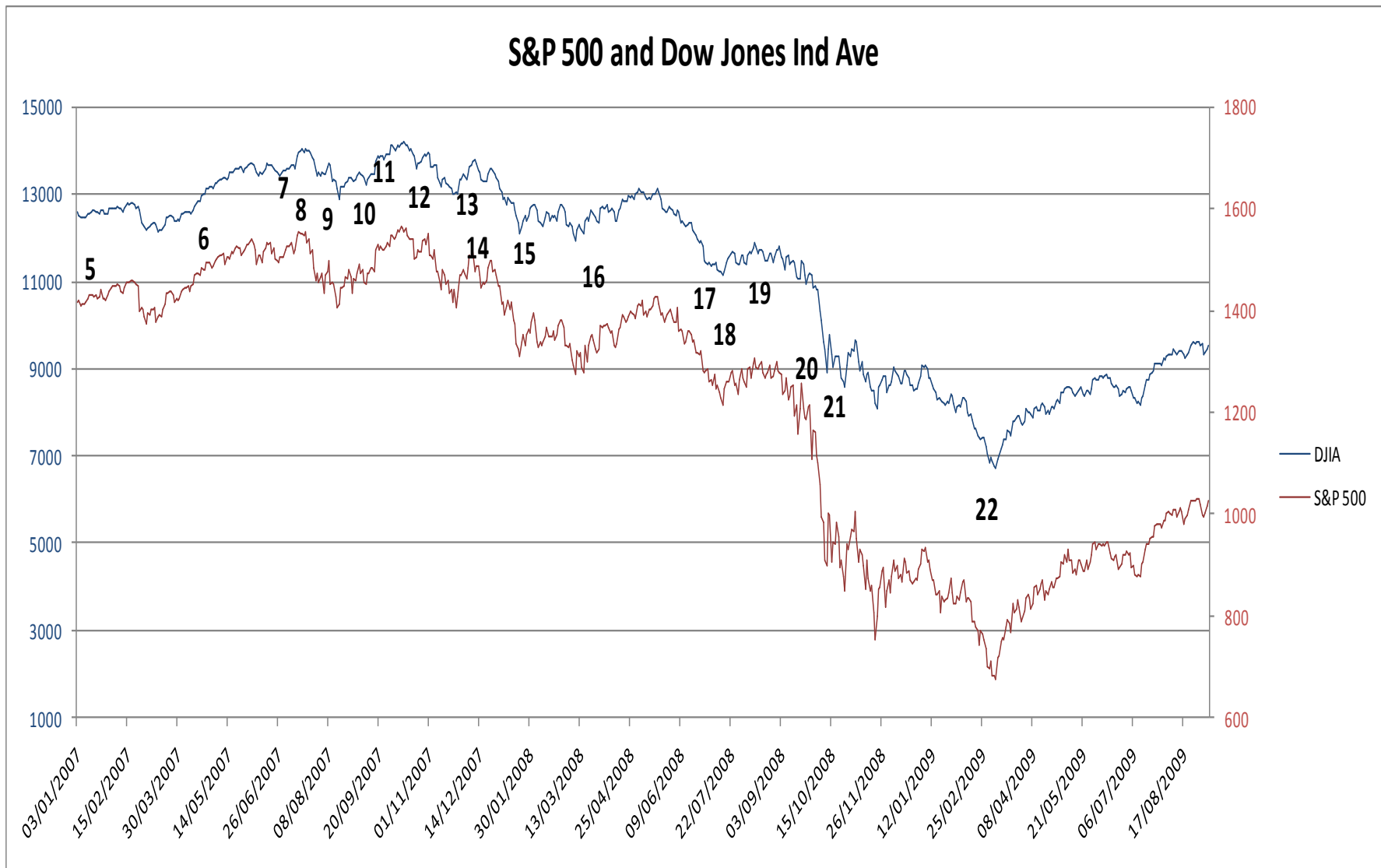


Figure 7: The S. & P. 500 and Dow Jones Industrial Average plotted against 2008 crisis timeline [Source: www.premiumdata.net]

The following timeline of the events, Figure 7, are based on an article by the New York Times [NYTimes, 2008]:

- 1) In January 2001 the interest rates started to fall. The aftermath of the technology bubble in 2001 saw the Federal Reserve (in the USA) lower its benchmark interest rate to 1 % from 6.5 % over two years. A strong foreign demand for American securities pushed down long-term interest rates.
- 2) In 2002 Wall Street tried to disperse risks. Wall Street packaged more mortgages and other consumer debt into securities for investors like pension funds, foreign central banks and hedge funds. Bankers asserted that these instruments, mortgage back securities and collateralized debt obligations, would help reduce and disperse risks. (3) October 2002 saw home prices rise sharply. Lower borrowing costs and the advent of more risky loans helped drive up home prices, which nearly doubled from 2000 to 2006.
- 4) July 2006 saw risky loans peak. Encouraged by low rates and securitization, banks and mortgage organisations took bigger risks in home lending by allowing homeowners to borrow more, put little or no money down and not provide any proof of their financial condition.
- 5) In January 2007 the prices of houses began to fall sharply. Interest rates were rising and homeownership were at record levels. The house prices started to dip in the second semester of 2006. (6) The 2nd of April 2007 saw New Century Financial enter bankruptcy. New Century was one of America's biggest subprime lender and their failure focussed America on the rise in mortgage defaults. The S.&P. 500 closed at 1,424.55, up by 0.26 %.
- 7) More homeowners were unable to refinance or sell their depreciating homes in the second half of 2007 with defaults on mortgages climbing. The first trouble of subprime loans emerged but they were quickly moved to supposedly better quality loans. (8) The 22nd of June saw Bear Stearns dipping into their rescue fund. Bear Stearns pledged up to \$3.2 billion in loans to bail out one of its hedge funds that were collapsing due to bad bets on subprime mortgages. It was the biggest rescue of a hedge fund since 1998 when more than a dozen lenders provided \$3.6 billion to save Long-Term Capital Management. Despite the efforts, the fund later collapsed. The S.&P. 500 closed at 1,502.56, down by 1.23 %.
- 9) Early in August of 2007 defaults were rising and real estate prices were falling. The value of mortgage securities fell rapidly and investors started leaving the market. Banks took more than

\$500 billion in write downs and the International Monetary Fund estimated losses to top \$1 trillion. On the 9th of August BNP Paribas, a French bank, suspended three of its funds due to exposure to U.S. mortgages. The European Central Bank and the Federal Reserve intervened by lending money to banks. The S.&P. 500 closed at 1,453.09, down by 2.96 %. The 16th was the day the largest mortgage lender in the U.S., Countrywide Financial, drew down \$11.5 billion from its credit lines as it could no longer sell or borrow against the home loans it made. The S.&P. 500 closed at 1,411.27, up by 0.33 %.

- 10) A British mortgage lender, Northern Rock, turned to the Bank of England for an emergency loan because it was unable to raise financing in the tight credit market. The bailout on the 14th September was the latest indication that the subprime market turmoil from the U.S. had expanded to other areas. The S.&P. 500 closed at 1,484.25, up by 0.02 %.
- 11) The U.S. Federal Reserve was hoping to restore calm in the markets by cutting its benchmark interest rate by half a point on the 18th of September. The following eight months saw the Federal Reserve funds fall to 2% from 5.25%. The S.&P. 500 closes at 1,519.78, up by 2.92 %.
- 12) The S.&P. 500 reached a new high, S.&P. 500 at 1,565.15, with investors still extremely optimistic on the 9th October 2007. The head of Merrill Lynch resigns on the 30th of October after an \$8.4 billion write down and an unauthorized merger approach to a rival bank. The S.&P, 500 closed at 1,531.02, down by 0.65 %.
- 13) On the 5th of November, the chief executive of Citigroup, Charles O. Prince III, steps down in the wake of a \$5.9 billion write down and sharp drop in profit. The S.&P. 500 closed at 1,502.17, down by 0.50 %.
- 14) The Bank of England opted to react to the prospect of rising inflation and subsiding economic growth. They reacted by cutting their benchmark rate for the first time in two years on December the 6th. It was reduced by a quarter of a point to 5.5%. The bank was quoted saying that the credit squeeze in the U.S. curtailed loans for households and businesses, denting Britain's growth prospects. Across the financial system, banks, securities firms and hedge funds increased their use of borrowed money to make investments. They borrowed at low rates and made investments that yielded a much higher return, putting very little of their own money at risk.

- 15) In late January 2008, the Federal Reserve announced the biggest one day cut in the benchmark interest rate in an attempt to reduce the bleeding. The S.&P. 500 closed at 1,310.50, down by 1.1 %.
- 16) Two months after announcing that its chief executive would step down because of losses due to subprime mortgages, Bear Stearns was sold to JPMorgan Chase for a tenth of the firm's market price two days before. The Federal Reserve had to approve a \$30 billion credit line to help JPMorgan. The day after, 17th of March 2008, the S.&P. 500 closes at 1,276.60, down by 0.90 %.
- 17) On the 25th of June 2008, Barclays joined rivals in tapping the wealth of Asian and Middle Eastern investors to strengthen their capital base. The move indicated that losses from the subprime mortgage turmoil in the U.S. continued to wear on European banks.
- 18) The big fall of Fannie Mae and Freddie Mac shares on July the 7th, 2008, was due to an analyst report that stated that a change in accounting rules could require organisations to raise more capital. The S.&P. 500 closed at 1,252.31, down by 0.84 %. Federal regulators seized IndyMac Bancorp on July the 11th. This was one of the biggest bank failures in U.S. history. The bank, which was once part of the Countrywide Financial Corporation, was the first major bank to shut its doors since the mortgage crisis erupted. The S.&P. 500 closed at 1,239.49, down by 1.11 %.
- 19) The U.S. Congress hurried to pass a housing bill that gave the Treasury new powers to lend or invest in Fannie Mae and Freddie Mac on July the 26th. The act created a program to refinance and give the U.S. government's backing to troubled home mortgages. The following day of trading saw the S.&P. 500 close as 1,234.37, down by 1.86 %.
- 20) September 2008 saw losses rise more as firms like the Lehman Brothers were having more difficulty in raising capital. Banks tightened lending standards which squeezed the economy and the financial system in a self self-perpetuating cycle. On the 7th, the U.S. government seized control over the nation's two largest mortgage finance organisations, Fannie Mae and Freddie Mac. This was done with the hope of causing a reduction of influence on Wall Street and Capitol Hill and at the same time counting on these organisations to pull the nation out of its worst housing crisis in decades. The S.&P. 500 closed at 1,267.79, down by 2.05 %. On the 15th, Merrill Lynch agreed to sell itself to the Bank of America for approximately \$50 billion to avert the deepening financial crisis, while other firms like Lehman Brothers filed for bankruptcy

protection and hurtled toward liquidation after failing to find a buyer. The Dow Jones industrial average closed at 10,917.51, down by 4.42 %.

21) The American International Group was offered \$20 billion from the subsidiaries of New York to bolster its capital as it faced potential disastrous credit downgrades. The following day, the 16th of September, the Federal Reserve agreed to a \$85 billion bailout which gave the government control of the insurance giant, American International Group.

22) The result of this market crisis shows as on the 27th of February 2009, the Dow was down over 50 % from its peak in October 2007.¹ Reports made on the 10th of March 2009 by Reuters stated that 45 % of the world's wealth had been destroyed.² The destruction occurred in less than a year and a half.

2.2 The effect of the 2008 crisis on South Africa

Most developed countries are considered to be in a recession with high unemployment and sharp declines of their economic growth as the main characteristics. Developing countries have also been affected due to the integration with the world economy and the dependence on global markets. A sharp fall in demand for exports, slower economic growth and the wariness of investors for emerging markets shows that the international credit crisis is apparent in South Africa [Inglesi, 2009].

A lot of resources are being spent on saving the textile industry, car manufacturers and a whole range of industries begging at the feet of the government [Fakir, 2009]. Large amounts of money are used to save industries and the employed, but then the employed of South Africa are continually striking to force pay raises and in effect helping South Africa stumble through the recovery³.

¹ <http://www.cnbc.com/id/29428424/site/14081545>

² <http://www.reuters.com/article/ousiv/idUSTRE52966Z20090310>

³ http://www.fin24.com/articles/default/display_article.aspx?ArticleId=1518-1445-1911_2337297

http://www.fin24.com/articles/default/display_article.aspx?ArticleId=1518-1786_2542174

“Before the crisis we only had to pump more money to grow the momentum of the economy. We have, these days, to pump money into the economy to save the existing economy and try and spend to create new growth and economic momentum [Fakir, 2009].” In the first three months of 2009, the South African economy has had to let go of 179 000 jobs, with another 267 000 in the following three months. Ebrahim Patel, minister of Economic Development in South Africa, reported that the last six months (to date August 2009) have shown a total loss of 475 000 jobs.⁴

The crisis saw South Africa’s manufacturing drop by 17% in June 2009 and the gold output was 12% lower for the same period the previous year. South Africa’s finance minister, Pravin Gordhan, said that the impact of the recession on South Africa lagged somewhat behind the rest of the world and so will the recovery [Bryson, 2009].

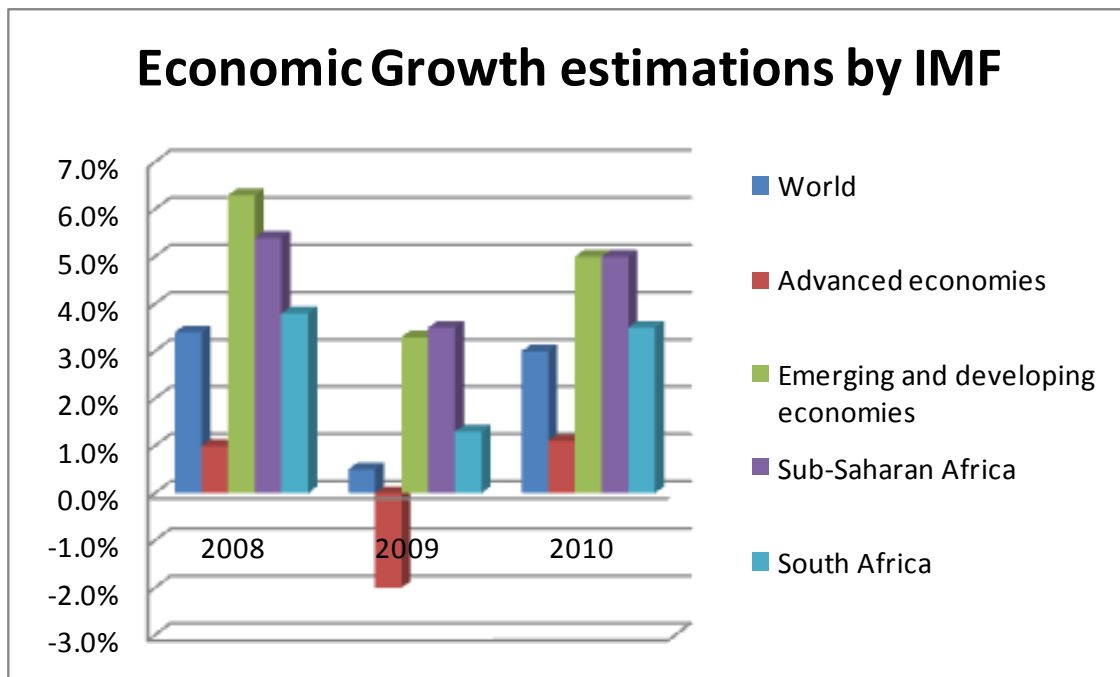


Figure 8: Economic growth rates as estimated by the IMF adapted from Inglesi (2009)

http://www.fin24.com/articles/default/display_article.aspx?ArticleId=1518-1786_2538596

http://www.fin24.com/articles/default/display_article.aspx?ArticleId=1518-2387-2465_2540222

http://www.miningmx.com/news/platinum_group_metals/Strikes-at-Impala-Aquarius-knock-platinum-output.htm,

⁴ http://www.fin24.com/articles/default/display_article.aspx?Channel=News_Economy&ArticleId=1518-25_2554828&IsColumnistStory=False

The above figure shows the slowdown in all economies, but the emerging and developing economies together with the South African economy still showed a growth rate of above 1%. The world economy is expected to recover (global economic growth of 3%).

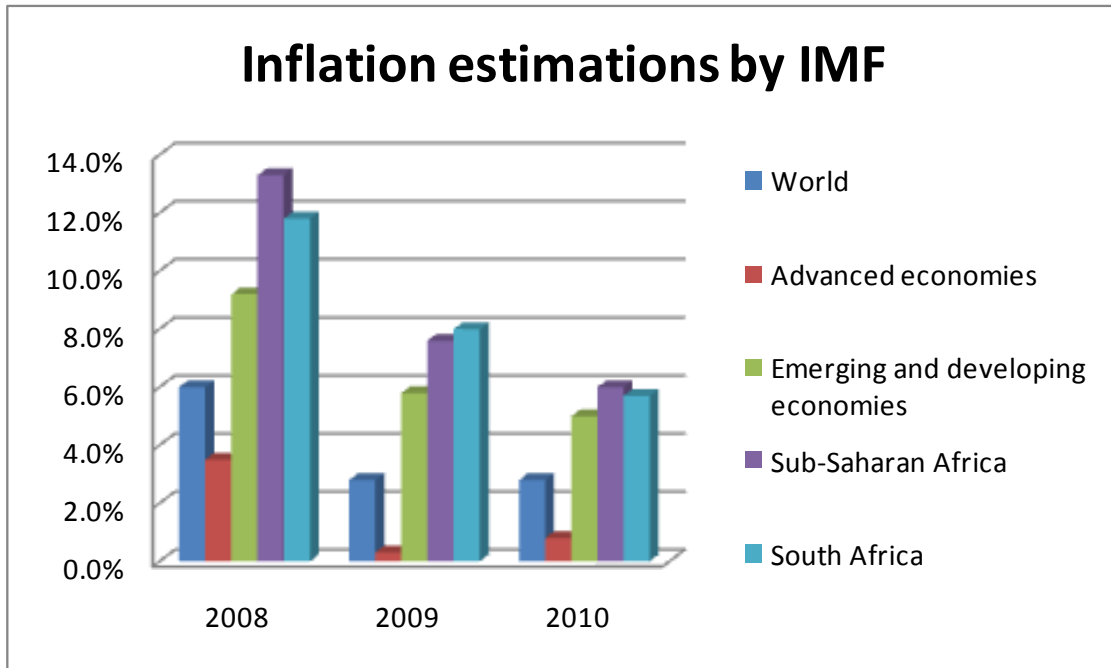


Figure 9: Inflation as estimated by the IMF adapted from Inglesi (2009)

The advanced economies will most probably experience inflation of less than 1%, Figure 9, during the next two years (as of beginning of 2009) [Inglesi, 2009]. Sub-Saharan Africa and South Africa's inflation rates are projected to subside to single digit for both 2009 and 2010.

Table 1: World trade volume estimations adapted from Inglesi (2009)

Imports	2008	2009	2010
Advanced economies	1.5%	-3.1%	1.9%
Emerging and developing economies	10.4%	-2.2%	5.8%
Sub-Saharan Africa	12.3%	11.4%	-
South Africa*	6.4%	4.2%	6.8%
Exports	2008	2009	2010
Advanced economies	3.1%	-3.7%	2.1%
Emerging and developing economies	5.6%	-0.8%	5.4%
Sub-Saharan Africa	2.3%	9.1%	-
South Africa*	1.8%	1.6%	4.6%

* Afrinem's macro model forecasts

All the projected data, Table 1, point to the advanced economies struggling the most in 2009 with both imports and exports experiencing negative growth. The IMF projections show that emerging and developing economies will have negative growth in imports and exports, but their levels will recover to the 2008 values the next year.

South Africa is shown to experience a decline in imports and exports in 2009. The reduction in percentages will not suffer as much as the advanced or emerging countries. In 2010, South African export growth is expected to be higher than in 2008 while imports will return to 2008 levels growing at 6.8% in 2010.

Regarding South Africa's businesses, the country has seen a 41.3% jump in April 2009 liquidations on the same level a year ago, which brings the year-to-date (April 2009) total to 1357. It shows a 45.3% increase than that of the first four months in 2008. The following alarming statistics emerged to date (April 2009) [Doig, 2009]:

- Agricultural failures have jumped 125% (from 8 to 18);
- mining closures doubled from three to six;
- manufacturing casualties rose 17.9% to 79 from 67;
- electricity, gas and water liquidations spiked from four to eleven;
- construction firms have seen a 105.7% rise in closures (from 35 to 71);
- wholesale, retail trade, catering and accommodation firms failure have increased by 26.7% (from 344 to 436);
- the logistics sector experienced 29 closures (up from 25);
- the financing, insurance, real estate and business services saw 51.6% more failures (up from 370 to 561); and
- community, social and personal services failures rose to 145 (from 78).

The total number of liquidations recorded in South Africa for August 2009 declined by 7.4% year on year. The above statistic is promising as South Africa saw a 33.8% increase in July 2009 year on year.⁵ Some more alarming numbers showed that liquidations increased 29.7% for the first eight months year on year.

The South African government have taken the impact of the global economic crisis on the local economy and decided that an effective response is required. The “Framework for South Africa’s Response to the International Economic Crisis” was released on the 19th of February 2009. The main purpose of this document is to contextualise the strategies and plans of the country as a response to the international economic crisis.

The framework proposes various interventions in which South Africa aims to reduce the impact of the crisis. The key directions are [SA Government, 2009] & [Inglesi, 2009]:

1. Increase of investment in public infrastructure;
2. macroeconomic policies to limit the impact of the recession;

⁵ http://www.fin24.com/articles/default/display_article.aspx?Channel=News_Economy&ArticleId=1518-25_2554812&IsColumnistStory=False

3. industrial and trade policy measures which aim to improve the competitiveness and performance of key industries;
4. employment measures which aims to avoid further retrenchments in the public and private sectors;
5. development of social plans;
6. global coordination; and
7. social partnerships.

The global economic crisis of 2008 has knocked the wind out of the world and South African economy. Various industries have stumbled, and as a result the unemployment rate has increased. The way in which the South African economy reacts to crisis is important to the well being of its businesses and its people through employment.

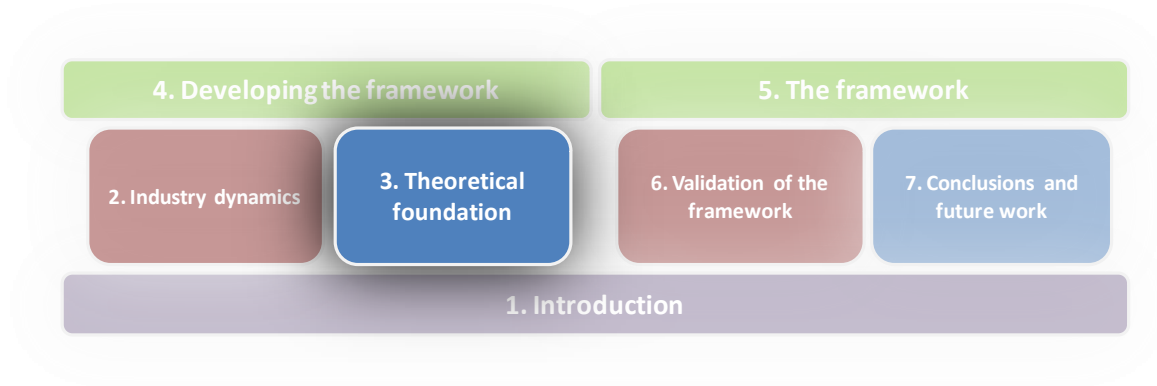
2.3 Chapter conclusion

This chapter showed how the crisis of 2008 unfolded and the destruction it left in its wake. Economies need to prepare for these high impact events and they do this by businesses being crisis aversion aware be it through being oversensitive, by overreacting or being complacent. The positioning of an organisation lies in its strategy and some of the tools that play a part in strategic management is discussed in the following chapter.

The following chapter will provide a fundamental knowledge together with probable tools of addressing the challenges the world economy is facing.

3. Theoretical foundation

“I know that history is going to be dominated by an improbable circumstance, I just don’t know what that circumstance will be.” – Nicholas Nassim Taleb (2007)



The purpose of this chapter is to lay the theoretical foundation in order to address the challenge as posed by the previous chapter, industry dynamics.

There are concepts which are listed here that do not form a complete whole; there is thus an option for the reader to skip this chapter. The chapters which follow refer back to this chapter which would allow for the reader to gain more insight into the specific field discussed and its place in the research.

The previous chapter showed that some circumstances paint a picture of gloom for the world and organisations. The difficult circumstances need to be taken care of to ensure organisations, at least, will survive until the storm clears. The opportunities that are a result of special circumstances need to be prepared for in order to get maximum output from it.

The way to move from a position one finds oneself in currently, position A, to a planned position at B is through a strategy. The positioning of an organisation is a challenge which is of a strategic nature. Strategic issues are commonly handled by executives and employees higher up on the organisation hierarchies. Strategic management tools are thus used to help understand how one can start to solve or at least position an organisation so as to survive during difficulties and/or set the organisation in an advantageous position.

The topics discussed in the sub-chapters are placed there to aid in building a solution for industry needs. These topics have helped through direct use, a process of thoughts or a mere moment of clarity regarding subsequent thoughts or topics. Each heading was included to try and guide the reader through the process of how the author sees how various fields fit into the realm of strategy. Some fundamentals are given on new topics in the world, such as black swans, but most of the topics have found their place within strategic management. An organisation's direction is dictated by its decision makers and these executives follow or should follow some sort of strategy in order to reach their objective.

3.1 Strategy

The word "strategy" is derived from the Greek word *stratēgos*; which derives from two words; the first is "stratos" which means army, the second is "ago" which is ancient Greek for leading/guiding/moving.⁶

According to the online business dictionary⁷, strategy is the art and science of planning and marshalling resources for their most efficient and effective use. There are many definitions of strategy today and each organisation, business school and strategic guru has written his/her own.

Mintzberg (2009) summarizes some of the general areas of agreement on strategy:

- Strategy concerns both the organization and the environment;
- the substance of strategy is complex;
- strategy affects overall welfare of the organization;
- strategy involves issues of both content and process;
- strategies are not purely deliberate;
- strategies exist on different levels; and
- strategy involves various thought processes.

⁶ <http://www.easy-strategy.com/strategy-definition.html>

⁷ <http://www.businessdictionary.com/definition/strategy.html>

Strategy also plays a distinct role within an organization. Mintzberg (2009) notes the advantages and disadvantages of the roles of strategy. These have been adapted and presented in Table 2.

Table 2: Roles of strategy adapted from Mintzberg (2009)

Roles of strategy	Advantages	Disadvantages
Strategy sets direction	To chart the course of an organization in order for it to sail cohesively through its environment	It can serve as a set of blinders to hide potential dangers. Setting out on a predetermined course in unknown waters is the perfect way to sail into an iceberg.
Strategy focuses effort	Promotes coordination of activity. Without direction as set out by strategy, people will pull in a variety of different directions and chaos will ensue.	Groupthink arises when effort is too carefully focused. Other possibilities are missed due to lack of peripheral vision.
Strategy defines the organization	Provides people with a shorthand way to understand their organization and to distinguish it from others.	Defining an organization too sharply could also mean to define it too simply. Stereotyping is a danger and the rich complexity of the system is lost.
Strategy provides consistency	Needed to reduce ambiguity and provide order. Strategy is like a theory: a cognitive structure to simplify and explain the world, and thereby facilitate action.	Creativity thrives on inconsistency, thus a lack of creativity could follow a consistent rolled out plan.

“Strategy without tactics is the slowest route to victory. Tactics without strategy is the noise before defeat.” – Sun Tzu (Chinese general and author, 500BC)

Business strategy shows a distinction between strategy and tactics. Strategy is the overall plan for deploying resources to establish a favourable position. A tactic is a scheme for a specific action. Tactics are concerned with the manoeuvres necessary to win battles, strategy is concerned with winning the war.

A wide array of literature can be found on corporate strategy of which Porter (1998), Mintzberg (2009) and Ansoff (2007) are some of the most well known. Most of these authors’ literature focuses on helping an organisation compile a strategy. Strategy is thus a structured process in which an organisation moves through a framework to build a plan to reach its objectives.

There are two generic ways in which the design of a strategic process can be followed [Moll, 1998]:

1. A systems approach based on those of Prahalad, Hamel (1996) and Senge (1994); or
2. a value chain approach as based on that of Porter (1998).

The systems approach was chosen as the author is well acquainted with the systems approach.

3.1.1 Systems approach

“A man is born, and not made, a strategist.”- Count Alfred von Schlieffen

There are some strategists who were born to do so, but there are few who are so fortunate. The rest of civilization has no difficulty in learning how to apply strategy as so much literature can be found to teach individual strategy. A popular look at individual strategy can be found in the work of Robert Greene (2000, 2003 & 2006).

The above quote by Count von Schlieffen is true, but for those that are not natural strategists, a systems approach will lead the user through steps for which the outcome is focussed on a strategy to guide an organisation into a desired position.

The systems approach to strategic planning is based on an assessment of the causal relationships within the organisation. The inputs for this process are:

- An analysis of the environment; and
- an analysis of the current performance of the organisation.

The process itself consists of the following activities [Moll, 1998]:

- Definition of the current reality of the organisation;
- cause/effect analyses of the current reality
- definition of the future intent of the organisation;
- cause/effect analyses of future intent;
- definition of required interventions in order to progress from the current reality to the future intent
- definition of the driving forces as a source of energy in achieving these strategic initiatives
- definition of the constraints that inhibit the achievement of strategy; and
- an implementation plan for strategy.

An organisation needs to test whether the future intent is met and this is done through feedback.

3.1.1.1 Feedback

“However beautiful the strategy, you should occasionally look at the results.” – Winston Churchill

Winston Churchill could easily have been referring to a strategic process when he uttered this frustration. In feedback systems the variable being controlled is measured by a sensor, and the measured information is fed back to the controller to influence the controlled variable [Franklin et al., 2006]. The principle is readily illustrated by a very common closed-loop feedback system as shown in Figure 10.

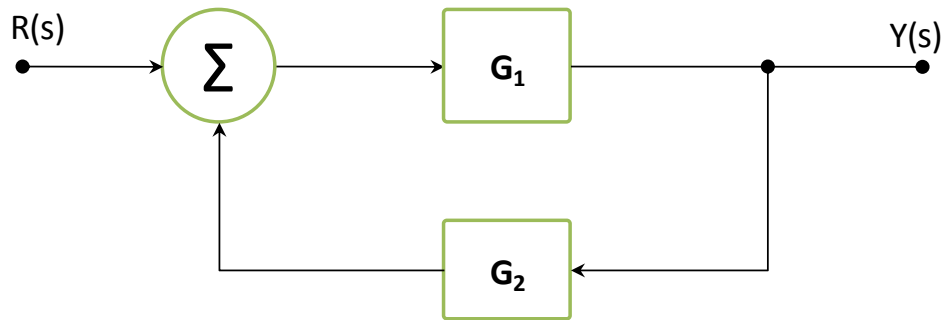


Figure 10: Example of a simple feedback system adapted from Franklin et al. (2006)

The system receives a signal, $R(s)$, which goes through a process, G_1 , with an output signal, $Y(s)$. The output signal, $Y(s)$, is measured by the sensor, G_2 . The measurement is then sent to the controller, Σ , which controls the input signal to ensure the desired output signal is obtained. The signal would then look as shown in Figure 11.

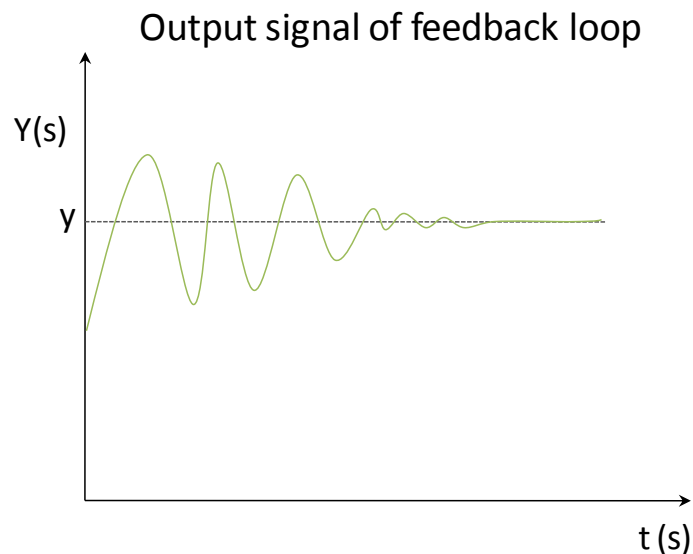


Figure 11: Output signal versus time in an closed-loop feedback system

The output signal oscillates around the desired output, y . Feedback is used to measure and send information regarding the real output and how it varies to the desired output.

Feedback is a principle used in many disciplines and its use in strategy is of the utmost importance. A strategy is formulated to reach a desired objective; theoretically it should be 100% accurate. Care should be taken not to make the incorrect assumption that theory gives an accurate example of reality. Feedback systems are thus used to measure whether the objectives are being met and if

not then some changes need to be made to reach them. The organisation should be going through constant learning through a continuous interaction between strategy formulation and strategy implementation in which strategy is constantly being adjusted and revised in light of experience [Grant, 2008].

A system can be studied through simulation, as shown in Figure 12.

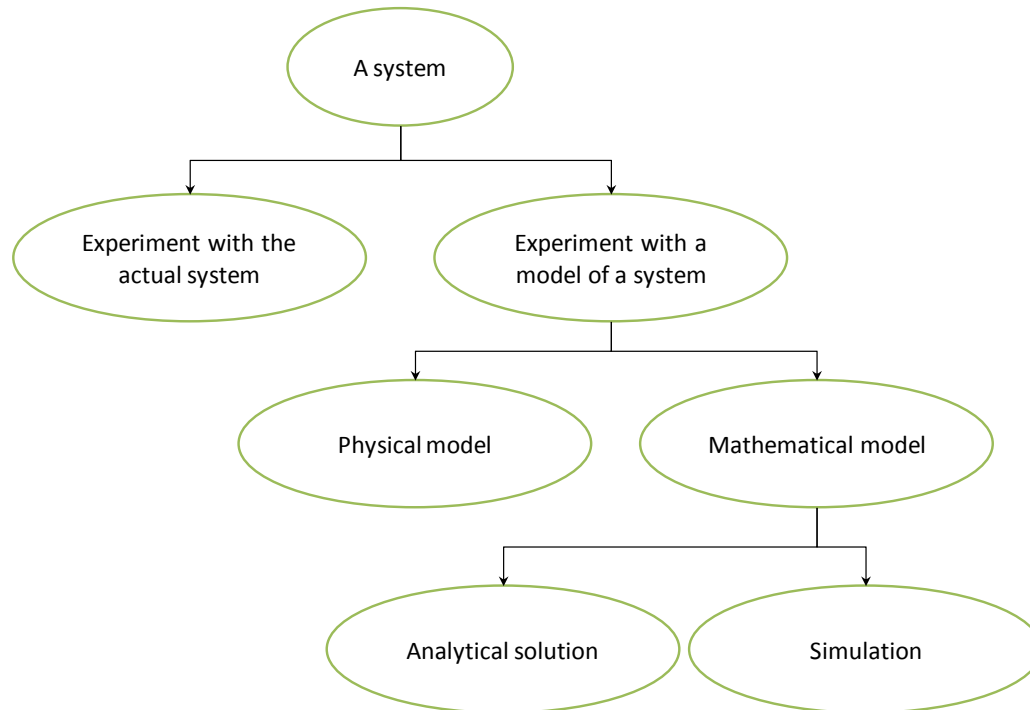


Figure 12: Ways in which to study a system adapted from Law (2005)

There are a number of problem solving/analysis tools and techniques such as [Bekker, 2009]:

- Queuing theory;
- linear programming;
- assignment algorithms;
- graph theory;
- markov chains;
- simulation.

A frequently chosen tool to study a system is simulation.

3.1.1.2 Simulation

Bekker (2009) defined simulation as:

“... the experimentation with a model of a real-world system in order to study the behaviour of the model, given certain starting conditions. It is assumed that the behaviour of the model is a sufficient predictor of the real system's behaviour. This definition implies that we generally try to answer what-if questions with simulation.”

Law (2005) defined it as:

“...a broad collection of methods and applications to mimic the behaviour of real systems, usually on a computer with appropriate software.”

Simulation is an important tool in the Industrial Engineer's toolbox in order to test what-if questions. A system could be studied as if independent of time, or time can play a significant role. The nature of one or more system variables could be stochastic, while one or more events in the system happen at discrete points in time and other are continuous [Bekker, 2009].

Bekker (2009) identified 19 steps to simulation studies from literature:

1. Formulate and define the problem;
2. project planning;
3. define the boundaries for the study;
4. formulate a concept model;
5. preliminary experiment;
6. choose the parameters that will be investigated to give the desired information;
7. determine the input data required; obtain the data and process it;
8. translate the model to a computer simulation language;
9. verify the model;
10. validate the model;
11. rework the model where necessary;
12. do an initial run to generate data for the preliminary statistical analysis;
13. perform statistical analysis to determine the actual number of replications;

14. execute the production runs;
15. perform the statistical analysis;
16. modify the model for alternatives where required;
17. document the study concurrently;
18. implement the results of the study; and
19. maintenance, feedback, monitoring and refining.

These steps are extensive, but more detail can be found in the work of Bekker (2009).

The abovementioned steps will take a simulator through the necessary actions in building the organisation's model. Steps to consider in simulation modelling for success [Sadowski et al., 2004]:

- Establish a clear focus;
- plan carefully and thoroughly;
- build a realistic timeline; and
- constantly review and reassess.

Factors of success are important in simulation modelling, but it is important to keep the pitfalls of failing simulation models in mind [Sadowski et al., 2004]:

- Tackling the wrong problem;
- working on the right problem at the wrong time;
- missing the warning signs of data complications;
- getting lost in detail;
- leaving analysis for the end and not revisiting steps in simulation modelling;
- having too much fun with animation; and
- only testing at the end of the project.

A simulation model always needs to be validated to ensure the model is a close representation of that which it should be a replacement for. Law (2005) suggests three types of validation to ensure the model is a near accurate representation of the system:

1. Conceptual-model validation;

A structured walk through of the conceptual model should be done before an audience of interest. The conceptual model should then be updated before programming of the model starts.

2. results validation; and

If there is an existing system, then the model output data should be comparable with the output data collected from the actual system.

3. face validity.

Regardless of whether there is an existing system, the results of the model should be reviewed for reasonableness.

Regardless of whether the model is valid or not, there are some advantages and disadvantages to simulation.

The advantages of simulation are:

- Analysis of systems operation before implementation, thus reduction of cost of iterations;
- tactical and strategic planning;
- optimisation or sub-optimisation;
- long processes are studied in a relative short time;
- critical parameters in a system can be identified and studied;
- evaluation of alternatives; and
- changes to the system can be investigated without disrupting the operations.

Bekker (2009) refuses to believe that simulation has disadvantages, so he referred to them as drawbacks. Some of these drawbacks are:

- Good simulation analysts need good training and experience. If the analyst does not have the capability, it must be acquired which results in time delays or costs;
- simulation studies can be expensive in many cases. Software packages are generally expensive and it takes time and effort from many stakeholders to complete a simulation study, and then the added expense of implementation;
- a simulation study takes time if properly executed;

- a simulation study could be too costly to address a particular problem;
- other tools such as linear programming may be more appropriate to analyse a given problem; and
- the interpretation of simulation results requires a sound statistical background.

Simulation is a versatile tool which can be applied to many areas, some are listed here [Bekker, 2009]:

- Chemical plants;
- military;
- aerospace systems;
- environmental, ecological studies;
- financial decision support systems;
- supply chains and logistics;
- strategic decision making;
- etc.

Given the tools of strategy and the systems approach, Ansoff (2007) gave us strategic management through which all of this can be studied. There are some more tools which have been found in the boardrooms of organisations and in some new product development through a systems approach such as brainstorming and the 635 method.

3.1.1.3 Brainstorming & 635 method

Brainstorming is group activity mostly used in business meetings to generate new ideas for innovation or improvement.

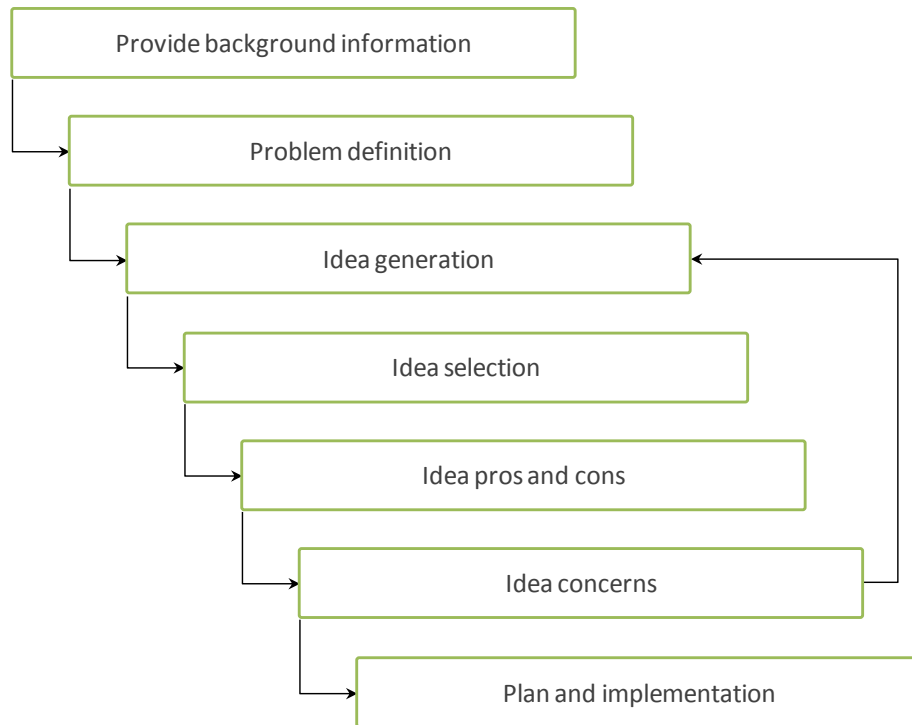


Figure 13: Generic brainstorming process

Figure 13 shows a generic brainstorming process. During the *idea generating* phase no team discussion should be held. Creativity is reduced when one person’s ideas contaminate that of the group. Room for discussion on each of the ideas is left for the *idea selection* phase. Each member should then have a chance to think about what the *pros and cons* of each idea could be, this should also be done with no discussion. The *critical concerns* for each idea should be raised and time should be given to solve them. The result of the brainstorming session should be a plan to set the idea into *action and implement*.

Participants in brainstorming sessions should not fear scrutiny of absurd ideas as the objective is to have as many ideas as possible. The critical review of the ideas only happens in a later phase. The brainstorming model also allows for participants to build on each other’s ideas to allow for more ideas.

Brainstorming should not be restricted to finding solutions to challenges, but in the case of scenario planning, it could be used for scenario generation and solutions/recommendations to scenarios.

Rolling work is a concept where each individual in a group improves on the previous individual's work. The 635 method as proposed by Pahl and Beitz (2007) is one example of this. The 635 method is a systems approach to engineering design. Firstly, a problem or need arises for a certain type of product. The problem or need is then broken down into a set of requirements which the product should satisfy to be successful. These requirements are then translated into functions. Concepts should be developed for each of these functions. The compilation of these concepts should then be found to create a solution. There is a need to develop as many concepts as possible to ensure the near best possible solution is found. The method uses six individuals, three concepts and five iterations, thus 635. Each individual comes up with three concepts and sends them to the next individual who will improve and change or develop a new concept from these concepts. The final outcome is up to five iterations on each concept and thus a greater chance at a successful product.

Brainstorming is a highly effective exercise, but some threats should be taken note of such as groupthink. Groupthink is defined by Merriam-Webster (2009) as:

“A pattern of thought characterized by self-deception, forced manufacture of consent, and conformity to group values and ethics.”

An individual will mostly conform to a group's thinking as the group dynamic influences individuals within the group. Given these systems approach tools, a systemic approach to strategy is given in strategic management.

3.2 Strategic management

Strategic management is a process of strategic decision making that sets the long-term direction for the firm in order to achieve a sustainable competitive advantage. The ultimate concern of strategic management is thus to improve performance through time.

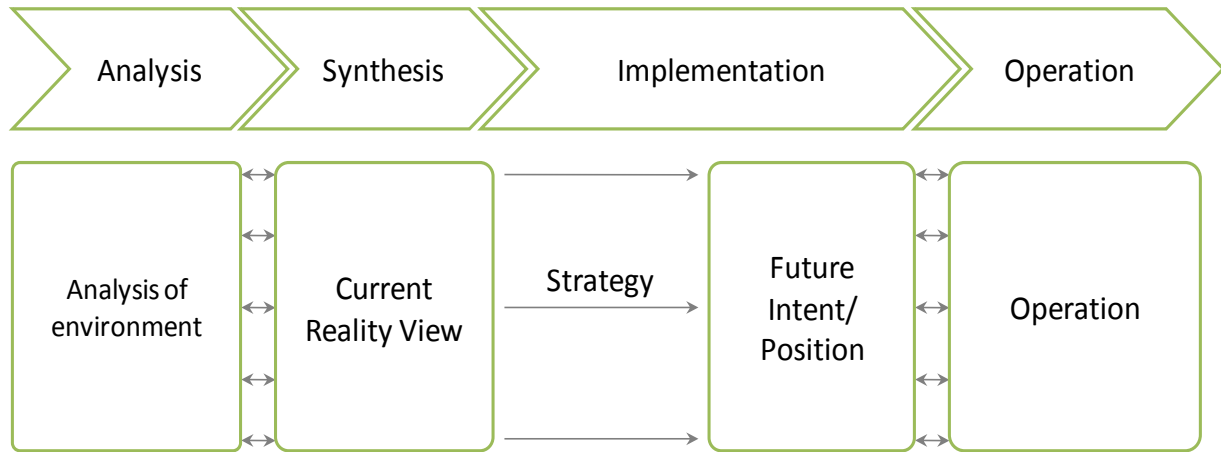


Figure 14: Strategy connecting current state with future intent

Strategic management directs focus on the decisions that can be controlled in the present by keeping in mind the uncontrollable conditions in the future, Figure 14. Analysis of the environment would fit in with the strategic analysis in which various tools, such as those mentioned in the subsequent chapters, can be used to gather data. This works collaboratively with the designing of a specific strategy and the objectives set around this strategy. The strategy is then designed and implemented in the hope of reaching the future intent, the place where we want our strategy to take us. The operation thereafter concentrates on keeping up with the objectives while another strategy should be ready to be designed to ensure continuous improvement.

Grant (2008) structured his book in a way in which he saw the strategic process play out, which includes a large analysis of the organisation and its surroundings, Figure 15. Thereafter, the organisation will continue to the synthesis of the strategy, business or corporate.

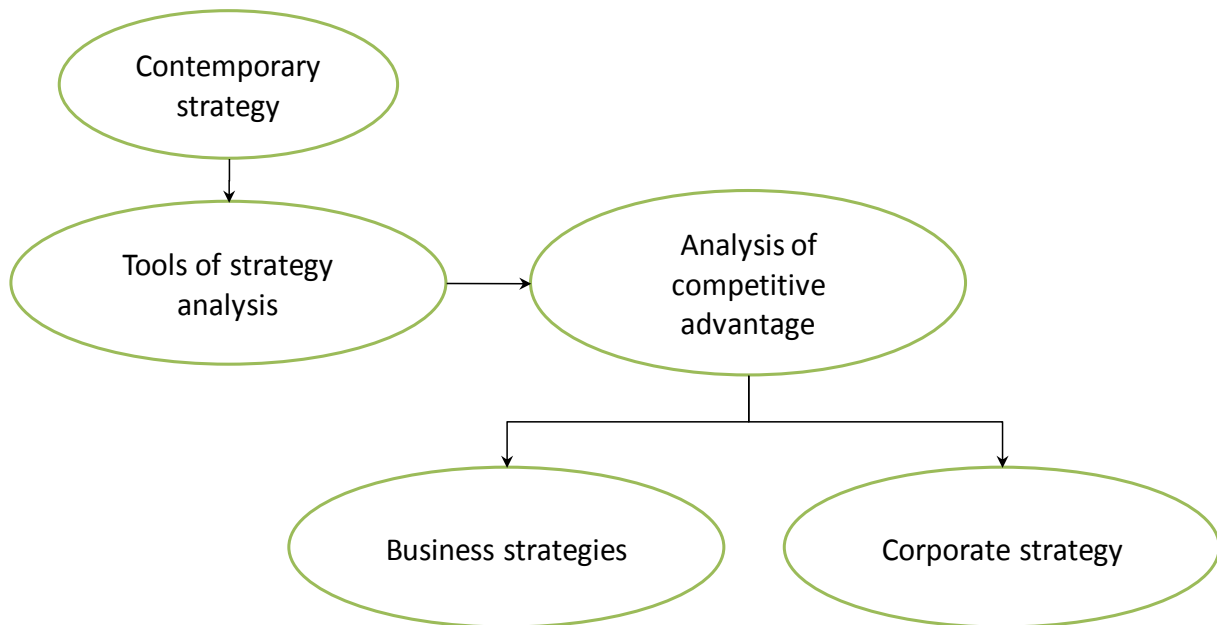


Figure 15: Contemporary strategy adapted from Grant (2008)

It is important to note that there are two basic types of strategies which are business strategies and corporate strategies. Business strategy focuses on the ‘How should we compete?’ and corporate strategy is concerned with ‘Which industries should we be in?’

The strategic planning process typically combines both top-down and bottom-up strategy making. The top management sets the guidelines in the form of mission statements, business principles and performance targets while the individual business units take the lead in formulating strategic plans. The strategic plans are then open to the business unit managers which have freedom to adjust, adapt and experiment with the plan. It is thus shown that strategy is a planned emergence [Grant, 2008]. The author believes that the gap which exists between the strategies that are planned and the strategies that emerge can be reduced through constant feedback.

The collaboration between strategy and the field of industrial engineering through the author’s own experience has come to show that a logical way of creating strategy would be through a systems approach. The systems approach would allow for fixed steps that need to be completed in order.

Pearce et al. (2005) suggests nine strategic management formulation steps:

1. Formulate the mission, including broad statements about the purpose, philosophy and goals;
2. conduct an analysis that reflects the internal conditions and capabilities;
3. assess the external environment, including both the competitive and the general contextual factors;
4. analyze the options by matching its resources with the external environment;
5. identify the most desirable options by evaluating each option in light of the mission;
6. select a set of long-term objectives and grand strategies that will achieve the most desirable options;
7. develop annual objectives and short-term strategies that are compatible with the selected set of long-term objectives and grand strategies;
8. implement the strategic choices by means of budgeted resource allocations in which the matching of tasks, people, structures, technologies, and reward systems are emphasized; and
9. evaluate the success of the strategic process as an input for future decision making.

These nine tasks indicate that strategic management involves the planning, directing, organizing, and controlling strategy-related decisions and actions.

As shown in Figure 14, strategic management takes a look at the analysis, synthesis, implementation and operation. The following sub-chapters discuss the principles of analysis and synthesis in more detail. The implementation and operation phases are mostly up to change management, project management and operations research and fall outside the scope of this study.

3.2.1 Strategic analysis

Strategic analysis focuses on extracting data applicable to the organization and the environment it operates in. The more accurately a problem is defined, the more effective the decisions leading to a solution can be.

3.2.1.1 Scenario planning

“Science has not yet mastered prophecy. We predict too much for the next year and yet far too little for the next ten.” – Neil Armstrong

Scenario planning works by describing a small number of scenarios, by creating stories of how the future may unfold and how they might affect the issues that confront an industry. Scenario planning helps would-be decision makers to anticipate hidden weaknesses and inflexibilities in industries and their methods.

“Scenarios are carefully crafted stories about the future embodying a wide variety of ideas and integrating them in a way that is communicable and useful. Scenarios help us link uncertainties about the future to the decisions that we must make today [Schwartz, 1991].”

Scenario planning can be used to explore and learn the future in which an organization’s strategy will be formed. Scenario planning works by understanding how and what the impact will be of the most uncertain and important driving forces. The end result is a number of diverging stories which results from extrapolating uncertain and heavily influencing driving forces. The objective is to increase the knowledge of the business environment and to widen perception of possible future circumstances.

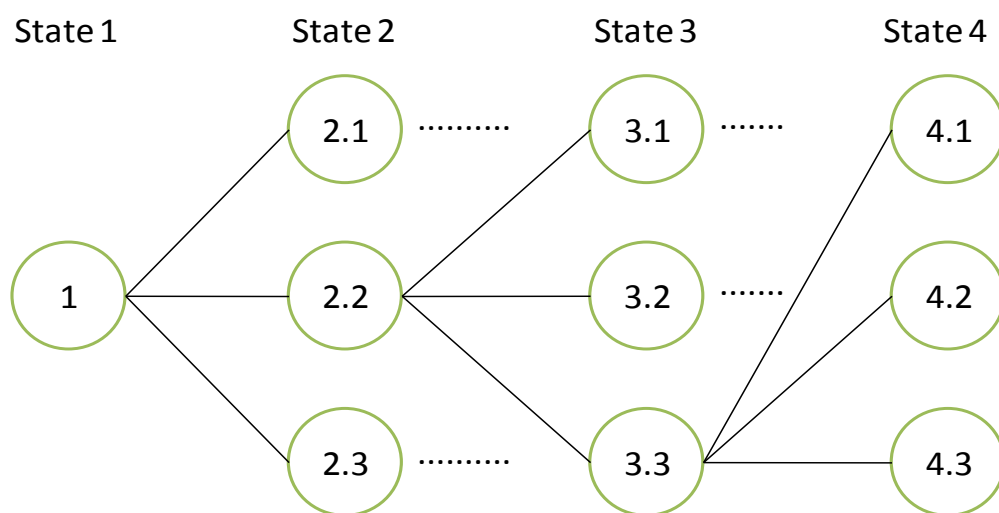


Figure 16: Depiction of scenarios

Figure 16 shows how scenarios are crafted. An industry could find itself in state 1 and craft the scenario 2.1, 2.2 and 2.3. Plans are set out for each of these scenarios to ensure the industry is positioned to handle the circumstances sufficiently. When state 2 has been reached we see which of the scenarios have been incorrect and new scenarios are created to find scenarios 3.1, 3.2 and 3.3. The scenarios would then repeat in this same manner.

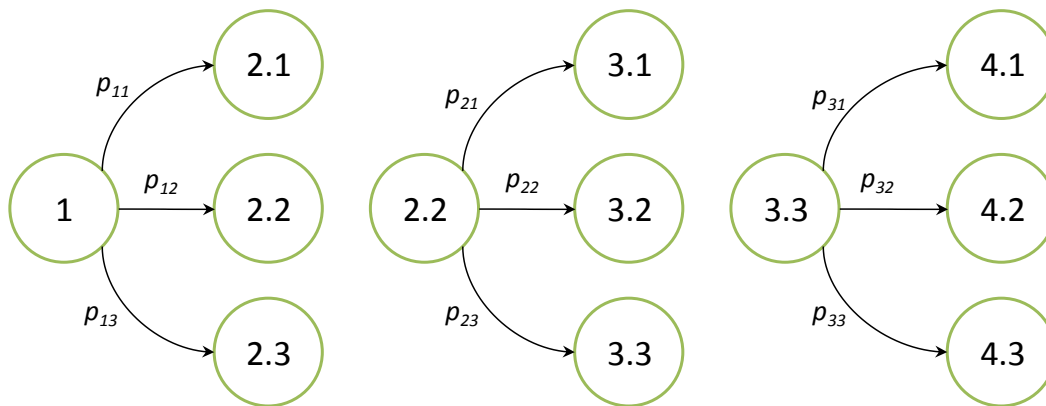


Figure 17: Markov chains with probabilities

We could also attach probabilities of occurrence of each of these events to calculate the probability of moving from the initial state to any of the last scenarios in the last state. In this manner we could use the systems sciences with scenario planning to get a more calculated probability of a specific situation happening, Figure 17. It is important to realise that the probabilities here will not be assigned any values, instead, they will only focus on abstract terms, e.g. highly improbable, improbable, probable and highly probable.

The probability of reaching state 4.3 would then be calculated as follows, if they are mutually independent:

$$P_{143} = P_{12} \times P_{23} \times P_{33}$$

The probability may not form part of the story side of scenario planning, but the probabilities might play an important role in the scenario most likely to happen.

Schwartz (1991) proposes the following steps to derive scenarios:

1. Identify the focal issue or decision;

2. determine the key forces in the local environment;
3. determine the drivers in the macro-environment that impact on the forces identified in the preceding step;
4. rank the forces and the drivers according to uncertainty and importance;
5. select the scenario logics;
6. flesh out the scenarios;
7. evaluate the decision using each of the scenarios as basis; and
8. select leading indicators and signposts in order to identify the unfolding of the future against the individual scenarios.

The following should also be considered when deriving scenarios:

1. Do not pre-empt to the obvious three scenarios (high, middle and low road);
2. do not assign probabilities to the various scenarios as you will most likely only concentrate on the most likely scenario;
3. provide the scenarios with useful names. Memorable names will ensure they make their way into the decision making process;
4. the scenario development team should be carefully selected; and
5. scenario development should be intensely participatory.

Scenario planning as presented by Schwartz (1991) focuses on a certain concern for the organisation. The input determines the output and the input here is a pending concern.

Sunter et al. (2001) designed a way in which they could create scenarios and found a way of mapping it on a matrix, Figure 18.

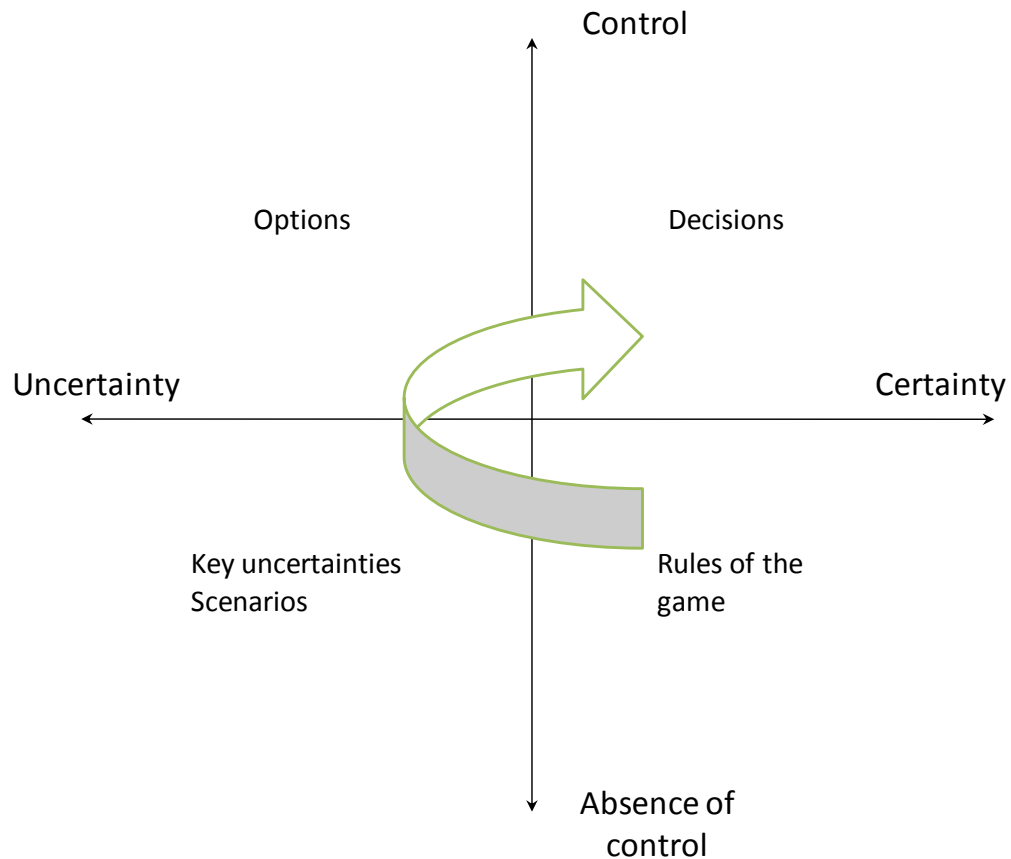


Figure 18: Scenario planning process as adapted from Sunter et al. (2001)

The process is a very simple one to depict how scenario planning is mapped out. An organisation would start with the rules of the game, what is happening. The organisation then moves to identify the key uncertainties and develop scenarios around these uncertainties. According to the scenarios created, there are various options the organisation has regarding how it will act. The last quadrant leads to the decision to be made after the options were weighed up in the previous quadrant.

The advantages of scenario planning in a highly uncertain environment are clear. There are various different scenarios that can play out in the future and thus no one case can be regarded as probable. Even the definite probability will be a black swan if it doesn't happen, so scenarios should cater for these too.

Scenario planning will help to develop plans which will be triggered by certain underlying drivers of uncertainty. Current environmental factors are making scenario planning more complex with the vast range of probable outcomes.

It is critical to bring decision making executives into the planning process early. The process should be kicked off by involving the executives to look at threats that could be faced and the organisation's collective strategic response [Dye et al., 2009]. Turbulent times are calling for new ways of building strategies and these should be explored.

The way in which organisations react to circumstance can be seen in sensitivity analysis.

3.2.1.2 Sensitivity analysis

Sensitivity analysis is the study of the amount of variation found in the output of a mathematical model due to the variability in the different sources of input into the model. The output could be apportioned to both a quantitative as well as a qualitative differentiation of the various inputs. In sensitivity analysis one tries to identify what source (input) of uncertainty weights more on the study's conclusions (output), therefore looking at the effect that varying the inputs of a mathematical model will have on the output of the model itself.

Monte Carlo simulation is a sampling technique which is used to simulate random values as the input to a model. Sensitivity analysis could use the random inputs created by Monte Carlo simulation, but known inputs (controllable variables) can use to dictate an outcome.

The method shows that there are controllable- and uncontrollable variables that have an influence on a model. The uncontrollable variables are not under our authority, but a focus on the controllable variables will help us to counter the uncontrollable variables. For example, if we focus on the price of a ton iron ore and assume the selling price of steel is US\$60/ton and we are producing iron ore at US\$65/ton, then we will be losing US\$5/ton due to our inability to effectively control the cost of the production of the iron ore. Thus, we will want to try and counter the uncontrollable variable, the selling price of iron ore, by manipulating what we can control, the cost of production.

3.2.1.3 Swot analysis

A SWOT analysis identifies the **S**trengths, **W**eaknesses, **O**pportunities and **T**hreats of a particular organisation.

The strengths and weaknesses of an organisation are internal factors that create or destroy the value. It does this by weighing up its assets, skills or resources (all controllable variables) to that of its competitors. The opportunities and threats are external factors that create or destroy value. These relate to uncontrollable variables that emerge from competitive dynamics of the industry or market which can be found from Porter's five competitive forces or from PEST analysis.

3.2.1.4 Porter's five competitive forces

Porter's competitive forces are used to make an analysis of the attractiveness of an industry structure. The analysis is made by identifying five of the fundamental competitive forces:

- Entry of competitors;
- threat of substitutes;
- bargaining power of buyers;
- bargaining power of suppliers; and
- rivalry among existing players.

Table 3 shows what factors would be taken into account when analysing each of the five forces. The five forces allows for useful input when doing a SWOT analysis.

Table 3: Competitive forces influenced by underlying factors [Grant, 2008]

Entry of competitors	Threats of substitutes	Bargaining power of buyers	Bargaining power of suppliers	Rivalry among existing players
Economies of scale	Quality	Concentration of buyers	Concentration of suppliers	The structure of competition
Capital/investment requirements	Buyers' willingness to substitute	Differentiation	Branding	The structure of industry costs
Customer switching costs	Relative price of switching to substitutes	Probability of buyers	Profitability of suppliers	Degree of product differentiation
Access to industry distribution channels	Cost of switching substitutes	Role of quality and service	Suppliers threaten to integrate forward into industry	Switching costs
Access to technology		Threat of backward and forward integration into the industry	Buyers do not threaten to integrate backwards into supply	Strategic objectives
Brand loyalty		Switching costs		Exit barriers
Likelihood of retaliation from existing industry players			Role of quality and service	
Government regulations			Industry is not a key customer group to the suppliers	
			Switching costs	

The five forces model would also look at the dynamics within an industry and help the strategists gain a greater understanding of the competitiveness within the industry. The five forces can benefit from the use of PEST analysis to highlight some factors within an industry.

3.2.1.5 PEST analysis

The environment in which an industry operates is of extreme importance and a common way of assessing it is through the analysis of PEST (Political, Economic, Social and Technological) factors, Table 4.

Table 4: Some issues when considering PEST analysis

Political Factors	Economic Factors	Social Factors	Technological Factors
Global political institutions	Cost of production	Social change	Global technology scanning and technology clusters
Government legislation	Currency exchange rates	Global convergence	The knowledge based economy
Political risk	Cost of capital		Spread of the internet

The broad framework presented by PEST can assist as a checklist to identify what types of external factors influences an industry could encounter in the international market. Usage of PEST analysis will vary between organisations as they depend on factors such as strategy, research reports, marketing plans, etc. The factors that arise from a PEST analysis session are usually outside of the control of the organisation and should thus be handled as either threats or opportunities.

Considering all these factors separately and in isolation is of no use, the competitors and the organisation's interaction with the competitors is of extreme importance and the field of game theory has helped us gain a greater understanding of that.

3.2.1.6 Game theory

Grant (2008) stated that Porter's five forces model is limited as it fails to take full account of competitive interactions among firms.

The essence of competition in strategy is the interaction among the players. The decisions made by one player are dependent on the actual and anticipated decisions of the other players.

Game theory allows the modelling of competitive interaction and offers two valuable contributions to the field of strategic management [Grant, 2008]:

1. Permits the framing of strategic decisions. Game theory provides the structure, a set of concepts and a terminology which allows the description of competitive situations in terms of:
 - a. Identity of players,
 - b. specification of each player's options;
 - c. specification of the payoffs from every combination of options; and
 - d. the sequencing of decisions using game trees.

These help an organisation in a systemic, rational approach to decision making.

2. Predicts outcome of competitive situations and identify optimal strategic choices. Through insight offered into situations of competition and bargaining, game theory can predict the equilibrium outcomes of competitive situations and the consequences of strategic moves by any one player.

"...game theory is not useful because it gives us answers, but because it can help us understand business situations. Game theory provides a set of tools that allows us to structure our view of competitive interaction. If we identify the players in a game, identify the decision choices available to each player, specify the performance implications of each combination of decisions and predict how each player is likely to react to the decision choices of the other, then we have made huge progress in understanding the dynamics of competition. Most importantly, by describing the structure of the game we are playing, we have a basis for suggesting ways of changing the game and thinking through the likely outcomes of such change." –R. M. Grant (2008)

Strategic analysis focuses on analysing an organisation and the environment within it functions, but some strategies focus on shaping the environment to the organisation's own advantage.

3.2.2 Synthesis

"I can't change the direction of the wind, but I can adjust my sails to always reach my destination."

- Jimmy Dean

Jimmy Dean refers to how we cannot control the uncontrollable, but there are actions we can take to ensure we use the uncontrollable to reach our goals. In strategic management, we try to foresee, by using scenario planning, etc., the uncontrollable circumstances and thus be able to use our controllable variables to ensure we arrive at our ultimate goal or vision for an organisation. Knowing what we can control and what risks can be taken are of extreme importance in synthesising a strategy.

3.2.2.1 Risk and uncertainty management

The Merriam-Webster (2009) describes risk and uncertainty as:

"To expose to hazard or danger."

"lack of conviction or knowledge especially about an outcome or result."

Klinke and Renn (2001) developed six main types of risks that determine risk management strategies. They named these risk types after Greek mythology characters, Table 5.

Table 5: Six main types of risk [Klinke and Renn, 2001]

Greek mythology characters	Risk types
Damocles	High catastrophic potential, probabilities widely known
Cyclops	No reliable estimate on probabilities, high catastrophic potential at stake
Pythia	Causal connection confirmed, damage potential and probabilities unknown or indeterminable
Pandora	Causal connection unclear or challenged, high persistency and ubiquity
Cassandra	Intolerable risk of high probability and great damage but long delay between causal stimulus and negative effect
Medusa	Perception of high risk among individuals and large potential for social mobilization without clear scientific evidence for serious harm.

Given the six main types of risk, Klinke and Renn (2001) proposed three main ways in managing these risks, given in Table 6.

Table 6: Risk management strategies as proposed by Klinke and Renn (2001)

Risk management strategies	Risk types	Requirements	Definition
Risk based or risk informed management strategies	Damocles & Cyclops	Sufficient knowledge of key parameters	Emphasis on scientific assessment, reduction of exposure and/or probabilities, risk management according to expected values on risks and benefits, and reliance on inspections, auditing and routine controls.
Precautionary or resilience based strategies	Pythia & Pandora	High uncertainty and ignorance	Emphasis on transdisciplinary research and investigations, the containment of application, constant monitoring, redundancy and diversity in safety design, liability, and a no tolerance policy for risk control.
Discursive management strategies	Cassandra & Medusa	High ambiguity	Emphasis on reaching political consensus or agreement, the importance of procedure and transparency, the establishment of trust-generating institutions, an investment in risk communication, the involvement of stakeholders, including industry and governmental organisations, and public participation.

The conclusion as stated by Klinke and Renn (2001) showed that risk management strategies need to be tailored to the main characteristics of the risk source in question.

“The modern awareness of risk is not about our own experiences or about the current statistical risk image of deaths, harm, and injuries. Rather, it is about an uncertain future.” – Hovden (2004)

“Designers should deal with the upside of the probability distribution just as they deal with the downside. They should build in the capability to deal with these extraordinary circumstances. Dealing with both the upside and the downside of uncertainties is not incompatible” [de Neufville, 2004].

De Neufville (2004) has highlighted three basic ways to manage uncertainty:

- Control uncertainty, such as demand management;
- protect passively, as by building robustness into an organisation; or
- protect actively by creating flexibility that managers can use to react to uncertainties.

Some uncertainty can be affected by uncertainty caused by market fluctuation or social pressures. Demand management is a prime example of this. Adjusting price or quality of a service provided by an organisation at certain times. Through this the increase or decrease of the demands can be controlled.

When protecting an organisation, there are various forms of passive protection which will function without any significant management decisions. Redundancy of parts is a standard way of achieving operation robustness in an engineering system. Robustness can also be obtained like the air traffic control system operating under localized high demand or bad weather.

The last mentioned, protecting actively, we can use by thinking of dealing with uncertainty by enabling the organisation’s decision makers to take specific decisions to alter the configuration of the organisation depending on circumstances. In finance, options can be created that can be exercised when circumstances warrant. Classic forms of options are those that expand or contract a system or a product so that the final configuration can be delayed and thus enable the designer to alter the system/product more closely to what is desired.

Strategic decisions depend a lot on the experience gained from learning. The responses to uncertainty should be highly connected across the time scales. Learning from experience can be active or passive. One approach is to observe what happens and deduce these trends and other characteristics of uncertainty. This approach has been used in classic financial analysis. Analysts will examine market data, identify trends if they exist, calculate the variance of the distribution and then proceed to calculate the value of the options they will use to hedge against risk or exploit opportunities.

De Neufville (2004) developed a two way typology of ways to manage uncertainty in engineering systems design. The used time-scale from operational, through tactical to strategic was used against the different responses a system could have to uncertainty. The generic table is listed in Table 7.

Table 7: Two way typology of ways to manage uncertainty as proposed by de Neufville (2004)

Time Scale and mode of response	Uncertainty management	System Modification	
		Passive: Robustness	Active: Flexibility
Operational			
Tactical			
Strategic			

An example of how the table would be used is shown in Table 8.

Table 8: Example of how to use the two way typology table as done by de Neufville (2004)

Time Scale and mode of response	Uncertainty management	System Modification	
		Passive: Robustness	Active: Flexibility
Operational	Correcting a new source of variation revealed by statistical process control	Increasing a machine tool's stiffness so to avoid chatter and thereby improve surface finish	Design a machine to detect chatter and change feed rate automatically to avoid poor surface finish
Tactical	Investing in a system to control manufacturing process parameters like temperature, pressure and humidity	Robust parameter design – selecting levels of processing parameters that ensure adequate performance over a wide range of conditions	Organizing a plant so that it can adapt to month-to-month changes in product mix.
Strategic	Implementing a system by which you work with your employees and suppliers to continually improve quality and cost.	Setting up a technology strategy so that your plant can meet the new accuracy demands that are forecast to be needed in ten years	Managing a network of suppliers so that you can add emerging new capabilities and drop suppliers that become uncompetitive.

Another way of reducing risk and forcing opportunities is through the diversification strategy.

3.2.2.2 Diversification strategy

“Strategic decisions are primarily concerned...with the selection of the product-mix that the firm will produce and the markets to which it will sell.” – Igor Ansoff

Diversification strategy is an organisation’s focus on exploiting various industries of operations.

“Diversification is a conundrum. It represents the biggest single source of value destruction ever perpetrated by CEOs and their strategy advisers at the expense of their unwitting shareholders. Yet, specialization restricts a firm’s options and condemns it to the fortunes of its industry.” – Grant (2008)

There are three major motives that drive an organisation to diversification [Grant, 2008]:

1. Growth;

The absence of diversification results in organisations being prisoners of their industry. The organisation can only grow with relation to an industry’s growth and are at times subject to difficult times due to a down cycle.

2. risk reduction; and

Organisations are subject to what the industry is feeling in the global arena. The basket has a chance to drop with all the proverbial eggs. If the eggs are distributed among a couple of baskets, the risk is reduced.

3. profitability.

According to Grant (2008), there are three tests that have to be applied to decide whether diversification would create shareholder value:

- a. The attractiveness test should focus on the attractiveness of the structure or the potential of attractive structure of the industries chosen for diversification;
- b. the cost of entry test should test that the cost of entry must not capitalize all the future profits; and
- c. the better-off test. The new unit must gain either competitive advantage from its link with the corporation or vice versa.

If organisations are to survive and prosper over the long term they must change, and this change inevitably involves redefining the businesses in which the organisation operates. Hewlett-Packard (HP) and IBM are among the longest established organisations in the fast-paced US electronics industry. The success and longevity of both have been based on their ability to adapt their product lines to changing market opportunities. HP has shifted from measuring instrument to computers and printers, cameras and other imaging products. IBM has moved from typewriters to computers to consulting services.

Another way in which organisations can develop their strategy to look for new directions of an organisation is the blue ocean strategy.

3.2.2.3 Blue ocean strategy

The following chapter is based on the work by Kim et al. (2004).

“Competing in overcrowded industries is no way to sustain high performance. The real opportunity is to create blue oceans of uncontested market space” [Kim et al., 2004].

Red oceans represent all the industries in existence today, the known market space. In red oceans the industry boundaries are defined and accepted, and the competitive rules of the game are well understood. Organisations try to outperform their rivals in order to grab a greater share of existing demand. As the space gets more and more crowded, prospects for profit and growth are reduced.

Blue oceans are all the industries that are not in existence today. This is the unknown market space, untainted by competition. Here, demand is created rather than fought over. In the blue ocean, there is ample opportunity for growth that is both profitable and rapid. Blue oceans are created in two ways:

1. An organisation can give rise to a completely new industry; or more commonly
2. an organisation creates it by altering the boundaries of an already existing industry (out of a red ocean).

Kim et al. (2004) found in their analysis of organisations that they have found a consistent pattern of strategic thinking behind the creation of new markets and industries, blue ocean strategy. The

logic behind blue ocean strategy parts with traditional models focussed on competing in existing market space.

Kim et al. (2004) found in a study of 108 business launches that 86% of the new ventures were line extensions, incremental improvements to existing industries. Only 14% were aimed at creating new markets or industries. The line extensions did account for 62% of the total revenues, but they delivered only 39% of the profits. The 14% invested in creating new markets and industries delivered 38% of total revenues and a startling 61% of total profits. The blue ocean opportunities account for the greatest profit margins, but organisations are still mainly focussed on competitive strategies.

Competition matters, but by focusing on competition, scholars, organisations and consultants have ignored two very important aspects of strategy. The first is to find and develop markets where there is little or no competition, blue oceans, and the other is to exploit and protect blue oceans.

An overview of three industries; automotive, computers and movie theatres, were looked at to find the underlying logic behind blue oceans. The following findings were found:

1. Blue oceans are not about technology innovation alone, but are done by linking technology to what buyers valued;
2. incumbents often create blue oceans and usually within their core businesses;
Most blue oceans are created from within and not beyond red oceans through improvement on existing products and/or services.
3. organisation and industry are the wrong units of analysis; and
There is no consistently excellent organisation, with the same applying to an industry. The most appropriate unit of analysis is the strategic move, the set of managerial actions and decisions involved in making a major market-creating business offering.
4. creating blue oceans builds brands.
Almost all of the organisations studied are remembered for their blue oceans which were created long ago.

The findings showed that large research and development (R&D) budgets do not ensure the creation of new market space, but the key lies with the right strategic moves. When organisations understand what drives this good strategic move, they will be well placed to create multiple blue oceans over time, thereby continuing the deliverance of high growth and profits over a sustained period [Kim et al., 2004].

Table 9 shows the difference between a red ocean- and blue ocean strategy.

Table 9: Red ocean versus blue ocean strategy adapted from [Kim et al., 2004]

Red ocean strategy	Blue ocean strategy
Compete in existing market space	Create uncontested market space
Beat the competition	Make the competition irrelevant
Exploit existing demand	Create and capture new demand
Make the value/cost trade-off	Break the value/cost trade-off
Align the whole system of an organisation's activities with its strategic choice of differentiation or low cost	Align the whole system of an organisation's activities in pursuit of differentiation and low cost

One of the most important features of blue ocean strategies is the rejection of the fundamental thought that there is a trade-off between value and cost. Blue ocean strategies in organisations can pursue differentiation and low cost, simultaneously. These create economic and cognitive barriers to imitation for would-be competitors. Large volumes of customers are immediately attracted and thus open up scale economies rapidly. Competitors are now placed at a cost disadvantage and imitation requires changes to the whole system of activities, organisational politics which are needed to switch to a divergent business model. Cognitive barriers created by the blue ocean can be just as effective. A leap in value rapidly earns brand buzz and a loyal following in the marketplace. Experience shows that even the most expensive marketing campaigns struggle to unseat a blue ocean creator [Kim et al., 2004].

The two oceans have always coexisted, and always will. The reality in practice is that organisations need to understand the strategic logic of both the red and blue oceans. Blue ocean strategists have always existed, but their strategies have been largely unconscious. Organisations will find that the strategies for creating and capturing blue oceans have a different underlying logic from red ocean strategies and once this is realised, they will be open to create blue oceans [Kim et al., 2004].

The ability of an organisation to search for uncontested markets can be prescribed to a way of thinking and ultimately the processes that align these beliefs. Innovation is a way in which organisations can look to venture into new industries, which is further discussed in chapter 3.4.

Complexity theories have also started to play a role in thinking about the complex when synthesising a plan.

3.2.2.4 Complexity theory

Complexity theory has shown that complex systems display common and predictable patterns of adaptive behaviour.

Complexity theories include theories like chaos- and catastrophe theories. Chaos theory could be seen as a solution which encompasses all the uncontrolled compared to the controlled input variables. A system is in chaos if it is [Gleick, 1998]:

- Sensitive to initial conditions;
- topologically mixing; and
- has dense periodic orbits.

Some of the common features of complex adaptive systems are [Grant, 2008]:

- Unpredictability;
- self-organisation; and
- inertia and chaos.

There are some ideas to be kept in mind as to how organisations can best use the performance peaks associated with chaos [Grant, 2008]:

- Establish simple rules;
 - i. Boundary rules are needed to know in what area of chaos will be operated;
 - ii. rules designate a common approach to how the organisation will exploit opportunities; and
 - iii. rules are used to determine priorities in resource allocation.
- establish conditions for both incremental and radical change;
If achieving the highest level of adaptive performance requires a combination of frequent small changes with occasional radical leaps, management systems can be designed to encourage these outcomes;
- accelerate evolution through flexible organisational structure; and
Organisational structures tend to ossify over time as power centres build and interactions become institutionalised.
- use adaptive tension to position at the edge of chaos.
The challenge for top management is to create a level of adaptive tension that optimises the pace of organisational change and innovation.

The notion of using chaos theory in solving management problems is not a new trend. Various scientists have, since the inception of the field, experimented with the method on various scientific areas. Whilst intuitively attractive, management scientists tend to use only the concepts of the approach rather than the modelling itself.

As per the current mathematical theory a chaotic system is defined as showing “sensitivity to initial conditions”. In other words, to predict the future state of a system with certainty, you need to know the initial conditions with infinite accuracy, since errors increase rapidly with even the slightest inaccuracy. Chaos theory regards industries as complex, dynamic, non-linear and far-from-equilibrium systems. The future performance cannot be predicted by past and present circumstances and actions. In a state of chaos, industries behave in ways which are simultaneously both unpredictable and patterned.

Steps in chaos theory follow a process. In order for chaos to be controlled, the system or the process of chaos has to be controlled. Three steps are needed to control a system [Grant, 2008]:

- A target, objective or goal which the system should reach. For a system with predictable behaviour this may be a particular state of the system;
- a system capable of reaching the target or goal; and
- some means of influencing the system behaviour. These are the control inputs like decisions, decision rules or initial states.

These steps allow for organisations to understand how they can dictate the direction of the organisation in a complex system. Some organisation variables are controllable and allow for the organisation to use these variables in accordance with its objective and the environment which dictates operation.

Another theory which falls under complexity is catastrophe theory. Catastrophe theory can be explained through the use of a bottle. A bottle will be in a fixed state while standing up. Any force applied to the bottle which does not push it over will cause the bottle to go back to its stable state, the state in which it is standing up. Thus, a system will always try to occupy a preferred state or a range of stable states. If a force which would push the bottle past its tipping point, the bottle will fall over which induces a catastrophic change. There is no continuous way back to the 'old' stable state.

Systems may change through a combination of continuous and discontinuous change patterns. These positions describe the possible outcome basins. Various positions will never be occupied as these states are unstable.

New theories have emerged which takes a different look at uncertainty. The black swan theory has not been added to strategic management, yet, and will thus be discussed here as a separate field.

3.3 Black swan theory

“Before the discovery of Australia, people in the Old World were convinced that all swans were white, an unassailable belief as it seemed completely confirmed by empirical evidence. The sighting of the first black swan might have been an interesting surprise for a few ornithologists, but that is

not where the significance of the story lies. It illustrates a severe limitation of our learning from observations or experience and the fragility of our knowledge. One single observation can invalidate a general statement derived from millennia of confirmatory sighting of millions of white swans. All you need is one single black bird.” – Nicholas Nassim Taleb (2007)

A black swan is an event which has three main characteristics:

1. It is an outlier outside the realm of regular expectations, because nothing in the past can convincingly point to its possibility (rarity);
2. it carries extreme impact; and
3. even though it is an outlier, human nature makes us connect explanations for its occurrence after the fact, making it explainable and predictable (retrospective predictability).

The term Black Swan comes from the assumption that 'all swans are white'. In that context, a black swan was a metaphor for something that could not exist. The 17th century discovery of black swans in Australia changed the term to stand for the perceived impossibility which actually came to pass. In hindsight, nobody could ever be 100% sure that black swans did not exist as they have not seen every animal on earth. The reverse holds true that only one black swan proves that there are definitely black swans. The same principle could be applied to the notion that there are no flying pigs, but we cannot claim that with any conviction as we have not tested every pig on earth. The alternative holds true that if we see only one flying pig, then it must be true that flying pigs do exist. The previous example is rather farfetched, but an elaborate attempt to explain the reasoning behind black swans.

The highly expected not happening is also regarded as a black swan if the aftermath shows great impact and retrospective predictability. The occurrence of a highly improbable circumstance is the equivalent of the non-occurrence of a highly probable one. Let us take for example the case of the Y2K bug. Most of the world population thought the world would end the moment the clocks hit the year 2000. People were getting ready by having secret stashes of food and private lodgings to hide away in. The result was an anti-climax. No big explosion hit at the start of the year 2000, no digital equipment malfunctioned and started killing people.

Black swans have had great impact on the world throughout history. Tsunamis, financial market turmoil, global economic crisis 2008, 9/11 terrorist attacks are just a couple of circumstances with negative impact which have changed the way the world interacts. Black swans are not necessarily bad, the internet is a black swan which was not built for people to connect and share knowledge but introduced as a military application which evolved [Taleb, 2008]. Knowing how an industry will react to devastating or positive environmental factors are of extreme importance for competitiveness in the global arena.

Taleb (2007) states that humans struggle with the confirmation bias. We state a theory and collect information to strengthen the conviction that we are correct and we dispel information refuting our view. The same applies to quotes; as you could easily find a quote which confirms your statement as correct, regardless of the statement made. Taleb (2007) believes that our naive focus on the observations of the past as something definitive or representative of the future is the essential inability that leads to our lack of understanding the black swan. We do not understand black swans as we did not evolve in an environment where there are a lot of black swans. It is just not part of our intuition.

Taleb has a problem with, what he labels the ludic fallacy, the belief that the unstructured randomness found in life resembles the structured randomness found in games. The ludic fallacy stems from the assumption that the unexpected can be predicted by extrapolating from variations in statistics based on past observations, especially when these statistics are assumed to represent samples from a bell curve. These concerns are often highly relevant to financial markets, where major economists use value at risk models (which imply normal distributions), but market return distributions are skewed.

Decision theories are generally focussed on a fixed universe or model of possible outcomes which ignores and minimizes the impact of circumstances which are outside model. For instance, a simple model of daily stock market returns may include extreme moves such as Black Monday in 1987, but might not model the market breakdowns following the September 11 attacks. A fixed model considers the "known unknowns", but ignores the "unknown unknowns".

“I know that history is going to be dominated by an improbable circumstance, I just don’t know what that circumstance will be.” – Nicholas Nassim Taleb (2007)

Black swans have always dictated history, but few organisations prepare for them. The preparations for improbable circumstances fall short of adequate as organisations try to predict and thus prepare for a specific circumstance instead of looking to cope with improbable circumstances as a whole.

3.3.1 Coping with black swans

The main idea in coping with black swans is that one should be *hyperconservative* when you look at downside risk and *hyperaggressive* when it comes to opportunities that cost you very little. A simple way of stating this is to bet pennies in order to make dollars [Taleb, 2008].

Taleb (2008) concedes that an organisation which is focussed on reducing the shock of catastrophes lag behind other organisations on bourses as these organisations do not take on the added expenses of insurance, more cash and less leverage. The organisations that were enjoying the reduced insurance expenses on the bourses are the ones that have fallen to catastrophes, the others are still operating.

Taleb contends that banks and trading firms are very vulnerable to hazardous black swan circumstances and are exposed to losses beyond that predicted by their defective models. Taleb shoots down the idea that anything can be depicted by a statistical curve. Taleb argues that statisticians, economists, some mathematicians and physicists argue correctly, but around the wrong principles.

Taleb raises his concerns regarding portfolio theory and statistics in the interview with McKinsey Quarterly (2008). *“The field of statistics is based on something called the law of large numbers: as you increase your sample size, no single observation is going to hurt you. Sometimes that works. But the rules are based on classes of distribution that don’t always hold in our world. All statistics come from games. But our world doesn’t resemble games. We don’t have dice that can deliver. Instead of dice with one through six, the real world can have one through five—and then a trillion. The real world can do that. In the 1920s, the German mark went from three marks to a dollar to*

three trillion to a dollar in no time. That's why portfolio theory simply doesn't work. It uses metrics like variance to describe risk, while most real risk comes from a single observation, so variance is a volatility that doesn't really describe the risk. It's very foolish to use variance."

The views raised by Taleb in this quote are partially prescribed to by the author. The typical bell curve used in statistics does have its applicability and these applications have proven extremely successful. Most of the successful applications of statistics and the bell curve focus on quality control processes such as six sigma. A reduced sigma value would thus relate to reduce cost as time and materials are wasted by those products that fall outside the third sigma variation.

Certain black swans are only as black a swan as the viewpoint taken. Taleb (2007) used the turkey scenario to explain the sucker's problem. A turkey is fed from the day of its birth every day for a 1000 days. According to history as seen by the turkey, he expects to be fed every day. The black swan happens to the turkey as it is slaughtered on the 1001st day. The 1001st day is a black swan for the turkey as there is no way it could have predicted that it would be slaughtered on the 1001th day. On the other side of the fence, the butcher does not see a black swan. It is a run of the mill operation which he expects. It all depends on the way in which you find relationships between entities. The black swan is thus a sucker's problem which depends on which side of the situation you are placed yourself. The black swan occurs relative to your expectation. This is also a prime example of the highly probable not happening as a black swan.

The world has a view of what is necessary to know and what is not necessary to know and the black swan principle elevates the fact that the things that are not said are the most important things.

Taleb (2007) also refers to the fire hydrant test which showed that more information does not lead to more accurate answers. Take two groups of people and show them a blurry image of a fire hydrant, blurry enough for them not to recognize what it is. For the first group, increase the resolution slowly in ten steps. For the second, do it faster, in increments of five. Stop at a point where both groups have been presented an identical image and ask each of them to identify what they see. The member of the group that saw the fire hydrant in fewer steps are likely to recognize the hydrant much faster. The moral of the exercise shows that the more information is given to

someone, the more hypotheses they will formulate along the way, and the worse off they will be. They will see more random noise and mistake it for information. A theory made is unlikely to be changed. The principle showed here also ties up with the information gathered to support your point of view, confirmation bias. Your mind has been made up early and thus the range of ideas generated is constrained.

“Forecasters” make a huge judgement error in the accuracy they aim for. There should always be an error rate on both sides, a bandwidth, within which one should work. The larger the error is chosen on the upper and lower level, the wider the confidence interval and thus, the greater the probability of being correct (bringing stats to the black swan-taboo). A strategic management decision could then be taken which is the best within this bandwidth to ensure an advantageous position in time of turbulence or favoured times.

Taleb (2008) is critical of scenario planning as, according to him, current strategists do not think out of the box. The result is four or five scenarios which you can envision at the expense of others you cannot. Scenarios and forecasts should rather focus on how fragile the portfolio or organisation is to the environment. Scenario planning should be focussing on creating a scenario to test the fragility.

Taleb’s (2007) main themes for dealing with black swans are:

- Keeping your eyes open for black swans to help you realise when you are reaching environments of extremes;
- not being too glued to your beliefs when confronted with contrary evidence. Dare to say that you do not know;
- knowing the limits of your knowledge and thus knowing where you can be a fool and where you cannot. Sometimes foolishness is dangerous and sometimes it can mean nothing;
- forecasting errors increase exponentially as the forecasting period lengthens. The focus should often be on consequences and not overly precise probabilities;
- expose yourself to positive black swans while hedging against the negative ones. Maximize the possibilities of serendipity;

- search for evidence which refutes a theory rather than building up information that supports it; and
- look to history, but not for stories to predict the future, but to stories which show how wrong forecasters have always been.

Given these pointers as given by Taleb (2007), with the idea in mind of being hyperaggressive with opportunities, innovation as a field has been made room for in this study.

3.4 Innovation

The primary reason for the existence of innovation is for organisations who continuously strive to obtain or increase their competitive advantage. The innovation process, if applied and managed correctly, provides the vehicle for organisations to effectively and constructively move forward in their quest for competitive advantage [EE textbook, 2009].

The innovation management process thus provides the means through which the organisation can more effectively, and in a more structured manner control how they gain the competitive advantage, whether this will be through a product, process or enterprise innovation or a combination of the three.

Tidd et al. (2005) defines innovation as:

“A process of turning opportunity into new ideas and putting these into widely used practice.”

Innovation theory states that there are two basic triggers of innovation:

1. Market pull which is based on customer demand; and
2. technology push which arises through new technologies.

These two forces describe the triggers of innovation at a very high level, but there are several more very detailed factors that necessitate innovation within an enterprise, Figure 19.

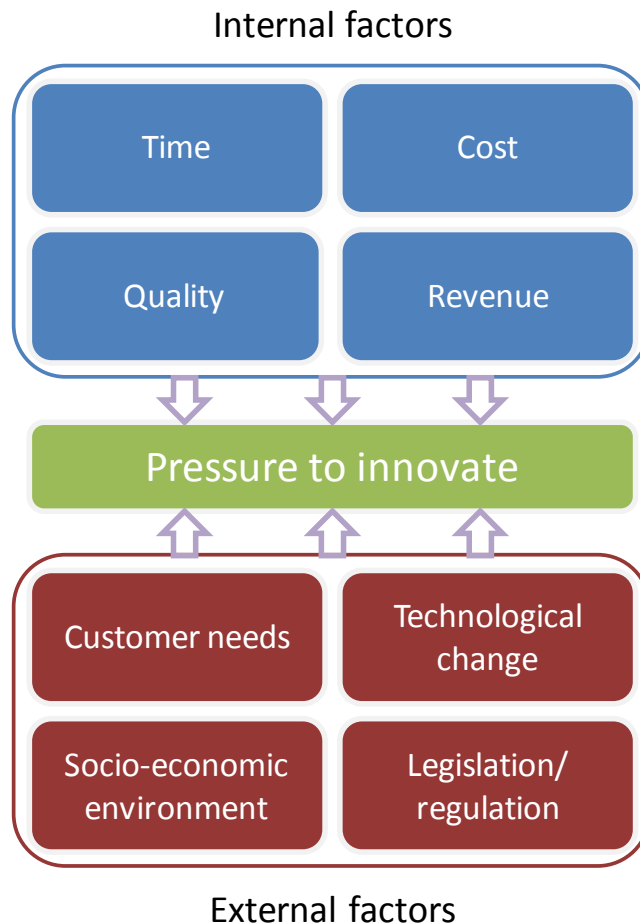


Figure 19: Pressure to innovate due to internal and external factors adapted from [EE textbook, 2009]

These internal and external factors were listed to make the reader aware of them, but they will not be studied in more depth as this is not within the scope of the research.

Literature has shown that we can find different types of innovation [Schumpeter, 1939]:

- New products;
- new methods of production;
- new sources of supply;
- the exploration of new markets; and
- new ways to organise business.

It is found that these innovations can be simplified into three primary sources of innovation [EE textbook, 2009]:

1. Product innovation;

For a product initiative to constitute an innovation, the product itself need not be new in its entirety. Product innovation encompasses a change in or an addition to the entities that comprise the product line.

2. process innovation; and

Process innovation may create competitive advantage in the form of organisational improvements that bring about differentiation in the form of quality, time-to-market, and after-market support and is often associated with improving the effectiveness and/or efficiency of production.

3. strategy innovation.

Strategy innovation creates competitive advantage in the form of direction and positioning that serves to create long term differentiation. Such differentiation can create new markets, anticipate future markets, or revitalise old markets so that an organisation can pre-emptively position itself for competitiveness.

Innovation is not limited to just one of these sources as it is possible that a given initiative is best described by a combination of these sources. Strategists need to manage and position organisations for these sources of innovations.

“The most significant distinction between invention and innovation is that, for an initiative to be constituted an innovation, certain fundamental activities must be completed, specific inputs and information must be considered and utilised, definite outputs must be created, and ultimately it must lead to commercially successful implementation that creates value for all the relevant parties. Innovation, therefore, necessitates the execution of a process” [EE textbook, 2009].

3.4.1 Innovation life cycle

The innovation process will be displayed as a life cycle of phases which requires execution in order to ensure necessary inputs are considered, activities performed, and outputs generated, Figure 20.



Figure 20: Generic innovation life cycle adapted from [EE textbook, 2009]

The five phases identified are [EE textbook, 2009]:

1. Invention;

The invention phase is where opportunities are identified, ideas generated and generally relates to acts of creativity.

2. feasibility;

The feasibility of the invention ideas need to be determined through testing and screening. Together with the testing and screening, the specification, functional analysis and initial design are executed.

3. implementation;

The implementation phase addresses detailed design and the manifestation thereof.

4. operation; and

Once the process has delivered a viable output, the operation thereof is undertaken.

5. disposal.

After the desired/maximum utilisation has been attained, the innovation process enters into its final phase. The disposal of one initiative is done here, but not the conclusion of the innovation process.

The above mentioned life cycle is such that all of the mentioned phases may be revisited. The feedback helps to refine certain outputs and improve on the original initiative. The feedback is an important part of the learning process. To improve on an old initiative, some of the later stages may be refined and revisited to ensure competitive advantage.

3.4.2 Configuring an enterprise for innovation

A brief introduction will be given to some concepts which can be used to develop the innovation capabilities of an organisation.

The definition of innovative capability according to the EE textbook (2009) is:

“The organisational means with which innovative outputs are generated.”

Gary Hamel (2006) also stated that there is no sausage crank for innovation, but the possibilities to increase the odds of an ‘eureka!’ moment are there by assembling the right ingredients.

There are three high-level categories of innovation capability, innovation capability areas, which are [Essmann, 2009]:

- The innovation process;

The innovation process is the practices, procedures, activities, etc. that take ideas and/or opportunities through concepts, which is followed by development and implantation and circumstantially to a stage of operation. It refers to the complete innovation life cycle. The innovation process is then further sub-divided into:

- Explore and converge;

The exploring and converging stage is set out to search for opportunities and helps in being receptive to new ideas, and translating these into concepts that could potentially be realised.

- portfolio management;

Portfolio management is set to coordinate the organisational resources, the pursued opportunities, prospective opportunities and the existing value offering to achieve balance within the innovation portfolio that aligns with organisational strategy and meets objectives.

- consolidate and exploit; and

Consolidation and exploitation of prioritised opportunities through effectively and efficiently substantiating, implementing through project management techniques.

- process control and risk management.

Process control of the innovation process through effective decision making, and managing and mitigating the risk and uncertainty associated with innovation.

- knowledge and competency; and

The innovation process requires both specific and broad based knowledge and competency, whether already within the organisation or still to be developed or acquired. The associated management requirements are also included for knowledge, competencies as well as technology. The knowledge and competency area is further broken down into:

- Discover;
Discovering through continuous research, networking and collaboration in existing and new fields to improve and build on the knowledge base.
 - absorb and consolidate; and
Absorbing and consolidating relevant information and knowledge in context.
 - core competency and technology.
Core competencies and technologies should be developed and/or acquired and be managed.
- organisation support.
Organisation support includes structures, resources, measures, infrastructure, strategy, etc. necessary to support the process, and the knowledge and competency requirements for innovation. The organisation support can be further divided into:
 - Innovation strategy and leadership;
The development and conveying of innovation specific strategy and objectives forms here, together with the championing and encouraging of innovative behaviour.
 - structure and infrastructure;
The organisational structure needs to be flexible, adaptable and conducive to innovation, and the necessary infrastructure needs to be available to support and facilitate innovation.
 - environment and climate; and
The organisational policies, values, practices and procedures need to contribute to an environment which is conducive to innovation.
 - resources and measurement.
An organisation needs to invest sufficiently in innovation, alignment of its resources with innovation requirements and appropriately measure the innovation related processes and outputs.

Further research done by Essmann (2009) showed 42 crucial requirements for organisation innovation capability which are more detailed than the above mentioned areas, but they remain generic to each organisation in various industries. Some of these requirements are:

- Involving customers and suppliers in the innovation process;
- testing, screening and prioritising opportunities and concepts;
- allocating resources appropriately;
- balancing the innovation portfolio between radical and incremental innovation;
- continuous research; and
- motivating, rewarding and celebrating success.

3.4.2.1 Assessing and improving innovation capability

An Innovation Capability Maturity Model (ICMM) as designed by Essmann (2009) describes the organisational innovation capability. Essman (2009) highlighted 42 requirements for organisational innovation capability and these are tested at 5 levels of maturity. The ICMM enabled the development of an innovation capability assessment (ICA) which is used to understand the situation within an organisation. It assesses the innovation capabilities and identifies strengths and weaknesses. The ICA is accompanied with a methodology for improving the innovation capability within an organisation.

The abovementioned methodology together with other innovation models are discussed in the EE textbook (2009).

Alvin Toffler coined the term “prosumer” in his 1987 book *The Third Wave*, when referring to the merger of role-responsibility between producers and consumers of products [Toffler, 1980]. The use of this word is fitting for a large number of today’s innovation processes as stated by the article in Time magazine 2006 [Grossman, 2006]:

“Car companies are running open design contests. Reuters is carrying blog postings alongside its regular news feed... We're looking at an explosion of productivity and innovation, and it's just getting started, as millions of minds that would otherwise have drowned in obscurity get backhauled into the global intellectual economy.”

The article highlights the need for innovation in corporations today. Innovation is needed to ensure an organisation stays ahead of the empowered individual, but also ahead of other organisations who are drawing the advantage from these new processes. The awarding of recognition to prosumers for their ever-increasing importance and role in “productivity and innovation” speaks a lot as to the potential and threat these individual prosumers can offer the organisation of the future.

The following sub-heading is based on a conference article by Marais and Schutte (2009).

3.4.3 Open innovation

West and Gallagher (2006) define open innovation as:

“...systematically encouraging and exploring a wide range of internal and external sources for innovation opportunities, consciously integrating that exploration with firm capabilities and resources, and broadly exploiting those opportunities through multiple channels.”

Adopting open innovation opens an organisation up to valuable knowledge, ideas, technology or inventions (collectively referred to as intellectual property, IP). The IP can be introduced from outside an organisation into the innovation process, or that internal IP can be made public outside the conventional innovation process boundaries.

3.4.3.1 Open innovation models

There are five generic open innovation models as highlighted by Marais et al. (2009), Table 10:

- Platforming;
- idea competitions;
- customer immersion;
- collaborative product design and development; and
- innovation networks.

Table 10: Definitions of open innovation models adapted from Marais et al. (2009)

Open innovation model	Definition
Platforming	<p>The technique of developing and introducing a base product with the purpose of providing a basis for prosumers to access, customize and exploit certain facets of the base product to extend the capabilities of that product whilst providing value increases for all parties involved.</p>
Idea competitions	<p>The technique of adapting an idea suggestion system to be more competitive by rewarding successful submissions (from inside or outside the organisation) financially, or in other forms related to the organisation.</p>
Customer immersion	<p>A technique whereby customers' inputs as to product requirements and expectations are exploited through intense customer interaction and the involvement of, and study by employees in the customer-product interaction process with the assistance of new technologies.</p>
Collaborative product design and development	<p>The technique of increasing the importance and responsibility of suppliers' and customers' role in the product design process and supply chain to result in increased productivity to the benefit of the organisation, and circumstantially the customer</p>

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

Implementable open innovation models will be discussed in more depth in Appendix A – Open innovation models.

3.4.3.2 The advantages of open innovation

Procter and Gamble which has successfully implemented open innovation through their “Connect and Develop (C&D)” program and have experienced improvements in various aspects related to the program.

Since Procter and Gamble’s introduction of the C&D program, the research and development productivity has increased by nearly 60%, while their innovation success rate has nearly doubled [Huston et al., 2006].

The advantages that open innovation potentially offers cannot be restrained to R&D productivity alone. The potential influence hereof is easily recognised in marketing, market targeting as well as market research that relates to product testing [Marais et al., 2009].

The incorporation of customers earlier into the design process will attract a specific niche group of prosumers, the lead users. The prosumer will in the most instances be representative of the lead-user group. It is the lead-user group who will positively influence the market testing aspect of open-innovation implementation [Marais et al., 2009].

Lead users are the individuals who are enthusiastic about new products, or contributing towards new collaborative projects, and while being actively engaged in contributing, will discuss it with their peers and through that, create awareness for the early adopters of the circumstantial product. This whole process equates to inexpensive or even free marketing for the project (or product’s) hosting organisation [Marais et al., 2009].

It is also a positive loop as the involvement of the lead user will ensure an end product which is close to exactly what the end customer wants and will lead to more accurate market research, targeting and circumstantial sales increase [Marais et al., 2009].

3.4.3.3 The disadvantages of open innovation

As is the case with any new venture or technology, open innovation has certain probable disadvantages and risks. The greatest risk associated with open innovation is the possibility of revealing IP not intended for sharing, which could decrease the organisation's competitive advantage.

The correct balance has to be found between sharing enough of the organisation's IP to allow prosumers to constructively contribute towards the project, while sustaining the required secrecy to either maintain or achieve competitive advantage.

It is suggested that industries that rely heavier on technology in their product and service offering will benefit more from open innovation models. This holds true as the dynamic capabilities introduced by software provide the adaptability to cater for the prosumer. This may prove to be a limiting disadvantage of open-innovation.

The introduction and adoption of various communication mediums, which fosters a more effective collaborative environment, coupled with the increased capabilities each prosumer and R&D expenditure from large organisations has resulted in an immense increase in the number of inventions created.

3.4.4 Opportunities in innovation and risks

The innovation adoption curve, Figure 21, helps with the selling of a new product or idea. Instead of trying to sell to the masses immediately, a corporation should try to convince the innovators (lead users) first. The lead users will convince the early adopters and the product or idea will filter down to the laggards.

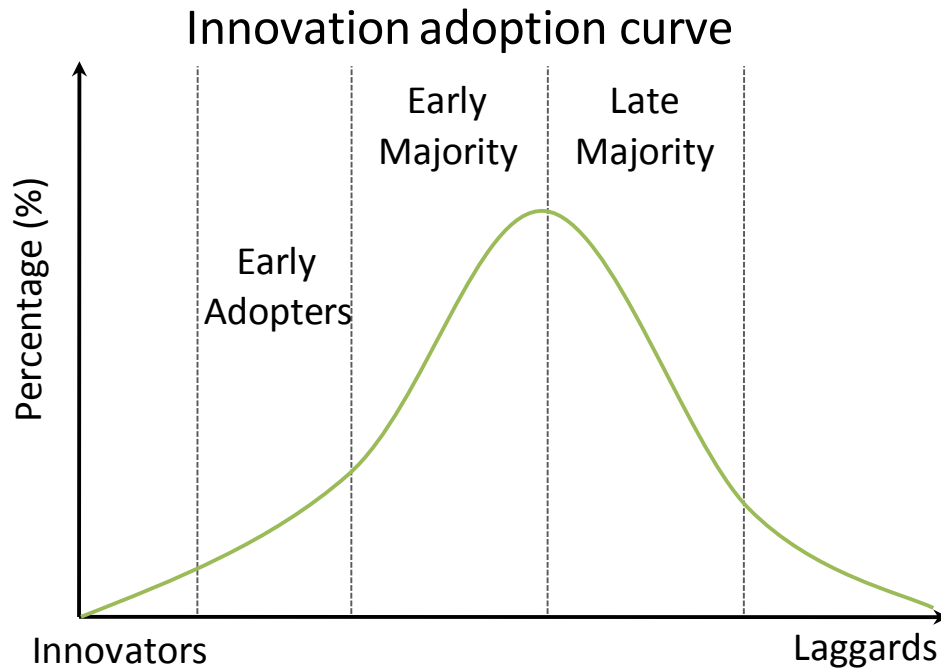


Figure 21: Innovation adoption lifecycle adapted from Moore (2004)

The innovation adoption curve gives us a great understanding of how users adopt innovation. Innovation has been used synonymously with opportunity. The opportunity taking curve is thus shown in Figure 22.

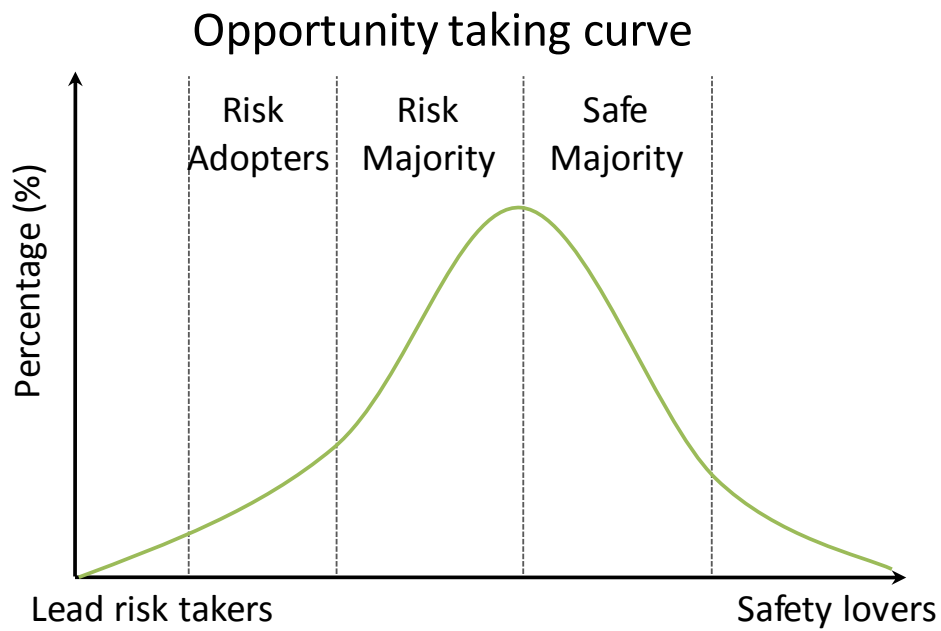


Figure 22: Opportunity taking curve

The opportunity taking curve shows the distribution of the various groups of opportunity takers. The lead risk takers will be those that accept the highest risk. The risk is high, but thanks to the technological era, we find that the invested capital needed to take these opportunities is much less than it used to be. Andreessen shared in an interview with Maney (2009) that organisations that used to need \$20 million to get a product out the door in the late 1980s now only need \$200 000. The risk is high, but the invested capital needed for most opportunities are not as high as it used to be with the potential rewards higher for those that risk the most [Hagel III, 2008].

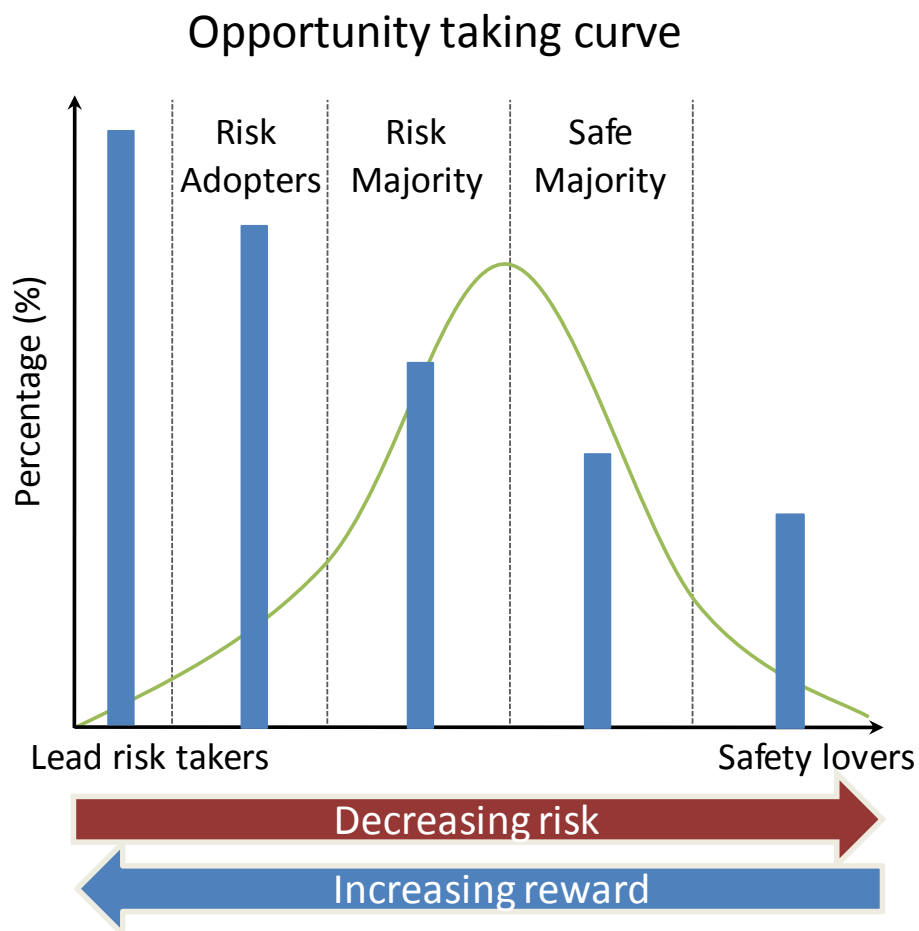


Figure 23: Opportunity taking curve versus rewards

Innovation, by definition, plays a large role in taking opportunities within an industry. Various tools and concepts have now been discussed, but they need to be compiled to be of value regarding improbable circumstances. A structured way to prepare an organisation for improbable circumstance can be through either a model, a methodology or a framework.

3.5 Design criteria

Following the study of the literature and the effect of a catastrophe on some parts of South Africa's economy some ideas have formulated which will be raised to help develop the framework.

The following ideas should be included into the framework:

- Strategic management seems to lack preparation for the improbable circumstance as is shown in lack of preparation for the 2008 crisis;
- to prepare for improbable circumstances, organisations need to know what the effect of the improbable circumstances would be;
- to prepare, organisations need to know what improbable circumstances could be present;
- to know the effect of the improbable circumstances, organisations need to know how they are affected by the circumstances;
- the effects of improbable circumstances that do not have a big impact on the organisation should not be taken into account, strategic management focuses on that; and
- the drastic effects, catastrophes or miracles, should be prepared for.

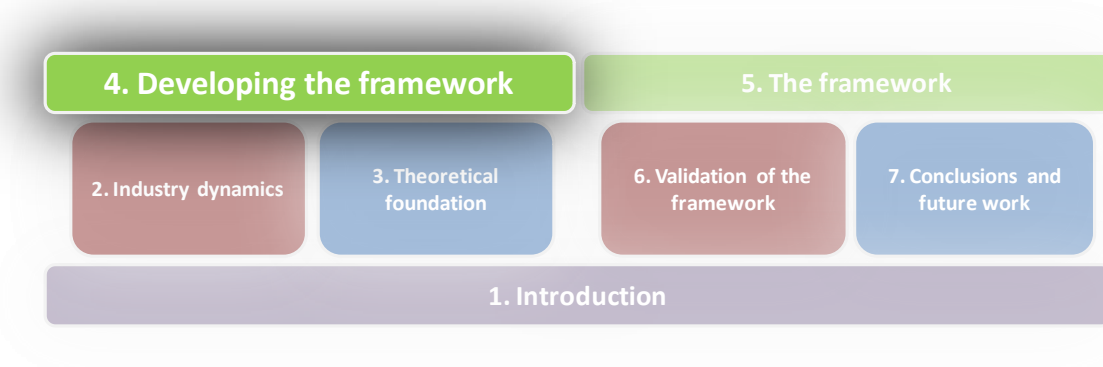
In the following chapter, these ideas will be used to develop the framework.

3.6 Chapter conclusion

This chapter has provided the concepts which are fundamental not only to the analysis phase, but to the study in general. Some concepts were only listed, while others were elaborated on. The rationale is that some level of knowledge is assumed and therefore only a limited range requires elaboration.

4. Developing the framework

“When I say artist I mean the man who is building things - creating moulding the earth - whether it be the plains of the west - or the iron ore of Penn. It's all a big game of construction - some with a brush - some with a shovel - some choose a pen.” - Jackson Pollock



The purpose of this chapter is to show the building process toward building a theoretical framework to answer the research questions in chapter 1.3 and the design criteria as shown in chapter 3.5.

Mouton (2008) stated that science cannot make progress without theories and models. The construction of theories and models is an attempt to explain various phenomena in the world. A theory will make a set of statements that makes explanatory or causal claims about reality. A model is the set of statements which aims to represent a phenomena or set of phenomena as accurately as possible. He reiterated that good theories and models provide causal accounts of the world which allows us to make predictive claims under certain conditions, brings conceptual coherence to a domain of science and simplifies our understanding of the world.

A framework was decided on as it allows for a playing field within each of the phases. Each organisation has an already invested infrastructure and a large role of strategy is doing what you can with what you have. No recipe is given to working through the framework except for the high-level phases with requirements. Every organisation will use tools which are more applicable to the

infrastructure and the knowledge of the organisation. The four fields of concern studied in the previous chapter are listed and their roles are discussed in the next sub-heading.

4.1 Fields of concern

The fields of study that gave understanding to the design criteria, chapter 3.5, are shown in Figure 24. The design criteria that are important to the development of the framework are:

- To prepare, organisations need to know what improbable circumstances could be present;
- to prepare for improbable circumstances, organisations need to know what the effect of the improbable circumstances would be;
- to know the effect of the improbable circumstances, organisations need to know how they are affected by the circumstances; and
- the drastic effects, catastrophes or miracles, should be prepared for.

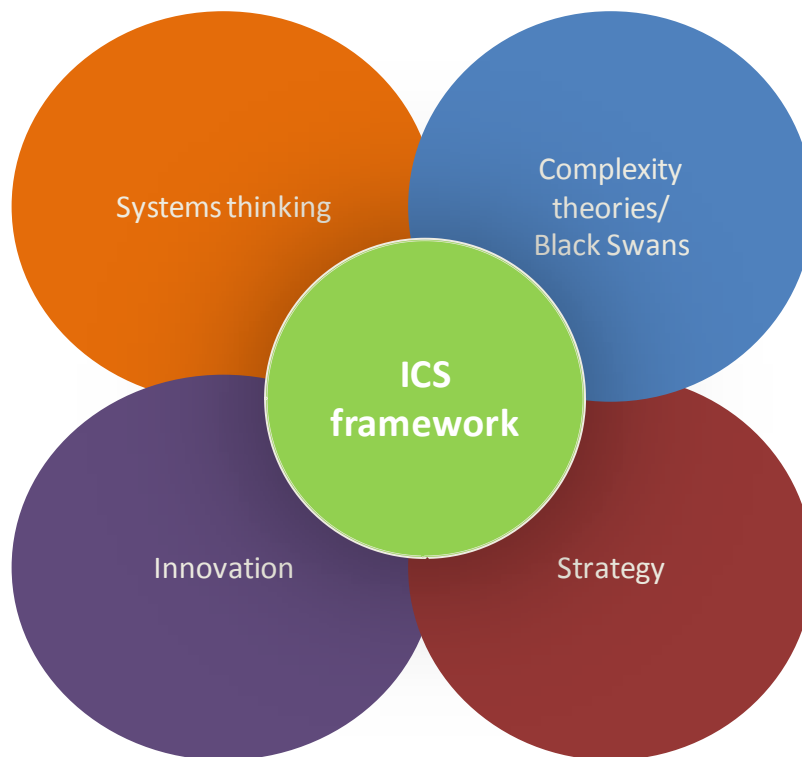


Figure 24: ICS framework's fields of concern

“Corporate managers are often caught by surprise. Corporate policies are often undone by unexpected changes in the environment-by sudden rises or drops in the price of a raw material, by

a competitor's technological breakthrough, or perhaps by a change in the regulations that set the boundaries of the organisation's "playing field." Being blindsided, managers often then make decisions that, in the end, exacerbate the original problem. "If we had only known what was going on," the responsible managers circumstantially say, "we could have avoided the crisis" [Schwartz, 1991].

Together with these criteria, the four areas of concern are shown and how they fit into the development of the framework.

4.1.1 Black swans

Each of the points to cope with black swans, chapter 3.3.1, are valuable, but they need to be grouped and be placed in the correct order to ensure that they are each taken into account at the correct time.

4.1.2 Systems thinking

Systems thinking gives a structured way of addressing problems. The logic used will break the framework up into simple steps to ensure they can be followed. The systems approach will allow for accountable deliverables through addressing the requirements at each phase with the inputs received from the previous phase.

Systems thinking plays a role in the following factors for coping with black swans:

- Keeping your eyes open for black swans to help you realise when you are reaching environments of extremes;
- knowing the limits of your knowledge and thus knowing where you can be a fool and where you cannot. sometimes foolishness is dangerous and sometimes it can mean nothing;
- forecasting errors increase exponentially as the forecasting period lengthens. The focus should often be on consequences and not overly precise probabilities;
- expose yourself to positive black swans while hedging against the negative ones. Maximize the possibilities of serendipity;

- search for evidence which refutes a theory rather than building up information that supports it; and
- look to history, but not for stories to predict the future, but to stories which show how wrong forecasters have always been.

Systems thinking will also incorporate the feedback loop used in control theory at first. The feedback will test all the answers before they are delivered as a solution in terms of the strategy of the organisation.

4.1.3 Strategy

Strategic management has delivered very little in the form of tools or methodologies to help organisations cope with the black swans as can be seen with the way organisations continually handle catastrophes. Strategic management has been very useful in helping organisations prepare for the day-to-day markets, green area in Figure 25, but something needs to be added to the process.

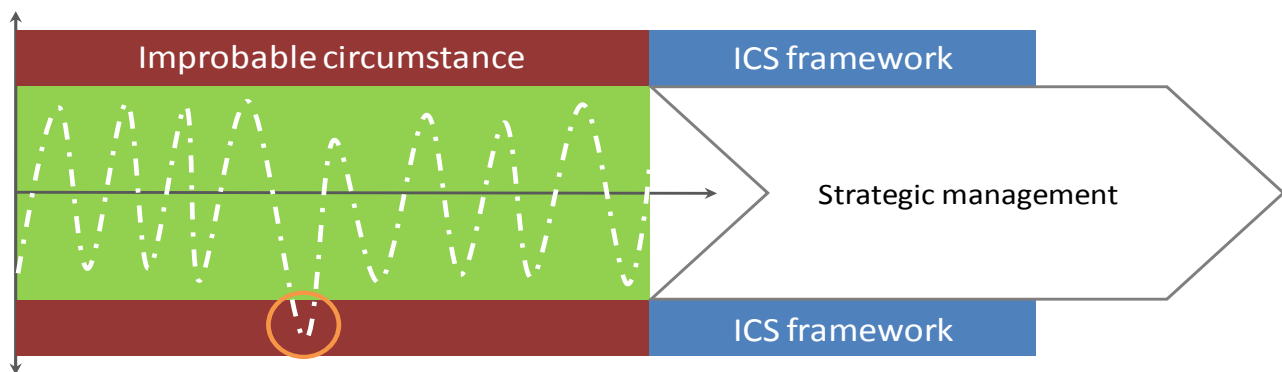


Figure 25: The framework's place in strategic management

The improbable circumstance is that which lies outside of the green day-to-day market trading area. The ICS framework will look to address these improbable circumstances that hit rarely, but when they do, they cause great destruction. The ICS framework thus adds to the process of strategic management and does not look to replace it.

Strategy plays a role in the following factors for coping with black swans:

- Keeping your eyes open for black swans to help you realise when you are reaching environments of extremes;
- not being too glued to your beliefs when confronted with contrary evidence. Dare to say that you do not know;
- knowing the limits of your knowledge and thus knowing where you can be a fool and where you cannot. sometimes foolishness is dangerous and sometimes it can mean nothing;
- expose yourself to positive black swans while hedging against the negative ones. Maximize the possibilities of serendipity;
- search for evidence which refutes a theory rather than building up information that supports it; and
- look to history, but not for stories to predict the future, but to stories which show how wrong forecasters have always been.

These improbable circumstances leave opportunities behind for those that survive and taking an opportunity falls into the area of innovation where it is only innovative if it adds value to the organisation.

4.1.4 Innovation

Innovation management takes an organisation through a process from the initial idea to a place where value is added to the organisation by this idea. Innovation can be subdivided into many categories, chapter 3.4, to address various issues in the organisation. Marais (2009) showed how open innovation is placed within a innovation management process to improve the impact of such a process.

“We ought to pay attention to this wake-up call. Embrace uncertainty. Get to know it. In uncertainty lies great opportunity. If you don’t try to understand what’s separating the known from the unknown from the unknowable, you’re really missing out. You’re just playing roulette with big money—usually other people’s money. It behooves us to take uncertainty seriously and to fundamentally rethink the way we do strategic thinking and planning” [Courtney, 2008].

Innovation plays a role in the following factors for coping with black swans:

- Not being too glued to your beliefs when confronted with contrary evidence. Dare to say that you do not know;
- knowing the limits of your knowledge and thus knowing where you can be a fool and where you cannot. sometimes foolishness is dangerous and sometimes it can mean nothing; and
- expose yourself to positive black swans while hedging against the negative ones. Maximize the possibilities of serendipity.

Innovation looks at addressing opportunities that arise or creating opportunities and thus addressing blue oceans, chapter 3.2.2.3, to fuel a diversification strategy, chapter 3.2.2.2. Innovation allows for various tools which look to address the framework's approach to reacting and creating opportunities.

4.2 Structuring the framework

The four fields of concern have each played their role in the structure of the framework. As previously stated, not all men are a born strategist, which gives rise to a stepwise approach to addressing strategic issues. The main points listed to cope with black swans were used to create an approach to prepare for these black swans, the improbable circumstance.

The questions/thoughts raised when addressing the coping for black swan points are generally:

- What are the extreme environments?
- How do the extreme environments affect my organisation?
- How do I expose and balance my organisation to positive extreme events or protect my organisation against negative extreme events?
- How do I question my organisation's current strategy or position?

The questions are placed in sequential order to prepare a process of addressing these black swans. In order to know what the extreme environments are, an organisation needs to know what would be extreme for it. To know this an organisation needs to do an analysis of factors that affect the organisation and its environment. Following the analysis, the organisation can start to think and create these extreme events (improbable circumstances). The next question can be answered by

taking the organisation’s current strategy and an extreme event into account and observing the outcome. The third question focuses on addressing the outcomes generated by the previous question. The last question is focused mainly on feedback where a new strategy should be questioned against the various events conjured up in the first question.

The literature studied together with the industry dynamics raised four questions in preparation for each type of improbable circumstance be it miracle or catastrophe, Figure 26.

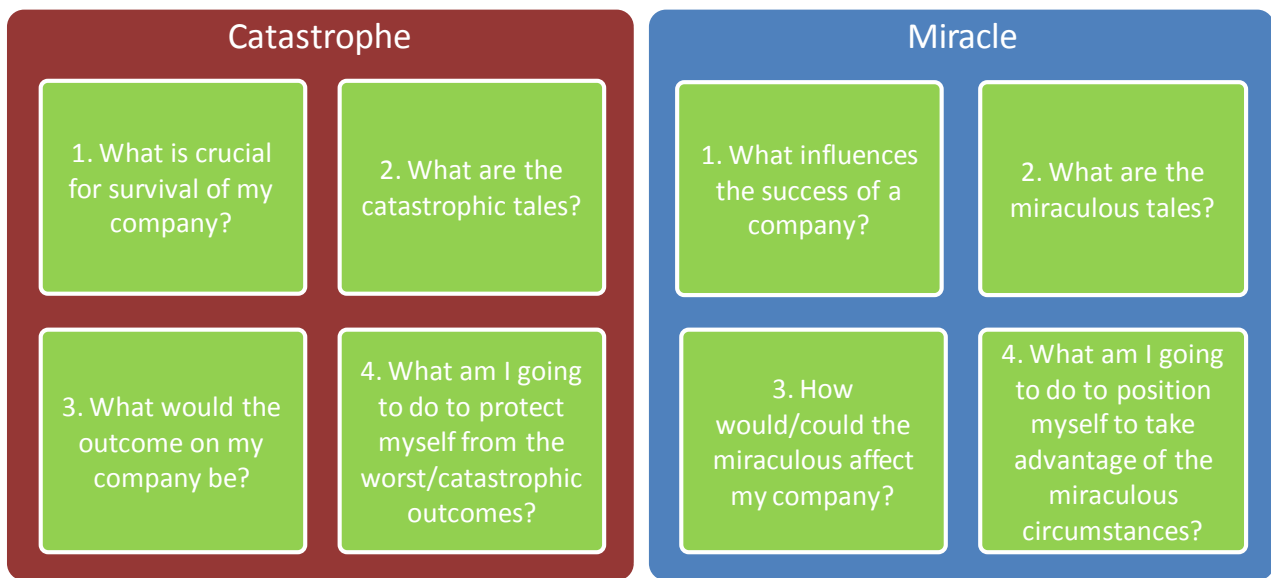


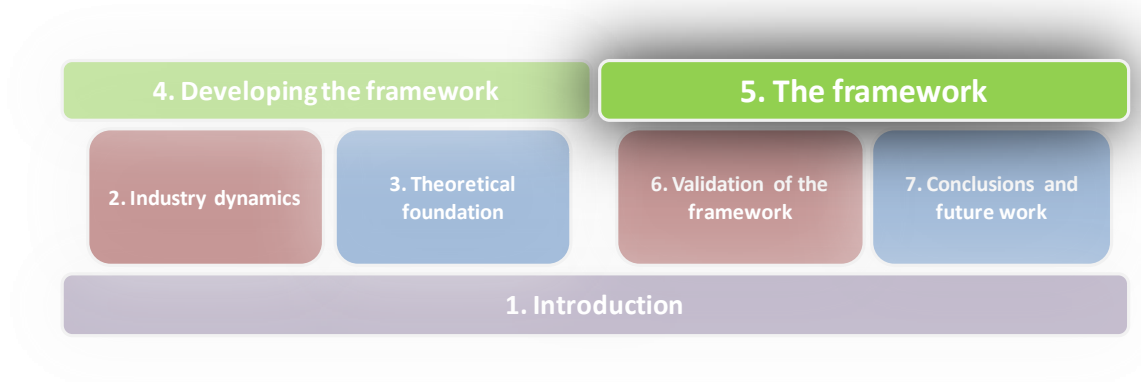
Figure 26: Questions in preparation of improbable circumstances

The questions in preparation of each improbable circumstance group adhered to a specific phase in the framework. The first question of each group could be answered by analysis. The second questions are answered by creating these improbable circumstances. The third questions need to be answered to test the consequences of the circumstance and thus analyse the fragility of the organisation. The last questions the focus on the design/synthesis of a plan to address the outcome of the third questions. Answering each of these questions would result in a stepwise approach to improve an organisation’s ability to prepare for improbable circumstances and the framework to address the improbable circumstances is given in the next chapter and Figure 27.

4.3 Chapter conclusion

These four fields were seen as those which fulfil the criteria for coping with black swans. They are not the only ones, but go a long way to start this field of research.

5. The framework



This chapter will discuss the framework as developed in the previous chapter.

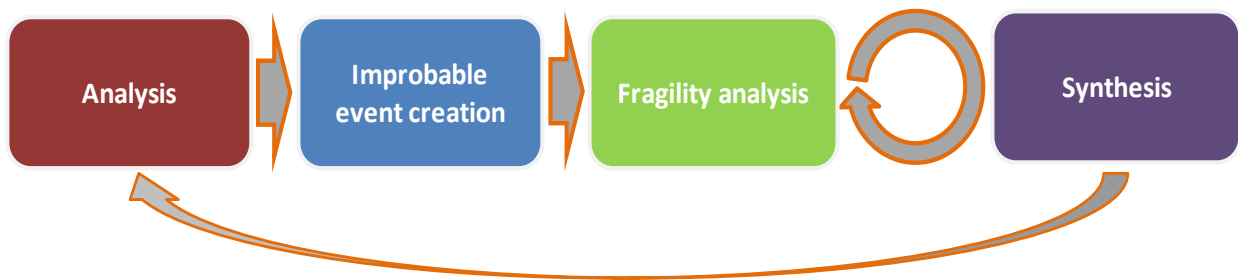


Figure 27: Improbable circumstances strategic framework

The Improbable Circumstance Strategic (ICS) framework, Figure 27, starts with the analysis phase of the normal strategic management process, as introduced in chapter 3.2, and flows into the beginning of the implementation phase thereof. It does not seek to replace the normal strategic planning of the organisation, but to add to it. The ICS framework is divided into four phases:

- The analysis phase;
- the improbable circumstance creation phase;
- the fragility analysis phase; and
- the synthesis phase.

The ICS framework proposes a structured way of approaching the challenge in the strategic management field posed by an improbable circumstance. Given the structured way of approach,

as proposed by the ICS framework, organisations should realise that a recipe will not be the same for every organisation as stated by contingency theory.

Contingency theory is a behavioural theory which states that there is no one way which is the perfect way to lead an organisation or specified organisational structure. The same can be said for various models, methods and frameworks. These have to be applied in various ways to shape to the organisation and the environment it operates in. Fixed rules for the usage of a model, method or a framework can thus not be applied to every organization.

The ICS framework is thus not a recipe with a set of rules for each phase, but it identifies what the inputs and deliverables should be. The requirements of the process which turns the inputs into the deliverable are given together with examples at each phase to show which tools could be used and how they could be used. The examples used are not fixed answers to every challenge in an organisation, but they are given to open up the strategist's mind to what might be needed. Each organisation will have its own set of tools, as some organisations already have the necessary infrastructure and they might be tools which are already in operation, but are used in different ways. These tools should be continually updated as various fields grow. The tools used should not be restricted to those given by strategic management, but disciplines outside of the field of strategy should be ventured to find solutions to phase requirements. The tools used in the examples might be old or new, but they have been highlighted to guide an organisation's strategists to utilize them in a different way to address various challenges. These tools are not the only ones applicable to the task at hand as the framework is live and thus no exact recipe should dictate how strategists reach the deliverables.

The following sub-heading, analysis, will discuss the first phase of the ICS framework.

5.1 Analysis

Analysis is defined as [Merriam-Webster, 2009]:

“An examination of a complex, its elements, and their relations.”

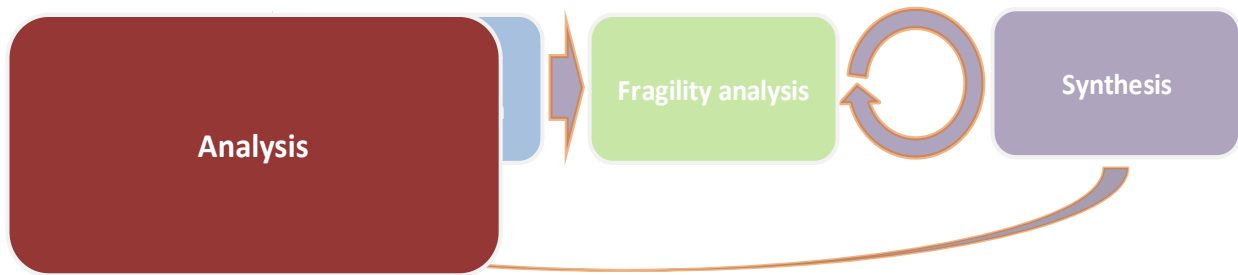


Figure 28: Analysis phase as initial step in the ICS framework

Analysis is the first phase, Figure 28, and arguably the most important to explore the environment and the organisation to determine factors which affect the organisation, both internally and externally. The analysis helps gain a greater understanding of the complex.

The following phase question is the primary focus of this phase:

What influences the success of the organisation?

The ICS framework's analysis phase works hand-in-hand with the analysis phase of strategic management. The analysis of the environment and the organisation is needed to identify factors that affect the organisation and the effect they have on its objectives.

5.1.1 Inputs, deliverables and requirements

The inputs of this phase are any sort of data or information that can be accessed to analyse to give the needed deliverables.

The deliverables of this phase are answers to the phase question, which are:

- Internal factors that affect the ability of the organisation to reach its objectives;
- the external factors that affect the ability of the organisation to reach its objectives; and
- how these factors influence each other.

These deliverables would be the outcome of a common analysis done by an organisation for its strategic purposes. There are some requirements which form part of the analysis phase:

- Understand organisation dynamics;
- identify the internal factors that are relevant to the strategic decisions;

- identify the external factors that are relevant to the strategic decisions;
- understand the relationship between these factors; and
- classify (controllable- and uncontrollable factors) these factors and understand how they influence the organisation and the industry.

Knowing how internal factors are affected by the environment will play an important role in the fragility analysis phase. A simple example of the tools, methods and models that can be used in the analysis phase is discussed in the following heading.

5.1.2 Example

Various tools for the analysis purpose exist in a number of strategic management textbooks and they include some of the tools mentioned in chapter 3.2.1.

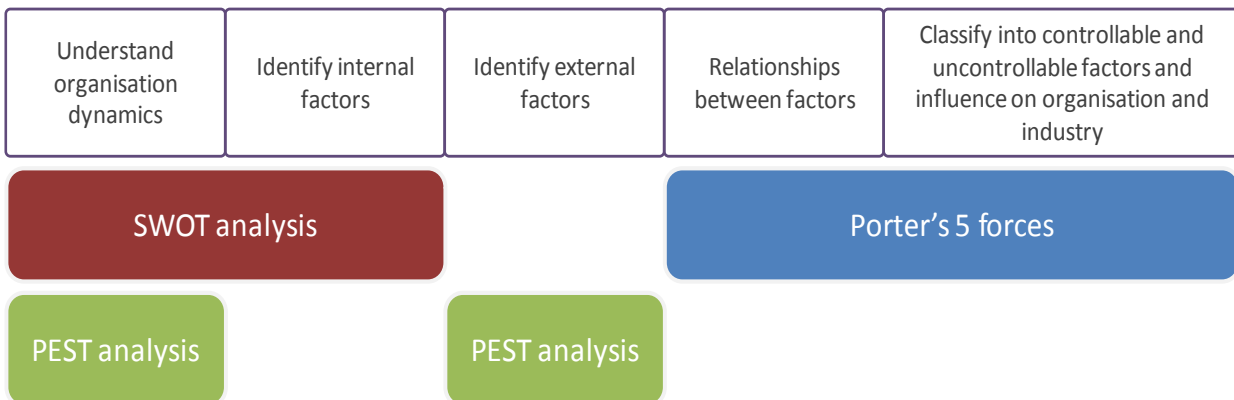


Figure 29: Requirement for analysis phase with possible tools

Commonly used tools for analysis are PEST analysis, SWOT analysis and Porter's five forces.

5.1.2.1 SWOT analysis

A SWOT analysis will identify the strengths, weaknesses, opportunities and threats of an organisation. Its focus is internal and thus on the variables which an organisation can control.

The strengths and weaknesses of an organisation are internal factors that create or destroy the value. It does this by weighing up its assets, skills or resources (all controllable variables) to that of its competitors. The opportunities and threats are external factors that create or destroy value.

These relate to uncontrollable variables that emerge from competitive dynamics of the industry or market which can be found from Porter's five competitive forces or from PEST analysis.

5.1.2.2 Porter's five forces

Porter's five forces are used to make an analysis of the attractiveness of an industry structure. The analysis is made by identifying and the understanding of the five fundamental forces:

- Entry of competitors;
- threat of substitutes;
- bargaining power of buyers;
- bargaining power of suppliers; and
- rivalry among existing players.

The five forces model would also look at the dynamics within an industry and help the strategists gain a greater understanding of the competitiveness within the industry. The five forces can benefit from the use of PEST analysis to highlight some factors within an industry.

5.1.2.3 PEST analysis

PEST analysis focuses on the external factors that affect organisation; political-, economical-, social- and technological factors. It assists as a broad framework which works as a checklist to identify these factors. The usage of PEST analysis varies from organisation to organisation as they depend on various factors such as strategy, research reports, marketing plans, etc. The factors that arise from a PEST analysis session are usually outside of the control of the organisation and should thus be handled as either threats or opportunities.

The factors which affect how an organisation operates within an industry have now been identified and their impact should be better understood. Circumstances have an effect on industries and these circumstances play a role in how an organisation operates.

5.2 Improbable circumstance creation phase

“Deep understanding of global forces and scenario-based analysis provides a more realistic approach to test potential sourcing strategies than betting on a single view of the future” [Braga et al., 2009].

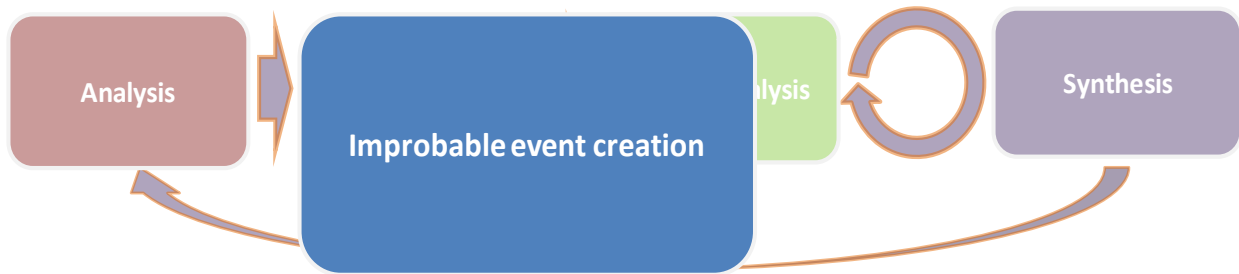


Figure 30: Improbable circumstance creation phase

Figure 30 shows where the improbable circumstance creation phase fits in the framework.

The following phase question is the focus of this phase:

What circumstances would have an extreme impact on the organisation?

The phase question here can be divided into two questions to distinguish between the two types of extreme impacts, catastrophes and miracles:

1. What circumstances would have a disastrous impact on the organisation?
2. What circumstances would be miraculous for the proceedings of the organisation?

The two phase questions highlight what the organisation is searching for in this phase. These questions are separated as the miraculous circumstances should not be forgotten.

“... the problem of silent evidence. ... to the point of blindness to reality. It is why we fall for the problem of induction, why we confirm. ... We respect what has happened, ignoring what could have happened.” – Nicholas Nassim Taleb (2007)

5.2.1 Inputs, deliverables and requirements

The inputs into this phase are obtained from the analysis phase as a better understanding of the dynamics between the forces and an organisation/industry is understood. These factors will affect the organisation either positively or negatively. The factors together with some information should be communicated to help everyone participating in the strategic process to understand the dynamics. The amount of information given should be carefully chosen as the outcome should not be completely influenced by one person. Individual creativity is of importance at this phase.

A great amount of information does not necessarily lead to a more accurate answer [Taleb, 2007]. The fire hydrant test proved the confirmation bias that states that once a theory is made it is very unlikely that it will change as information will be gathered which will confirm the theory and nothing to refute it.

The deliverables at the end of this phase should be:

- The circumstances least likely to happen, outliers which would not present day-to-day operations; and
- the circumstances which would be the absence of the highly probable.

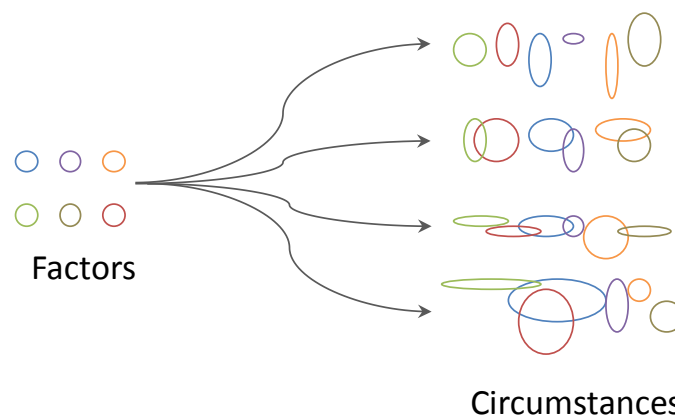


Figure 31: External factors combined to form scenarios

The improbable circumstance creation phase uses the deliverables from the analysis phase and combines these factors in various ways to craft improbable circumstances, Figure 31.

The following requirements are of importance in this phase:

- The factors obtained from the previous phase should be manipulated to craft rare circumstances;
- craft circumstances around ideas that might show that the current position/strategy is not prepared for difficult times;
- when looking at a circumstance with a disastrous impact, a catastrophe, an organisation will be looking at what could cause a major setback, losses or ultimately ruin;
- the highly probable not happening is also an improbable circumstance, always look for the non-obvious;
- miraculous circumstances should be created to depict the environment as that which is conducive to extreme growth, for your own and other organisations;
- a large amount of circumstances need to be created in order to be able to attempt to be prepared for most circumstances; and
- circumstances are not monitored as the organisation is not preparing for certain situations, but for collective groups and their consequences.

Figure 32 shows the steps in the improbable circumstance creation phase.

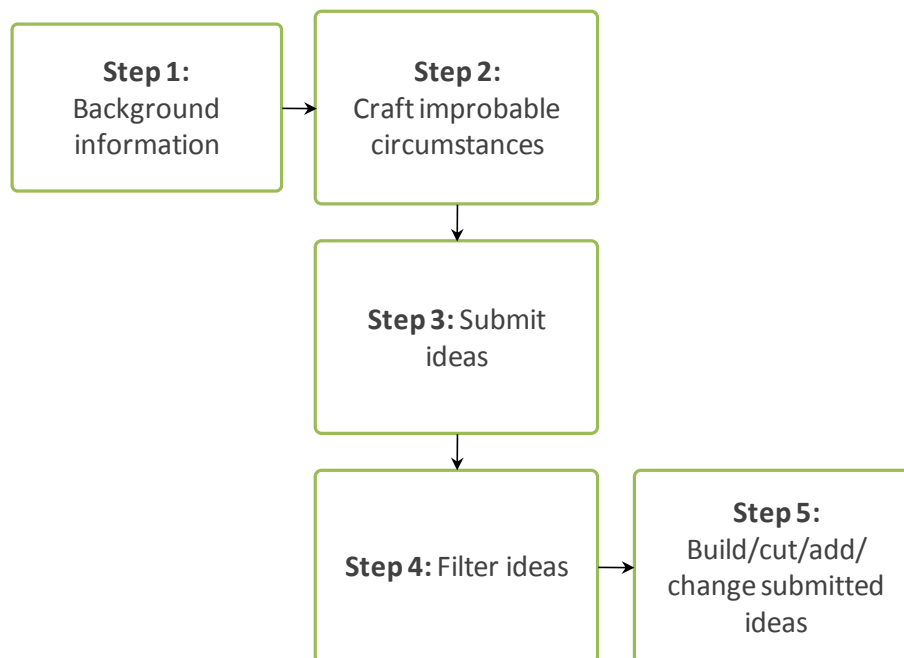


Figure 32: Steps in improbable circumstance creation

These steps have been adapted from Schwartz (1991), but does not focus on just one or two scenarios or the monitoring thereof. These circumstances are used for testing and not actual monitoring to find out which plot is busy playing out. The scenario monitoring should fall within the normal strategic management cycle of day to day strategy formulation. The steps are as follows:

Step 1: Background information

The information needed to craft the scenarios should be given. Information should focus on the deliverables given by the previous phase, the factors that would affect the success of the organisation. The information give here should again be controlled so as not to constrain individualistic creative thoughts. The objectives of the exercise must be clearly defined; *to manipulate the given factors to create improbable circumstances.*

Step 2: Craft improbable circumstances

The information given in step 1 should be used and manipulated in various ways to conjure up a large amount of circumstances. Craft circumstances around the information given to prove that the current position/strategy is not prepared for it. When looking at a circumstance with a disastrous impact, a catastrophe, an organisation will be looking at what could cause a major setback, losses or ultimately ruin. The highly probable not happening is also an improbable circumstance, always look for the non-obvious. Miraculous circumstances should be created to depict the environment as that which is conducive to extreme growth, for your own and other organisations.

Step 3: Submit ideas

A large amount of circumstances need to be created in order to be able to *attempt* to be prepared for most circumstances. Ideas should be generated from shop floor personnel whose thinking is different from that of the decision makers. They know what events on the shop floor would create a catastrophe/miracle, such as technological breakthroughs, etc. Various channels should be opened to the not so predictable creative minds in the organisation.

Step 4: Filter ideas

A large amount of ideas would now be submitted. Many ideas overlap and some are of no use as they are normal day-to-day circumstance. Many scenarios would seem absolutely absurd, but these are often the stories that make or break organisations. Decision makers would have a good idea of what circumstances raise red flags. A large number of circumstances should be the end result of this step. The most likely circumstances are of no importance here, they should form part of the normal strategic management process and do not fall within the scope of this framework. The likely circumstances should be taken note of as those circumstances that are expected, don't happen are of extreme importance. These scenarios are highly improbable and thus extremely important to this exercise.

Step 5: Build, cut, add or change submitted ideas

The ideas that have made the filtering process can be manipulated by the decision makers. The executives of the organisation would know what the tipping points are to result in a catastrophe or miracle.

A simple example of the tools, methods and models that can be used in the improbable circumstance creation phase is discussed in the following heading.

5.2.2 Example

There are various tools which fit the various steps within the improbable circumstance creation phase, Figure 33. They are not the only ones, but they have been highlighted here as they have come across the author's path in some way or another.

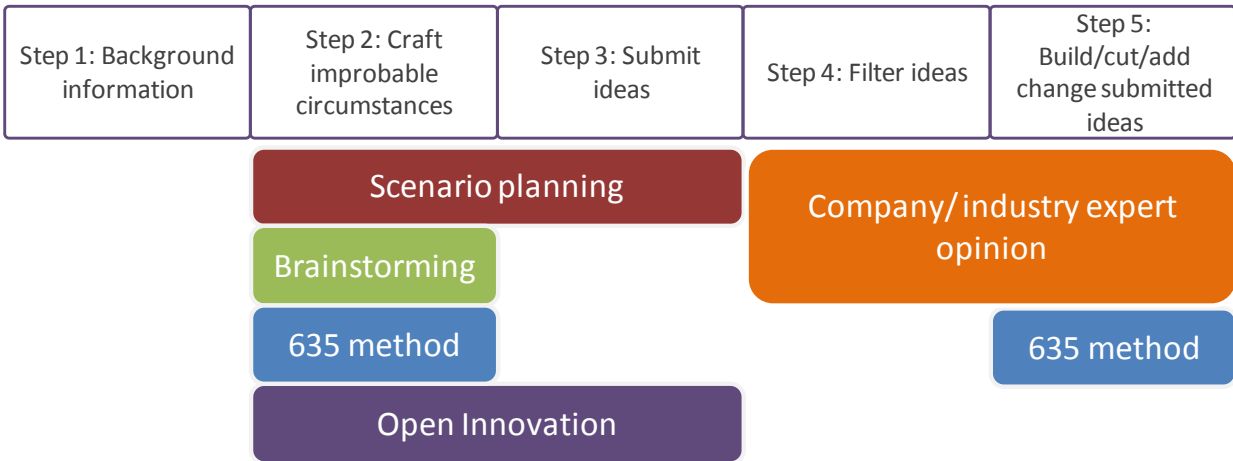


Figure 33: Steps in IEC phase with possible tools

The creation of various circumstances which could affect an organisation could be developed by scenario planning. Scenario planning is not used here in exactly the same manner as set out in “The art of the long view” by Peter Schwartz (1991), but new uses of old tools and methods is what is needed to equip organisations for the future. Other tools such as brainstorming and open innovation principles are highlighted to add to scenario creation.

5.2.2.1 Scenario planning

Scenario planning, 3.2.1.1, plays an important part in the modern market, but it is adapted for the purpose of this framework. The black swan is that “unknown unknown” which is a catastrophe or a miracle. So, scenario planning only caters for the “known unknowns” when done correctly. A philosophical question might arise regarding the thorough use of scenario planning. Every story that is conjured up takes the “unknown unknown” and changes it to the “known unknown” and thus removes it from the list of black swans as you now see it as an improbable circumstance that could happen. The probability that a black swan, something you never catered for, happening is thus reduced with every scenario that changes the “unknown unknowns” to “known unknowns” or solution which ultimately changes it to the “known knowns”. The probability of being on the losing end is consequently reduced with reduction in “unknown unknowns”.

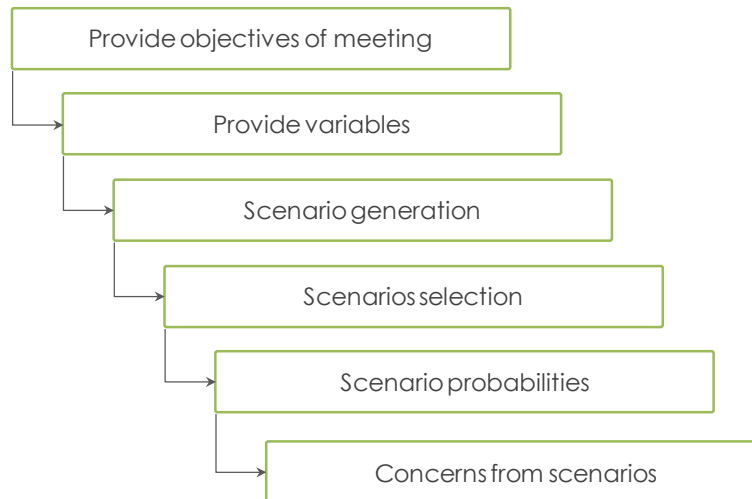


Figure 34: Brainstorming applied to scenario planning process

Figure 34 is an example of how brainstorming should be used in scenario planning sessions. The *objectives* of the meeting would be stated to ensure every member is working toward the same goal which would be to raise *improbable scenarios*. The session does not focus on addressing these problems, but the presentation of scenarios which would affect the industry.

Scenarios could also be crafted through a systemic approach like rolling work such as the 635 Method [Pahl and Beitz, 2007]. The method uses six members, three concepts and five iterations, thus 635. Each individual comes up with three scenarios and sends them to the next team member who will elaborate and change or develop a new scenario from these scenarios. The final outcome is up to five iterations on each scenario and thus a wide range of scenarios.

We go back to the figures depicted in chapter 3.2.1.1 to explain how scenario planning helps in catering against improbable circumstances. Figure 35 shows how probabilities could be applied to plots unfolding in a scenario through Markov chains.

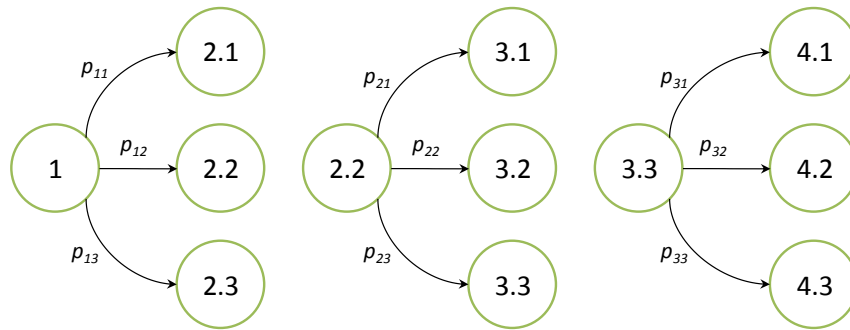


Figure 35: Markov chain with probabilities

The probability may not form part of the story side of scenario planning, but the probabilities play an important role when looking at improbable scenarios. The probabilities of each scenario happening should be placed under a microscope. What if the highly probable doesn't happen? The highly probable not happening would also be an improbable scenario. The factors from the previous phase should be pushed to the extreme values and craft scenarios around that.

It helps to focus on either a catastrophe or miracle. Miracle scenarios might be crafted or thought of while working on catastrophes, but they should be taken note of for further discussion for the miracle scenario creation session.

5.2.2.2 Open innovation

Open innovation, chapter 3.4.3, provides improbable circumstance creation with the *idea competitions-model* and the *platforming model*, chapter 3.4.3.1, which will prove useful in generating ideas. It is well suited to generate a large quantity of ideas, and embraces and enhances creativity. A certain amount of information is given and an *idea competition* environment can be launched where individuals submit ideas for some kind of recognition/reward.

Great ideas arise from the most unusual places. Intel's decision to abandon memory chips and concentrate on microprocessors was initiated through a host of decentralised decisions taken by divisional and plan managers that were acknowledged by top management and turned into the strategy [Grant, 2008].

These examples listed aim to steer an organisations strategic minds in a direction to creation of improbable circumstances. The organisation should be tested against these circumstances.

5.3 Fragility analysis phase

An understanding of how the organisation is affected by certain factors is important in strategy formulation.

“... in order to make a decision you need to focus on the consequences (which you can know) rather than the probability (which you can't know) as the central idea of uncertainty.” – Nicholas Nassim Taleb (2007)

An interesting view is raised here by Taleb (2007) where the probabilities normally dictate our actions, when we need to focus on what the consequences would be and act in response to them. The fragility analysis phase tests the consequences of each of the circumstances created in previous phase.

Organisations very often take a look at the cost of a new capital project and the return on investment and, based on these two statements, the decision of continuing with the project or abandoning it is made. Little consideration is given to how this project may be affected by changing circumstances [Schwartz, 1991]. The same can be applied to organisations and how they fit into the environment.

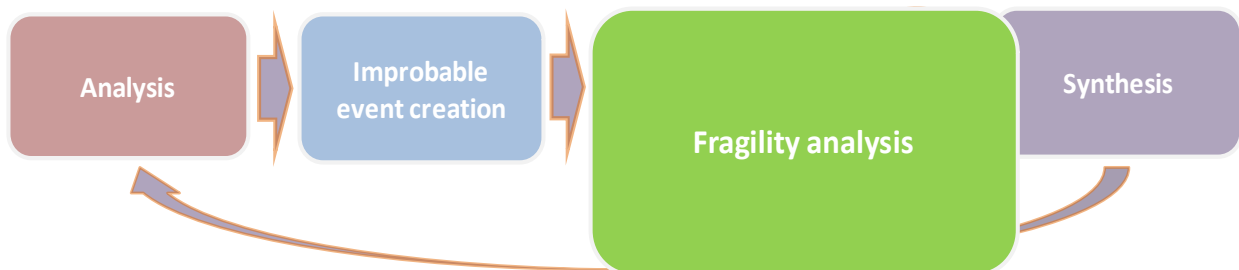


Figure 36: Fragility analysis phase

The fragility analysis phase, Figure 36, analyses an organisation’s sensitivity to various changes in circumstances.

The following phase question is the focus of this phase:

What would the outcome of these circumstances on the organisation be?

“Know how to rank beliefs not according to their plausibility but by the harm they may cause.” –

Nicholas Nassim Taleb (2007)

5.3.1 Inputs, deliverables and requirements

The inputs of this phase are taken from the previous phase. The organisation will now be tested against the improbable circumstances created in the previous phase. These results will be a test to see to what extent an organisation is sustainable.

The deliverables of this phase will be two groups of circumstances:

- Catastrophic circumstances where each circumstance in the group would lead to a catastrophic outcome for the organisation; and
- miracle circumstances where each circumstance in the group would lead to a miraculous outcome for the organisation.

Like in chaos theory, small changes to variables in complex environments could have a drastic outcome. A term “circumstance analysis” could be coined here where the sensitivity of the organisation to various circumstances should be tested. The fragility analysis phase should focus on the factors’, from the analysis phase, role in the circumstances and how these factors will affect the organisation.

The effects that the circumstances will have on the organisation should be grouped. Some circumstances would not affect the organisation, but the other two groups; miracles and catastrophes will be of importance for the framework as these circumstances are improbable with extreme impact. The circumstances which have roughly the same outcome from the scenario analysis should be taken into account as the 80/20 principle would apply to the positioning for these. This principle should be kept in mind as there will be certain scenarios that could be left out as they have no real effect on the workings of the organisation.

The two main groups will be catastrophe circumstances and miracle circumstances. These groupings are made as a specific group so as to find solutions to one type of group and not single

circumstances. An example of this is the insurance of separate items in your house at various insurance organisations. This doesn't make sense, but you acquired new belongings and went about insuring these items one by one at the best rate at the time of purchase. It would make more sense to have all your items insured by just one organisation and add newly acquired items to that organisation. The same principle applies to protecting against catastrophes.

The requirements for reaching the deliverables in this phase are thus the following:

- A sensitivity analysis of the organisation to various circumstances should be tested;
- a focus should be placed on how the various factors in the circumstances influence the organisation, thus the consequences are looked at and not specific circumstances;
- two groups should be formed as the 80/20 principle applies:
 - A catastrophe group;
 - a miracle group; and
- all the 'what if?' questions should be answered in this phase

An example of a tool is given in the next sub-heading. It is important to note that the example is only one of which there could be many. The organisation needs to find a plan which will give the deliverables that is the best fit for the organisation.

5.3.2 Example

There are various tools which fit the requirements within the fragility analysis phase. The following example has crossed the author's path through bachelor studies and is not seen as the only tool applicable.

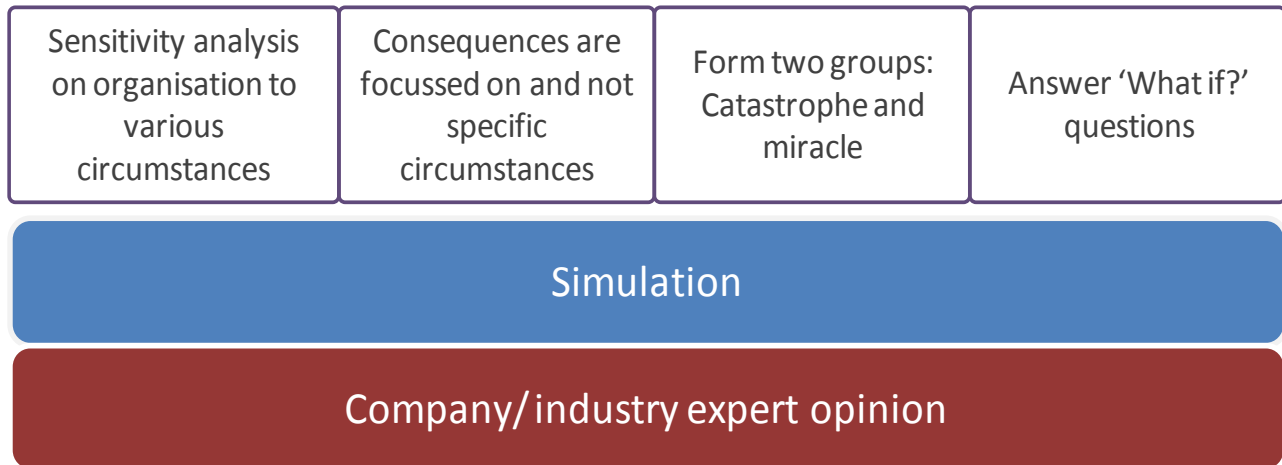


Figure 37: Requirements of fragility analysis phase and possible tools

An expert's view and/or a model of the organisation and how it interacts with its environment should be used in this phase. Simulation is a powerful tool in analysing how an organisation would react in various circumstances.

5.3.2.1 Simulation

Simulation is defined as [Bekker, 2009]:

"...the experimentation with a model of a real-world system in order to study the behaviour of the model, given certain starting conditions. It is assumed that the behaviour of the model is a sufficient predictor of the real system's behaviour. This definition implies that we generally try to answer what-if questions with simulation."

Simulation is an important tool in the Industrial Engineer's toolbox in order to test these what-if questions. Scenarios are perfect what-if questions to ask and to test on a business. Setting up a model to be tested through simulation needs a great understanding of the organisation and the industry it operates in. The model created always needs to be validated to ensure it represents answers that are sufficient to predict how a business will react in the reality.

The analysis phase gave a thorough understanding of the factors which influence organisation and its environment. These factors can also be used to set up a model to be tested against various scenarios in simulation. An expert in the organisation and industry's opinion is needed to help build and validate the model. Some simulation steps will be listed here and was listed in chapter

3.1.1.2, but an in depth look at the look at simulation is outside the scope of this study and could be done in future studies.

There are 19 steps to complete a simulation study and these were listed in chapter 3.1.1.2 [Bekker, 2009].

Simulation is only a tool to test the fragility of the organisation to various circumstances. The consequences of the circumstances are known now and the framework should now move into the synthesis phase to form solutions for the various consequences.

5.4 Synthesis phase

“The best way to predict the future is to create it.” – Peter F. Drucker

“We can analyze the past, or we can design the future...that is the difference between suffering the future or enjoying it.” – Edward de Bono (2002)

An organisation needs to synthesise a strategy to ensure it is sufficiently prepared for would-be improbable circumstances.

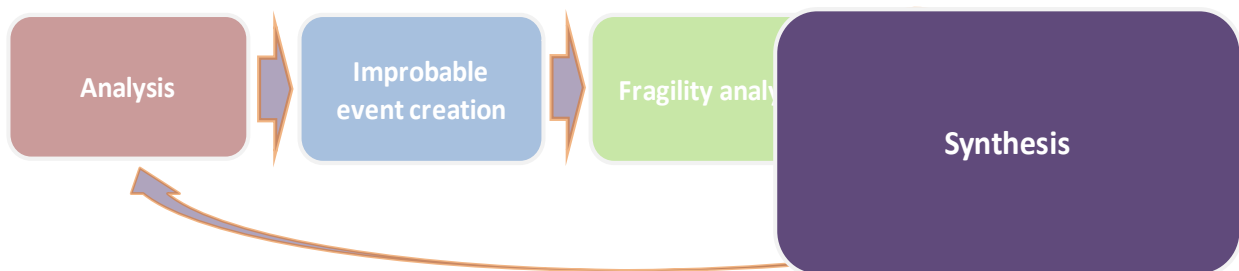


Figure 38: The synthesis phase within the ICS framework

The synthesis phase, Figure 38, will be the phase where a plan is devised, according to the outcome of the fragility analysis phase, to place an organisation at a certain position within the market to withstand/prosper in times of improbable circumstance.

“Don't cross a river if it is four feet deep on average. ... The policies we need to make decisions on should depend far more on the range of possible outcomes than on the expected final number.”

– Nicholas Nassim Taleb (2007)

“What matters is not how often you are right, but how large your cumulative errors are.”

– Nicholas Nassim Taleb (2007)

The following phase question is derived from the main research question, chapter 1.3.1, and is the focus of this phase:

How can an organisation prepare for an improbable circumstance?

The ideal would be a plan in which the organisation prepares for all the catastrophe scenarios which will also position it to take the opportunities presented by miracles.

There are various circumstances in the global marketplace which have been seen as negative, e.g. the rising oil price. Logistics organisations were suffering and had to reduce margins drastically, but on the other hand oil and petroleum organisations were prospering. The difference between struggling and prospering is just the position you hold in the market. It is not easy, if not impossible, for a logistics organisation to relish a rising oil price, but it can position itself to be adequately prepared for a drastic change in one of the key factors in its industry.

5.4.1 Inputs, deliverables and requirements

The circumstance groups that were delivered from the previous phase will now be analysed according to how an organisation can survive/prosper in the circumstances that in the previous phase showed catastrophic outcomes and prosper in miraculous outcomes. The first would be the most difficult, but most important. An organisation that doesn't exist cannot look to prosper.

The deliverables of this phase are also the final deliverables of the ICS framework which will be a plan with two objectives:

1. To position the organisation so as to reduce the negative impact that catastrophes might inflict; so as to ensure it can
2. position the organisation so as to take advantage of the opportunities that may arise during miracles.

It is impossible to prepare for every probable/improbable circumstance, but preparing for more than you are currently prepared for is an improvement and falls in the industrial engineer's dominion of continuous improvement.

The coping with the black swan chapter, 3.3.1, applies here to the way in which an organisation should manage these circumstances. An organisation should be hyperconservative when you look at the downside risk (catastrophes) and hyperaggressive when it comes to the opportunities when they cost you very little (miracles) [Taleb, 2008]. Knowing where you can be a fool and where you cannot is important in crafting a strategy.

The development of the framework chapter, chapter 4, highlighted the following requirements to the synthesis phase. The requirements of this stage are further discussed in the following sub-headings, but they are:

- The organisation should be hyperconservative when looking at downside risk;
- the organisation should be hyperaggressive when opportunities cost very little, thus expose yourself to miracles;
- question the new position or strategy. Keep thinking around ideas that might show the new strategy or position redundant.
- a fine balance should be found between chasing every opportunity and leaving room for catastrophe preparation;
- the new position or strategy should be tested against some of the circumstances from the previous phase, feedback (cybernetics);
- new fields should be researched for various tools which could help with the usage of the ICS framework; and
- put your organisation in situations where favourable consequences are much larger than unfavourable ones.

“The real importance of the Greeks for the progress of the world is that they discovered the almost incredible secret that speculative reason was itself subject to orderly method...I now state the thesis that the explanation of ... active attack on the environment is a three-fold urge: 1) to live, 2)

to live well, 3) to live better. In fact the art of life is first to be alive, secondly to be alive in a satisfactory way, and thirdly, to acquire an increase in satisfaction.” – Alfred North Whitehead

The following three sub-headings, catastrophe preparation, miracle preparation and feedback, will be introduced as examples. These sub-phases within the synthesis are crucial to the framework and these steps need to be taken. The first objective is thus to survive/prosper in difficult times.

5.4.2 Catastrophe preparation

In the preparation for a catastrophe, being hyperconservative could mean insurance, liquid assets, retreating from a certain segment in the market or diversifying risk throughout various markets.

One of the motivations for implementing a diversification strategy is that of risk reduction, chapter 3.2.2.2. Grant (2008) argues for a diversification where businesses are brought under common ownership, but the individual cash flows remain unchanged. As long as the cash flows of the different businesses are imperfectly correlated, then the variance for the cash flow of the combined business is less than the average of that of the separate businesses. Through this, diversification reduces risk.

The logical argument is that organisations are now less prone to be competitive in one industry as resources are spread, but the strategy of focussing on one core activity has led to demise whenever a catastrophe strikes. The organisations which insured through diversity are more open to catastrophes, but only a part of its businesses are hit, the others remain in tact and ready for operation.

Organisations that focus on reducing the shock of catastrophes lag behind other organisations which do not take on added expenses relating to insurance, more cash and less leverage [Taleb, 2008]. The organisations that were enjoying the reduced insurance expenses on the bourses are the ones that have fallen to catastrophes, the others are still operating.

A look at risk and uncertainty management was looked at in chapter 3.2.2.1. The three basic ways to manage uncertainty as stated by de Neufville (2004) are repeated for the purposes of this chapter:

- Control uncertainty, such as demand management;
- protect passively, as by building robustness into an organisation; or
- protect actively by creating flexibility that managers can use to react to uncertainties.

Some uncertainty can be affected by uncertainty caused by market fluctuation or social pressures. Demand management is a prime example of this. Adjusting price or quality of a service provided by an organisation at certain times. Through this the increase or decrease of the demands can be controlled.

When protecting an organisation, there are various forms of passive protection which will function without any significant management decisions. Redundancy of parts is a standard way of achieving operation robustness in an engineering system. Robustness can also be obtained like the air traffic control system operating under localized high demand or bad weather.

The last mentioned, protecting actively, we can use by thinking of dealing with uncertainty by enabling the organisation's decision makers to take specific decisions to alter the configuration of the organisation depending on circumstances. In finance, options can be created that can be exercised when circumstances warrant. Classic forms of options are those that expand or contract a system or a product so that the final configuration can be delayed and thus enable the designer to alter the system/product more closely to what is desired.

Strategic decisions depend a lot on the experience gained from learning. The responses to uncertainty should be highly connected across the time scales. Learning from experience can be active or passive. One approach is to observe what happens and deduce these trends and other characteristics of uncertainty. This approach has been used in classic financial analysis. Analysts will examine market data, identify trends if they exist, calculate the variance of the distribution and then proceed to calculate the value of the options they will use to hedge against risk or exploit opportunities. A way to reduce risk to the organisation is to use the learning and experience of executives and veterans in the industry.

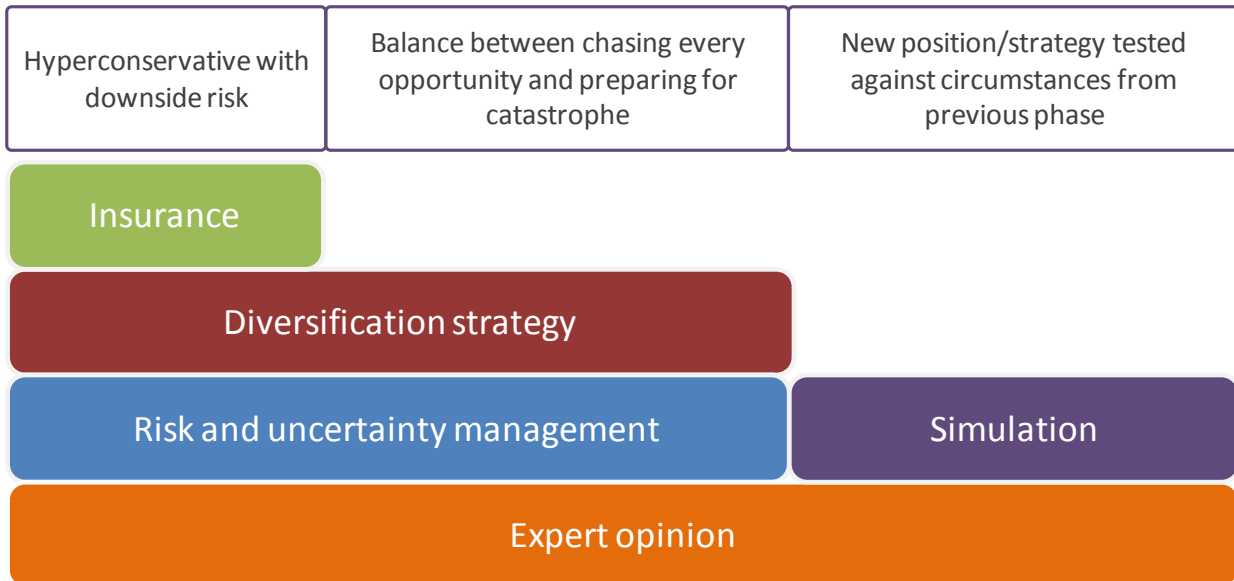


Figure 39: Probable tools to fit the requirements of catastrophe preparation

Figure 39 shows where some of the tools mentioned would fit in. Simulation is inserted in the last requirement shown as simulation could be used to test how the new position will hold up in old circumstances.

Circumstances that have led to great destruction always pass leaving opportunities behind. The organisations which adequately prepared for a rare circumstance and were more protected from this catastrophe are the ones that can take advantage of the opportunities that arise after catastrophes. These organisations are left to play on the field with a rather immobile competitor as other organisations will be making plans to loosen up liquid assets.

*“The greatest enterprise risk may be in not pursuing enterprise opportunities.” – Brian E. White
Phd (2007)*

It is a catastrophe to not pursue opportunities. An organisation thus needs to ensure it is in position to take advantage of opportunities, or create opportunities itself.

*“This is a really interesting time because it provides unprecedented opportunities for the survivors.”
- Hugh Courtney (2008)*

5.4.3 Miracle positioning

An organisation subject to catastrophes have no idea what the risks are, they just hold on and hope to survive. When an organisation looks to miracles or opportunities, the risks are known, every move has been calculated.

These days, when confronted by rapid change, executives instinctively magnify the apparent risks and discount potential rewards, a tendency documented in the behavioural economics literature [Hagel III et al., 2008].

Being hyperaggressive on scenarios or opportunities that cost you very little is a good thought to lead with while looking for solutions to take advantage of favourable scenarios.

The technological era we are living in allows for organisations to make a large impact with investment capital which would seem benign compared to some investments made a decade ago. Hagel III (2008) stated the power of the technological era in business:

“Today’s new digital infrastructure in fact gives relatively small actions and investments an impact disproportionate to their size.” - J. Hagel III (2008)

Marc Andreessen is a co-founder of the Andreessen Horowitz venture capital firm. He was the co-founder of Netscape, which sold to AOL for \$9.6 billion, and Loudcloud, which sold for \$1.6 billion to Hewlett-Packard and is currently (August 2009) on the board of Facebook and eBay [Maney, 2009]. Marc Andreessen, together with Ben Horowitz, launched a \$300 million venture capital firm, Andreessen Horowitz, on 6 July 2009. The new firm is looking to do seed investments, initial investments to help start-up companies develop, into 60 to 80 companies with a 75% to 80% cash amount waiting for later stage investments. Andreessen shared in an interview with Maney (2009) that companies that used to need \$20 million to get a product out the door in the late 1980s now only need \$200 000. Andreessen Horowitz is a firm which is looking to take advantage of the improbable where they might find one start up company which will turn into a multi-million dollar organisation. Andreessen Horowitz is negating catastrophes by investing in a diverse group of companies, but at the same time positioning themselves to take advantage of opportunities. The

10% of start-ups that succeed compensate for the other 90% of the poorer performing companies in the venture capitalist's investment portfolio [Clark, 2005].

Miraculous growth can be explained by opportunities. Organisations should be looking to take as many opportunities as is feasible. The downside of a catastrophe will be either great losses or ruin whereas the downside to an opportunity not working as it should are the losses of the wasted investment. These losses are losses over investments which you have most control. The risks are known and so are the amounts of potential losses.

Models such as the innovation capability maturity model (ICMM) which was developed by Essmann (2009) can be used to assess the innovation of the organisation through the innovation capability assessment (ICA). The assessment is followed by a methodology of how an organisation can improve its innovation capability. The methodology follows the assessment and is only done once the strengths and weaknesses are understood. The model is further discussed by Essmann (2009) and the EE textbook (2009). Managing the innovation process also looks to make an organisation more capable of taking opportunities or making them. An organisation will thus look to be more adaptable to take opportunities.

Open innovation models like platforming, as discussed in chapter 3.4.3, can be used in this phase in the same way that Apple did with the iPhone. Apple supplied users/developers with the platform from which to program applications for the iPhone. The result of this was that 1.5 billion applications were downloaded in the first year of availability. The profits were shared 30%/70% between Apple and the consumer. Great amounts of profits were made by just allowing the users to develop their own use for the phone [Marais, 2009]. Open innovation allows organisations to take advantage of prosumer inputs and thus opening up to various opportunities.

Figure 40 refers back to the opportunity taking curve as explained in chapter 3.4.1. Here, the blue squares represent the potential rewards to be had by various groups of opportunity takers.

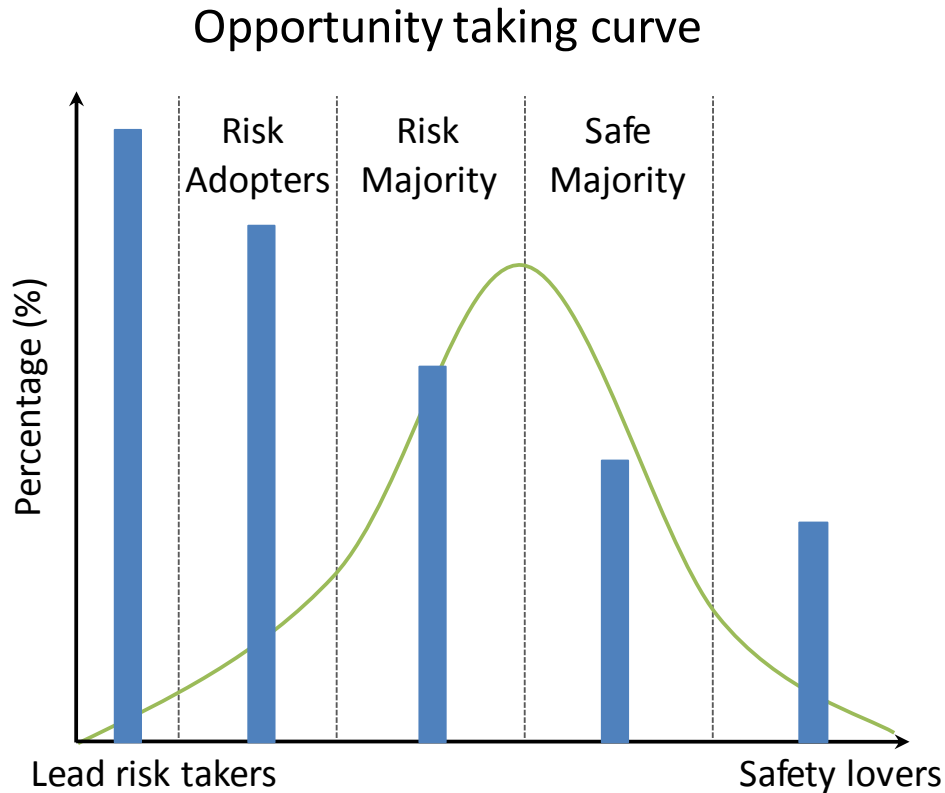


Figure 40: Opportunity taking curve with rewards

The amount of risk taken is synonymous with rewards to be gained. The example of a share trading portfolio can explain this. Investing large cash amounts in young, small unknown organisations is a large risk, but the rewards to be gained if that organisation grows are large. The risk is there, but the amount of money lost is the amount you control. As mentioned before, the cash needed to take initial risks in some industries have been drastically reduced through technology.

Organisations which take chances as lead risk takers are the ones that gain a greater reward and end up with a large segment of an industry, Figure 41. The lead risk takers will have the greatest market segment and the rest have to share the remains.

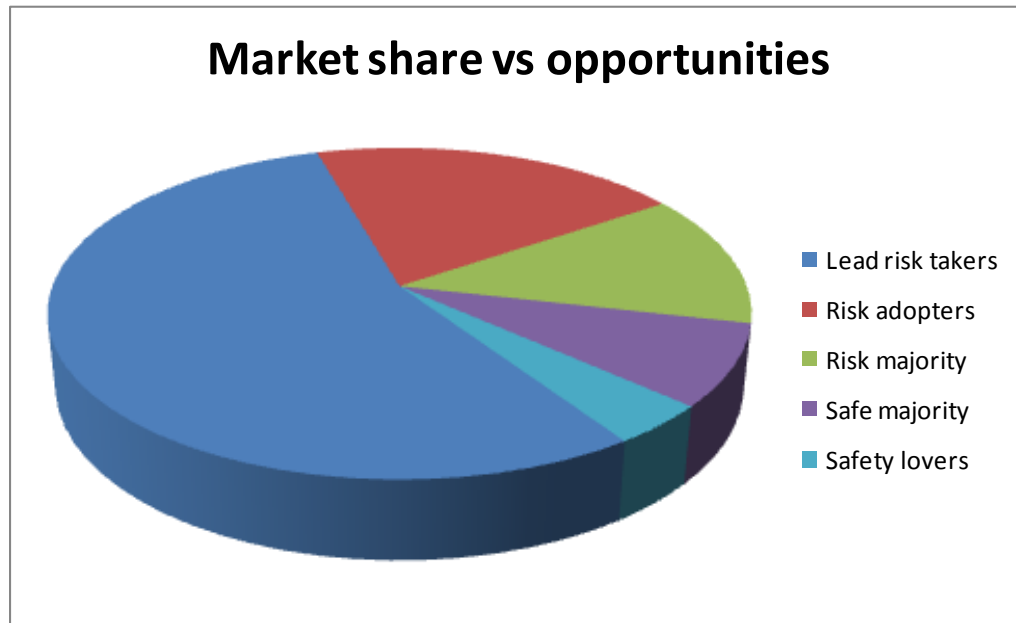


Figure 41: Market share versus opportunity taken

The problem with the organisations that do not take the risk is that their strategies become reactive. The market is open and everybody will now be fighting to gain a greater percentage of the pie. Risk is reduced by waiting longer for great opportunities, but so are the rewards. Market competitiveness takes over where innovation used to be. The strategies for organisations start to form around products, systems and operations and the competitiveness thereof.

The losses with opportunities that do not work out as planned are small in relation to what used to be the case. Organisations should be focussing on changing their strategies accordingly; high risk is less likely to cost great amounts of money. The danger here lies with the downside of missing opportunities as competitors move in to reap the rewards.

Blue ocean strategy, chapter 3.2.2.3, shows the difference in logical thought behind that of creating new markets or industries for products compared to the competition in existing industries [Kim et al., 2004]. Blue ocean strategies focus on [Kim et al., 2004]:

- Creating uncontested market space;
- making the competition irrelevant;
- creating and capturing new demand;
- breaking the value/cost trade-off; and

- aligns the whole system of an organisation's activities in pursuit of differentiation and low cost.

Differentiation thus shows risk reduction together with opportunity creation. Blue oceans are not constrained to an industry or an organisation, but by the strategic move of an organisation. Organisations need to step away from the red oceans, existing industries and markets, and see the opportunities that exist within and beyond red oceans. New technologies do not create blue oceans, but blue oceans are created when a new technology is linked to what buyers value. The study done by Kim et al. (2004) shows that large R&D budgets do not create new market spaces, but only form part of making blue oceans. The correct strategic move creates these spaces, and once the understanding behind the blue ocean logic is understood it allows organisations to create multiple blue oceans over time. The outcome is thus continued high growth and profits. Strategies like these are also researched by Hagel III et al. (2008), shaping strategies, but are quite similar to the blue ocean strategies and will be left for the readers own further study. The parallel can be seen between blue ocean strategy and innovation. Innovation is a tool which can lead to the creation of blue oceans. Moore (2004) discusses how an organisation can innovate in an established enterprise.

There have been cases such as the 3M Post-It notes which have come about through searching for opportunities and new products and even while failing, a new product as a best seller is born. To read this story and see the value of searching for new markets, the reader can go to http://www.3m.com/us/office/postit/pastpresent/history_ws.html.

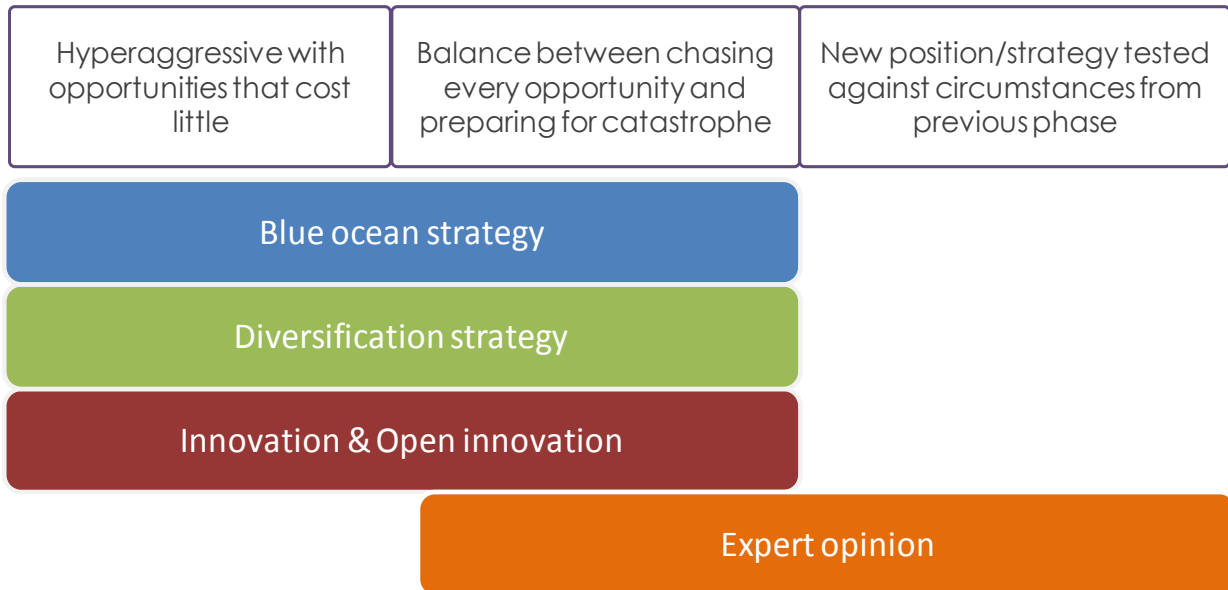


Figure 42: Probable tools to fit the requirements for the miracle preparation phase

Figure 42 shows which tools fit into the requirements as set out for the miracle preparation phase. The top three tools are used to strengthen the conviction of preparing for opportunities. The bottom, Expert opinion, is most valuable as part of the feedback requirements. At this stage in the framework, the circumstances would have been accepted and a plan devised to prepare, but the new position of the organisation will be subject to different circumstances. The organisation should test fragility of the organisation to each plan to ensure the organisation’s new position is sustainable.

5.4.4 Feedback - cybernetics

“The chief cause of problems is solutions.” – Eric Sevareid

The phase does not end with the first plan to position the organisation, be it for a miracle or catastrophe, as every plan needs to be tested in the fragility analysis phase to ensure the plan is feasible to the organisation.



Figure 43: Feedback from the synthesis to the fragility analysis phase and back to analysis

The feedback from the synthesis phase to the fragility analysis phase, Figure 43, ensures that the proposed future positioning of the organisation will function appropriately to the improbable scenarios. A fragility analysis has to be done on the proposed position of the organisation to see whether it handles all the created improbable scenarios adequately. The analysis has to be done as new risks might arise with the new positioning. An elementary example of this is a person standing in the sun. He/she moved there for the heat, but there are new risks involved with standing there such as the development of skin cancer in the long term. The same weighing up of the risks should be done in this feedback to fragility analysis portion of this phase.

“..., you’re going to have to make decisions very quickly on fundamental opportunities that may drive your earnings performance for the next decade or more, and you’ve got to be prepared to make these decisions in real time. That requires a continuous focus on market and competitive intelligence and far more frequent conversations—daily, if necessary—among the top team about the current situation. Senior executives already may be in closer contact because of the emergency they face, but that doesn’t necessarily imply that they have the raw material and the structure to work through strategic decisions systematically. These daily conversations have to move beyond getting through that day’s crisis to more fundamental strategic issues as well, because the decisions made today may open up or close off opportunities for months and years to come.” –

Hugh Courtney (2008)

The more this framework is applied, the easier it will be to use. Organisations will know what is needed and what they are missing. Organisations will start to find new tools and become more creative with their use. The feedback will allow for incremental improvements (right up the industrial engineer’s alley), but will also count the lessons learnt. Circumstances created will only have to be added to and new tools can be investigated to find solutions. Reiterations will become

less and thus less time will be spent on positing for improbable circumstance. The organisation should be going through constant learning through a continuous interaction between strategy formulation and strategy implementation in which strategy is constantly being adjusted and revised in light of experience [Grant, 2008].

The deliverables of this phase are also the deliverables of the framework. The implementation of these plans would fall under project management, but these are outside of the scope of this research.

5.5 Framework summary

The ICS framework together with the requirements at each phase is given in Figure 44.

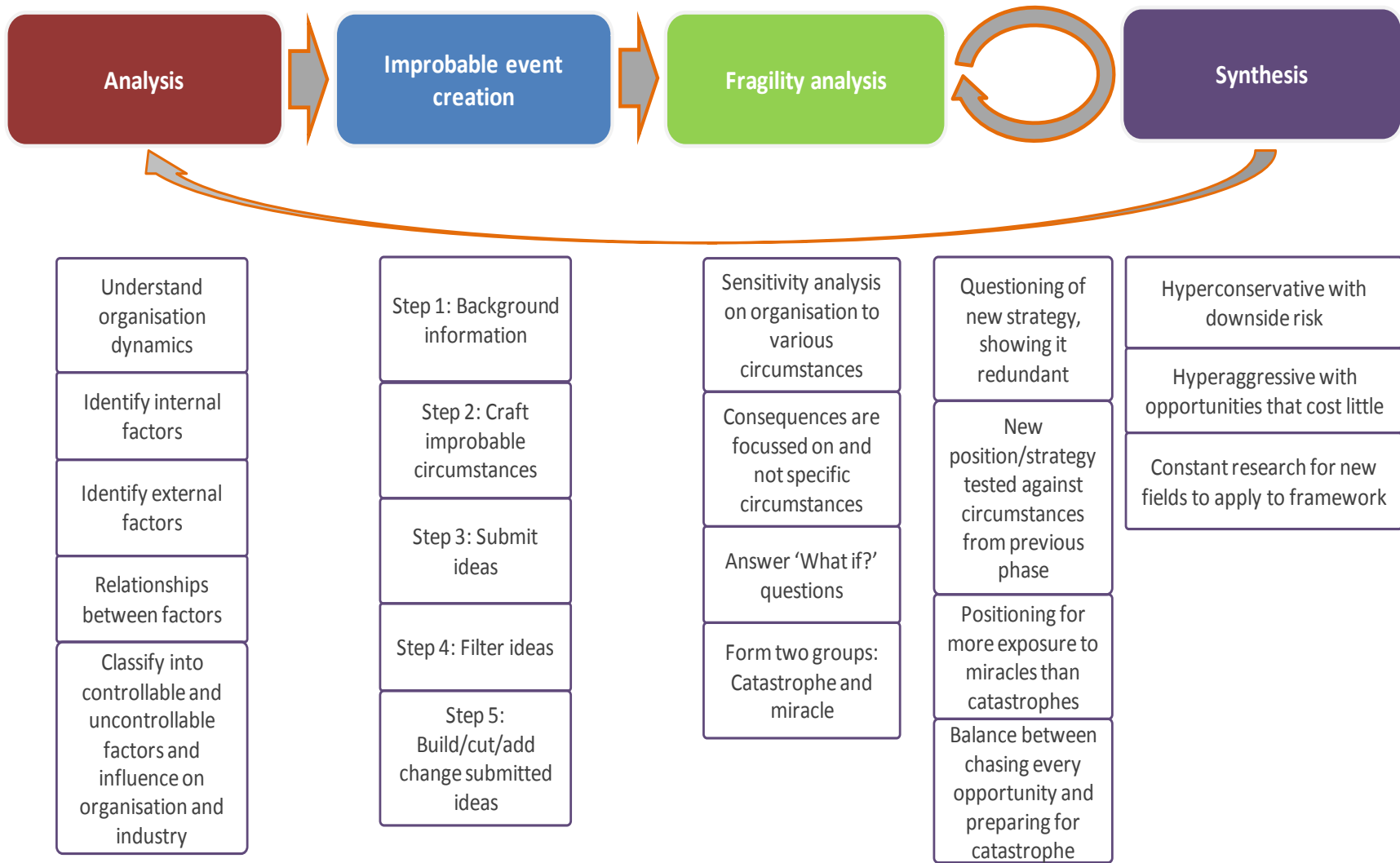


Figure 44: The ICS framework and requirements

5.6 *Inhibitors to success*

There are always inhibitors to the successful implementation of a model, methodology or framework. Some of the challenges to successful implementation were raised during interviews, presentations or general discussions. These inhibitors will be listed in chapter 6.4.2.

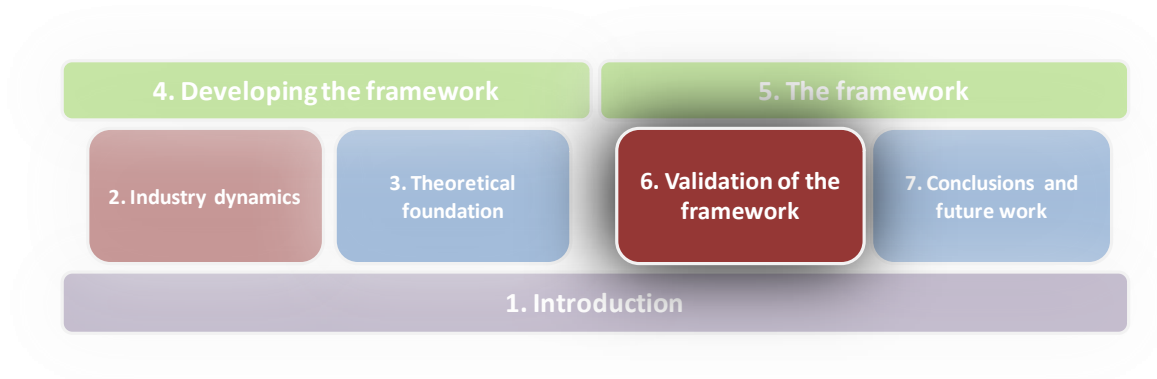
5.7 *Chapter conclusion*

This chapter has put forward a framework which provides a means for taking the first step towards preparing for improbable circumstances. This framework was developed from the analysis of the preceding chapters that include prevailing literature, market research and relevant tools and techniques.

The product of this chapter is an untested framework. The following chapter will test the framework to validate its applicability.

6. Validation of the framework

“A theory need not give us answers, but it should, perhaps, question the questions until they bleed a little.” – Anthony Boucher



The purpose of this chapter is to validate the research, highlight shortcomings and test the response of industry and/or organisation leaders.

6.1 Types of validation

There are three ways in which the ICS framework can be validated:

1. Interviews with experts;
2. implementation; and
3. case studies.

There are advantages and disadvantages to each of these forms. Each will be discussed abstractly for purposes of motivation.

6.1.1 Interviews with experts

According to Merriam-Webster (2009) an interview is:

“A meeting at which information is obtained from a person.”

The interviewer would thus, in the case of validating the ICS framework, look to obtain knowledge from the interviewee which will either refute or confirm the claims of the framework. There are four main interviewing types [Mouton, 2008]:

1. Structured self-administered questionnaires;
2. structured telephone interviewing;
3. semi-structured focus group interviewing; and
4. free attitude interviewing methods.

The research conducted calls for experts to express their opinion on the framework's usability, reliability and feasibility. A semi-structured interviewing process done as a one-on-one interview would be the most useful. The one-on-one interviewing process helps in getting an open opinion on a few (five or less) open ended questions. The drawback of this is that the interviewee will only be able to answer with the knowledge of what he/she has dealt with and what is presented to them.

6.1.2 Implementation

The Merriam-Webster (2009) defines implementation as:

“To give practical effect to and ensure of actual fulfilment by concrete measures.”

The implementation of the framework in an organisation's strategy or strategic session is one that would refute or validate the framework. The advantages are obvious, from actual results to be seen to the adoption thereof by the decision makers. The disadvantages however, ensure that this is not suitable for the length of study as permitted by the degree Master of Science in Industrial engineering. The amount of time needed to practically test the results of the framework could range from one day to at least five years as strategy takes time.

The use of implementation is thus not feasible to the research at this time, but can be part of future work.

6.1.3 Case studies

The Merriam-Webster (2009) defines a case study as:

“An intensive analysis of an individual unit stressing developmental factors in relation to environment.”

The validation of the framework through case studies is an act of which the results would probably be most inconclusive, but there are results to be had. The framework can never be applied to certain old case studies, but some events around the downfall and prosperity of organisations can relate to the framework. Some organisations can, by pure luck, be prepared for a catastrophe or a miracle and using these case studies, the framework can show some validity.

6.1.4 Result

Validation through interviews with industry and subject theory experts came to the fore as the most sufficient way to test the framework for a Master’s dissertation. Their uses in validating the framework will be discussed further.

6.2 Interview with experts

The interview format was done one-on-one. The interviewing process questioned experts in the relative fields of the framework. The interviewee was subjected to a presentation, Appendix B – Interview presentation, by the author followed by a chance to question any information regarding the presentation to determine the interviewee’s understanding of the framework. The following questions will follow to determine the interviewee’s views on the applicability of the framework and their own expert opinion or recommendations. Eight experts in the related fields were interviewed. The reply to the questions often had an example and these are included to show that some organisations have been fortunate in preparations for improbable circumstance.

The interviews were recorded and the transcripts of each interview can be found in Appendix C – Interview transcripts.

The following five questions and their reason for existence follow:

- 1. Does the framework, if implemented correctly, allow for better preparation for improbable circumstance for an organisation?*

The question is posed to find out whether the framework does what it was designed to do. It is impossible to know the effect the framework would have on an organisation without implementation, but the interviewee's experience should allow for some validation through this question.

2. *If not, where does the difficulty lie?*

Any expert that does not believe that the framework does what it should, will have either recommendations or constructive criticism to help in the development of an improved framework.

3. *Do you see any factors to consider when implementing any of the four phases?*

The four phases together with the synergy between them should be thought of separately and as a whole to ensure all the parts act in accordance with the primary goal of the framework, to prepare an organisation for improbable circumstance. Inhibitors to the successful use of the framework will arise here.

4. *What does the framework add to the field of strategic management if implemented correctly in an organisation's strategy?*

The abovementioned question is posed to hear what the expert's thoughts are about the framework and its position within an already populated field of strategic management.

5. *Would you apply the framework to your organisation?*

If a strategist is prepared to implement the framework, then this will bode well for future work. An implemented framework will test the next level of its implementation and its usability.

6.3 Interviewees

The eight interviewees were taken from various fields. A list of the eight interviewees and their positions, Table 11, with a short description of each organisation will be given. They are not listed according to importance or position, but according to the date of the interview.

Table 11: Professionals interviewed

Date	Interviewee	Position
6 October 2009 (15h00)	Dr. Heinz Essmann (HE)	Programme manager of Indutech (Pty) Ltd
6 October 2009 (16h00)	Bernard Katz (BK)	Business engineering services manager of Indutech (Pty) Ltd
8 October 2009 (14h00)	Dr. Willem Barnard (WB)	Director of the NMI Group, MD of Caledon suiwel, Member of board and audit committee and member of the USB Advisory board.
16 October 2009 (11h00)	Wessie van der Westhuizen (WvdW)	Chief strategic officer of Altech
19 October 2009 (14h00)	Andries Mans (AM)	Business analyst of Safripol (Pty) Ltd
20 October 2009 (12h00)	Van Der Spuy Brink (VDSB)	Chairman of Advisory Committee at Third Circle Asset Management (Pty) Ltd and Sole owner of Corvus Dreammaker.
22 October 2009 (12h00)	Prof. Mellet Moll (MM)	Independent consultant and company director
22 October 2009 (14h00)	Dr. Stephen Bosman (SB)	Chief strategic officer of GijimaAST

There is some bias in this collection of experts of which none overlap and they are that:

- Two of the interviewees come from the same organisation;
- one of the interviewees had some contact with the author as a lecturer and previous studyleader; and
- one of the interviewees acted as the co-studyleader for this reasearch.

A short description of the field of each of the interviewee's representative companies are given to show the diversity of the industries looked at.

6.3.1 Indutech (Pty) Ltd⁸

“Indutech enables innovation through combining excellence in business engineering methodologies and sensitive change management to deliver competitive advantage.”⁸

Indutech offers innovative change. They focus on enabling its clients to adapt rapidly to new products, technologies, processes and markets to provide clients with a competitive advantage. They conceive, test, implement and refine ideas to dramatically improve businesses of clients.

6.3.2 Altech⁹

Altech's, a member of the Altron group, is a leading South African multi-billion rand high-technology groups involved in the design, development, convergence, manufacture, installation and distribution of telecommunications equipment, multi-media systems, IT solutions, electronic components, cellular telephony and industrial electronic products.

6.3.3 GijimaAST¹⁰

GijimaAST is an empowered South African Information and Communications Technology company listed on the JSE. Their competencies and vertical market focus include broad experience and market penetration in the financial services and retail market, manufacturing, mining, telecommunications as well as National and Provincial Government departments and State-owned enterprises.

⁸ <http://www.indutech.co.za/about>

⁹ http://www.altech.co.za/about_overview.asp

¹⁰ <http://www.gijima.com/about-us>

Almost 90% of the top 100 JSE-listed companies, including nine of South Africa's leading corporations are serviced by GijimaAST. They employ more than 3200 professionals in more than 70 offices throughout southern Africa.

6.3.4 Third Circle Asset Management (Pty) Ltd¹¹

Third Circle Asset Management is a registered financial services provider licensed by the Financial Services Board.

They are an independent, asset manager which focuses on value added discretionary investment management services for both individual as well as institutions.

6.3.5 Corvus Dreammaker¹²

Corvus offers professional event execution in the following areas:

- Focused research on a particular topic and presenting it in a keynote manner;
- facilitation of strategic decisions;
- problem solving workshops, finding solutions beyond the obvious;
- leading workshops and conferences;
- opening speaker for events.

Their topics of excellence include:

- Strategy of the knowledge organisation;
- innovation and creativity; and
- facilitation workshops.

¹¹ <http://www.thirdcircle.co.za/english/index.php>

¹² <http://www.corvus.co.za/programmes.htm>

6.3.6 Safripol (Pty) Ltd¹³

Safripol is an independent plastics manufacturing company that supplies Polypropylene and High-density Polyethylene to the converting industry.

Safripol is owned by ABSA Capital, Thebe Investment Corporation and the management team. They have 300 employees that are based at the manufacturing plant in Sasolburg with a small team in Bryanston.

6.4 Results and discussion

The results of each of the questions together with the related answers and examples are given in the next sub-headings.

6.4.1 Does the framework, if implemented correctly, allow for better preparation for improbable circumstance for an organisation?

All the interviewees responded positively, thus with a 'YES' to this question.

6.4.2 If not, where does the difficulty lie?

Some difficulties that were generated from the interviewees after the presentation were:

- Innovative thinking in organisations is difficult where strategic planning and management is done with military precision;
- the CEO's time spent in the process which is seen as a rare commodity;
- if an organisation's strategic team cannot see patterns and relationships between these patterns;
- the quality of the role players in the process need to be high;
- the implementation of the framework;
 - Regarding thinking around what are critical factors and what are minor factors to consider; and

¹³ http://www.safripol.com/About_who.html

- justifying the resources spent on something that is improbable.
- the fear of analysis paralysis within a process like this;
- most organisations forget the finances with regard to innovation;
- there could be too many circumstances which would take up a lot of time;
- a limited understanding of business models and corporate models and understanding the difference in timelines; and
- a decentralised business will struggle to implement this framework.

VDSB did not mention any difficulties, but said he would contact later if he thought of any difficulties. He has not done so to date (1 November 2009).

6.4.3 Do you see any factors to consider when implementing any of the four phases?

Some of the issues raised within this part of the interviewing process overlap with the previous question's replies, but they are raised here as these are specifically aimed per phase:

- Analysis phase;
 - There is a big problem with analysis paralysis as there are many factors, options and conditions to consider, the right people are needed around the table; and
 - how wide do you put up your radar screen when taking circumstances into account.
- improbable event creation phase;
 - The time spent here could be too long;
 - the quality of the design of the enterprise could lead to too many catastrophe factors as poor business are very fragile; and
 - how organisations define what is critical and what is not, the red flags need to be defined properly.
- synthesis phase;
 - Synthesis is a special skill of putting a lot of complex information into simple tasks and the right people should be included here;
 - the level of detail of the synthesis plans are important, how much detail can you describe those plans which will lead to the difficulty of implementation;
 - innovation is extremely applicable to the success in improbable circumstances; and

- more interpretation on the synthesis part and what is needed.
- a need for the right people around the table during any of the four phases is crucial as well as having them synchronised throughout the process;
- garbage in equals garbage out and thus quality, being alert, is of extreme importance throughout the framework; and
- the actions of people and how they interact with each other, judgement needs to be weeded out.

6.4.4 What does the framework add to the field of strategic management if implemented correctly in an organisation's strategy?

Five of the interviewees gave a definitive 'Yes, it adds to the field of strategic management' and some of the interviewees comments are:

- "..., it helps you guard against catastrophes and in fact helps you take advantage of catastrophes. ..., it allows you to also take advantage of difficulties." – SB
- "...it is driven by a real life situation, like in your case." – MM
- "Existing strategy management does not make place for improbable circumstance, to my knowledge it is not explicitly focussed." – HE
- "If the framework is set up correctly and implemented correctly then it would definitely add to strategic management. ...Your framework will add to the process and a better method than the rules we have used in the past. Although the wheel has been invented, we may make the wheel work better. Strategic management is improved through this extra tool." – AM

One of the interviewees' comments were inconclusive, another was not sure where it would fit in and under what conditions it would work. Another interviewee stated that it could be groundbreaking work if one gets to the point of application (WB).

6.4.5 Would you apply the framework to your organisation?

Six of the interviewees replied with a 'YES'. One of the interviewees (VDSB) offered to implement the framework in a two day strategic session with North West University's Vaal triangle campus on

the 19th and 20th of November 2009. Some of the interviewees concluded that they already have a fitting place to implement the framework.

One of the interviewees was inconclusive while one other could not give an immediate answer as he would want to sit and think exactly how he would implement it.

6.4.6 General comments & recommendations

Some general comments and recommendations were made which are relevant to this framework and just interesting principles to keep in mind.

6.4.6.1 General comments

Through frameworks like these, an organisation becomes a learning organisation. It adapts to whatever happens in the environment, but whatever the organisation does gets absorbed into the environment. This equilibrium is of the utmost importance to organisations.

BK: "..., this is a catastrophe, and because we are prepared for it, we turn it into a miracle. Especially in the diversification part, those kind of areas, if you use that as a plan... listen, if the catastrophe does not happen, the diversification is still good for us."

MM: "Russell Ackoff stated that one can be reactive, inactive, active, preactive or interactive. Interactive is me taking the lead in influencing the environment. So I am setting up a plan and this plan will most probably change the industry or set some trend or something. And this will open your eyes to that."

SB: "..., given the lack of alternatives, yes, it would definitely be feasible to apply this to the organisation. ...There is no substitute for grey matter and an understanding of the markets."

AM: "Maybe if somebody did this in 2005, then maybe the 2008 crash could have been prevented."

WB: “I think it is unique and I think it would be interesting to see it developing into things such as the process that you propose and the results you will generate through this. Safe to say that it will depend largely on the actors you have around the table.”

“It is definitely better than anything that I have seen up till now in terms of, you know, how companies do it.”

“I honestly believe the whole area of risk management, risk analysis, the high level implication of corporate governance is what we are talking about here and this is where it would mean the most.”

Some of the comments that were made surrounding the framework and what could be improved to it or added to increase its usability are listed as recommendations.

The results showed that there is a need for a tool to address the situation of black swans. They proved that this was a viable tool and almost all of the interviewees had recommendations which proved exactly what the author set out to do: to set up a framework to get strategists thinking in a certain way, but still apply their own experiences and knowledge of their businesses to it.

6.4.6.2 Recommendations

Some of the interviewees stretched the need to look at corporate governance and how the framework relates to the way in which organisations should handle risk.

Benchmarking also came up as a tool if the expert’s opinion is included within the framework.

Hedging should be applied to multi-national corporations when looking at catastrophe protection.

A matrix could be set up to help convey the message of the framework. The scenarios could be plotted on the matrix according to uncontrollable to controllable on the one axis and then survival to prosperity on the other.

These recommendations would help improve the framework. One organisation has done very well during and especially after the recent 2008 crisis and the organisation’s CSO, WvdW, was one of the interviewees. The interview with WvdW started rolling out into what Altech did to overcome

these difficult times and their strategy could add to how organisations currently prepare for the difficult times.

6.4.7 Altech's strategy

Altech improved its operating margin from 9% to 10% in the six months to end-August 2009 while the group's CEO, Craig Venter, predicted the performance to improve. The operating profit during the six month period increased by 17% to R479 million [Dingle, 2009].

Altech invests heavily in East Africa through its holding in Kenya Data Networks (KDN). Altech's holdings in KDN recently increased to 60%. Predictions from Craig Venter shows that the operating profit from East African organisations will improve to 50% in the last three years of Altech's total operating profit which is currently 18%[Dingle, 2009]. Craig Venter was quoted as saying that Altech will continue to take advantage of their strong balance sheet in the window of opportunity while their competitors are low. He was also quoted as saying that the end of Altech's investments in terms of acquisitions that form part of the bigger strategic puzzle is not near the end. "The next six months will be even better. Over the last four or five years Altech has always shown better performance in the second half of the year and I expect it to be the same this year," Venter stated [Dingle, 2009].

Altech's strategy is cemented in its three dimensions. They look at a 3-D approach with the three axis being; product life cycle, market/technology life cycle and the enterprise life cycle. The three axis cube allows for the space of a perfect storm, disruptive activities, but also the space for constructive innovation, Figure 45.

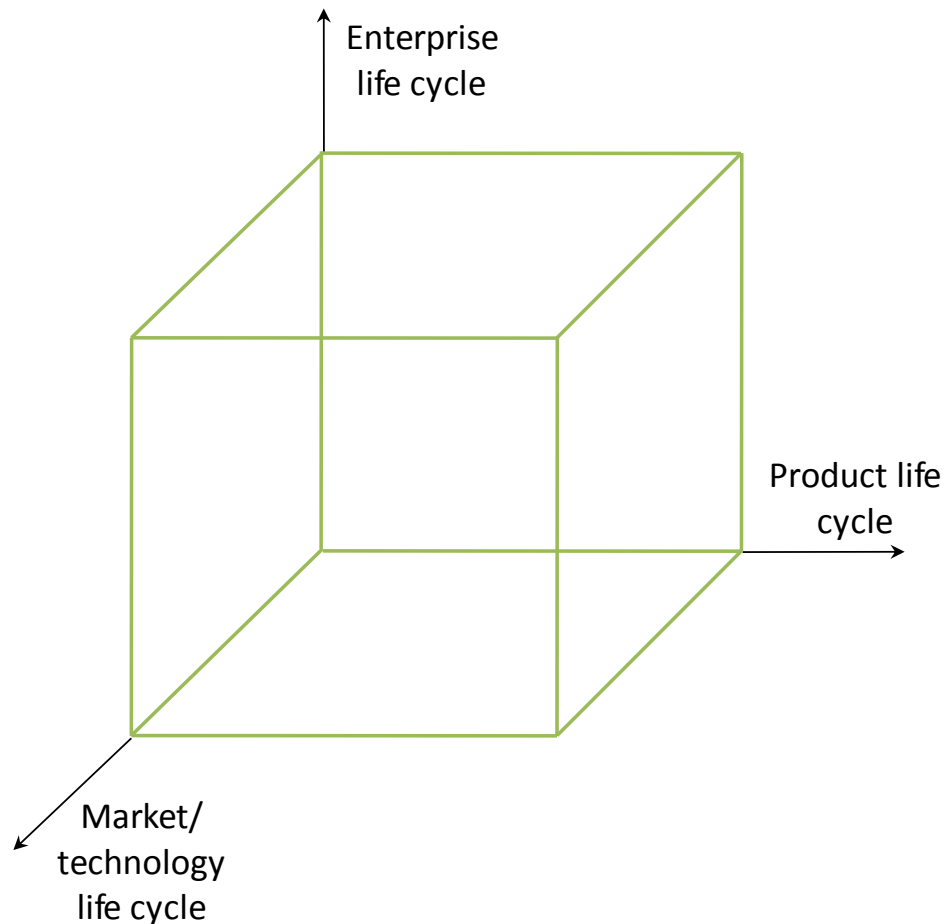


Figure 45: Enterprise engineering cube

Altech constantly looks across those three axis to look for opportunity and risk and the improbable circumstances which would disrupt any of those entities. When you look at the typical enterprise engineering model, you see different segments in the business to map them against capability maturity indexes. They are used to see where the organisation stands in terms of those three axis and whether the organisation has the capacity to manage radical change in terms of capability and find the maturity space that it is in in every one of those entities which will then assist with the improbable event profile.

One entity across those three axis is HR, which is their most important asset. They look to train their people to think differently through the Altech academy. The academy allows for systems engineering, design thinking and time condensing management methodologies. The latter not only looks at the future state, but aims to pull the future state into the now and determine the gap.

Their belief that there is no more time for incremental forward growth allows them to see that you actually have to make the future, condense it into the current reality and identify the gaps.

Eight years ago they had approximately 37% of their income come from annuity, the rest was profit. The present sees them collecting 85% of their income from annuities with the biggest risk profile only present in about 15% of their profits. It was a big strategic move that was driven by an understanding that rapid change is coming at an exponential basis.

The 3-D space and how you position within it is important in staying at the cutting edge, but not the leading edge. Cutting edge concerning your core innovative capabilities allows for the flexibility to shift. Altech does a lot of proactive work too, but so many organisations gamble their future on innovation, but Altech sees it as a balance. Too much change too quickly that is unnecessary pushes the organisation into disproportionate risk, too much adversity and an organisation loses control. The CSO and chief technology officer work closely together to ensure this balance is maintained.

18 months prior to the crash, Altech started cost cutting. There was a strenuous focus on the balance sheet side, pushing short working capital, having less stock and in certain cases the people in non-key positions were not replaced. The normal cycle of people were changed, but not the key skills and R&D and training of people were not touched.

The most important thing is mapping of the three dimensions. A look across product services and the technology and markets segments are taken to see how they fit the enterprise. The approach that Altech has taken to their strategic process is new, but it is populated with old tools. The outcome shows that there are ways in which corporations can prepare for improbable circumstances and some of the principles mentioned in this specific interview would support the ICS framework well.

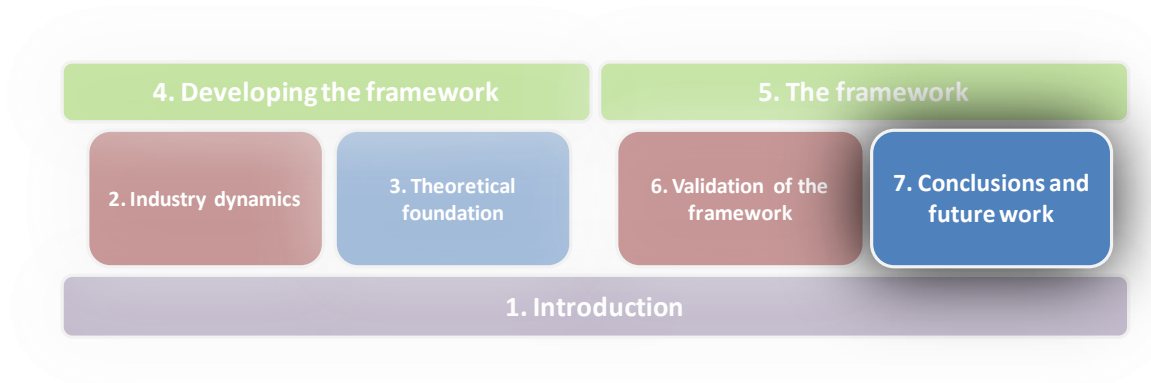
6.5 Conclusion

The result of the interview process was of a positive nature. The objectives for the process were reached through feedback on the framework through recommendations; critical review and case for further research were focussed on.

The above chapter's focus was on validating the framework through industry support and through this make the case for further research. The author believes that there is sufficient information to support the further research of the framework while there is not sufficient evidence to deem the framework unnecessary.

7. Conclusions and future work

“There is nothing more difficult to take in and, more perilous to conduct, than to take a lead in the introduction of a new order of things, because the innovation has for enemies all those who have done well under the old conditions and lukewarm defenders in those who may do well under the new.” – Niccolo Machiavelli



The purpose of this chapter is to conclude the research and its findings and discuss future work as recommendations for the research.

7.1 Overview

Improbable circumstances such as the global economic crisis of 2008 hit many industries, but it is but just one of so many circumstances which bring an organisation to ruins. They need not be global as a coffee plantation in Brazil can burn down and hit the coffee industry badly. These events happen frequently and most organisations look back and know that they could have prepared for it.

The aftermath of events such as these has led to the author asking various questions such as the research questions in chapter 1.3.2. These questions have been answered throughout this document and the locations will follow the question.

- What is an improbable circumstance?

Improbable circumstances are that which are not likely to happen, but they could cause a catastrophic or miraculous outcome (chapter 3.3. Black swan theory).

- What is an unfortunate improbable circumstance?

An unfortunate improbable circumstance is known in this document as a catastrophe which is explained in chapter 3.2.2.4 Complexity theory.

- What is a fortunate improbable circumstance?

A fortunate improbable circumstance is known throughout this document as a miracle and thus an event which would lead to prosperity for an organisation (chapters 5.2 Improbable circumstance creation phase and 5.4.3 Miracle positioning).

- How does strategic management currently guide an organisation to prepare for improbable circumstances?

Strategic management does not have a vast amount of tools to address the improbable circumstance. There are fields of study which focus on uncertainty and risk management (Chapter 3.2.2.1) and there are other fields such as innovation (chapter 3.4) which focus on improving an organisation's ability to add value through ideas. These fields are exactly what is needed in strategic management, but they are rarely, if ever, used in an organisation's strategic process (chapter 3.5 Design criteria).

- How can improbable circumstances be predicted?

Improbable circumstances cannot be predicted as people need to forecast. Forecasters have been unsuccessful up to date (chapter 3.3.1 Coping with black swans). Scenario planning, however, has had some success, but it is the tracking of a plot which have in many cases shown windings on the road there (chapter 3.2.1.1 Scenario planning).

- How can organisations prepare for unfortunate improbable circumstances?

There are many ways in which an organisation can look to negate the impact of the negative, be it probable or improbable, as shown in chapter 5.4.2 Catastrophe preparation.

- How can organisations prepare for fortunate improbable circumstances?

The industry has not seen too many tools to take opportunities, but many in the strategic management field and lateral fields are listed and discussed in chapter 5.4.3 Miracle positioning.

The framework was designed to answer the main research question as stated in chapter 1.3.1 and the following chapter will discuss how this was answered.

7.2 The framework

The framework, Figure 46, was designed to help answer the main research question which is:

How can organisations adequately prepare for improbable circumstances?

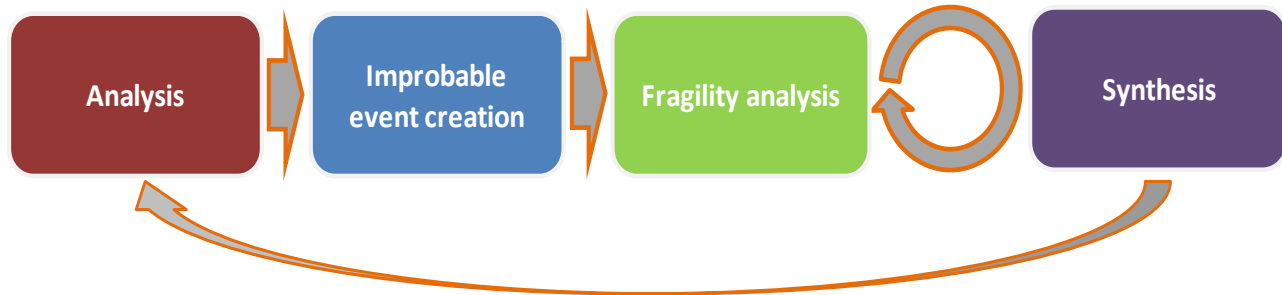


Figure 46: The ICS framework

An organisation that merges its strategy planning with the ICS framework would be better prepared to handle improbable circumstances. The organisation would go through each phase and take the inputs given, address the requirements and aim to reach the deliverables at each phase. The framework was validated through interviews with eight industry experts through one-on-one interviews after the author presented the framework.

“Those who danced were thought to be quite insane by those who could not hear the music.” –

Angela Monet

The results discussed in chapter 6.1.4 showed a positive response from all the interviewees. One could argue that they would not want to hurt a student’s hard work, but that could be banished as most are industry stalwarts and have no need to keep people happy.

The results showed that the framework should go a long way to help an organisation address improbable circumstances and their effect. The responses highlighted that there is a need for a tool to address the situation of black swans. They proved that this was a viable tool and almost all of the interviewees had recommendations which proved exactly what the author set out to do: to set up a framework to get strategists thinking in a certain way, but still apply their own experiences and knowledge of their businesses to it.

“All religions, arts and sciences are branches of the same tree.” – Albert Einstein

An industrial engineer's approach was applied by using systems thinking, lateral thinking regarding new philosophies and the fundamentals of strategic management. The industrial engineer will forever have his place in this world as long as various fields of study and practice are connected.

The following exciting research opportunities were discovered during the synthesis of the framework and the analysis of the results.

7.3 Future work

“Develop a passion for learning. If you do, you will never cease to grow.” – Anthony J. D’Angelo

Some of the interviewees stressed the need to look at corporate governance and how the framework relates to the way in which organisations should handle risk. A board of an organisation should be approached with the angle of improving their social responsibility and through that get the framework implemented.

Future study would include implementing the framework in various organisations. The results of the implementation would then focus on the various factors to consider in each of the phases. The two phases which would be the most interesting would be the improbable event creation phase and the synthesis phase. The factors each organisation should consider when creating improbable events would then come to the fore as well as to what extent they should be considered. The synthesis of the plan would be the most interesting as a structured way to developing a plan could play a role, but that might curb the creativity of the plan. The use of the enterprise engineering cube, Figure 45, as used by Altech could be included in this together with the analysis.

Together with the implementation of the framework, a matrix could be set up to help convey the message of the framework. The scenarios can then be plotted on the matrix according to uncontrollable to controllable on the one axis and then survival to prosperity on the other. The matrix could be set up and used in various implementations and the results could be charted to see if it is of any use. The hypothesis is that there will be a certain bandwidth within which the organisation should operate and a specific trend could come to the fore concerning a specific plan within each quadrant, Figure 47.

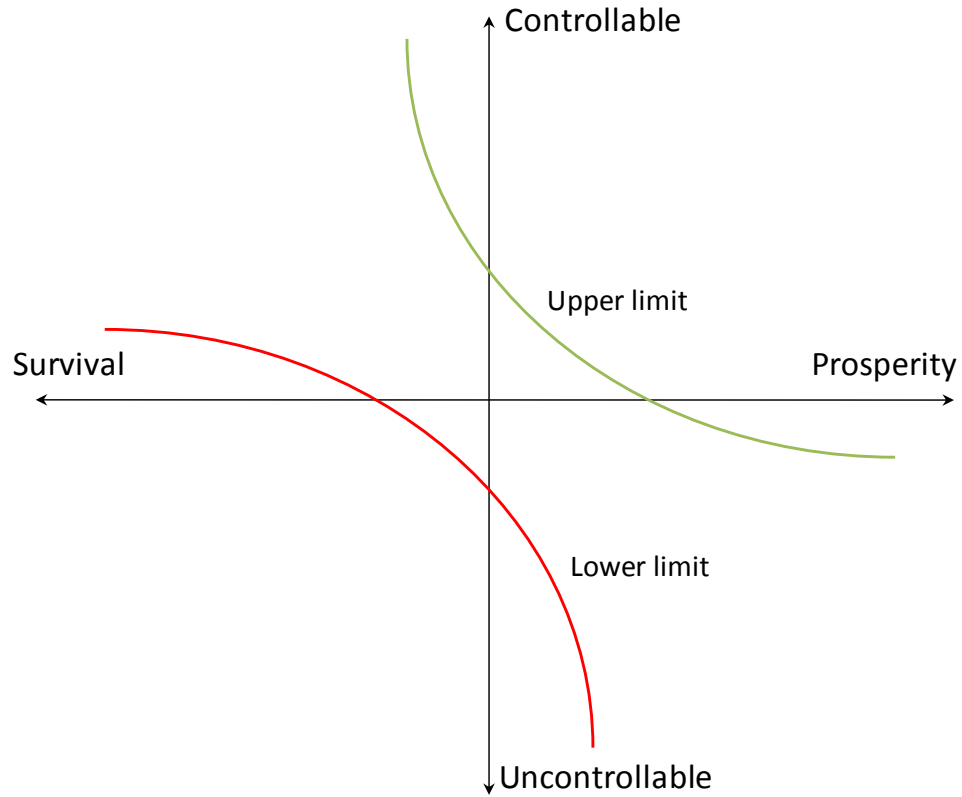


Figure 47: Proposal of ICS matrix

The hypothesis would state that the more you focus on survival, the more you can focus on the factors that you can control to negate it, but when it comes to prosperity, you would just need to ensure your infrastructure is in place when the right conditions hit.

Another part that would add to the future work could be the implementation of the framework in a number of organisations in one industry to try and set up a generic model for an industry.

8. References

[Ansoff, 2007] Ansoff H. I., "Strategic Management", Classic Edition, Palgrave Macmillan, New York, 2007.

[Bekker, 2009] Bekker J., "Discrete-circumstance Simulation", Stellenbosch University, Class notes for Simulation 442, 2009.

[Bosman, 1998] Bosman S., "A framework for managing risk in a changing business", PhD thesis, University of Pretoria, 1998.

[Braga et al., 2009] Braga D., Erdmann D., Malik Y., Satpathy A., "Global sourcing in a world less flat", McKinsey and Organisation, 21 April 2009. Available online at: <http://whatmatters.mckinseydigital.com/globalization/global-sourcing-in-a-world-less-flat>.

[Bryson, 2009] Bryson D., "Financial crisis knocks Africa even as globe prepares for recovery", Business Report, 20 August 2009. Available online at: <http://www.busrep.co.za/index.php?fArticleId=5131667>

[Burke et al., 1992] Burke W. W., Litwin G. H., "A causal model of organisational performance and change", Journal of Management, Volume 18 No. 3. September 1992.

[Clack, 2005] Clack C. D., "Venture analytics", Copyright, 2005. Available online at: <http://www.cs.ucl.ac.uk/staff/C.Clack/clack/ventureanalytics.htm>.

[Courtney, 2008] Courtney H. "A fresh look at strategy under uncertainty: An interview", McKinsey Quarterly, December 2008. Available online at: http://www.mckinseyquarterly.com/Strategy/fresh_look_at_strategy_under_uncertainty_2256

[Davenport, 2009] Davenport J., "Junior coal miners say limited rail capacity hampers SA exports", Mining Weekly, 6 February 2009. Available online at: http://www.miningweekly.com/article.php?a_id=152855.

[De Bono, 2002] De Bono E., "New Thinking for the New Millennium", New Millennium Entertainment, 1st edition, 2000.

[de Neufville, 2004] de Neufville R., "Uncertainty Management for Engineering Systems Planning and Design", Engineering Systems Monograph, MIT esp, March 2004.

[Dingle, 2009] Dingle S., "Altech promises more", Fin24.com 2009/09/29. Available online at: http://www.fin24.com/articles/default/display_article.aspx?ArticleId=1518-24_2554980.

[Doig, 2009] Doig L., "Liquidation statistics April 2009: comment by Luke Doig, senior economist, Credit Guarantee Insurance Corporation", Credit Guarantee Insurance Corporation, April 2009. Available online at: <http://www.creditguarantee.co.za/Downloads/Economic/Comment%20on%20Liquidation.pdf>

[Dye et al., 2009] Dye R., Sibony O., Viguerie S. P., "Strategic planning: Three tips for 2009", The McKinsey Quarterly, April 2009. Available online at: http://www.mckinseyquarterly.com/Strategy/Strategic_Thinking/Strategic_planning_Three_tips_for_2009_2340?gp=1.

[EE textbook, 2009] EE textbook, Stellenbosch University, Enterprise Engineering class notes, 2009.

[Essmann, 2009] Essmann H. E., "Toward Innovation Capability Maturity", PhD thesis, Stellenbosch University, 2009.

[Fakir, 2009] Fakir S., "How the Financial Crisis Strikes Another Blow to the Poor in South Africa", SACSIS, 15 September 2009. Available online at: <http://sacsis.org.za/site/article/353.1>

[Franklin et al., 2006] Franklin G. F., Powell J. D., Emami-Naeini A., "Feedback control of dynamic systems", Fifth edition, Prentice Hall, 2006.

[Gleick, 1998] Gleick J., "Chaos: The amazing science of the unpredictable", Vintage, 1998.

[Grant, 2008] Grant R. M., "Contemporary Strategy Analysis", Blackwell Publishers, Sixth Edition, 2008.

[Greene, 2003] Greene R., "The art of seduction", Penguin (Non-Classics), 2003.

[Greene, 2006] Greene R., "The 33 strategies of war", Viking adult, 2006.

[Greene, 2000] Greene R., "The 48 laws of power", Penguin (Non-Classics), 2000.

[Grossman, 2006] Grossman L., "Time's Person of the Year: You, Time magazine, 2006. Available online at: <http://www.time.com/time/magazine/article/0,9171,1569514,00.html>.

[Hagel III et al., 2008] Hagel III J., Brown J. S., Davison L., "Shaping strategy in a world of constant disruption", Harvard Business Review, October 2008.

[Hamel, 2006] Hamel G., "The Why, What, and How of Management Innovation", Harvard Business Review, Vol.84 No. 2, 2006.

[Hovden, 2004] Hovden J., "Risk and Uncertainty Management strategies", 6th International CRN Expert Workshop: Societal Security and Crisis Management in the 21st Century, Stockholm, 22-24 April 2004.

[Huston et al., 2006] Huston I., Sakkab N., "Connect & Develop – Inside Procter and Gamble's new model for innovation", Harvard Business Review, Volume 84 No. 3, 2006.

[Inglesi, 2009] Inglesi R., "Economics Matters: International Financial Crisis: The South African Experience and Response", Afrinem, February 2009. Available online at: [http://web.up.ac.za/sitefiles/file/40/677/7494/Economics%20Matters\(1\).pdf](http://web.up.ac.za/sitefiles/file/40/677/7494/Economics%20Matters(1).pdf)

[Kim et al., 2004] Kim W. C. And Mauborgne R., "Blue ocean strategy", Harvard business review, October 2004.

[Klinke and Renn, 2001] Klinke, Renn, "Precautionary principle and discursive strategies: classifying and managing risks", Journal of Risk Research, Vol. 4. No. 2. 2001.

[Kuras and White, 2006] Kuras M. L., White B. E., "Complex Systems Engineering Position Paper: A Regimen CSE", Conference on Systems Engineering Research (CSER), Los Angeles, 8 April 2006.

[Maney, 2009] Maney K., "Marc Andreessen Puts His Money Where His Mouth Is", Fortune Magazine, Vol. 160 No. 2, 20 July 2009.

[Marais et al., 2009] Marais S. J., Schutte C. S. L., “The definition and development of open innovation models to assist the innovation process”, Conference article SAIIE 2009, 28 – 30 October 2009.

[Merriam-Webster, 2009] Merriam-Webster online dictionary, Copyright 2009. Available online at: <http://www.merriam-webster.com>.

[Mintzberg et al., 2009] Mintzberg H., Alstrand B., Lampel J., “Strategic safari: your complete guide through the wilds of strategic management”, Prentice Hall, Great Britain, 2009.

[Moll, 1998] Moll C. M., “An engineering approach to business transformation”, PhD thesis, University of Pretoria, 1998.

[Moore, 2004] Moore G. A., “Innovating within Established Enterprises”, Top-Line Growth, July-August 2004, pg. 87 - 92.

[Mouton, 2008] Mouton J., “How to succeed in your Master’s & Doctoral Studies”, Twelfth edition, Van Schaik Publishers, Pretoria, 2008.

[NY Times, 2008] NY Times, “How a Market Crisis Unfolded”, NY Times, 15 September 2008. Available online at: http://www.nytimes.com/interactive/2008/09/15/business/20080915_TURMOIL_TIMELINE.html

[Pahl & Beitz, 2007] Pahl, G. & Beitz, W. 2007. *Engineering Design – A systematic Approach*. 2nd edition. London: Springer.

[Pearce et al., 2005] Pearce J. A., Robinson R. B., “Strategic Management: Formulation, Implementation and Control”, McGraw-Hill, 2005.

[Porter, 1998] Porter M. E., “Competitive Advantage: Creating and Sustaining Superior Performance”, Free Press, 1998.

[Prahalad et al., 1996] Prahalad C. K., Hamel G., “Competing for the future”, Harvard Business Press, 1996.

[SA Government, 2009] SA Government, "Framework for South Africa's response to the international economic crisis", 19 February 2009. Available online at: <http://www.info.gov.za/view/DownloadFileAction?id=96381>

[Sadowski et al., 2004] Sadowski D. A., Grabau M. R., "Tips for successful practice of simulation", Proceedings of the 2004 Winter Simulation Conference, 2004.

[Schumpeter, 1939] Schumpeter J. A., "Business cycles: A theoretical, historical and statistical analysis of the capitalistic process", McGraw-Hill, New York, 1939.

[Schwartz, 1991] Schwartz P., "The art of the long view", Doubleday Business, April 1991.

[Senge, 1994] Senge P., "The fifth discipline: the art of the learning organisation", Doubleday Business, 1994.

[Sunter et al., 2001] Sunter C., Illbury C., "The Mind of a Fox: Scenario Planning in Action", Human & Rousseau, 2001.

[Taleb, 2007] Taleb N. N., "The Black Swan", Penguin Books, 2007.

[Taleb, 2008] Taleb N. N., "Taking improbable circumstances seriously: An interview with the author of The Black Swan", McKinsey Quarterly, December 2008. Available online at: http://www.mckinseyquarterly.com/Taking_improbable_circumstances_seriously_An_interview_with_the_author_of_The_Black_Swan_2267.

[Thom, 1989] Thom R., "Structural Stability and Morphogenesis: An Outline of a General Theory of Models", Addison-Wesley, 1989.

[Tidd et al., 2005] Tidd J., Bessant J., Pavitt K., "Managing Innovation: Integrating technological, market and organisational change", 3rd edition, Wiley & Sons, 2005.

[Toffler, 1980] Toffler A., "The Third Wave", 1st edition, Morrow, 1980.

[West et al., 2006] West J., Gallagher S., "Challenges of open innovation: the paradox of firm investment in open-source software", R&D Management, Challenges of open innovation: the paradox of firm investment in open-source software, Volume 36 No. 3, June 2006.

[White, 2007] White B. E., "Let's give more emphasis to opportunities in 'complex' 'enterprise' environments", Conference on Advanced Risk Management and Its Applications to Systems Engineering, November 2007.

[Yip, 2002] Yip G., "The end of global strategy", European Management Journal 19, 2002.

Appendix A – Open innovation models

Marais and Schutte (2009) summarised the five generic open innovation models as shown in Table 12.

Table 12: Open innovation models adapted from Marais et al. (2009)

Open innovation model	Primary offering	Primary driving contributors
Platforming	Extending reach and offering of existing product	Entire prosumer base
Idea competitions	Idea gathering, and customer insight gaining	Entire prosumer base
Customer immersion	Product testing, customer feedback, product refinement	Customers
Collaborative product design and development	Outsourcing product development, increasing speed of development and lessening cost of development	Customers and suppliers
Innovation networks	Problem solving (R&D related), increasing speed of R&D	Entire prosumer base

8.1.1.1 The advantages of open innovation

Proctor & Gamble, widely regarded as one of the leaders of open innovation with their introduction of the “Connect and Develop (C&D)” program have experienced improvements in various aspects related to the program.

Huston and Sakkab (2006) [17] states that since the introduction of the C&D program at Proctor and Gamble, research and development productivity has increased nearly 60%, while the innovation success rate has nearly doubled since before the adoption of the program.

The advantages that open innovation potentially offers cannot be restrained to R&D productivity alone. The potential influence hereof is easily recognised in marketing, market targeting as well as market research that relates to product testing.

The incorporation of customers earlier into the design process will attract a specific niche group of prosumers, which von Hippel refers to as lead users [18]. The prosumer will in the most instances be representative of the lead-user group. It is the lead-user group who will positively influence the market testing aspect of open-innovation implementation.

Von Hippel defines lead-users as follow [18]:

- Lead-users face the needs that will be general in the market place ahead of the general market place; and
- lead users are positioned to benefit greatly from a solution to those needs.

Lead-users are thus individuals who are enthusiastic about new products, or contributing towards new collaborative projects, and while being actively engaged in this exercise, will discuss it with their peers, and thus create awareness for the early adopters of the circumstanceual product. This whole process equates to inexpensive or even free marketing for the project (or product's) hosting organisation – also known as viral marketing.

It is also a self-fulfilling prophecy because of the involvement of the prosumer, he/she will enforce his/her needs and wants into the developing product, which will result in an end-product exactly to the want and need of the more general end-customer – which results in more accurate market research, targeting and circumstanceual sales increases.

Open innovation thus potentially offers viral marketing, as well as more accurate market targeting, together with the increases in effectiveness of research & development. Further advantages will be discussed per identified model.

8.1.1.2 The disadvantages of open innovation


As is the case with any new venture or technology, open innovation has certain probable disadvantages and risks. The greatest risk associated with open innovation is the possibility of

revealing intellectual property not intended for sharing, which could decrease the hosting organisation's competitive advantage, or blemish planned future products.

A fine balance thus has to be achieved by organisations who wish to deploy open innovation models with regard to intellectual property sharing. The correct balance has to be found between sharing adequately to allow prosumers to constructively contribute towards the project, while sustaining the required secrecy to either maintain or achieve competitive advantage.

It is suggested that industries that rely heavier on technology in their product and service offering will benefit more from open innovation models. The reasoning being that the dynamic capabilities introduced by software provide the adaptability to cater for prosumer. This may prove to be a limiting disadvantage of open-innovation.

Appendix B – Interview presentation



Improbable Circumstances Strategic framework

Presented by: Deniz Kocak
 Guided by: C. S. Schultz and Dr. S. Rouman
 Department of Industrial Engineering
 Stellenbosch University



Improbable circumstance

Strategic management

FNB Average Consumer Price Inflation

financial crisis Great Crash of 2008


BRITISH BANK CASUALTY IN RED



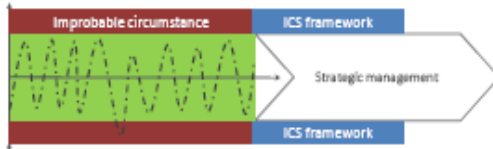
REUTERS
45 percent of world's wealth destroyed: Blackstone CEO
 Tue Mar 10, 2008 3:42pm EDT

Why?

- Black Monday
- Great Depression (1930s)
- Market Crash of 1987
- Global economic crisis 2008/9



Its place?



5

Fields applied



6

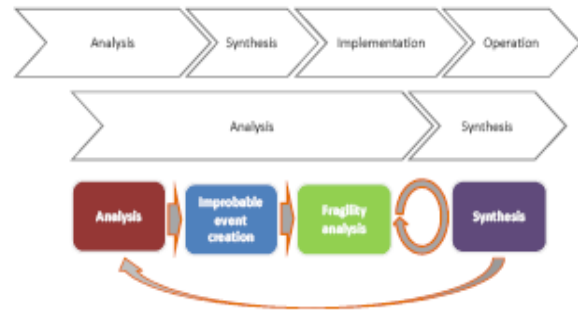
ICS framework



- A first step towards preparing for improbable circumstance
- Not a recipe
- Inputs, requirements and deliverables
- Tools up to user

7

The ICS framework and strategic management



8

Analysis

- "An examination of a complex, its elements, and their relations."¹

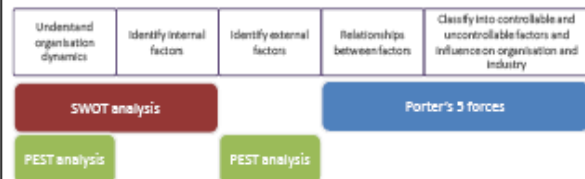


- What determines the success of the company?

9

Analysis (cont.)

- Inputs
 - Related information
- Deliverables
 - Internal factors
 - External factors
 - Influence on each other



10

Improbable event creation

- *"Deep understanding of global forces and scenario-based analysis provides a more realistic approach to test potential sourcing strategies than betting on a single view of the future"*¹²



- What circumstances (catastrophic/miraculous) would have an extreme impact on the organisation?

11

Improbable event creation (cont.)

- **Inputs**
 - Factors from analysis phase
 - Understanding of factors and their influences
- **Deliverables**
 - Circumstances least likely to happen
 - Circumstances which would be the absence of the highly probable
- **Steps in the IEC phase**



12

Fragility analysis

- *"... in order to make a decision you need to focus on the consequences (which you can know) rather than the probability (which you can't know) as the central idea of uncertainty."*¹³



- What would the outcome of these circumstances on the organisation be?

13

Fragility analysis (cont.)

- **Inputs**
 - Circumstances least likely to happen
 - Circumstances which would be the absence of the highly probable
- **Deliverables**
 - Circumstance group which would lead to catastrophic outcome
 - Circumstance group which would lead to a miraculous outcome



14

Synthesis

- *"Don't cross a river if it is four feet deep on average. ... The policies we need to make decisions on should depend far more on the range of possible outcomes than on the expected final number."*¹⁴



- *"What matters is not how often you are right, but how large your cumulative errors are."*¹⁵

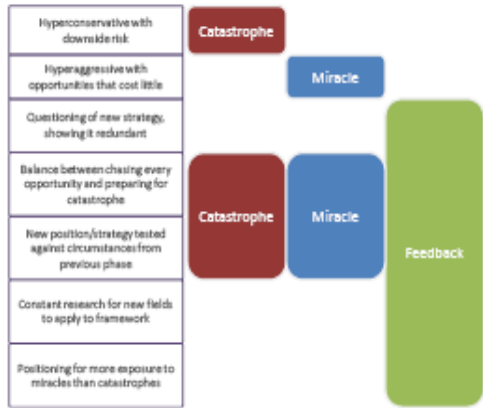
15

Synthesis (cont.)

- An organisation can prepare by positioning itself for a drastic change in one of the key factors in its industry
- How can an organisation prepare for an improbable circumstance?
- 3 stages within the synthesis phase:
 1. Catastrophe preparation
 2. Miracle preparation
 3. Feedback

16

Synthesis (cont.)



17

Catastrophe preparation

- A company that is looking to do well, should first and foremost exist
- The first objective is thus to survive in difficult times



18

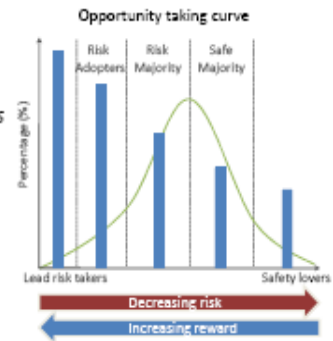
Miracle preparation

- "The greatest enterprise risk may be in not pursuing enterprise opportunities."⁴
- "This is a really interesting time because it provides unprecedented opportunities for the survivors."⁵
- Catastrophes carry unknown risks
- Miracles through opportunities carry known risks
- The downside of a catastrophe will be either great losses or ruin

19

Miracle preparation

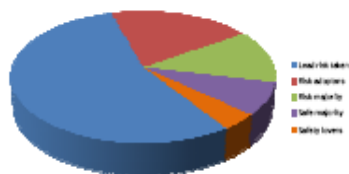
- "Today's new digital infrastructure in fact gives relatively small actions and investments an impact disproportionate to their size."⁶



20

Miracle preparation

Market share vs opportunities



21

Miracle preparation



22

Feedback

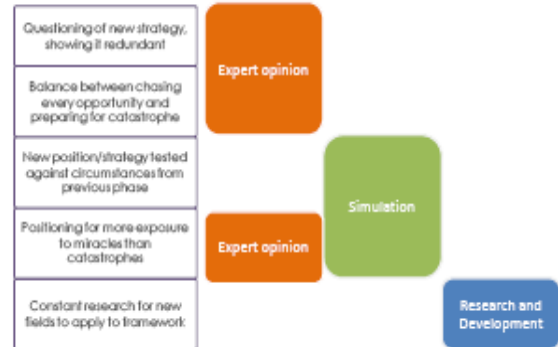
- *“The chief cause of problems is solutions.” – Eric Sevareid*



- New position = new threats
- Systems engineering:
 - How does a small change affect the whole?
- Continuous improvement

23

Feedback



24

Final remarks

- Continuous revision is needed
- Plan's implementation would fall with PM and thus outside scope
- It aims to:
 - Improve a company's preparation for improbable circumstances
 - Add to the process of strategic management
 - Reduce a company's fragility to catastrophes while preparing to set it up to take opportunities
- It does not:
 - Prepare for all circumstances
 - Replace the normal strategic management process
 - Set out a methodology

25

References

1. Merriam-Webster's online dictionary. Available online at: <http://www.merriam-webster.com>
2. Braga D., Erdmann D., Malik Y., Satpathy A., "Global sourcing in a world less flat", McKinsey and Organisation, 21 April 2009. Available online at: <http://www.mckinsey.com/strategy/global-sourcing-in-a-world-less-flat>
3. Taleb N. N., "The Black Swan", Penguin Books, 2007.
4. White S. E., "Let's give more emphasis to opportunities in 'complex' 'enterprise' environments", Conference on Advanced Risk Management and Its Applications to Systems Engineering, November 2007.
5. Courtney H. "A fresh look at strategy under uncertainty: An interview", McKinsey Quarterly, December 2008. Available online at: http://www.mckinseyquarterly.com/Strategy/fresh_look_at_strategy_under_uncertainty_2756
6. Hagel III J., Brown J. S., Davison L., "Shaping strategy in a world of constant disruption", Harvard Business Review, October 2008.

26

Questions

1. Does the framework, if implemented correctly, allow for better preparation for improbable circumstance for an organisation?
2. If not, where does the difficulty lie?
3. Do you see any factors to consider when implementing any of the four phases?
4. What does the framework add to the field of strategic management if implemented correctly in an organisation's strategy?
5. Would you apply the framework to your organisation?

27

Appendix C – Interview transcripts

The transcripts of the interviews done by the author, Denzil Kennon, will follow.

Interviewee – Andries Mans¹⁴

14h00 - 19/10/2009

Interviewee:

Maybe if somebody did this in 2005, then maybe 2008 could have been prevented. South Africa had it fairly easy because we had somebody, Minister of Finance, who said make some rules regarding giving people money for houses. We feel it, as we are part of the world, but it did not hit us as hard as the rest of the world.

I think people could prevent this if they stayed within the normal business rules.

Interviewer poses first question.

Interviewee:

Well, I think there is a way now of looking at it. In the past, people ignored this stuff. They looked at what they could see and handle and only worry about that. This would help you to widen your vision. WE like to concentrate and thus narrow our vision, but you don't want to ignore the big events that could hit. If this can help us to wide and narrow enough, it could work.

Interviewer:

A lot of corporations have core competences, which is one way to say I have a very risky business. If this core is hit, my business is spoiled.

Interviewee:

¹⁴ Business Analyst for Safripol, part of the ABSA group. E-mail: amans@safripol.com

That is very true, we at Safripol were taken over by the DOW organisation in 1999 and DOW said to focus on core business. In that way, they had more than 300 companies world wide and thus are diversifying. But we are thus taking on a lot of risk to ensure they reach their objective.

So, for us diversification would be good, but you are thus moving away from your core business. You need to find the balance then. We used to do all our own things, warehousing, etc. When DOW came along, everything outside plastic was outsourced.

The wider you go, the more efficiency you also lose. Sasol diversified, but Petrol is carrying them.

The more you do, the smaller your economies of scale become. It is a tight situation.

Interviewer:

What I see is that Sasol had the core business and then decided to start going bigger and thus taking opportunities.

Interviewee:

Your theory should hold, because it makes sense...it will help make a better decision.

I like that section where you have brainstorming to get all the ideas of what could happen and what you should do when it happens and then preparing for that. Something with a low probability with a high risk should be kept in mind.

We are taken over frequently, we should be sold within 7 years by ABSA. Yes, we see that this happens often. We have to prepare for this type of thing. If a shareholder has a philosophy like this, then they are not worried about the probabilities of once in 200 years.

Your number 1, I would thus say yes. It allows for everything.

Interviewer poses second question.

Interviewee:

During the brainstorming you have many ideas, you have to narrow them down. You cannot spend resources wasted. Please narrow down the ideas.

The scenarios should be ranked. That is why you multiply probability x impact. You need to rank it, it is not the best but it is a method.

If one of our suppliers has got more than 80% business with us, you like it, but it is not good. If something happens to us, then he goes down. So, that is some things to consider. We need our clients to have a great spread of suppliers.

Remember that all businesses are not the same, but I like that this is more generic.

A funny thing is that we have a very deep focus on safety. Three years ago, Sasol found that because they neglected safety, they almost lost all of their business. They lost many men. We were fortunate in that regard. They had to spend so much money on safety the last few years and we have been easing through it. Once you pass a hurdle, it is easy to keep it up. We are over the hurdle and our process of safety is improving. We could concentrate on business and how to survive the crash, and that has helped us immensely through this crash.

We still made profit this year, we won't get our bonus, but we made a profit. We are the only one in the ABSA group from the manufacturing side that is still making money. In that regards, Safripol has something magical. We are a very quick acting workforce which helps. Our people believe us when we start tightening belts and we are fortunate. Mittal is struggling as the workforce is not believing management.

Safripol is lucky to have knowledgeable people and that is where our magic lies. We are in a very bad position, ABSA and two individuals bought us two years before the crash. Which shows we still did something right regarding your framework without knowing it and that is how we got through it.

Our management have put some money away in the 2 years that were good for the bad days. And that has helped us immensely.

The second question asks where the difficulty lies. If we say no, where does it lie... People don't understand the framework correctly, that might be a difficulty. No understanding of economics will also make it extremely difficult. Even the Bible gives us the 7 year cycle. If you know it, prepare for it. It won't go well forever.

The difficulty lies if you ignore high probabilities and high impacts. But you cannot.

Interviewer poses third question.

Interviewee:

Well, in each of them you have to be awake. If any of those catches you asleep, it is redundant. They follow on each other, and thus success per phase is extremely important. One of the four might be of more importance, but you have to put your champion in there.

Well, you won't have to spend money at simulation, time...yes...but not money.

The red flags need to be defined properly in the IEC or fragility analysis phase. You have set up certain rules, become complacent and thus ignore them.

Translating it to computer needs correct information. Garbage in, garbage out.

Interviewer poses fourth question.

Interviewee:

If your framework is set up correctly and implemented correctly then it would definitely add to strategic management. Any way of helping in the decision making process is a great addition. Your framework will add to the process and a better method than the rules we have used in the past.

Although the wheel has been invented, we may make the wheel work better. Strategic management is improved through this extra tool.

Interviewer poses fifth question.

Interviewee:

Yes, I am sure. If it makes sense our organisation will definitely implement this. The same goes for SAP, we made the decision, it was expensive, but it has paid dividends.

So, yes, if your framework can save money, make a place safer or more efficient it will be implemented. There is not a lot of resources except effort and time of people to go into it. So, it should be implemented.

It could also be revolutionary.

Interviewee – Bernard Katz¹⁵

16h00 - 06/10/2009

Interviewer poses first question.

Interviewee:

Ok, well I think...first thing that comes to mind is, YES, definitely from the point of view that without the framework companies wouldn't necessarily think about it. They would not have the time or energy into using a normal strategy planning based on the normal way it is done. And those outliers may be discussed at the end of that or be lost, but it would not be a priority for a company to have a proper session and a proper process to actually identify the outlying circumstances or improbable circumstance. So, I think just from a point of view of putting it on the agenda, it plays a role.

It is difficult to compare it to another strategy for improbable circumstance, because I don't know one, but seeing it from a perspective of putting it on the agenda, yeah.

Interviewer poses second question.

Interviewee:

¹⁵ Business Engineering Services Manager of innovation company, Indutech, E-mail: bernard@indutech.co.za

It is more mainly on the implementation of it, which I know you don't cover, but how do you in a way justify the cost, time, money and effort? Once you go through this exercise, if you don't do anything afterwards it is pointless right? If you just know it could happen and this is the circumstance, it is too late. But how do you actually justify the time, effort and money to put something into place for something that is so improbable?

Interviewer:

That is a chapter I have set up which discusses inhibitors to success. One of them is the cost for positioning. Obviously, yes, how do you weigh that up? That should be up to the decision makers. If you mostly prepare for improbable circumstances, normally prepare for catastrophe. Like the Japanese who build a business to last for 200 years. At the end of the synthesis phases for both the ICS framework and the normal strategic management, you would have to weigh up your plans, people need to start thinking that well, this framework is just as important to look at to prepare for catastrophe to ensure you are operating forever. And then afterwards look to prosper.

Interviewee:

Just, in the analysis phase, do you in a way quantify the effects of the improbable circumstance besides saying that the company will close? I mean, do you have a part of the exercise where you look at what the circumstance will actually cost us.

Interviewer:

It is quantified in the fragility analysis, there you will be looking at margins and each company will know where their red lights start to flare up.

Interviewee:

Do you know what might be an easier sell? If you, maybe you are doing it that way, but combining miracle and catastrophe preparation. Saying that, this is a catastrophe, and because we are prepared for it, we turn it into a miracle. Especially in the diversification part, those kind of areas, if you use that as a plan...listen, if the catastrophe doesn't happen, the diversification is still good for us.

Interviewer:

Exactly, that is why I had the diversification strategy at both preparations...to show that preparation for one could be preparation for another.

Interviewee:

We talk about innovation as a competitive advantage. Why is it a competitive advantage? It allows you to be more adaptive and change quicker to a circumstance. You could refer to show that it allows you too be more flexible to adapt to catastrophic events. So, being innovative is another way of both surviving improbable circumstance, being a miracle or catastrophe. So, just as an example. We do quite a lot of work in the insurance environment. There are new paying regulations coming in, the new regulations say that brokers will no longer get paid commission up front. They are now going to get, as it went. Every time someone pays their premium, they will get 2% of that payment. That is a catastrophe for the industry, because brokers will no longer get what they sell per month. Now, you will get only 2% of each premium of 3 clients in the one month...that will be your income. And 90% of brokers were lost overnight, as they could no longer survive on that salary stream. Only a few could build up a portfolio of clients... So, companies that can adapt quickly to new regulations, and put in place plans for their brokers to supply that period...those are the ones that will obviously come out in the end and have a large share of the market.

Why is innovation a tool? Because you have the ability to adapt to things quickly. Even if you look at the money needed to prepare for a specific situation, if you just prepare your capability to adapt quicker, then that can see you through that particular circumstance. Generic preparation is more important than specific.

Interviewer poses the third question.

Interviewee:

Maybe just on the synthesis, it is the level of detail you go to the plans. How much detail can you actually put in at that stage. So, again...the cost...how can you describe your design in those plans,

or are they fairly high level...or do you look at more detail at the implementation thereafter, but I don't think it is a major thing.

Interviewer poses the fourth question.

Interviewee:

I think, it is merely a focus on the improbable circumstance and getting people to understand, yes they are called improbable circumstance but the fact of probability is still a problem that needs to be addressed. They are not called impossible circumstances. I am not sure exactly, I know we don't look at it... I am not sure about big companies. But if they don't, I am sure it adds quite a lot.

How and when do companies do this? Do they do it as part or in place of normal strategy? Do they do it parallel? Last day of normal strategic management?

Interviewer:

It is continuous, with the feedback loop, it should be looked at constantly. It becomes easier and faster after every usage. New improbable circumstances will slowly be added and only rarely change.

The IEC phase might take some time, depending on how many people you include though.

Interviewer poses last question.

Interviewee:

Yes, it is one of these insurance type things. It is a grudge purchase, it makes 100% sense. If you don't do it, you feel guilty, if something happens and you didn't plan for it. But it is a grudge if you have to spend so many resources.

When it comes to corporate governance, they focus on responsibilities of boards of executives and non-executive directors. It would fall directly into protecting shareholders and stakeholders. It could play a role like the King commission. You might even find paragraphs in there which would

call on companies to do this type of thing. That in a way in itself could be a seller for this thing. This allows you to apply to these parts of King 3.

Interviewee – Heinz Essmann¹⁶

15h00 - 06/10/2009

Interviewer poses first question.

Interviewee:

Yes, if implemented correctly is a difficult one. What is correct? You mentioned several times that there are multiple tools that could be used to perform different phases in the activity. Buy-in into this process, if it is done half heartedly, then no. Correctly there, there are many direct dimensions to implement this correctly. If it is done with the right mindset, got buy-in, people believe in it, then yes. But I am challenging that correctly.

Interviewer:

The aim was to propose tools to try and validate each phase, but the implementation and buy in would fall under management and whoever implements this. That would be a big hurdle, yes.

Interviewer poses second question.

Interviewee:

What is the second phase? Improbable circumstance phase?

Interviewer:

No, improbable event creation. I am not looking to follow plots or work with scenario planning. That would fall within the normal realms of strategic management.

Interviewee:

¹⁶ Programme manager at innovation company, Indutech. E-mail: heinz@indutech.co.za

Yes, scenario planning has been done to the nth degree.

Referring to the third phase, fragility analysis:

Isn't it a robustness analysis? You are testing the robustness of your company?

Interviewer:

You can say that, but no.

Interviewee:

By understanding what could happen, you want to design something that would survive in the most improbable events. It is not dealing with circumstances though, but events. So, the robustness thing is just my own preference. Analysing how fragile the organisation is is better.

Interviewer:

Yes, I want to test how fragile it is, not how strongly I am posed. Show the current strategy redundant rather than confirming it the whole time. I don't want to test its strength, but rather how weak it is.

Interviewee:

So, finding things that will break it down. If you can't, then you work harder at doing it but the harder you have to work the more likely success is. Ok, then I agree 100%.

As isolated phases? I have mentioned the one, preparing as a function of probability and impact or probability and consequence as apposed to just consequence. Because if you plan for something with 10 to the power of -5 probability of occurrence.

Interviewer:

If you look at risk management as a normal tool in strategic management then you would weigh up that option. What I am looking at is the outlier. You just don't want to be caught with you pants

down dealing with an improbable circumstance. The balance of that comes when you weigh the end of the framework's synthesis phase to that of the strategic management's synthesis phase.

Interviewee:

You have got feedback on the outside of these four phases, not much feedback within.

Interviewer:

Only feedback between the fragility analysis and synthesis phases.

Interviewee:

Inter-phase feedback? What about intra-phase feedback?

You have one in the IEC phase too, between the 5th step and back to the 2nd step. That is seen as feedback.

Interviewer:

I just want to ensure that it doesn't feed back to the shop floor creation...That will take too much time, so it is a partial feedback...definitely not complete.

Interviewee:

Oh okay, I understand.

You said Scenario planning has often been incorrectly used, so again...you go from putting a few things together...and that is it. But it is more a continuous process. It is a continuous cycle of planning scenario, testing robustness against them, adjusting if required, redoing scenarios, and so on.

It is actually a continuous cycle, it should take forever. But the times spent in IEC, I have no idea.

Lets look at the innovation point of view. The feasibility of innovation within the framework space. Innovation depends on what you see as innovation. Some people look at innovation ... we see

innovation itself as a process as a cycle of bringing new ideas to products, process, business models...bringing new ideas to a point where they add value to the organisation. That cycle, whether it is linear, or feedback, or network over many people. Innovation management is managing that cycle. That is a tool in how you look to realise your strategy through new ideas. So IM as a tool within a strategy development thing...I don't know whether it is at the same level of detail. Looking at the slide where it is used as a tool. What I see it as rather a tool, I see it as essential inputs. There will be an intrinsic link between what you are doing to be more innovative or to innovate within the organisation and these activities.

I would actually just say that in order to prepare for miracle...you are rather chasing that miracle.

Interviewer:

Exactly, the opportunities.

Interviewee:

Oh, yes, it is identifying an opportunity...to become a miracle.

Blue ocean strategy is often related to innovation. It is about building your strategy to make you more innovative. So identifying those factors that other people are not competing on and leaving a gap in the market in which you can be the first to enter and lead and set that as your point of differentiation. The Body Shop is the great example there. There were luxury products, but Body Shop comes with a simple earthy feel and sets themselves completely aside. That is a blue ocean strategy. So, thus focussing on areas that are uncontested. So, there is an intrinsic link between IM and BOS, we see IM as also linking to corporate strategy. So we set out innovation strategy, how do you realise your corporate strategy through innovation. What are your objectives for innovation, so how much do you want to spend on new products and processes. How do you want to split it over process innovation, business models innovation, product innovation, service innovation, how do you want to balance radical disruptive changes, things that are extremely out of the ordinary, or incremental changes, things that add to your existing product to discern you from your competition.

And then innovation strategies set that out for you, how do you plan to implement your corporate strategy through innovation? So that is the link.

Interviewer:

I have always seen innovation feeding for a blue ocean strategy which could/should lead to diversification.

Interviewee:

Another point is, a little pedantic, I have a very manipulated view of innovation as I have studied it. It is for me a more objective perspective. I agree fully that as an institution to be successful in improbable circumstance, it is extremely applicable.

Interviewer poses fourth question.

Interviewee:

I saw a diagram that you showed which perfectly illustrated what it adds. That is what your thesis adds to the field of strategy management. It sums it up as that part on the outside. Existing strategy management does not make place for improbable circumstance, to my knowledge it is not explicitly focuses. I am not a 100% convinced yet on how much effort you need to place on improbable circumstance. You need to plan for it, that I agree with. What do you envisage should a typical ratio of time spent be to normal strategic management and this framework.

Interviewer:

Many companies spend weeks, other don't have a strategic process at all. So, it is difficult to say. Some people have stumbled upon preparation by chance, like Gijima AST and Altech for instance. They saw it coming, and they made the necessary changes.

Interviewee:

It is a difficult question to answer. And each company would have its own ratio. Google would probably spend more time on improbable circumstance preparation than a sugar manufacturer, or

toilet paper...a commodity that is needed, but not competing in a market that is in total upheaval compared to a company that goes head on with a company like Microsoft and so on. So, I only asked to give you a difficult question. I have no idea what would be the right answer.

Should there be a separation between the framework and normal strategic management?

Interviewer:

I really want them separate, you only use its analysis phase, when you come to the synthesis phases you know exactly which is which's domain and how you will cater for that.

Interviewee:

Scenario planning for normal strategic management and scenario planning for your improbable circumstance. Would you separate the activities and create separate scenarios?

Interviewer:

Yes, I believe that scenario planning you use in normal strategic management is really different from this framework. I have changed sp and added my own steps. In art of the long view, the focus on not working on probabilities, but it is extremely important in my case. I don't care about the probable.

I see it as a whole different tool and application.

Interviewee:

Do you feel that in your presentation you sufficiently covered the tools, do you think you should present a bit about your customisation.

Interviewer:

It is new work, but it is not what the framework is about. I adapted it, to show it is feasible. One way to validate the phases is to find tools to support the actions. I don't care what tools companies use, as long as it works.

Interviewer poses last question:

Interviewee:

Absolutely, it would be absolutely ridiculous not to. Companies that have done something similar without applying your framework are those that have not only lasted during improbable circumstances but thrived in troubled times.

Interviewer:

It is the same as the Altech case study which I will be doing.

They are prospering just because they saw difficult times coming and prepared for it.

Interviewee – Prof. Mellet Moll¹⁷

12h00 - 22/10/2009

Interviewee:

In scenario planning is daar so assestelsel wat basies se dat daar sekere dinge is wat jy kan control en ander dinge wat jy nie kan control en die ander as is die impak wat gemaak is. Strategie moet wees, wat doen jy om die controllables te control, en dan die uncontrollable moet jy teen werk. As hierdie goed verkeerd gaan, hoe kan ek die effek van die uncontrollables verminder deur die controllables te gebruik.

Daar is so analogie in statistiek van n verwagte. $E = px$ impak. Jy kan so logika uitlok.

In multinational corporations sal jy hedging moet insit by catastrophe protection. Die meeste internasionale companies, in hulle finansiële afdelings, by die tessourier, hy is gewoonlik die hoogs betaalde finansiële officer. Hy is die local bank. Hy sal werk met wisselkoerse, so forward hedging is op dieselfde level.

¹⁷ Independent consultant and company director. E-mail: nosferatum101@gmail.com

You could look at benchmarking too, if you have expert's opinion there.

Die filosofiese opinie daaroor in die begin is baie belangrik en dan die bestuursimpak is baie belangrik. Daardie twee dinge het ek nou nie hier gesien nie, maar 'n educated ou, 'n CEO, gaan hierdie lees en aan hom verduidelik waar dit in die bigger picture inpas. Hy kan die tegnieke naslaan, so vir jou volledigheid, maar vir die bigger picture moet jy 'n 'So what?' gee.

Interviewer poses first question.

Interviewee:

Ja, there are a few problems that companies have when strategising. The biggest problem is that the plan is linear. Die tweede ding is ek dink 'n proses soos hierdie laat 'n mens toe om die toekoms te kan beïnvloed en nie net kan verstaan nie. Maar as jy deur die iterasies gaan dan leer jy al hoe meer. Jy sal die woord neerskryf want that is how a learning organisation works. A learning organisation is in equilibrium with its environment. So, whatever happens in the environment, the organisation adapts. Whatever an organisation does, gets absorbed into the environment. You need to look at something that is iterative and looks at multiple outcomes to be able to create that learning equilibrium thing. The third thing is Russel Ackoff's story about a change in the environment. What do you do? You can be reactive, inactive, active, preactive or interactive. Interactive is me taking the lead in influencing the environment. So I am setting up a plan and this plan will most probably change the industry or set some trend or something. And this will open your eyes to that.

Interviewer poses second question.

Interviewee:

Innovative thinking, I think, normally in companies the strategic planning and management process is a rigid process that is done with military precision. You cannot do away with the fact that a company has an annual clock or cycle. And you have to fit in your planning with that. It does inhibit the idea of thinking innovatively. Secondly, I think time for CEOs because they are too busy working and thinking about the future and that might lead to situations where they see stuff

coming but they go on with their daily work. I think innovative thinking, time...what else is there? You don't always recognise a pattern until afterwards, the ability to see patterns, recognise and interpret them and see the relationships between things and their interconnectedness. It needs a special skill, which I suppose with a lot of experience, you'll get that for most CEOs and strategists are new to this.

Interviewer poses third question.

Interviewee:

With analysis there is a factor to consider, how wide do you put the radar screen on. What are all the factors that you look at before bringing them into play in the process. It is garbage in garbage out, what you pick up there goes into your strategy. And what you pick up there is based upon your view of what is important. And it is often not the seniorist guy in the company that collects information, so the word I want to plant in your head is knowledge management, data mining, competitive intelligence, etc. Also, studying economics all of the time, but scanning the right factors in the analysis phase. And in most part, I have seen good strategies based on the wrong analysis. Your strategy is only as good as your analysis. If you look at the phases after that, and you look at the phase where you investigate the circumstances, it is very much one of being able to envision the effects of what you are looking at as factors and then in the synthesis phase, synthesis is a very special skill which is the ability of somebody to put together a lot of complex information into simple tasks. Simplifying complexity. In analysis, I think you need to look at KM, CI and data mining and circumstance it is really about being able to investigate them well, and the synthesis part it is complexity theory. Maybe not applied as is, but your ability to live with complexities, and interpret them into a whole that makes sense.

Interviewer poses fourth question.

Interviewee:

SM is probably one of those disciplines which started organically in companies. It probably started with operational management and people started to push the horizon further until they started to distinguish between operations and strategy based on the time horizon. Short term is part of long

term, so it is a major consideration. If you look at contribution, the first thing you need to look at is the impact on the company. To me, especially in a management sciences and all the applied sciences, I suppose the practical usability is what generates an academic demand and not the other way around. Maybe in some other fields like philosophy, languages or arts or humanities it might be that you want to develop theory and then look for a solution for it. But management is a very specific thing which is used by very specific people, and the usability for them and how it addresses their problems is more important than to add to academic content. Academic content is a consequence of collective thinking in a field like this and not the objective itself. I believe one should focus on what it does to the industry and secondly to academia.

It doesn't neglect academia, but it means academia should be there to gather all the knowledge that is being gained, look after it, nurture it and then build upon it and give back. But it should be driven by a real life situation, like in your case. The end result is then does it answer back and gives some form of answer to the initial problem.

Interviewer poses fifth question.

Interviewee:

My experience in corporate is one of CEOs aren't interested in clever guys. Typically what you might find is that the CEO, by first intent be interested in how you do it and what you do. What he wants to know is that you have an approach to give him a better answer than in the past. And the only real thing you are going to tell him is that you are going to look at various possible scenarios of things that might be happening and we will plan accordingly. Based on whatever happens we will decide what to do. Lets say now you have your CEO and the chief strategist. The chief strategist like a mechanic is on top of his tools he understands them and uses them. And he must implement whatever is new to solve new problems, what the CEO then does is he gets these new problems and would like to pass it on to the strategist and he must do his stuff there and come back with a better plan. So, basically...hmmm...yes, I would.

Interviewee – Van Der Spuy Brink¹⁸

12h00 - 20/10/2009

Interviewee:

Oor ¼ weke moet ek die mense hierdie mense hier help. Kyk ek het dit nou al baie gedoen. Daar is drie takke. Daar is mense wat na die strategie kyk van hierdie groepe in n organisasie. En nou moet 'n paar goed balanseer met mekaar. Eerstens is dit die gedrag van die mense, hoe voel hulle. Dit moet jy perfek reg doen. Dan het jy 'n proses, nie jou proses, genome parallel thinking. Dit beteken, as ek skep dan skep ons saam, as ons kritiseer dan kritiseer ons saam. As ons inligting bymekaar sit dan sit ons dit saam bemekaar. Hierdie proses pas mens toe, daar is so boek, Thinking for the new millennium wat hieroor gaan. How do we weed out judgement?

By Jaco en Sheraan het ek groot 'DJ' op hulle bord geskryf, deferred judgement. Daar is verskeie maniere hoe mens parallel thinking kan doen. En dan populate jy dit. To populate some sort of a model, you touched a couple of models... You actually talk about this comprehensive model, which is more than a two day session. The elements thereof is so much more than that. Ek is baie opgewonde en sukkel om nou 'n loophole te sien. Ek sien die hoop en dit is great.

Ek is baie opgewonde, dit het my getref in die eerste 3 minute en die res is die vital onderkant.

Ek sien geleentheid. Ek dink nou mooi of dit nie hoort hier vandag (Vaal pukke strategy day).

Discussion on logistics and base for implementing the framework on the 19th & 20th of November.

Interviewee:

We will do 3 minute lecturettes throughout the session to give background on framework. No serious lecture, point to consider in each lecture/phase.

¹⁸ Chairman of Advisory Committee at Third Circle Asset Management (Pty) Ltd and Sole owner of Corvus Dreammaker. E-mail: vds.brink@corvus.co.za

The top of the pyramid is there, this framework colours the top of the pyramid.

It rings all the bells, but I might phone later to ask some questions.

Interviewee – Wessie van der Westhuizen¹⁹

11h00 - 16/10/2009

Interviewee:

So maybe just as a comment, in the strategic environment, you must make sure you don't suffer from analysis paralysis. Because that can absorb so much time that you miss opportunities. Secondly, it is very important that the whole team is synchronized around the specific scenario. Not that is the right scenario, but synchronized. So, any deviation in the realities that you pick up compared to the scenario you are working against will alert the whole team that something is changing. Thirdly, we believe in the principle that strategy is a dynamic process. So, the longest timeframe between strategic reviews and outputs is 3 months. Specifically to realign with the environment. What you need to do in the context in the way you are looking at it. You need to cement your approach in its three dimensions. What we do is we look at the typical product life cycle, the technology and market life cycle which is the second axis. So it is actually a 3-D model we are looking at. That already becomes more complex and that is really where you enter the framework of stealth competitors, improbable circumstances. So, we begin to analyse 5/6 different stealth scenarios in a fairly simplistic format that could potentially affect the major portions of our business. Then the third axis, is also to look constantly at where the enterprise is in its life cycle. Because that is something that people forget in totality, that the enterprise has a life cycle. Lets just take an example of that which is practically visible. Traditional telecoms the old fixed line has a life cycle of close to a 100 years before it was really substantially disrupted by mobile. Mobile has been around for around 50 years in large format and that is about to be fully disrupted as an enterprise business, not a market... Through a concept of converged services which brings back an integration to mobility and the traditional fixed line space. But with unified

¹⁹ CSO of Altech. E-mail: wvdwesthuizen@altech.co.za

communications we actually don't know which network or which profile you use. So, the enterprise has got the lifecycle and we have several of our businesses which that is entering in our opinion timeframes now where the whole enterprise life cycle is 7 years.

The important thing is, if you look at those 3 axis, we get the space for the perfect storm, disruptive activities, but also the space for constructive innovation. So, we match those things, and look across those three axis on a constant base looking at the opportunity and risk side and the stealth circumstances which would disrupt any of those entities. And that is the way we go through our strategic operation.

I mean, clearly you can extrapolate that backwards or slice it if you want to. Looking at the typical enterprise engineering model where you look at different segments in the business whether it is your customer interface, manufacturing, R&D facilities, to map them against CM²9 Capability maturity indexes to see where you stand in terms of those three axis and whether you actually have the capacity to manage radical change in terms of your capabilities and also to find your maturity space that you are in in every one of those entities which will then assist you in that improbable event risk profile. And that in a nutshell is our strategic model and methodology.

Interviewer:

That is very unique and interesting. I have also looked at innovation capability maturity models which also looks at whether you are ready.

Interviewee:

Just as an example of what this drives now, if you look at just checking one entity across those 3 spaces. Our most important asset is HR, we are an IT company, when we come back to one of the key risk mitigation profiles that is apart from HR. Looking at that framework through the improbable risk circumstances. That said, we actually look to train our people to think differently. And that created as an outcome the Altech academy where we run specific courses like the systems engineering with you guys down at Stellenbosch, we do design thinking and we are now busy developing a course on time condensing management methodologies. To not only look at the future state, but to pull the future state into the now and determine the gap. You can think for

yourself, if that fits your loop from the synthesis back to the analysis profile. So, it is really using in a very similar basis that methodology to say there is no time anymore for incremental forward growth, you actually have to make the future, condense it into the base reality and identify the gaps. So, those are the sort of methodologies that we are approaching from a HR development profile and the other thing that we have constructively done the last 8 years is to say ok, the dynamics in the world space is changing, how do you minimize your risk profiles in that context? And this is to move away from the current reality and have abrupt intervention where just by the nature of it you buy yourself time, your reactive capability is thus improved. And in that process what we have managed in the last 8 years. 8 years ago, we had about 37% of our income come from annuity, the rest was profit. Here, we are now at 85% of our income is annuity. Our big risk profile lies in 15% of our income. A big strategic move driven by an understanding that rapid change is coming at an exponential basis.

Things are moving so quickly, and we are at the bottom of the exponential curve.

We look at things like time cycles, we are not clever enough to do it. We track these cycles in every part of our business, especially when you look at that 3-D space. Those cycles give you valid info on product and market shift, and if you combine those two things, you will understand the enterprise. Okay, strategically we have to shift our business profile to annuity based income where we stand in the South African environment.

I think a company is looking to superimpose their capabilities in the 3 D space, it is important that you stay at the cutting edge and not the leading edge. At least where your core innovative capabilities are concerned. That allows for the flexibility to shift and shift. The other important thing that underlies the fundamental proper business systems. If you can't have control over what you are doing in terms of the basics that comes from being i every engineering project from configuration to across the supply chain. Everything must have systems in place that can manage that then change is fairly easy. Because, what happens from that perspective it is a profile that changes it doesn't change the fundamental methodology of execution.

WE do a lot of proactive work, you know, we also disagree fundamentally with some of the proactive push, where so many companies gamble their future on innovation, where we believe

there is a balance. Too much change too quickly that is unnecessary pushes you into that disproportionate risk. A lot of companies innovate themselves out of issues, there is no need in certain instances if you have fundamental markets. In most cases, make sure everything in fundamentals are sorted. Collapse is caused, look at Motorola, IBM, all of those guys went through a phase of disproportionate chaotic innovation. Too much adversity and you lose control. It is a constant balance. We have a nine profile innovation matrix which covers the three axis. You know, product, systems and enterprise versus strategy is a fundamental, major, normal. And in that space, we are always careful not too push too many radical innovation profiles, because that can put the organisation at high risk.

We, myself and the chief technology officer work closely together to maintain that balance.

Interviewer:

A lot of opportunities arise after a catastrophe. What is the effect of prime individuals? How do you position yourself for opportunities, by incorporating prime individuals, but keeping a lean company running? You will be looking to employ more people to manage opportunities.

Interviewee:

I agree, look at stats 70% of mergers fail and in general on innovation you have a 10% success rate. You have to keep those numbers in mind in terms of the process that you are working with. Now, to answer on the HR side...that is part of the reason we have brought in the structure of the academy...people that have gone through that schooling can mentor other people in the philosophies of the company. It is clearly not just knowledge but culture too. If you have mismatch in the culture you are equally at risk.

Interviewee:

Let us look at the framework. Some inhibitors to success have been raised in interviews.

Interviewer:

People tend to forget the finances when you look at innovation. Just coming back, in the financial portion, people just look at the income statements and profitability which is fair and necessary. But we have a massive emphasis on balance sheet management and that is why we are in a position to take risks, because we don't gear at all. There is a massive focus on our balance sheet. At the end of the day that is where the business lies.

Cashflow and cash cycles come from the balance sheet.

Interviewee:

Altech has its hands in more than one pies. Is this something that immediately happened?

Interviewer:

About 10 years ago we formulated which is still the core of our present strategy and this is position in what we call the TMT markets. And we have built business around those three legs. The hype of convergence started 10 years ago and we realised that that hype has a longer horizon to it than a lot of people expected and we were right. Looking at analysis, we realised that key convergence is driven through simply three things: that is processing power, storage capacity and telecomm bandwidth. In other words the ability to communicate.

WE looked at the evolution of that and realised and thought we were 5or 6 years away, which was right in a first world, but it is only here now. Those things combined allows for convergence where you can unify communication, you become device agnostic. The principles that Windows is pushing from telecomputing, we are entering that space. And on top of that clearly, the philosophy of media across telecommunications. It is high quality, HD for then film, it would take the top ADSL line in SA 8hours. In Kenya it would take 12 minutes. Those type of things are enabling convergence, but convergence relate to IT, media and communications that is why we built those three legs 10 years ago. We start thinking across the capabilities.

Strategically, although it looks like a haphazard businesses it is built specifically around integration in telecoms and the IT industry.

Interviewer:

What was the view before the 2008 crash?

What was done when the crisis hit?

Interviewee:

WE didn't react to it, we were ready for it. In the sense, from the turbulence in the international markets we anticipated a slow down. The magnitude was difficult to judge. What we started to do 18 months before the crash, we changed the criteria for signing people. Now, luckily in SA we had a change in the credit act and we followed that into our businesses. We changed vetting in the various businesses where you have signed clients. We would take prepaid subscribers.

We started with a common framework for cost cutting 18 months prior to the crash. That cost cutting is not in the traditional sense where you cut people and R&D. We actually didn't touch R&D, we put much more strenuous focus on the balance sheet side, we pushed just short working capital, less stock and in certain cases we didn't replace people in key positions. The normal cycle of people we changed, but not touching our key skills. We have not cut down on training at all.

The point is that we were not hit, because we had the balance sheet sorted out.

Interviewer:

Your position and the process compared to the industry.

Interviewee:

We still had positive growth, we have thus strengthened our position. WE know it won't continue to run at 20%, we thus saw a new engine for growth in Africa. We searched for something that is through its J-curve effect. WE have a slow change in the SA space, but still extract 10% annual growth with some changes to our portfolio.

We have started a new engine for growth where you get 15% year on year growth in the short to medium term without overextending. That is part of the overall portfolio management, where do we sit on these S-curves? Look at the press around Cellular networks, tax implications, etc.

The important thing is the mapping of the 3 dimensions. The technology and market segments, we look across product services and how they fit in the enterprise.

Interviewer.

Your views on the framework?

Interviewee.

I really like your framework's approach. If you are ready to share some more information with me, what I am happy to do, is I can extract some ideas from our strategy that is not sensitive for you. But give me a copy of what you have, then I can share more.

Interviewee – Dr. Stephen Bosman²⁰

14h00 - 22/10/2009

Interviewee:

Maybe one could look to convey the message of what you are talking about through a matrix or something like that. Almost something like the Boston Matrix?

You could look at significance and something else on the other axis.

You are right though, that type of detail is more on a PhD level. You are making the case here and then for further studies continue in more depth.

Interviewer poses first question.

Interviewee:

Yes.

Interviewer poses second question.

²⁰ CSO for Gijima AST. E-mail: stephen.bosman@gijima.com

Interviewee:

I think it is a question you should ask anyone. The difficulty with any strategic process is to balance input and output. At one stage strategic planning involved ...eventually organisations will have to look at things like this. It is difficult, so many organisations implement things to look in the short term. They won't see its value immediately...not in the next month, 6 months...but only a year...or normally even longer.

You need to understand the difference between business model and corporate models. Business models generically, a centralized business will have most of the strategic control and strategic planning. It is a lot easier to implement this in a centralised model. You have directional control over the whole organisation. In a de-centralised organisation it would be very difficult.

Interviewer poses third question.**Interviewee:**

The factors are really integrated. You can also get into an analysis paralysis, you have so many factors, options and conditions to consider. Let us take for instance; Barclays forced us to come up with business continuity management. What that is, as one of their biggest suppliers in Africa, they want to make sure whatever happens, we will be able to sustain the level of service. So, look at any probability, could be outbreak of SARS, AIDS, a strike or an outbreak of fire, could be whatever the case is. When you start going through those, in essence risk is also an improbable event. You can look at so much and don't want to be stuck in analysis paralysis. One of the ways to deal with that is to come up with fairly possible scenarios, so you create a scenario as generic, you then go and raise the risks in the context of the scenario. Otherwise you could end up with many risks, however if you find scenarios slightly different than scenario planning. A scenario could be the availability of one of our campuses to deliver service. So, for that scenario to unfold, what could happen for that to unfold.

Another issue, there is no one as clever as a certified MBA. Just because they advanced their studies, they think they know how a business works. So, when you are implementing this, make

sure you have people who know what they are doing compared to people who think they know what they are doing. It could fatally lead you to a tangent which could be of no use.

Interviewer poses fourth question.

Interviewee:

Adds to, it helps you guard against catastrophes and in fact helps you take advantage of catastrophes. Remember, a steel company in Vanderbijlpark, the transformed themselves into an IT company called Blue Sky. It was UNICO I think. Iscor took over one part, the steel part and they turned into an IT company overnight. So, it allows you to also take advantage of difficulties.

Interviewer poses fifth question.

Interviewee:

Would you apply it? I would be surprised if you get a NO to this. Well, given the current market conditions, you would be foolish not to think about improbable circumstances and their impact on your business. So, applying this framework, given the lack of alternatives, yes, it would definitely be feasible to apply this to the organisation. The constraints refer back to previous questions.

When you are talking about strategy, you want to get away from the old strategy departments, monkeys grinding the old muesli pot. It doesn't give an answer, it helps you coordinate you resources in the company better, but it won't answer questions like this. There is no substitute for grey matter. And an understanding of the markets.

Interviewee – Dr. Willem Barnard²¹

14h00 - 08/10/2009

Interviewee:

²¹ Former CEO of KWV, now Director of the NMI Group, MD of Caledon suiwel, Member of board and audit committee and member of the USB Advisory board. E-mail: barnardwj@gmail.com

It is close to the engineering approach of a design review in the system and the development thereof. Where you get experts around the table not involved in the development of the system, but from outside, and you have a similar approach but also completely divorced of that. People would come with new ideas, new visions of possibilities. The real addition of that to this whole process depends very much on the two factors, the one is the quality of expert that you have around the table, secondly, the quality of the design that you look at. If you have a bad design, then many catastrophes can happen. If you have a good design, it would be more difficult to find catastrophes. So, I agree that this is outside the normal spec of strategic management, strategic management sometime enter the domain of catastrophes, that is normally where strategic management originated. Like in the military, whenever you are faced with such an extreme opportunity or extreme catastrophe it is your life. Strategic managers have been listening to that problem for millennia, since 600BC, it has evolved through lots of concepts.

There was the consideration of catastrophic failures, which usually focus on the failure of leadership. The general was the problem, or the leak in function in the organisation's leadership. In my experience, those were the critical factors. I have not come across any good examples that I can now think of that would consider the opposite. The extreme opportunities. Normally strategic management goes into the opposite, the defence when looking at these type of things.

I think it is unique and I think it would be interesting to see it developing into things such as the process that you propose and the results that you will generate through this. Safe to say that it will depend largely on the actors you have around the table.

Again, the interpretation of the quality of the design in terms of the enterprise that you investigate. It is also going to be difficult to create standards... If you want to go into an engineering example. If you want to design a product for the military, you are only allowed to use a specific A-level spec and standards for the product. Materials would have to conform to certain specification. If you have that then you eliminate a lot of uncertainties in the analysis process. But still, there would be an extremely important level of analysis into that system, like what would be the most credible accident. And then what would be the answers of that process, that could probably the strategic thinkers busy.

A good understanding on that level of quality that you have achieved in your original design is important, and the level of analysis that you subsequently do to that few accidents or accidental situations that you could define and how it affects.

Then, there is also another aspect that comes in. I am getting into criticality analysis, that is obviously to get to the point where you define criticality in terms of the mission of the enterprise. What would be minor, what would be major, what would be critical failures to overcome? What would be the effect of the failures? You are focussing on the top half percent of the extreme critical failure that you have. Defining critical failure, on the spectrum. It will have different impacts on the enterprise.

That analysis, getting across to the user of this model, where you pitch the technicality here and what would the sort of thing that you define as critical and the effect it has on the industry. That single event, how is that going to be. It would be very helpful to see criticality analysis and to understand what is exactly meant by that.

Interviewer:

It is very generic, but when you sit with the user...they will know exactly what is critical for them. But yes.

Interviewee:

Not so much in the event, but in specifying the effect. That will position the whole exercise well in terms of a continuous management process. I personally believe that strategic management is just one part of the management process. It goes hand in hand with operational management. You have to understand the difference between strategic and operational process. You have to provide for those in you plans. But this is something different, this is actually failure mode analysis. Or huge advantage analysis, it is really looking at the extreme possibilities.

The best I have seen, there is systems engineering and the level where you do proper failure or mode and effect analysis in a system of expert inputs to really evaluate the effects and to evaluate the possible outcomes on the system. It may not even be possible to redevelop or redesign the

system. It may be too costly. It could be really advantageous for an enterprise to identify when a catastrophe happens and to abort in time. To call for a strategy of divesting or liquidation of the company before you haemorrhage it to death, to keep in mind all the stakeholders. This could be groundbreaking work if one gets to the point where one can apply that. It will definitely support the corporate governance concepts, the King concepts of risk analysis and risk management. It is much better than anything that I have seen up till now in terms of you know how companies do it.

Interviewer poses first question.

Interviewee:

Yes, and I think this is a unique approach and depending very much on how you implement it and as I said, the participants that you get in the loop in this whole process. It really depends on the quality they bring and the quality of the analysis.

Interviewer:

While we are there, I would like to rack your brain around your enterprise and how important is this to maturity. Saying that an enterprise which has a bad design, and can thus be open to more catastrophes, we dub that immature enterprises and those that have stronger systems, thus prone to less failure we call more mature. Would this framework not also be able to help die organisation to become more mature and thus create more mature leadership.

Interviewee:

This is exactly what I meant when I said that the quality of the design, of the structure that is the object of the analysis. Would very much influence the process. Because you know if it falls apart by its seems, you find too many circumstances that are of critical nature, but if you have good solid systems, you would find it more difficult to find circumstances that would negatively impact the organisation. But to get to that point you have to understand and create a set of standards to measure the quality of the existing structure that you have.

These components that you use has a reliability of 99.9%, so if you link them in a series the reliability will be that. All coherent standards within an entrepreneurial business, you wn't find

this. But look at old companies, like Anglo. They will have standards and systems to keep the company from going south.

Interviewer poses second question.

Interviewee:

As I said, the implementation thereof and thus just the role players within that implementation.

Interviewer poses third question.

Interviewee:

First of all, I still have difficulty in the positive link in creating those examples for the positive link. I have not thought of how you would do this positive creation. What I can tell you from my experience is that in all my exposure to this type of thing. People are much easier and more effective in the analysis part than in the synthesis part. Humans are like that, if we do not understand we break it down and go into more important detail. We are often surprised when we put things together. When we synthesise things, in those four activities that you have identified, my thinking would be that more thinking more effort on the interpretation of the synthesis part would be helpful.

Interviewer poses fourth question.

Interviewee:

There I honestly believe the whole area of risk management, risk analysis, the high level implication of corporate governance is what we are talking about here. And this is where it would mean the most.

Interviewer poses last question.

Interviewee:

Ja, that is certainly the type of question that a group CEO would ask himself. Whether he will invest time and money in doing this sort of thing. I would not be able to give you a definitive

answer right away, because I would still have to think about cost and selling it to investors that on using time on this sort of thing. But if I think about the raindance that top management is currently doing on the risk management part of the work then I think the board will be the right level to approach. Asking them, do you understand this? You are actually accountable to each shareholder for catastrophic events within the company and what is the integrity of your management, risk management strategically. I think you will raise a lot of interest there.