UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Beholding Value for Financial Decision-Making

by

Desmond Dawid Marais

Submitted in fulfilment of the requirements for the degree

Doctor of Commerce
(Financial Management Sciences)

In the

Faculty of Economic and Management Sciences

at the

University of Pretoria

South Africa

Supervisor: Professor DG Gouws

August 2014

DECLARATION OF ORIGINALITY

I, Desmond Dawid Marais, hereby declare that my thesis, *Beholding Value for Financial Decision-Making*, which I submit in fulfilment of the requirements for the degree Doctor in Commerce (Financial Management Sciences) at the Economic and Management Sciences Department of the University of Pretoria, is my own work. I further declare that this work has never previously been submitted at any tertiary or other institution and that all sources used as part of it were duly acknowledged and given proper recognition.

_____ _____

Desmond Dawid Marais Date of Signature

DEDICATION

I dedicate this document to my loving father Charles, my mother Louwin and my sister Jani, who have worked tirelessly during the course of my doctorate, selflessly exchanging their time at work for my own, enabling me to complete this document. Being able to now finish this journey with them present, represents an act of grace and kindness from my heavenly Father for which I am deeply grateful. It is only through the extent of His insight into me that I was able to bring this document to fruition.

Noting this, I want to make specific reference to my son, Charles. While finishing this document it dawned on me that he is today, as I am writing this, almost as old in years as it has taken me to complete this thesis.

Thank you buddy for all the joy you bring into my life, for loving me unconditionally and for teaching me about all the wonders I have so carelessly forgotten. To see the world through your eyes is not only deeply humbling but a tremendous source of inspiration for your dad, whose love for you is truly like the enigmatic subject matter of this thesis, boundless.

ACKNOWLEDGMENTS

To walk Pirsig's high country, where the air is thin and the view is spectacular, requires assistance; it requires a tireless guide. One who stares not only into the horizons of what might be, but who dares to stare into Nietzsche's abyss, reflecting the darkest and deepest aspects of what it means to be human. For 12 years now my tireless guide and I have been drilling holes in the infinite together; kindred spirits looking through them in the hope of catching a glimpse of the great wonder that will allow us to wield Lao Tzu's Tao. Only to now, at the end of this most tedious of journeys, realise that what we have been searching for outside of ourselves, was, as Brown wrote, inside us all along.

Professor Gouws, thank you for being the spark that ignited the all-consuming flame that now burns brightly in me; for giving me the curse and also the gift of seeing more and entrusting a lifetime of knowledge to me.

What words can ever be eloquent enough to express appreciation for such a gift?

Please know that I regard myself forever in your debt.

ABSTRACT

In behavioural finance, a substantial body of work exists about what motivates a decision-maker at the moment of choice. Yet what is often overlooked is that there is a whole lengthy part of the decision-making process that precedes the moment of choice. Moreover, although the decision-making process occurs in the psychological mind of the decision-maker, it has its origin in the physical matter of which the decision-maker is composed. This causes it not only to be constrained by physical laws, but also bound by physical systemic operational principles that allow the decision-maker to continue to function in a sustainable manner.

As such, any psychological estimate, which includes any value that is affirmed during the beholding of value process, will not only have to take these physical laws and operational principles into account, but will have to manifest in such a way that it conforms to them. Still further, work conducted in the field of behavioural psychology by, among others, Kahneman (2003), Zajonc (1980), Gigerenzer & Gaissmaier (2011) and Tversky & Kahneman (1992) indicates that a significant part of the decision-making process occurs prior to conscious awareness. Yet it still has a deep and profound impact on that part of decision-making that occurs after conscious awareness, that has up till now been the only part of the decision-making process that has been included as part of present financial literature.

Hence the purpose of this study is to make the process responsible for value and its formation visible, determining not only at what level of consciousness value formation occurs but moreover, establishing the size and scope of the decision-making process that up till now has not been accounted for in present financial literature. In doing so the study attempts to assist towards determining the impact that this has had on the financial social sciences' ability to assist in the financial decision-making process.

Key words: Disequilibrium; flow; change; transformation; bifurcation; dissipation; self-organisation; dynamic balance; uncertainty; anticipation; foresight; consciousness; artefact; context; value; measure; decision-making; judgement; choice; quality; congruence; unity.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

AAA	American Accounting Association
AICPA	American Institute of Certified Public Accountants
ANOVA	Analysis of Variance
ASC	Accounting Standard Codification
ASOBAT	A Statement of Basic Accounting Theory
BC	Before Christ
EEG	Electroencephalograms
EPS	Earnings per Share
ERS	Empirical Relational System
ESSA	The Economic Society of South Africa
FAS	Financial Accounting Standards
FASB	Financial Accounting Standards Board
fMRI	Functional Magnetic Resonance Imaging
GAAP	Generally Accepted Accounting Principles
GDP	Gross Domestic Produce
Hz	Hertz
IAS	International Accounting Standards
IASB	International Accounting Standards Board
IFAC	International Federation of Accountants
IFRS	International Financial Reporting Standards
IQ	Intelligence Quotient
MRI	Magnetic Resonance Imaging
NRS	Numerical Relational System

OECD	Organisation for Economic Co-operation and Development
PAF	Principal Axis Factoring
PFA	Principal Factor Analysis
PSSA	The Philosophical Society of South Africa
PWC	Price Waterhouse Coopers
SAAPMB	The South African Association of Physicists in Medicine and Biology
SACNASP	The South African Council for National Scientific Professionals
SANAPP	The South African National Association of Practicing Psychologist
SASBMB	The South African Society for Biochemistry and Molecular Biology
	Unfolding of Value Process
$V_{(un)}$	Value Affirmation at a Bifurcation Point
$V_{(bi)}$	Value Affirmation outside of Conscious Awareness
$V_{(bi1)}$	Conscious Considered Value Affirmation
$V_{(bi2)}$	

LIST OF DEFINITIONS AND PROPERTIES

Autopoiesis

- Definition

Autopoiesis is the continual structural changes that a system undergoes while preserving its patterns of organisation. The components of the network continually produce and transform one another, either through self-renewal of those cells and structures that exist or through adaptation by creating and developing new structures. This is a continuous process that occurs either as a consequence of environmental influences or as a result of the system's internal dynamics (Capra 2003:30).

- Definition

Derived from the Greek (auto-), meaning "self", and (poiesis), meaning "creation, production") it literally means "self-creation" and expresses a fundamental dialectic among structure, mechanism and function.

- Properties

Requires:

- Sensory surface.
- Motor surface.
- System of co-ordination between the two surfaces (Maturana & Varela 1998:153).
- Only product is themselves.
- No separation between producers and product.
- No separation between being and doing ie you do what you are (Maturana & Varela 1998:49).

Bifurcation point

- Definition

A crucial tipping point that either leads to a breakthrough or a breakdown (Laszlo 2006: Foreword).

- Definition

A particular point where conscious choice emerges in an attempt to wilfully freeze, staticise or stop the flow of a moving or changing process world (Bergson 1911:323).

Complex Adaptive Systems

- Definition

Several systems that jointly participate in a collaboration that causes them to behave so close in harmony that they respond to the challenges of other systems as a team. Within the collaboration each system has autonomy and freedom to make decisions (Waldrop 1992:145).

- Properties

See characteristics of complex in page 9 chapter 3.

Consciousness

- Definition

A continuously unfolding movement of patterns of which the self-awareness of the flow forms the seat (Bergson 1911:3; Bohm & Krishnamurti 1999:78).

- Definition

  An awareness of and responding to one's surroundings.

- Definition

  A fact of awareness by the mind of itself and the world (Oxford English Dictionary 2008:303-4).

- Definition

  An intrinsic state caused by the self-awareness of thought (Bohm & Krishnamurti 1999:78; Llinas & Ribary.1993: 2078-2081; Zohar &Marshall 2001:76).

Decision-making

- Definition

  An ability to engage in a process that leads to a choice or a judgement (Oxford Advanced Learner's Dictionary 2010:378).

- Definition

  A search for possible courses of action and a choice among them (Simon 1960:1).

- Definition

  A point, as Harrison (1995:4) notes, that forms part of a larger ongoing intellectual process in order to, as Emory & Niland (1968:12) reflect, differentiate among relevant alternatives; a selection point where the decision-maker commits to his or her preferred purpose as the best course of action.

- Definition

  A bifurcation point, a branch which generally becomes unstable at some critical distance from equilibrium (Prigogine 1997:66-70).

Dissipative Structures

- Definition

The emergence of oscillating chemical reactions, non-equilibrium spatial structures and chemical waves (Prigogine 1997:70).

- Definition

The gradual weakening of something until it disappears (Oxford Advanced Learner's Dictionary 2010:423).

Enfolding

- Definition

To fold inward (Bohm 1980:177).

- Definition

The intrinsic relationship of an element to the totality from which it has been abstracted (Bohm 1980:172).

Entropy

- Definition

Entropy is an inverse measure if a system's capacity for change: The more entropy there is, the less the system is capable of changing (Wheatley 1994:76).

- Definition

A quantity that measures the degree of evolution of a physical system. The term represents a combination of "energy" and "tropos", the Greek word for transformation, or evolution (Capra 1983a:60).

- Definition

A thermodynamic quantity representing the unavailability of a system's thermal energy for conversion into mechanical works, often interpreted as the degree of disorder or randomness in the system (The Oxford English Dictionary 2008:477).

- Definition

A measure of the variance between the minimum and maximum uncertainty pertaining to the outcome of the probability distribution of an event.

- Definition

A measure of the amount of ignorance in the state of knowledge.

- Properties

- The world has limited entropy at its disposal with every action that degrades energy entropy, leaving a smaller entropy budget for future generations (Georgescu-Roegen 1971:18, 283-91; (Secondlawoflife: Unknown).
- Not only a measure of the disorder or randomness in a system but also a measure of a system's unavailable energy (Beinhocker 2007: 67).
- Whenever outcomes are combined, entropy is reduced (Kapur & Kesavan 1992:34).
- With any choice made pertaining to a probability distribution, and entropy resembling less than its maximum entropy implies the use of unwarranted additional knowledge (Kapur & Kesavan 1992:37).
- Although uncertainty in general must be positive, the difference between uncertainties can be negative (Kapur & Kesavan 1992:57).
- In order for there to be a maximum entropy probability distribution (MEPD) the range must be finite (Kapur & Kesavan 1992:65-6).
- If the range is infinite and no constraint is supplied then no optimum or maximum distribution can exist because the entropy is unbounded.

- In the event that no constraint within the range is provided the optimum entropy probability distribution should constitute the uniform probability distribution.
- Information must be specified in the moment and as such is time bound (Kapur & Kesavan 1992:69). A characterising moment therefore contains all the relevant information about the distributions.
- The placing of constraints is a natural phenomenon imposed by nature (Kapur & Kesavan 1992:83).
- If more information exists than is known, then the maximum entropy distribution will differ from the observable distribution because other constraints not taken into account will be imposed (Kapur & Kesavan 1992:83).

Equilibrium

- Definition

A constellation of selected interrelated variables so adjusted to one another that no inherent tendency to change prevails in the model which they constitute (Machlup 1958:9).

- Definition

In classical thermodynamics, equilibrium is the end state in the evolution of isolated systems, the point at which the system has exhausted all of its capacity for change, done its work and dissipated its productive capacity into useless entropy (Wheatley 1994:76).

- Properties

- Economically often has built-in politics which impairs its usefulness as a value-free analytical device (Machlup 1958:2-3).
- Used as a mental tool, a methodological device that aids in establishing a causal nexus between different events or changes (Machlup 1958:2-3).

- A mental construction in which time plays two key roles. Firstly it appears as an independent variable and then as a subscript of other variables (Machulp 1958:7-9).
- Can either be stable or unstable based on the presence or absence of a mechanism for the self-correction of random deviations from the equilibrium values of the variables involved (Machlup 1958:13).

Flow

- Definition

Flow is the movement that creates pattern and form (Ball 2011: Foreword).

- Definition

A continuous movement in a specific direction (Oxford Advanced Learner's Dictionary 2010:574).

Gestalt Intuition

- Definition

A set of intuitions reflected upon as a single intuitive system (Oxford Advanced Learner's Dictionary 2010:626).

Heuristics

- Definition

A method of solving problems by finding practical ways of dealing with them, learning from past experience (Oxford Advanced Leaner's Dictionary 2010:704).

Homeostasis

- Definition

A continuous process of dynamic fluctuation, a transactional balance during which a system has great flexibility and many options at its disposal to interact with its environment (Capra 1983:294).

- Definition

A self-regulatory mechanism for open-ended systems far from equilibrium that is responsible for maintaining a state of dynamic balance amid continuous flow and change (Emery in Gouws and Lucouw 2000:29).

Inequality

- Definition

An unfair difference among things (Oxford Advanced Learner's Dictionary 2010:767).

Ignorance

- Definition

A blindness, a mental darkness, lack of awareness and/or lack of knowledge (Collins English Dictionary 2009:385; Collins English Thesaurus 2008:350; Oxford Advanced Learners Dictionary 2010:745).

- **Ordinal scales**

- Definition

The assigning of items to groups or categories while ranking their particular attributes without placing any particular meaning between the distances of the attributes.

- **Oscillation**

- Definition

A regular movement between one position and another or between one amount or another and then back again or a repeated change between different feelings, types of behaviour or ideas (Oxford Advanced Learner's Dictionary 2010:1039). Also associated with the terms fluctuation and wavering (Collins English Thesaurus 2011:490).

- **Pre-intellectual**

- Definition

The moment of vision before the intellectualisation takes place (Pirsig 1999:247).
The moment prior to comprehension, thought, reasoning and the application of logic (Collins English Dictionary 2009:404; Collins English Thesaurus 2008:377; Oxford Advanced Learners Dictionary 2010:781).

- **Reality**

- Definition

The moment of vision before the intellectualisation takes place (Pirsig 1999:247).

Representational measurement

- Definition

An attempt to summarise aspects of observable behaviour in a reasonably compact fashion and to investigate properties that follow from the behavioural properties (Iverson & Luce 1998:1).

Satisfice

- Definition

Looking for a result that is “good enough” rather than the absolute best (Simon 1996:47)

- Properties

· A practical application used by all economic agents as a result of severely limited conceptual and computational difficulties in trying to find the optimal course of action (Simon 1957:259).

Science

- Definition

The search for truth and insight and the breaking down of the artificially constructed walls that divide our understanding. (Maslow 1954:190). “For the domain of truth has no fixed boundaries within it.” (Kaplan 2004:4).

- Properties

· A value system based on human values (Bronowski in Maslow 1954:183).
· The hallmark of a science is not its ability to forecast the future, but its ability to explain things (Beinhocker 2007:58).

Systems Theory

- Definition

A theory that seeks to find common features in terms of shared aspects of organisation, the recurrent features of phenomena, the non-varying aspects of them and the in-variances.

- Properties

- Permits the integration of all social sciences into a coherent framework.
- Acknowledges the fact that the difference between many complex phenomena does not necessarily lie in the difference of substance, but in the relational structuring thereof.
- Characteristics of complex wholes remain irreducible to the characteristics of the parts (Laszlo 1984:19-20).
- Attempts to find the most general conceptual framework in which a scientific theory or a technological problem can be placed without losing the essential features of the theory or problem (Vickers in Haines 1998:7).
- Allows us to compare various kinds of systems with each other and to determine their relationships within the larger systems of which they form part in order to establish a general context (Laszlo 1972:14).
- Enables us to understand how a number of different things act together when exposed to a number of different influences at the same time (Laszlo 1972:3-6).
- Illustrates that the difference between many complex phenomena does not lie in the differences of substance, but in the relational structuring thereof.

Tao Axiom

- Definition

That fundamental “thing” that wields the essence of what is real.

Thermodynamics – First Law

- Definition

Within a closed system entropy will continue to increase and as a result the system will become increasingly disorganised (Laszlo 1972:52). Energy can neither be created nor destroyed. This is also known as the Conservation of Energy Principle (Capra 1983:59-60). If the total *energy in a system is conserved*, then the system is guaranteed to reach *equilibrium*.

Thermodynamics – Second Law

- Definition

A local decrease in entropy in one place must be followed by a proportionate increase in entropy elsewhere (Laszlo 1972:52). Entropy as a measure of disorder or randomness in a system is always increasing (Capra 1983:59-60).

Uncertainty

- Definition

A feeling of doubt with regards to that which is unclear; normally leading to hesitation (Oxford Advanced Learners Dictionary 2010:1617).

Value

- Definition

A thermodynamically irreversible, locally entropy-reducing, globally entropy-increasing transaction and/or transformation-producing artefacts and/or actions fit for human purpose (Beinhocker 2007:303-305).

- Properties

- Emerges from the psyche in its totality and as such can never be grasped by the intellect alone (Jung 1978:276).
- A form of feedback resulting from the arbitrage function of many other collaborating and conflicting systems parameters.
- The mechanism used within the psyche to maintain balance between itself and the social and physical worlds around it (Nietzsche 1966:43).
- Systemic.
- Will not remain constant.
- Will continuously change over time.
- Is subjective and individualistic by nature.
- Inextricably linked to movement/flow.
- Once formed, value is indivisible and whole.
- The cognitive transformation of basic psychological needs (Rokeach as sited in Batra et al. 2001:115).
- Place and time-specific.
- The process involving value is future-orientated.
- Choice plays a critical part in the value-determination process.
- Will always be relative to the index used to measure it (Debreu 1959:33-5).
- Have both a wealth and a choice constraint which is knowledge and availability dependant (Debreu 1959:62).
- Wealth aspect of value can be found in the production of incomes (Rothbard 1906:23).
- The satisfaction of any individual's wants has a *subjective character* vis-à-vis perception, recognition and understanding.
- Dependent on social truth pertained from social ideology (Tinker 1985:164).
- Intellectual capital, which consists of non-financial measures and other related information, drives the value of the enterprise (Roos & Roos 1997:413-426; Moon and Kym 2006:253-264).
- Can occur as part of either impulse or desire (Dewey 1915:16-7).

- Scarcity and availability form part of the construct with the understanding that their integration is within the context of substitutability; thereby giving value a transitive nature.
- Entirely subjective with each person applying weights on a purely private and not a public set of scales.
- Not intrinsic in the sense of being susceptible to objective measurement.
- Relative concept within the appraisals of each individual and always stands in relationship to something else.
- Can never be reduced to any definitive quantity (Harper 2006:3-4).
- Should not be regarded as a fixed unit of measure or a point but should rather be envisaged as a range.
- The poorer an individual's sense of quality, the greater the variance between the actual reality at the moment of vision and the intellectually identifiable things that emerge. Subsequently it is contended that the size of the variance will be inversely related to the accuracy with which an individual perceives value.
- In its intrinsic form value is infinite.
- As soon as the intellectualisation takes place, the value becomes bound by its specific finiteness for purpose which holds only provisionally as part of a particular individual's larger satisfice set.
- Is lessened through exclusion because we do not recognise all of it (Chan-A-Shing 1996:76).
- "Fundamentally, value resides in someone's mind, and is attributed to or read into an article, rather than residing inherently within it." (Littleton 1929:148).
- A subjective estimate of an article's relative importance.
- Exists in one mind alone, untouched by another.
- Goods possess a value not because they cost something but because they are fit for a specific purpose and as such are valued or are thought to be of value.
- A confrontation in the now whereby direction is provided through the changing of the status of the existing position, which although unbroken is nevertheless time and space-bound (Gouws: Unpublished).
- Its integration into financial statements implies a future dependency for the statements (Sterling 1968:481-502).
- Makes all financial statements provisional and dependent on future events which do not represent reality and whose attributes cannot be measured.

Value Process

- Definition

A future-orientated process whereby all allocations are provisional in nature and as such are dependent on subsequent events.

Values

- Definition

Preferred end-states of existence (Batra et al. 2001:118).

- Definition

Statements of belief about what is important (Beinhocker 2007:370).

- Definition

The conceptual generalisation of value.

- Properties

· Responsible for the maintaining of the dynamic balance that exists between the psychic, social and physical world (Maslow 1954:148).
· Changes in values result in the evolution of society and its economic system (Capra 1982:196).
· Preferential attributes of products and or services have a logical connotation with values.
· There can be no such thing as a “value free” social science (Jung 1958:79; Bell 1985:26).

CHAPTER 1

INTRODUCTION

1.1 OVERVIEW

To make a financial decision and exert a choice among alternatives is perhaps the most complex challenge financial decision-makers face, especially considering that these decisions are made while facing an ill-defined and uncertain future.

The process is complicated by the fact that it is not only influenced by physical changes occurring in the external environment surrounding the decision-maker, but also by psychological changes that occur within and among financial decision-makers as they interact with each other.

This results in a unique perspective, an individual context from which reflection and interpretation take place. It is this perspective and context that Nietzsche, as cited in Tobias (2005:145), refers to as fiction, a reality that Pirsig (1999:251) notes we invent for ourselves. Schopenhauer (1970:69-232) points out that decision-makers make sense of their surroundings to determine what they see when they behold and contemplate what is of value to them when making a financial decision. This is a continuous unfolding process that out of necessity places value at its very centre. The result is a complicated process consisting of many different intricately related states whose outcomes are always future-orientated and as such susceptible to uncertainty and the possibility of either risk or reward. How the financial decision-maker interacts with change and uncertainty, how value manifests and is assigned and what role it plays as part of this most complicated of processes, is perhaps one of the greatest mysteries yet to be solved in the modern age, especially when considering that among the behavioural social sciences, there has for some time now been a growing belief that much of this process occurs pre-intellectually. This is fuel for a lively debate within the social sciences about the origin, nature and role of value in the decision-making process.

This is partly reflected in Buys's (2009:498) question when he asks:

> *Should we not reflect on the value concept, both from a qualitative and quantitative perspective, as a foundation for a modern-day accounting framework?*

Not only does this question raise significant qualitative issues about accounting information and its portrayal of value, but further still, it puts value at the very centre of every financial management decision being made. Reflecting, as Mattessich (2003) as cited in Buys (2009:510) points out, a debate surrounding value that has been taking place throughout history and which has had, and continues to have, deep and profound implications for all the social sciences; including accounting and financial management.

As such, in order to make value and the process it emanates from more visible, this chapter proceeds with a clearly defined statement of the problem, followed by the research objectives, the importance and benefits of the proposed study, its research questions, limitations and assumptions. It then embarks on a review of the key contributors to the research topic, followed by a brief outline of the research methodology used. It also provides a summation of the chapters that will follow while outlining where each chapter fits into the overall research design.

1.2 PROBLEM STATEMENT

At present it is not clear at what level of consciousness value formation occurs, nor what process is responsible for its formation or what the interrelationship is between this process, change and the future-orientated aspect of decision-making. This leaves open the possibility that if, as is suspected, this process occurs pre-intellectually, a large part of the financial decision-making process has been left unaccounted for, or worse, is misrepresented by an ambiguous and often limited concept of value that not only distorts in its portrayal of wealth but also deeply affects the ability of the social sciences, such as financial management and accounting, to assist in the financial decision-making process.

1.3 RESEARCH OBJECTIVES

As an overall objective, this study aims to improve the quality of financial decisions being made. To meet this broad objective, four sub-objectives have been established which are:

Sub-objective 1

Determine at what level of consciousness value formation takes place.

Sub-objective 2

Illuminate the process responsible for value formation.

Sub-objective 3

Ascertain what the relationship is between the value process, change and the future-orientated aspects of financial decision-making.

Sub-objective 4

Determine if a large part of the financial decision-making process has been left unaccounted for in present financial literature and/or if this leads to a misrepresented, ambiguous and often limited portrayal of the concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

By solving the four sub-objectives the study also solves the overall objective.

1.4 THE IMPORTANCE AND BENEFITS OF THE PROPOSED STUDY

Prior to any financial decision being made, before any information may be deemed to be useful, its value must first be established. Understanding what is responsible for value's formation and what the interrelationship is between this phenomenon and the decision-maker's continuous confrontation with, and response to, change is perhaps one of the most important insights that can be obtained from a financial perspective.

Considering how little is known about value and the process it emanates from, it is clear that more research, discussion and reflection on this issue is sorely needed.

To understand not only what is valued but why it is valued and how this value comes about, provides valuable insight into the motivation behind a decision-maker's choices. It illuminates what Taylor (1991:28) describes as each decision-maker's original way of being human, his or her own personal measure used to weigh known choices that have future consequences.

Reflecting upon this, it becomes clear that among the social sciences the fields of economics, accounting and financial management will benefit most directly from the study. Economics will benefit in the sense that the study will contribute towards explaining why, as Tversky & Kahneman (1986:S252) point out, large widespread deviations from the normative model keep on occurring. Accounting will benefit from the study in the sense that it will assist it to determine what information is useful to its users, thereby improving the quality of the information it provides to its users during their decision-making processes. The study will also benefit financial management in terms of the quality of the financial decisions being made. Contributing further to financial decision-makers' understanding of value, an article entitled "The unfolding of value in a decision-making context" was, as part of the study, presented on July 1, 2013 at the World Finance Conference in Cyprus. Still further a paper entitled "The Tao Axiom: The unfolding of mankind's value consciousness" was submitted to SAJEMS on December 4, 2013. Five key articles have also emerged that are in the process of being completed, the titles of which are outlined below:

Title 1 – Beholding value: Ontological and philosophical perspectives of the beholder and their impact on the beholding of value process.

Title 2 – The value gene: Unfolding the origin, purpose and role of the beholding of value process from within the context of the material world.

Title 3 – Beyond cognitive financial decision-making: the beholding of value process and its role during pre-and post-awareness in financial decision-making.

Title 4 – General principles towards the establishment of a personal theory of value.

Title 5 – Accounting valuations and their contribution towards increasing the quantity and usefulness of information for financial decision-making.

1.5 RESEARCH QUESTIONS

Research question 1

At what level of consciousness does value formation take place?

Research question 2

What does the process that is responsible for value formation look like?

Research question 3

What is the relationship between the value process, change and the future-orientated aspects of financial decision-making?

Research question 4

Has a large part of the financial decision-making process been left unaccounted for in present financial literature and/or does this lead to a misrepresented, ambiguous and often limited concept of value that not only distorts in its portrayal of wealth but also deeply affects social sciences such as financial management and accounting in their ability to assist in the financial decision-making process?

1.6 LIMITATIONS

Considering the enigmatic subject matter as well as the exploratory nature of this study and the fact that in many instances it asks as many questions as it answers, it is doubtful whether a clear and concise answer as to exactly how and precisely in what sequence the value process will unfold within each individual decision-maker can be obtained.

To a large extent this is so because much of the process is by nature contextual and individualistic. This leaves the outcome of this study inconclusive with regard to how a general theory of value capable of conclusively quantifying value can be established.

Perhaps in this instance it is the researcher with his limited context, perception and inherent limitations that is the most significant limitation of the study in the sense that the research only reflects what the researcher is able to "see" at the time.

The study is also not able to meet the minimum requirements of 10 times as many subjects as variables set by Nunnally (1978:421) in order for it to be able to use factor analysis to assist in determining the shape structure of the questionnaire. Even on the minimum requirements outlined by Tabachnick & Fidell (183:379) of five times as many subjects as variables, it is still not able to meet the set minimum requirements.

Still further, the research results obtained from the qualitative interviews and questionnaires are cross-sectional by nature and as such can only identify the relationship between variables at a particular point in time (Ryan, Scapens & Theobald 2002:84).

1.7 ASSUMPTIONS

1.7.1 The defined ontology of this study is a combination of realism and idealism; idealism in the sense that personal reality is a mental construct relative to society and realism as an independent reality.

1.8 REVIEW OF KEY CONTRIBUTORS TO THE RESEARCH TOPIC

Reflecting upon the respective fields that contributed most towards this study, various significant and highly important contributions come to mind. This is the case with Maturana & Varela (1998) as well as Kauffman (1996) for their contributions towards structural congruence and the behaviour of living systems, Prigogine (1996) for his work

on dissipative structures, Von Bertalanffy (1972) and Laszlo (1972) for their respective creation and refinement of systems theory and Bergson (1911) for his perspectives on individual dynamic balance, flow and the creation of an individual's own unique context.

Special mention must also be made of Dawkins (2006:24) as well as Maturana & Varela (1998:17) for their contributions towards genetics, Simon (1996) for his creation of the concept of an artifact or interface between the artificial and physical worlds of a human being and Nietzsche (1989) as well as Schopenhauer (1970) for their descriptive insights into this artificial world. The same goes for Holland (2000) for his work on network cycles and artificial intelligence, Damasio (1996), Zohar & Marshall (2001) for their work on pattern formation and neuron oscillations and Pirsig (1999) for his recognition of the important role a human being's pre-intellectual reality plays in the decision-making process.

Reference must also be made to Spinoza (1996), Kant (1949), Nietzsche (1989), Maslow (1954), Pirsig (1999) and Jung (1958) for their contributions towards an understanding of what value formation is and how it occurs as well as Stevens (1966:396) and Taylor (1991) for their insights into measurement. The same goes for Dewey (1910) for his work on the motivating factors of an individual and Freud (1938), Zohar & Marshall (2011), Bergson (1911; 2002), Bohm & Krishnamurti (1999) for their work on consciousness, memory and self-awareness.

For contributions towards information processing and heuristics, Kahneman (2012), Zajonc (1980) and Kahneman &Tversky (1981; 1984) deserve specific mention. The same goes for Lao (2006) for his ingenious depiction of The Tao Axiom and Schwartz & Begley (2002) as well as Sudarshan & Misra (1977) for their introduction of the Quantum Zeno Effect and its ability to, through wilful attention, alter the direction of thought.

Many individuals have also made noteworthy contributions towards possible theories of value. Among others, they include Smith (2000), Marx & Ricardo as cited in Tinker (1985), Meek (1975), Jevons (2006), Menger (2007), Walras (2003), Debreu (1959:31) and Georgescu-Roegen (1960).

In terms of the discipline of accounting and its impact on decision-making, mention must be made of Littleton (1929), Canning (1929) and Ryan (2008). Further mention must also be made of Tinker (1985), who through the Paper Profit reminded us of the future-orientated nature of profit and the social implications of accounting as a discipline. Maslow (1954) and Zajonc (1980) deserve to be noted for their insights into uncertainty, as does Bernstein (1996) for his documentation of the evolution of humanity's understanding of risk.

Reflecting upon the key contributors, it becomes clear that although much work in various fields has been done towards a wide variety of aspects surrounding the value process and its role as part of financial decision-making, these results remain disconnected and highly fragmented in relation to the research topic.

1.9. RESEARCH DESIGN AND METHODOLOGY

This thesis utilises the problem-solving model designed by Mitroff, Betz, Pondy & Sagasti (1974:46-58) to construct a scientific model of value and the relationship it has with the financial decision-making process. It does so by, as depicted in Figure 1.1, proceeding with Circle 1 of the Mitroff model with the identification of an existing problem.

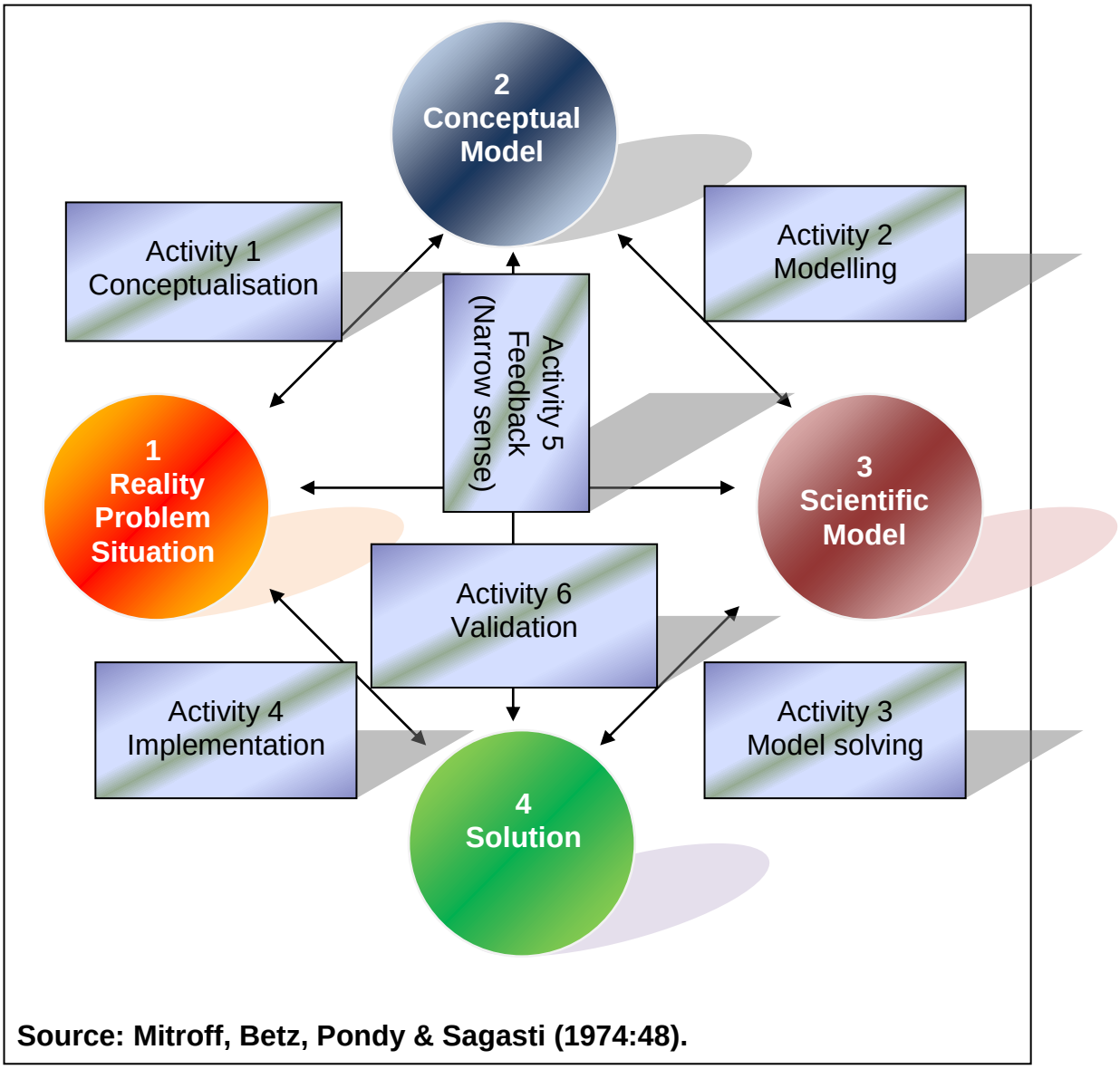
It then commences with Activity 1, during which a comprehensive critical multi- and trans-disciplinary literature review was conducted – multi-disciplinary in the sense that the research topic was not just studied in one discipline alone but in several disciplines at the same time, and trans-disciplinary in that, as Nicolescu (2005:5) points out, it was founded on the postulates that:

1. In nature and in our knowledge of nature, there are different levels of reality and correspondingly different levels of perception;
2. The passage from one level of reality to another is ensured by the logic of the included middle;

3. The structure of the totality of levels of reality or perception is a complex structure of which every level is what it is because all the levels exist at the same time.

This is a process which, it is argued, in conjunction with Nicolescu (2005:15), will allow for the establishment of links between persons, facts, images, representations, fields of knowledge and actions and will, through the incorporation of the perspectives of several disciplines, enrich and deepen our understanding of what value is and the role it plays as part of the financial decision-making process.

Figure 1.1: A systems view of problem-solving



Source: Mitroff, Betz, Pondy & Sagasti (1974:48).

Complementing this, a philosophy of science approach as discussed under point 7.1, 8.4.3, 8.4.6.1 as well as in Chapter 10, was used to identify several general principles. These general principles were then used to construct a conceptual model that was presented as part of Circle 2 of the Mitroff model.

The conceptual model, as Koornhof (2001:256) goes on to point out, establishes in broad terms the definition of the particular problem to be solved. In addition, as she goes on to note, it specifies the field variables that will be used to define the nature of the problem.

This was followed by Activity 2, a formulation or development activity that Mitroff et al. (1974:48) refer to as modelling, during which specific conditions obtained from key contributors to the research topic were attached to the general principles. This was done using Giere's (2004:743) representational formula:

S uses X to represent W for purposes P.

S representing the researcher who uses X in the form of a statement as obtained from leading figures in those fields contributing most to the researcher's understanding of value to represent an aspect of the real world – W for purposes P. This thereby resulted in the scientific model that, in accordance with both Koornhof (2001:257) as well as Mitroff (1974:48), was presented as part of Circle 3 of the Mitroff model. This was followed by Activity 3 of the Mitroff model, the modelling activity as well as Circle 4 and Activity 5 of the Mitroff model which are respectively predominantly discussed as part of chapter 8, 9 and 11 of the thesis.

1.10 OUTLINE OF THE PROPOSED STUDY

Chapter 1

Commencing with Circle 1 of the Mitroff model, Chapter 1 provides an overview of the problem area. It presents the problem statement, research questions and objectives and outlines the limitations and assumptions of the study. It also emphasises the study's importance and benefits before reviewing key contributions to the research topic. This is followed by a brief discussion of the research design and methods used as part of the study.

Chapter 2

As part of Activity 1 of the Mitroff model, Chapter 2 reflects on the ontological and philosophical perspectives of the beholder and their impact on the beholding of value. The chapter further places man's perspective at the very centre of the value process, making it the point from which all interpretation of value takes place and, from there, demonstrates the impact of the various ontological and philosophical perspectives on how the beholder beholds and perceives value.

Chapter 3

Chapter 3 continues with Activity 1 of the Mitroff model as it unfolds the origin, purpose and role of the beholding of value process from within the context of the material world. It also reflects on the reciprocal role that exists between value and change, in relation to the continuous systemic reciprocal conversion that occurs between matter and energy, towards the maintenance of an individual's dynamic balance.

Chapter 4

As part of Activity 1 of the Mitroff mode, Chapter 4 discusses the beholding of value process and its role during pre- and post-awareness in financial decision-making. As part of this discussion, the chapter reflects on a decision as a bifurcation point. It reviews how means and ends are brought together during the beholding of value process towards the affirmation of a value and finally, how a decision-maker is able to wield thought.

Chapter 5

Continuing with Activity 1 of the Mitroff model, Chapter 5 reflects on a personal theory of value as it progresses towards establishing general principles for the construction of a concept model. As such, it conforms to Giere's (2004:745) philosophy of science approach, whereby principles act as general templates for the construction of more specific abstract objects or models.

Chapter 6

Still further along Activity 1 of the Mitroff model, Chapter 6 discusses accounting valuations and their contribution towards increasing the quality and usefulness of information for financial decision-making. The chapter further examines the relationship between accounting and value, and determines in what manner accounting valuations contribute towards the making of a financial decision.

Chapter 7

As part of Activity 1 as well as Circle 2 and Activity 2 of the Mitroff model, Chapter 7 reflects on the process that was used during the construction of the conceptual financial value decision-making model. It also reflects on the research objectives as set out at the onset of the literature review, clarifying how the literature contributed towards meeting the set objectives.

Chapter 8

Primarily contributing to Activity 2 and 3 of the Mitroff model, Chapter 8 reflects on the research design and methods used to encapsulate those research methodologies and procedures deemed most appropriate to make value and its role in the financial decision-making process more observable.

Chapter 9

Through descriptive statistics, primarily contributing to Circle 4 of the Mitroff model, Chapter 9 reports on the socio demographics of the participants before embarking on a univariate, bivariate and multivariate analysis of the data collected from the questionnaires.

Chapter 10

Primarily contributing to Circle 3 and 4 of Mitroff's problem-solving model Chapter 10, in conjunction with a philosophy of science approach, reflects on the developments made towards a scientific model for the beholding of value process.

Chapter 11

Primarily, as part of Activity 5 of the Mitroff model, the final chapter provides a brief summary of the study and its findings, indicating how these findings relate to the research objectives of the study and how these objectives contribute towards resolving the original research problem.

CHAPTER 2

ONTOLOGICAL AND PHILOSOPHICAL PERSPECTIVES OF THE BEHOLDER AND THEIR IMPACT ON THE BEHOLDING OF VALUE

2.1 INTRODUCTION

How a beholder beholds value appears from the outset to be a mystery wrapped in the perceptions of the beholder. These perceptions, Schroeder (2012:1) notes, encompass – in the broadest sense, from the perspective of value theory – all branches of moral philosophy, social and political philosophy, aesthetics, and sometimes feminist philosophy and the philosophy of religion. In its narrowest sense however, as Schroeder (2012:1) points out, value theory is used for a relatively narrow area of normative ethical theory particularly, but not exclusively, of concern to consequentialists. This makes value theory roughly synonymous with axiology, which is primarily concerned with classifying which things are good and how good they are.

Reflecting on these two approaches, this study beholds value in the broader sense. It beholds value in much the same way as the good-first theory outlined by Schroeder (2012:5) whereby states of affairs are viewed as the "primary bearers" of value. As such value is reflected upon as a filter through which the beholder's context is created, and in relation to which the value of all that matters to the beholder is ascertained. This thereby reflects an undeniable relationship between how the beholder beholds value and how he or she ontologically perceives the world. It is a unique individualistic perspective that determines what, and to what extent, something is valued. It is a perspective about which De Chardin (2008:33) states:

> *Man, the centre of perspective, is at the same time the centre of construction of the universe. And by expedience no less than by necessity, all science must be referred back to him.*

De Chardin therefore suggests that not only is man's perspective at the very centre of the universe that man himself constructs, but that man is also the reference point, the point of interpretation, that all science must be referred back to for interpretation.

Yet, despite this critical point raised by De Chardin (2008:33), and despite a significant body of literature that has been written by the financial community on value and valuation models for decision-making, none of these models places man, and his ontological perspective of what he perceives to be real, and the impact this perception has on how he beholds value, at the centre of their models and writings. This causes them to not only fall short in addressing how a beholder comes to a belief, but also causes them to fail in clarifying how the philosophical perspective of the beholder influences how value is affirmed.

In view of this, the purpose of this chapter is to place man's perspective at the very centre of the value process, to make it the point from which all interpretation of value takes place and, from there, to demonstrate the impact the various ontological and philosophical perspectives have on how the beholder beholds and perceives value. This is a process during which, from a systems theory perspective, a trans-disciplinary critical literature analysis is conducted in order to establish a personal theory of value from which, in conjunction with a philosophy of science approach, general principles are derived to which specific conditions are added. That then in turn, as part of the Mitroff model, is used towards the construction of a model of the beholding of value process for financial decision-making.

As such this chapter commences with a discussion of the various ontological perspectives available to the beholder, outlining their respective value implications. This is followed by a discussion on the various philosophical perspectives of the beholder of value, Illuminating the impact that each philosophical perspective has on value and demonstrating how some perspectives limit value by confining it to what is, rather than what might possibly be. All aspects are aimed at unfolding the value mystery as the thesis progresses towards a model capable of encapsulating and making the process associated with the beholding of value visible for financial decision-making.

2.2 THE REAL – ONTOLOGICAL PERSPECTIVES AND THEIR IMPLICATIONS FOR VALUE

2.2.1 BACKGROUND

Reflecting on what it means to behold value, a parable can be drawn between value and Schopenhauer's (2004:118) statement that to be a philosopher is not to present life itself but rather our finished thoughts abstracted from it. This is a recognition on the part of Schopenhauer that there is a process that precedes this finality, one during which, as De Chardin (2008:33-56) points out, man's perspective is placed at its very centre as it surrounds itself with an aura of indefinite spatial and temporal extensions.

These perspectives require in this context that each individual establishes his or her own identity; one that Taylor (1991:40) contends can only be defined against the background of things that matter, things that are therefore of importance to the beholder and which supply a context against which value can be affirmed. But before this context of what matters can be established, the individual must first determine what he or she discerns to be real. The individual must first come to a belief. This is a combined and interrelated process that Schopenhauer (2004:118) contends occurs as a result of observation and experience of both the inner and the outer. This suggests both a physical and a psychological dimension to the process, one which, as Rhoads & Thorn (1994:91) point out, is used to make sense of the world. As such, it reflects a highly complicated process that makes use of scales. These scales are believed to be responsible for Nietzsche's (1989:11) foreground estimates or provisional perspectives. They are scales that allow us to, as Taylor (1991:62) points out, express ourselves, of which the value we behold for decision-making is the revelation they reveal. This suggests a highly personal and subjective dimension to the beholding process, something Herder, as cited in Taylor (1991:28), refers to as our original way of being human; our own personal measure of sorts. As part of these scales used by the beholder, Sen (2009:42-3) believes that a "dominance ranking" enabling "discriminating" power is required. Dominance and discrimination can only come from the conferring of value. This thereby points to the existence of an intricate interrelationship between value and the scales of the beholder, something Nietzsche (1989:11) hints at when he states:

> *Behind all logic and its seeming sovereignty of movement, too, there stand valuations or, more clearly, psychological demands for the preservation of a certain type of life.*

This implies that value plays an intricate part in what the beholder wishes to preserve of life. As such, it suggests life is something that is made up, or constructed. It is a proposition to which an alternative ontological perspective exists, that, if accepted, has the power to dramatically alter our perception of what value is. Therefore, considering these implications, the chapter proceeds to discuss the alternative ontological perspectives of what is deemed to be real, outlining the impact each one has on our understanding of value.

2.2.2 THE BEHOLDING OF VALUE – A REALIST'S PERSPECTIVE

The word behold emanates from Greek mythology and, in accordance with research conducted by Gouws (Personal interview 2010, March 13), implies to see something nobody else sees. It further, as he goes on to point out, implies to contemplate, to think about what you have seen in a way nobody else is thinking about it. Combining these two aspects, to behold value therefore means to see and reflect upon value from a unique perspective, a perspective realists believe subsists in the perception of objects (Ryan, Scapens & Theobald, 2002:13). Perception here, as Ryan, Scapens & Theobald (2002:13) indicate, is obtained through the senses. This is an aspect Plato, as cited by Russell (1945:149-154), also touches on when he states that perception plays no part in apprehending existence and as such has no part in apprehending truth. This assumes that the laws of nature are to be discovered, and form real descriptions of the world irrespective of the discovery of human beings. It implies knowledge to be a reflection and not an impression; a context which, if extended to the beholding of value process, results in it being confined to something that exists outside of us, something separate from the individual, to be discovered. As such, culminating into the intrinsic value of which Schroeder (2012:6) speaks.

2.2.3 THE BEHOLDING OF VALUE – AN IDEALIST'S PERSPECTIVE

In contrast to realists, idealists believe reality exists in the mind of the subject (Ryan, Scapens & Theobald, 2002:14). It is a perspective that Protagoras (480 BC) as cited in Guthrie (1977:262-263) and Nietzsche (1989:11) reflected upon when stating that man is the measure of all things. As Uzgalis (2012) points out, Locke built on this perspective when he viewed sensations as mere subjective representations of reality, thereby providing a theory with regard to knowledge about subjective data devoid of any relation to external objects. Along these lines Nietzsche (1989:11) and Hume (2003:14-183) believe human beings to be conscious only of what can be sensed – representations of a constructed reality made up through experience-based conjunctions between different events. Moreover, Berkeley (1975) as cited in Hume (2003:22-28), believes knowledge to be not only a mental construct – with perceptual qualities such as colour or texture being mental representations of the sense data, ie reality as we perceive it – but that the establishment of the coherence of knowledge through the beliefs of others results in it being a social construct. This perspective is not without opposition, as is demonstrated by Kant (1949:30), who argues that reality is a mental and not a social construct and Reid (1764), as cited in Hume (2003:349), who responds by stating that if the above hypothesis is correct, and certain impressions or ideas only exist in the mind, one cannot infer anything else from their existence. This is a prospect that, as Howson (2000:14-5) states, entails that there will be no grounds to believe that science is any more reliable than soothsaying as a predictor of the future behaviour of the system it studies; leading to the subsequent rejection by Reid (1764) as cited in Hume (2003:349) of Hume's empiricist principle that all ideas are derived from impressions. He argues that the mind itself generates distinct conceptions of external objects when stimulated by our senses.

Irrespective of the argument, what is clear from all the above-mentioned contributors is that, from their perspective, reality exists in the mind of the individual. This is a philosophical perspective brilliantly described by Schopenhauer (2004:69) when he states:

> *And he who, in such intuitive fashion, becomes aware that the present, which is in the strictest sense the sole form of reality, has its source in us, and thus arises from within and not from without… for there has been as much reality in him as without.*

Within this context, value becomes a construction of the mind that greatly resembles the instrumental value Schroeder (2012:6-11) refers to. This raises important questions about value and its relation to the deontic, ie categories like right, reason, rational, just and ought, aspects that will be discussed further as part of Chapter 4 of this study. A construction based on what Simmel (1900:372) refers to as changing relationships and the possibility of a sacrifice of some kind. This sacrifice emanates from the price that must be paid for the potential that accompanies all change. It is a highly interconnected reciprocal process that Simmel (1900:583-9) contends is accrued as a result of the measure of the possible sacrifice as well as various other beliefs, such as feelings and desires. In order to behold value, it is therefore necessary to know, and to have a clear understanding of, how we come to a belief; a task the next segment of the chapter will focus on.

2.3 COMING TO A BELIEF – PHILOSOPICAL PERSPECTIVES AND THEIR VALUE IMPLICATIONS

2.3.1 BACKGROUND

Originating from the Gothic word galaubjan, to believe literally means to make palatable to oneself, to have as conviction and to accept as true, a process which, when completed, results in the establishment of the known (Barnhart & Steinmetz, 2012:87). This conclusion is also reached by Russell (1945:149) when he states:

> *It seems to me that one who knows something, is perceiving the thing that he knows, and, so far as I can see at present, knowledge is nothing but perception.*

This is an intricate personal process that Jung (1978:184) believed begins during the act of observation, the details of which, if our objective is to behold value, require further clarification.

2.3.2 RATIONALISM AND ITS VALUE IMPLICATIONS

Rationalism entails coming to a belief through pure reason with the enquiring subject as source (Ryan, Scapens & Theobald, 2002:11). It holds that, as Blanshard (2014) points

out, reality itself has an inherent logical structure and that there is a class of truths that the intellect can grasp directly. Moreover, rationalism, as Lacey (1996:286) goes on to note, entails any view appealing to reason as a source of knowledge or justification. Rationalism claims that there are significant ways in which our concepts of knowledge are gained independently of sense experience (Stanford Encyclopaedia of Philosophy 2013). This implies the use of thought with regards to which Bergson (1911:x) states:

> *But from this it must follow that our thought, in its purely logical form, is incapable of presenting the true nature of life, the full meaning of the evolutionary movement.*

There is therefore a "moreness" to life that extends beyond the pure logical depiction of it, something which, given as Nietzsche (1989:11) suggests, value's role as the preserver of what the beholder wishes to preserve of life, it must be able to present. This presentation, which, as De Chardin (2008:30), Taylor (1991:62), Schopenhauer (2004:118), Nietzsche (1989:11) and Jung (1978:276) point out, is simply not possible, given the limitations of rationalism.

2.3.3 EMPIRICISM AND ITS VALUE IMPLICATIONS

On the other hand empiricism, which has its origin from Aristotle as cited in Ryan, Scapens and Theobald (2002:12) argues that knowledge is gathered through observation and categorisation. In other words, it is coming to a belief through what is perceived from the object's appearance with the object as source. As Rhoads & Thorn (1994:92) point out, this entails that empirical knowledge be accessible independent of theory. Modern empiricists therefore, as Ryan, Scapens & Theobald (2002:10-12) state, claim experience represents a justification for our belief about what we perceive to know. They go on to point out that both natural and social sciences should be "values-free" in the sense that they must be free from beliefs and ideologies which cannot be justified in terms of the objects of experience under study.

Yet, as De Chardin (2008:30) highlights, investigations into science have proven beyond doubt that no fact can exist in pre-isolation, with every experience, however objective, inevitably becoming enveloped in a set of complex assumptions as soon as the scientist

attempts to express it into a formula. Schopenhauer (2004:92) also fiercely criticises empiricism as a philosophical position, stating that:

> *When empiricism boasts that it alone has, through its discoveries, advanced human knowledge, it is as if the mouth should boast that it alone keeps the body alive.*

To therefore limit a belief with regard to value to only that which can be perceived from an object's appearance, with the object as the source, limits the beholding process to only that which exists; denying it the powerful construct of conception about what might be. Consider Simmel's (1900:578) remark when he states:

> *To be sure, the significance which things gain in and with exchange rests never isolated by the side of their subjective-immediate significance, that is, the one originally decisive of the relationship.*

To therefore limit belief pertaining to value to only that which can be observed, causes it to fail to capture the relational future-orientated context of value, as such, rendering empiricism incapable of beholding value in all its complexity for decision-making purposes.

2.3.3.1 LOGICAL POSITIVISM AND INSTRUMENTALSIM AND THEIR VALUE IMPLICATIONS

Like empiricists, positivists argue that true belief is grounded in what we perceive from a values-free independent reality (Ryan, Scapens & Theobald, 2002:17). As such, they point out that meaningful statements are only meaningful if, in principle, they can be verified by an appeal to observation; making use of general laws and theoretical terms in order for their values-free independent reality to emerge, subsequently viewing theoretical language as pure mental artefacts or linguistic conventions that allow for the tying-up of observable terms into loose bundles of thought.

Along these lines Rhoads and Thorn (1994:92) contend that metaphysical instrumentalism views theories as mere logical calculating devices or instruments that allow scientists to derive observational predictions from them under the premise that, as Friedman (1953) as cited in Ryan, Scapens & Theobald (2002:19) states, if the theory works in practice, the fact that it is unrealistic is quite irrelevant. This suggests that despite, as Popper (1968:59)

points out, methods of science being inherently theory-laden, it does not, as Hanson (1958:4-10) notes, imply a strong correlation between theories and observation; leading to an argument of theory neutrality.

This type of approach causes instrumentalists to argue that truth can only be obtained through observation, while on a theoretical level truth becomes a convenience rather than that which is coherent at either the individual or social level, making the realism of any theoretical term quite irrelevant in determining the validity of any theoretical constructions derived from them or in which they are embedded.

By denying the observable its truth value, limiting it to only the observable, instrumentalism and logical positivism have, as indicated by Suppe (1977:3-232), Rhoads & Thorn (1994:92) and Matheson & Kline (1988:217-233) been faced by a growing level of dissatisfaction which extends to its limiting of its belief with regard to value to that which can be observed. This causes it to fail in much the same manner as empiricism in its ability to capture the relational future-orientated context of value in all its complexity.

2.3.4 RELATIVISM AND ITS VALUE IMPLICATIONS

In contrast to empiricism, relativism argues that truth is relative to the beliefs of the observer (Ryan, Scapens & Theobald, 2002:16). As such, reality becomes a construction of the mind, a proposition that they go on to state entails laws to be socially constructed, with belief being relative to the social value system and norms of the individual. Taylor (1991:29) refers to this belief when he states:

> *Being true to myself means being true to my own originality, and that is something only I can contribute and discover.*

This suggests that what an individual believes is not only personal in nature but moreover individualistic to the extent that it is entirely unique to the individual and as such, from a truth perspective, not only makes truth relative to the individual but makes it something that only the individual can contribute towards and discover.

In addition, Nietzsche, as cited in Tobias (2005:145), notes:

> *No more fiction for us: we calculate; but that we may calculate, we had to make fiction first.*

This implies belief to be made up; a personal individual construction of sorts, placing man as De Chardin (2008:33) puts it, at the centre of the construction process. This is a point of view that leans towards what Schroeder (2012:16) refers to as Agent-Relative Teleology or Agent-Centered Consequentialism, with each agent doing what will bring about the results that are best – relative to him or her. This is a process founded on what Schopenhauer (2004:118) refers to as observation and experience, both inner and outer. Hence, the psychological and the physiological combine to present a single experience. This explains why, as Spinoza (1996:96-101) points out, different individuals value the same products differently and in many instances, the same individuals value the same products differently at different times. It thereby creates a framework for coming to a belief about value that extends beyond the scope of that which can be observed and, in doing so, enables relativism to capture the essence of value in all its complexity as part of the beholding process.

2.4 CONCLUSION

In this chapter, as part of Activity 1 of the Mitroff model, man's perspective was placed at the very centre of the value process, as the chapter proceeded to discuss the impact the different ontological and philosophical perspectives of man have on the beholding of value. This demonstrated that, from an ontological perspective, only idealism – and from a philosophical perspective only relativism – provide value with the freedom it requires for it to fulfil the role Nietzsche (1989:11) envisaged for it, as the preserver of a certain type of life. These aspects are vital to the establishment of a looking glass, a perspective with which to behold value. This is something of critical importance as the study progresses to, through a philosophy of science approach; establish a model capable of making the beholding of value process from within a decision-making context more visible.

Having therefore reviewed the dominant ontological and philosophical perspectives with regard to the beholding of value, it appears that two critical components are required for its manifestation. Firstly value requires the material world, that of which an individual's physical body and its surrounds form part. Secondly and equally importantly, value requires the coming to a belief, a process which by its nature has strong psychological connotations. Both are aspects for which separate theories need to be developed, or in some instances, existing theories expanded, as the study progresses towards the development of a unified theory capable of beholding value in all its complexity as part of the financial decision-making process.

CHAPTER 3

UNFOLDING THE ORIGIN, PURPOSE AND ROLE OF THE PROCESS OF BEHOLDING VALUE FROM WITHIN THE CONTEXT OF THE MATERIAL WORLD

3.1 INTRODUCTION

In behavioural finance, a substantial body of work exists about what motivates a decision-maker at the moment of choice. Examples of this work include that of, among others, Zajonc (1980:151-175), Tversky & Kahneman (1992:297-323), Gigerenzer & Gaissmaier (2011:451-482), Simon (1978:497-503) and Maslow (1954:176). Despite this significant body of knowledge, what is often overlooked is that all these psychological motivations have a physical origin, that is not only constrained by physical laws, but is also bound by systemic operational principles that allow them to function in a sustainable manner. This is an aspect Maturana & Varela (1998:95) reflect on when they state:

> *As observers, we have distinguished the living system as a unity from its background and have characterised it as a definite organisation. We have thus distinguished two structures that are going to be considered operationally independent from each other: living being and environment. Between them there is a necessary structural congruence (or the unity disappears).*

As such, any psychological estimate, which also includes any value that is conferred during the beholding of value process, will not only have to take these physical laws and operational principles into account, but will also have to manifest in such a way that it conforms to them. This conformance forms part of a process that occurs prior to conscious awareness, of which the actual value affirmed during conscious awareness is a mere by-product of this much larger process that manifests itself in many different forms.

The purpose of this chapter is to unfold the origin, purpose and role of the beholding of value process from within the context of the material world in order to make it more visible. Unfolding here within this context implies to gradually reveal and make the process known, to spread it out or open, uncovering it and classifying it as it evolves (Turnbull, Lea, Parkinson, Phillips, Francis, Webb, Bull & Ashby 2010:1627; Soanes & Stevenson 2008:1575; Crozier, Gilmour & Hucker 2008:739). The chapter aims to achieve this objective by, from a systems theory perspective, conducting a trans-disciplinary critical literature analysis in order to establish a personal theory of value from which, in conjunction with a philosophy of science approach, general principles are derived to which specific conditions are added that then in turn, as part of the Mitroff model, are used towards the construction of a model of the beholding of value process for financial decision-making.

In view of the above, the chapter commences with an exploratory assessment of this larger process taking place within the material world. It reflects on the reciprocal role that exists between value and change, in relation to the continuous systemic reciprocal conversion that occurs between matter and energy, towards the maintenance of an individual's dynamic balance. It then proceeds to assess the purpose of the beholding of value process, after which it establishes its role in maintaining the structural unity of the decision-maker and the environment, upon which it reaches a conclusion.

3.2 MAKING THE BEHOLDING OF VALUE PROCESS VISIBLE FROM WITHIN THE CONTEXT OF THE MATERIAL WORLD

3.2.1 BACKGROUND

Most behavioural finance literature focuses on the moment of choice, that moment during which a value is affirmed and a decision is made. Yet what is often neglected is that this moment is preceded by a process that gives the decision meaning. This is an aspect Simon (1960:202) reflects on when he states:

> *All of these images have a significant point in common. In them, the decision-maker is a man at the moment of choice, ready to plant his foot on one or another of the routes that lead from the crossroads. All the images falsify decision by focusing on its final moment. All of them ignore the whole lengthy, complex process of alerting; exploring and analysing that precedes that final moment.*

Simon therefore points out that each decision has a context from which it emanates and without which it has no meaning. This necessitates that the beholding of value process be made visible. Considering that this process has both a physical and a psychological component, systems theory is used to, as Laszlo (1972:13; 1984:20) notes, concentrate on structure on all levels of magnitude and complexity, fitting detail into general frameworks, discerning relationships and situations in terms of their environment. This process is critical to the establishment of a context within which the beholding of value process can be made visible. It is a process that, as Vickers (1970) as cited in Haines (1998:7) states, must occur without losing the essential features of the theory or problem at hand. This recognises, as Haines (1998:17) points out, that the whole is not just the sum of its parts. Moreover it suggests that there is always a synergy between the parts that results in a "moreness" that supersedes the sum of the individual parts.

This is a proposition that is supported by Laszlo's (1972:8) statement that the difference between many complex phenomena does not lie in a difference of substance, but rather in their relational structuring. This is not a stagnant structure but one which constantly changes and with regards to which the psyche responds by, as Jung (1978:276) points out, seeking an expression that will embrace its total nature. Assuming this to be true, it then follows that when an expression of the psyche such as value emerges, it will be a reflection of the psyche in its totality. Moreover, it will be a reflection of the changes that occurred in the relational structuring that underlies the psyche. As such, it follows that all laws governing change will also indirectly govern value, which in this context becomes a reflection of the change; hence necessitating the introduction of the two fundamental laws of change that Laszlo (1972:52) refers to as the two laws of thermodynamics. The first law states that within a closed system entropy will continue to increase, causing the system to become increasingly disorganised; consequently causing all closed systems within the decision-making process to increase in uncertainty.

The second law states that a local decrease in entropy in one place must be followed by a proportionate increase in entropy elsewhere. This is an aspect Bergson (1911:256) touches on when he states:

> *The law of the conservation of energy cannot here express the objective permanence of a certain quantity of a certain thing, but rather the necessity for every change that is brought about to be counterbalanced in some way by a change in an opposite direction.*

This suggests that the counterbalance is of a dynamic nature, a dynamic balance that permeates the entire physical universe. Zukav (1979:179) reflects on this when he notes that the entire physical universe is a whole which seeks balance within itself, one which, it would seem, manifests in what Maturana & Varela (1998:57-75) refer to as mutual congruent structural changes that occur amid the prerequisite of structural unity. It is a dynamic balance that is maintained as part of a continuous conversion process whereby, as Zukav (1979:102-179) points out, mass may be converted into energy and energy may be converted into mass, provided that the total amount of mass energy in the universe does not change.

He contends that this process generates an endless profusion of possibilities which inevitably transcend from the material world to the psychological world as they manifest into psychic content that requires both assessment and later the affirmation of value towards the establishment of their significance within the decision-making process. Nietzsche (1989:11) says of them:

> *Behind all logic and its seeming sovereignty of movement, too, there stand valuations or, more clearly, psychological demands for the preservation of a certain type of life.*

To therefore gain a better understanding of the requirements these valuations entail, in order to truly understand the beholding of value process and its role within the material world, it is necessary to make the interrelationship that exists between the beholding of value process and the material world visible. In addition, an understanding of the conversion process between mass and energy must also be obtained to assist in clarifying what the beholding of value process's role is in response to change.

Moreover, the beholding of value process's role as part of the decision-making process towards the maintenance of an individual's structural unity must be established. All these are aspects the next segment of this chapter aims to focus on.

3.2.2 CHANGE: THE DRIVING FORCE BEHIND THE BEHOLDING OF VALUE PROCESS

As the main driving force behind not only evolution but life itself, change is the source of all creation. This is an aspect Capra (2003:9) refers to when he states:

> *This is the key to the systemic definition of life: living networks continuously create, or recreate themselves by transforming or repairing their components.*

Change is therefore that which enables transformation, conversion and also possibilities, without which value ceases to be. From a material perspective, as Margulis (1998:63) goes on to note, change occurs through chemical and energy flow, during which Capra (2003:9-11) contends living systems feed off matter and energy from their environment in order to restore their structures as fast as they decay; his key to the systemic definition of life. Dawkins (2006:12-294) further notes that this is a process in which the deep structure of change emanates from the decay of the quality and not the quantity of energy, causing all living systems to oscillate between limits in a state of continual fluctuations; something he contends occurs even in the absence of a disturbance. This culminates in what Capra (1983a:79-98) refers to as a continuous dancing and vibrating motion whose rhythmic patterns are determined by their molecular, atomic and nuclear configurations.

It is a dance during which living systems choose what to notice and how to respond when they, as Holland as cited in Waldrop (1992:167) sate, explore their way through an immense space of possibilities as open-ended systems in dynamic balance, always unfolding and in transition. These possibilities would not be there if it was not for change, that which in essence gave birth to it. Within this context, as Dawkins (2006:24) points out, genes have no foresight. Although on a cellular level genes can account for certain activities occurring in response to flow and change, they have no way to plan in anticipation of the future. Yet, as Prigogine (1996:177) notes, all complex adaptive systems build models that allow them to anticipate the world.

It therefore appears that part of this noticing and responding to flow and change during the unfolding process in anticipation of the future, entails the use of models as forms of measure of what is, of which value is one such a model. Maslow (1954:176) believes we build these models in an artificial world we create in order to provide us with a frame of reference which is unique for every individual decision-maker. Holland (2000:53-57) points out that this frame is used to anticipate the future as we use these models to guide us into our activities, predicting the consequences of our actions and then revising our actions if the predictions are not verified after the actions have been taken. This is a process that occurs while we explore our way through a vast and interconnected landscape plagued by future uncertainty and the risks and potential accompanying it.

These models therefore form an intricate part of how human decision-makers manage uncertainty and allow the decision-maker to anticipate the future. As part of this process Bohm (1994:218) notes that choice is something produced in the mind of the individual, requiring of the individual both necessity and contingency. These are aspects in response to which our brains evolved a most impressive ability, to, as Cohen & Stewart (2000:425) point out, detect features. These are features of which the observation and meaning as Habermas (1972), as cited in Ryan, Scapens & Theobald (2002:33) reflect, are dependent upon our intellectual constructs and theories, which are in essence descriptions. This implies that what is observed and moreover, in what manner it is observed, will not only be dependent upon what is, but will also depend on the individual's constructs and theories. As such, it suggests that reality is a construction, something made up by the individual. A construction that culminates in an artificially created world that Simon (1996:6) believes is situated on an artifact which he describes when he states:

> *An artifact can be thought of as a meeting point – an 'interface' in today's terms – between an 'inner' environment, the substance and organization of the artifact itself, and an 'outer' environment, the surroundings in which it operates.*

The artifact therefore symbolises the meeting place between mind and matter where decision-making takes place, decisions which, as Harrison (1996:46) reflects, are judgements with regard to what one ought to do in certain situations. It is a mechanism that, as Darwin as cited in Littlejohn (1989:35), goes on to point out, allows human beings to evolve and adapt to outside pressures.

This is an adaptation without which no human being would have been able to survive. Each act, as Maslow (1954:233) reflects, is an expression of the whole integrated personality, the realisation of a trade-off that occurs between the individual's needs and the environment. This therefore suggests that each act is an expression of the decision-maker that embraces the entire decision-maker at the moment in time in which the decision is made. It is a continuous process of changing relationships that Simmel (1900:377) points out is always accompanied by a sacrifice of some kind. Change, movement or conversion therefore always come at a price, representing itself in the form of a trade-off, during which value assumes the role Laszlo (1972:105) envisages for it when he states:

Values are goals which behaviour strives to realize.

As such value becomes the preferred end state of existence described by Batra, Homer & Kahle (2001:118). Something Harper (2006:2) says each person weighs on a purely private and not a public set of scales. It is that most necessary of ingredients Nietzshe (1989:11) speaks of for the preserving of a certain type of life. The value process appears to accomplish this preservation by fulfilling its role as the mediator of change between an individual's inner and outer world.

3.2.3 THE PURPOSE OF THE BEHOLDING OF VALUE PROCESS: CONVERSION TOWARDS DYNAMIC BALANCE IN RESPONSE TO CHANGE

Human beings behold value in order to provide direction to a natural conversion process that manifests in a number of different ways. One such a way is through self-organisation. As a dissipative structure, all human beings have an inherent tendency to self-organise (Prigogine 1996:70). This is a process during which the individual, to a certain extent, becomes reflective of what Wheatley (1994:16) refers to as a temporary solution used to facilitate change. Capra (1983a:291) notes that during this process a continuous exchange of energy and matter is required between the living being and the environment.

It is a process also referred to as autopoiesis. Emanating from the Greek word (auto) meaning "self" and (poiesis) meaning "creation" or "production", autopoiesis literally means "self-creation" and entails not only self-renewal but also adaptation to change.

It is as Capra (2003:30) notes, the continual structural changes that a system undergoes while preserving its patterns of organisation with the components of the network continually producing and transforming one another, either through self-renewal of those cells and structures that exist or through adaptation by creating and developing new structures. This, as he goes on to point out, is a continuous process that occurs either as a consequence of environmental influences or as a result of the system's internal dynamics. So interconnected is this process between the being and the doing of the organism, that Maturana & Varela (1998:47-81) describe it as inseparable, pointing out that all structural change that occurs in a living being is necessarily limited by the conservation of its autopoiesis.

As part of this process, metabolism, emanating from the Greek word (metabole) meaning "change" constitutes the sum of the biochemical processes involved in life. It is that which Capra (2003:4-294) believes allows a system to remain in a continuous state of non-equilibrium by breaking down some structures in order to repair and create others. He contends that this results in a state of dynamic transactional balance during which there is great flexibility among possible options of interaction between the system and its environment.

As such it depicts a loose and fluid structure, which Waldrop (1992:303) believes can only transpire at the edge of chaos, that place where Spangler, as cited in Speerstra (2005:61), contends the familiar and the unpredictable meet. Because all structural changes in a living being are, as Maturana & Varela (1998:43-48) point out, necessarily limited to the conservation of its autopoiesis, metabolism balances entropy in order to preserve the structural unity of the system. This is not a static balance but rather, as Garrat as cited in Gouws & Lucouw (2000:31) point out, is dynamic in the sense that it exists between rates of external exchange and rates of internal adaptation to change.

This therefore implies that the beholding of value process not only takes into account the structural constraints of an individual before affirming any value on psychic content, but also takes note of the rates of internal and external exchange between the individual and the environment. It therefore first reflects on the effect that a value's affirmation might have on the autopoiesis and the dynamic structural balance of the decision-maker.

It assesses how an affirmation will affect the structural congruence or unity that exists between the decision-maker and the environment and as such, provides the required foresight necessary in order to preserve the decision-maker's structural unity.
The next section of the chapter will focus on this aspect as it proceeds to explore the role that the beholding of value process plays in the maintenance of the structural unity of the decision-maker.

3.2.4 THE ROLE OF THE BEHOLDING OF VALUE PROCESS: TOWARDS THE MAINTAINING OF STRUCTURAL UNITY

In order to understand value's role towards the maintaining of structural congruence, it is necessary to reflect on Dawkins (2006:12) when he states:

> *Darwin's 'survival of the fittest' is really a special case of a more general law of survival of the stable.*

Dawkins therefore suggests that a strong causal relationship exists between the survival of a system and its stability, which occurs despite an ongoing evolutionary process that in many ways can also be reflected upon as a flow in structure. It is a process that Maturana & Varela (1998:115) describe as a phenomenon of natural structural drift that occurs under ongoing phylogenic selection. An important characteristic of the stability associated with this structural drift is that, as Kauffman (1996:80) points out, it cannot be imposed from outside by natural selection, and therefore, as he goes on to reflect, must arise from within as a condition of evolution itself. As such it follows that, in accordance with the law of the conservation of energy as cited in Bergson (1911:256), a process enabling us to counterbalance change must exist within ourselves.

This mechanism comes from our genes but, due to their lack of foresight mentioned by Dawkins (2006:24), is not limited to them. It is a point Dawkins (2006:3) touches on when he states that we have the choice to upset the design of our genes. In addition, from the combined works of Prigogine (1996:177), Maslow (1954:176), Holland (2000:53-57) and Waldrop (1992:177), it follows that part of this mechanism entails the building of models in anticipation of the future.

This is something which, as Cohen & Stewart (2000:425) reflect, requires the detection of features, but moreover, requires interpretation, that which Littlejohn (1989:99-140) refers to as the creative act of ascertaining possibilities of meaning. It is a process which, as he goes on to point out, requires that the individual minds, an act calling for the postponing of action while meaning is consciously assigned to the stimuli.

Neither consciousness nor minding, as will later be discussed in detail as part of Chapter 4, are pre-requisites for this process to occur. Irrespective of this, it still requires the interpretation and the assigning of meaning to the stimuli. Meaning here implies the stimuli's significance, an aspect that can only be determined against the backdrop of the restoration and maintenance of the structural congruence between the individual and the environment. This implies that irrespective of whether this process occurs consciously or unconsciously, a decision is made with regard to the importance of the stimuli towards the restoration and maintenance of the structural congruence of the individual, which, as Harrison (1996:46) points out, once made implies the making of a judgement.

This judgement cannot take place without the affirmation of value, which once affirmed will cause exchanges between the individual and the environment to occur, resulting in a reciprocal flow of continuous feedback that, as Waldrop (1992:179) points out, will allow an agent to improve its internal models through adjustment over time. This is what Richardson (1992), as cited in Gouws & Lucouw (2000:36) views as an essential mechanism of self-regulation, allowing organisms to maintain themselves in a state of dynamic balance. With regard to feedback, Ramaprasad (1983:4-5) notes that it can be defined as information about the gap between the actual level and the reference level of a system's parameters which, in order to occur, requires that:

1. Data on the reference level of the parameter must exist.
2. Data on the actual level of the parameter must exist.
3. A mechanism for comparing the reference and the actual level of the gap must exist.

Reference level here refers to the individual's context or frame of reference with the actual level referring to data received from the external environment outside of the individual.

From this perspective, feedback can also be viewed as the variance or gap between an individual's frame of reference and the data received from the external environment outside the individual. This causes Ramaprasad to conclude that a mechanism must exist within each individual to close the gap between the individual's context and the context outside the individual forming part of the larger external environment. Without this mechanism no individual would be able to maintain his or her structural unity for a prolonged period of time. Within this context of maintaining the structural unity of the decision-maker, the beholding of value process assumes the role of the establisher of the relevance of stimuli in relation to the restoration of the dynamic balance that exists between the decision-maker and the environment. This process occurs pre-awareness and requires the measuring or weighing of stimuli towards the maintenance of the decision-maker's structural unity. It is a unity that on the one hand has a physical component that vests in the material world, while on the other has a psychological component situated on what Simon (1996:6) refers to as an artifact.

From there the process provides the foresight that Dawkins (2006:24) claims our genes lack. In doing so, it allows decision-makers to anticipate the future; a process which embodies Nietzsche's (1989:10) foreground estimates and his provisional perspectives and which forms the basic building blocks from which all decision-making occurs.

3.3 CONCLUSION

In this chapter, as part of Activity 1 of the Mitroff model, the beholding of value process was made more visible, highlighting that it supplies not only the context for decision-making but that it is also that from which a decision's meaning is derived.

Focusing on the beholding of value process, the chapter argues that the process occurs on what Simon (1996:6) refers to as an artifact, a meeting place between the material and the psychological worlds of the decision-maker; from where it mediates between the material and psychological worlds that the decision-maker simultaneously inhabits. It points out that because this process has its origin in the material world; it is bound or constrained by the material world's general laws and operational principles.

The chapter further reflects on decisions, as portrayed by Darwin as cited in Littlejohn (1989:35), as mechanisms allowing human beings to evolve and adapt to outside pressures. It argues that each act is, as Maslow (1954:233) envisaged it to be, a reflection of the whole integrated personality, with the value a decision-maker beholds being a manifestation of the psyche in its totality.

The chapter further contributes towards an understanding of the purpose of the beholding of value process by illuminating its role in the continuous conversion that occurs between the decision-maker and his or her environment. It argues that it is the beholding of value process that is responsible for the pre-awareness assessment of how an affirmation of value will affect the structural congruence or unity that exists between the decision-maker and the environment. The chapter then proceeds to clarify the role of the beholding of value process towards the maintaining of the structural unity of the decision-maker.
It argues that the beholding of value process is the mechanism within the decision-maker that allows him or her to counterbalance change. It is that which, on a pre-awareness level, weighs stimuli towards the maintenance of the decision-maker's structural unity, thereby providing the foresight Dawkins (2006:24) claims our genes lack and ultimately allowing the decision-maker to anticipate the future.

CHAPTER 4

THE BEHOLDING OF VALUE PROCESS AND ITS ROLE DURING PRE- AND POST-AWARENESS IN FINANCIAL DECISION-MAKING

4.1 INTRODUCTION

In behavioural finance literature, there is a growing body of work that recognises the point made by Simon (1960:202) when he noted that images depicting the decision-maker at the moment of choice, falsifies decision-making by focusing on its final moment, while ignoring the whole lengthy process that precedes it. Since then an increased amount of attention has been given to the process that precedes the final moment of choice. Today, relatively new branches of behavioural finance, such as neuro-finance, are beginning to make visible the complex and previously hidden cognitive processes engaged in financial decision-making by studying how people select action plans based on the acquired representations of the values of potential investment prospects (Payzan-Le Nestour, 2014). Examples of this include Gehring & Willoughby (2002:2279) who used Electroencephalograms (EEG) to study the brain activity associated with financial decision-making and Kuhnen & Knutson (2005:763) who used Functional Magnetic Resonance Imaging (fMRI) to investigate whether anticipatory neural activity will predict optimal and suboptimal choices in financial decision-making.

More recently, using neuro-finance, work on how financial decisions are made was also done by Rocha, Vieito & Rocha (2013) who not only provided an explanation of how Functional Magnetic Resonance Imaging (fMRI) and Electroencephalograms (EEG) are being used in financial studies in order to make those sections of the brain involved in financial decision-making visible, but also provided their own results of a study they conducted using EEG on stock market investment decisions.

In addition to the above, work by, among others, Kahneman (2003), Zajonc (1980), Gigerenzer & Gaissmaier (2011) and Tversky & Kahneman (1992) on heuristics, point to the fact that the decision-making process goes much deeper than conscious awareness to the point where it penetrates the pre-intellectual. This is a point Zajonc (1980:155) reflects on when he states:

> *Somehow we have come to believe, tautologically, to be sure, that if a decision has been made, then a cognitive process must have preceded it. Yet there is no evidence that this is indeed so. In fact, for most decisions, it is extremely difficult to demonstrate that there has actually been any prior cognitive process whatsoever.*

This implies that much of the decision-making process occurs prior to conscious awareness. Moreover it leaves a significant part of the decision-making process unaccounted for in present financial literature while also causing a misrepresentation in terms of the importance that is placed on those aspects of the process that are represented. Hence the purpose of this chapter is to establish what the beholding of value process's role is during the pre- and post-awareness phases of decision-making. It is an objective that the chapter aims to achieve by, from a systems theory perspective, conducting a trans-disciplinary critical literature analysis in order to establish a personal theory of value from which, in conjunction with a philosophy of science approach, general principles can be derived to which specific conditions can be added that then, in turn, as part of the Mitroff model, can be used towards the construction of a model of the beholding of value process for financial decision-making.

As such, the chapter commences with an exploratory introduction of the material world from which conscious unawareness emanates. It then, as part of the beholding of value process and its role during conscious awareness, discusses dual process theory and value's relationship with the affective system of the mind. This is followed by a discussion of how the beholding of value process determines significance. The chapter then proceeds to reflect on the relationship that exists between conscious unawareness and awareness, pointing out how the one affects the other in relation to decision-making. This is followed by a discussion on the role the beholding of value process plays during conscious awareness.

As part of this discussion, the chapter reflects on a decision as a bifurcation point. It reviews how means and ends are brought together during the beholding of value process towards the affirmation of a value and finally, how a decision-maker is able to wield thought. It also points out what the implications of this are towards the beholding of value process and its affirmation of value.

4.2 THE BEHOLDING OF VALUE PROCESS AND ITS ROLE DURING CONSCIOUS UNAWARENESS

4.2.1 INTRODUCTION

As decision-makers, we are unavoidably living beings first. We are living beings who, as Maturana & Varela (1998:95) point out, function as part of an environment requiring a necessary structural congruence or unity. This unity, as Dawkins (2006:12-294) notes, is continuously affected by the decay of the quality of energy both within and around ourselves. This necessitates that, in accordance with the law of conservation of energy as cited in Bergson (1911:256), the decay be counterbalanced. It requires what Capra (2003:9-11) refers to as a continual flow of matter and energy between the living being and the environment.

On a cellular level, genes are capable of accounting for much of the activity that occurs in response to change. However, as Dawkins (2006:24) notes, our genes have no foresight to anticipate the future. Yet despite this, as Holland (2000:53-57) points out, we anticipate the future; building, as Waldrop (1992:177) notes, explicit models of the world. Simon (1996:6) contends that these models are built on an artifact, a meeting point or interface that exists between our inner and outer environments. Partly physical, partly psychological, it is envisaged that this is the place from where the decay in the quality of energy is counterbalanced. According to Maslow (1954:233) this counterbalance occurs as part of a trade-off between the individual and the environment. It is a trade-off which, out of necessity, as Dawkins (2006:12) notes, aims towards the establishment of stability.

This stability can only be obtained from an assessment of the stimuli's significance in relation to the restoration of the dynamic balance that exists between the individual and the environment. It is therefore an assessment of the stimuli's value in relation to its context. Stimuli reach us through our senses. According to Trevarthen (1968:302-330) these senses are in some instances made up of a combination of sensory inputs that help us to build a unified and stable space in three dimensions, a regulatory frame that supplies context for action and perception.

This process occurs through a vast network of what Holland (2000:83) estimates to be approximately 50 billion neurons, each with a fan-out capacity ranging from 1000 to 10000. As such reflecting what Sholl (1956), as cited in Holland (2000:95), describes as a vast and complex sense structure emanating from the central nervous system; a highly intertwined network of internal cycles. These networks, as Zohar & Marshall (2001:7-71) note, oscillate simultaneously at similar frequencies to form wave patterns, the mind's content. The frequency of the oscillations, as they go on to point out, determines the individual's level of awareness; with conscious awareness only being reached at an oscillation of around 40Hz. It is the movement of these oscillations, the wave created by the movement in these pattern formations, that human beings experience as thought. It is this aspect of thought that Krishnamurti, as cited in Bohm & Krishnamurti (1999:24), refers to when he states:

> *So thought is a movement in the field of time.*

Characteristically, as Damasio (1996:34-51) points out, these pattern formations are not localised, with the dynamic state of the nervous system, as Maturana & Varela (1998:127-171) reflect, being dependent upon its structure. They go on to state that this structure determines its interactions by specifying which configurations of the environment can trigger structured changes in it, predetermining the range of an organism's possible behaviour. This therefore implies that all actions are predetermined in the sense that they are limited by the design of the structure from which they emanate.

As a structural pre-requisite for perception to occur, stimuli must first be converted into oscillating patterns of neurons, the frequency of which will be dependent upon their significance towards, as established in Chapter 3, the restoration and maintenance of the structural congruence of the individual. The significance of this will be reflected by the value that is affirmed by the stimuli.

Therefore, taking into account that the state of awareness with regard to what is perceived is, as Zohar & Marshall (2001:71-73) point out, dependent upon the frequency of oscillation of the neurons, then it follows that value affirmation is not only responsible for establishing the state of awareness that stimuli will reach, but also causally determines which system will be used to process it.

4.2.2 DUAL PROCESS THEORY: VALUE AND THE AFFECTIVE SYSTEM

For some time now, psychologists have been aware of the dual-process characteristic of the mind. As a leading figure in the field of process theory, Kahneman (2012:1112) explains dual process theory as the differentiation between two distinct processes the mind uses to manage what is perceived. Clarifying the differences between these two processes, Zajonc (1980:170) states:

> *Before we evolved language and our cognitive capacities, which are so deeply dependent on language, it was the affective system alone upon which the organism relied for its adaptation. The organism's response to the stimuli in its environment was selected according to their affective antecedents and according to their affective consequences.*

This suggests the existence of a primary system from which conscious awareness evolved. This system is much older than System 2 and appears to have much greater computational capacity, but cannot be consciously controlled. Zajonc (1980:166) believes it is this automatic unconscious process that is responsible for affective self-reference judgements that involve deep information processing. Assuming such a process to be slower, due to not only its attending to what is perceived but also the allocation of values towards it, Zajonc (1980:164-5) reflects quite the contrary when he states:

> *According to the prevalent view, attending to discriminanda alone should be easier and quicker than attending to discriminanda tagged with values. Since the latter involve more information, more detail must be attended to, and the subject would consequently require more processing time if anything, however, our results showed the opposite. Although of only borderline significance, affective judgements of polygons were made faster than recognition judgements.*

This therefore suggests that the affective system, which is comprised of intuitive operations and which is responsible for affective judgements, is faster than recognition judgements. Moreover as Kahneman (2003:1452) states, it is this system that is responsible for generating impressions of the attributes of objects which eventually culminate in the perception of thought. He contends that these impressions are voluntary and need not be verbally explicit. According to Tversky & Kahneman (1983:293-315) these impressions are routinely and automatically produced by System 1 without intention or effect. Kahneman & Frederick (2001:6) reflect on this aspect when they state:

> *There is now compelling evidence for the proposition that every stimulus evokes an affective evaluation, and that this evaluation can occur outside of awareness.*

This therefore suggests that every stimulus must have a value affirmed to it but moreover, it suggests that this value affirmation process occurs outside the conscious awareness of the individual. Simon (1978:501-503) reflects on these affective value affirmations as suitable outcomes, approximations in which the human expert does not so much search out as recognise the correct move. This recognition process is more often referred to as instinct. Mautz & Sharaf (1961:93) shed light on the origin of instincts when they state:

> *Our individual experiences are moulded and coloured by the background of inherited tendencies and many of the intuitions or direct insights that seem inexplicit as products of ordinary perception may well be the spontaneous expression of congenital tendencies.*

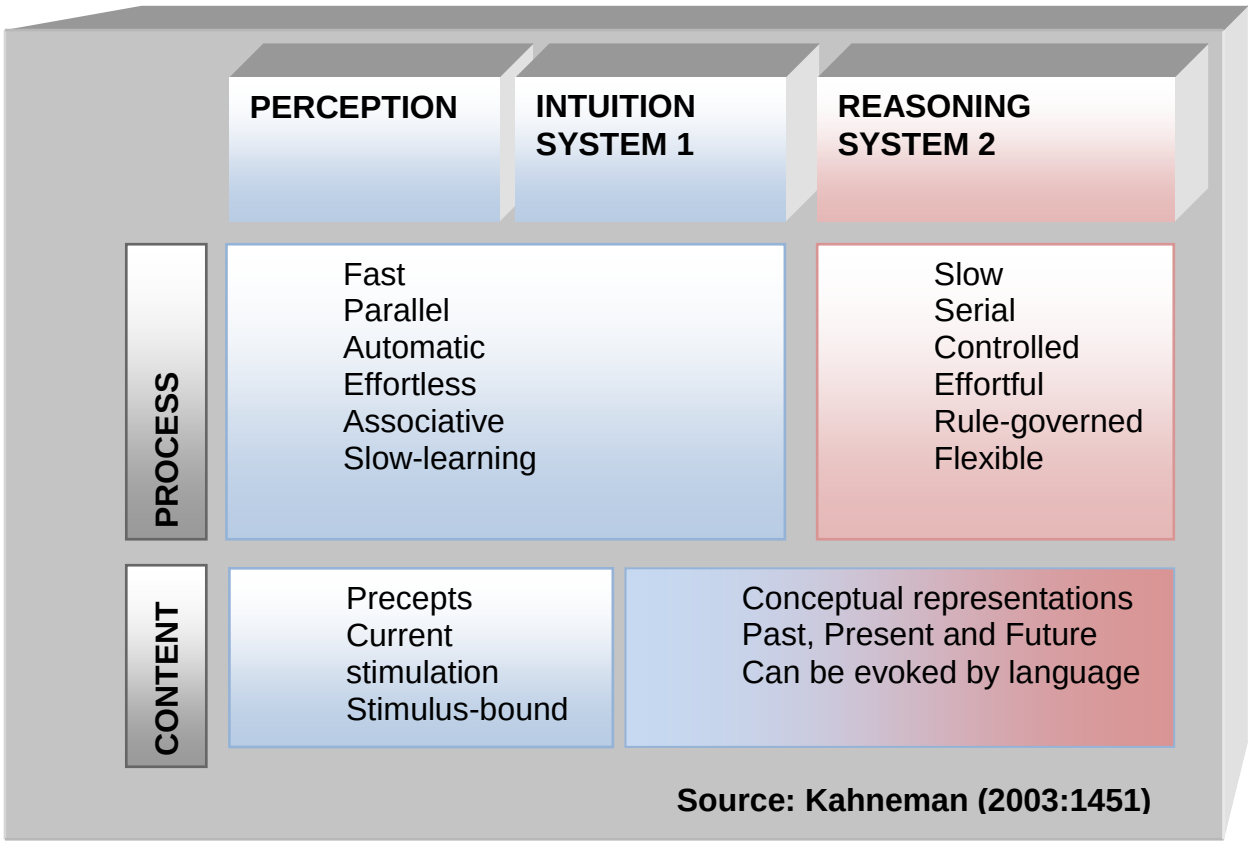
This therefore suggests that the ability to make an affective valuation is congenitally inherited. Put differently, the mechanism, the process that allows a decision-maker to make an affective valuation comes from the decision-maker's genes. It is a process during which the individual's own unique context is used in much the same way as anchoring or adjustment heuristics.

It involves what Cioffi (1997:207) refers to as the establishment of an anchoring point from which adjustments based on additional information are made. As part of this process, as Kahneman, Slovic & Tversky (1974:14) point out, different starting points yield different estimates. As such it implies an inherent sensitivity to initial conditions. This therefore suggests that the accuracy of the estimates, as Maslow (1954:129-176) notes, will be determined by the accuracy of the individual's frame of reference, which in turn determines how well the individual copes when dealing with the unknown.

Demonstrating the differences between the abovementioned two systems is Figure 4.1 as cited in Kahneman (2003:1451). According to Figure 4.1, System 1 is intuitive by nature and is based on what is perceived. Contextually it deals with precepts, in other words with rules of conduct or, put differently, general principles of action. It further occupies itself with stimulation and is, according to Kahneman (2003:1451), stimulus-bound. As a process it makes use of parallel processing and as such is fast, automatic, effortless and associative by nature, producing the same answer regardless of the way the elements are grouped, yet ultimately, as a result being slow to learn.

In contrast to System 1, Figure 4.1 depicts System 2 to be reason-based. From a contextual perspective System 2 occupies itself with conceptual representations. As such, apart from, as is also the case with System 1, occupying itself with the present, System 2 in addition also reflects on the past and the future.

Figure 4.1 – The dual processing systems of the mind



It can furthermore also be evoked by language. From a processing perspective and in contrast to System 1, System 2, due to the serial nature with which it processes information, is slow. Yet despite being slow, it has the ability to be wilfully controlled and hence, despite being rule-governed and more effortful than System 1, is more flexible. As part of System 1, there are also other factors that influence value estimates, such as habits. Dewey (1922:42) defines habits as socially shaped dispositions to particular forms of activities or modes of response to the environment. This is a disposition he believes channels impulses in specific directions towards outcomes, by entrenching particular uses of means and by prescribing a particular type of conduct under certain circumstances. Maturana & Varela (1998:201) refer to this prescribing of conduct as the trans-generational stability of behavioural patterns ontogenically acquired in the communicative dynamic of a social environment; something they refer to as cultural behaviour.

As such it follows that cultural behaviour has a significant impact on an individual's value estimates. It is this type of behaviour that Bohm & Krishnamurti (1999:84-93), Freud (1938:654) and Jung (1978:164) point out, causes conclusions reached from mere proposition to be presented as fact, resulting in a unification of repetitive thought with a propensity to imitate rather than seek authenticity. As an alternative, authenticity requires something very different. It requires what Taylor (1991:29) refers to as being true to one's own originality, something he contends only the individual can do. It requires what Herder (1913), as cited in Taylor (1991:28), refers to as a personal measure. It is personal in the sense that it is associated with the individual's identity. A personalisation which Taylor (1991:40) goes on to point out can only be defined against the background of things that matter. It therefore follows that in order to be authentic, in order to obtain a personal measure; a background of things that matter to the individual must first be established. What matters requires the assignment of a weight, the attribute of a value towards what is perceived, in order to create a landscape against which a personal measure can be established.

4.2.3 VALUE ALLOCATION: WEIGHING AND THE USE OF SCALES

When dealing with a construct such as value, one of the key questions that needs to be answered is if it is measurable. In the strictest sense, Vickery (1970:732) defines measurement as the assignment of numerals to represent elements or properties of elements in a specific system, on the basis of the isomorphism or homomorphism that exists between one or more empirical relational system (ERS) and one or more numerical relational systems (NRS).

Reflecting upon this definition, it is not clear if value meets Vickery's requirements for measurement. For instance, as decision-makers we know from experience that when we value, value does not take on the form of a numeric representation. Rather it presents itself as Nietsche's (1989:10) foreground estimates, his provisional perspectives. Moreover, as Chambers (1965:32-62) points out, in order for measurement to take place, a specification of the unit of measure must occur. This is something which is, as Herder (1913) as cited in Taylor (1991:28) points out, simply not possible with each of us having our own unique measure.

Yet, as Narens (2002:757) notes, the entire objective of numerical relational structure within the scale paradigm is to attempt to map the qualitative structure. From this perspective, the numbers are not an end in themselves but merely a means to an end. As such, considering Dewey's (1915:30-35) statement that to deliberate implies the assignment of weights to different prised qualities; it raises the question whether the affirmation of value within a ranking order requires any numerical representation at all. Considering Jung's (1958:5) point that it is a well-founded principle that the psychological composition of every human mind is unique and that as such, as Debreu (1959:33-35) notes, value will always be relative to the index used to measure it, then, within this context, the allocation of a weight with regard to what is perceived to be of value, the value placed on it in relation to other things of value, becomes nothing less than a measure of its significance; with the individual's unique dynamic balance representing the context within which the significance is determined.

This still leaves unanswered the question of what the scales are that are used as part of the value determination process. On this subject, much work has been done under the term heuristics. Gigerenzer &Gaissmaier (2011:451-454), point out that the word, of Greek origin, means "serving to find out or discover". In other words, it means to acquire knowledge which, as Russell (1945:149) reflects, is nothing other than perception. Within this context, heuristics can also be looked upon as a method that allows an individual to acquire knowledge through that which is perceived. It is what Gigerenzer & Gaissmaier (2011:251-454) refer to as a strategy emanating from efficient cognitive processes, either conscious or unconscious, that partly ignore information in order to make a distinction more quickly, frugally and/or accurately than more complex methods allow.

Alternatively, it is suggested that heuristics be reflected upon as scales used as part of the valuation process to determine the significance of perceptual information. In other words it is a way to measure the value of perceptual information. With, as Marewski & Schooler (2010) as cited in Gigerenzer & Gaissmaier (2011:456) point out, the type of heuristics used being dependent upon the content in question. As such, as part of the evaluation process, several alternative types of heuristics are used. A brief summation of each as well as an outline of what each entails is provided below.

1. Recognition heuristics

As defined by Goldstein & Gigerenzer (2002) as cited in Gigerenzer & Gaissmaier, (2011:460) recognition heuristics entail that: “If one of two alternatives is recognised and the other is not, then infer that the recognised alternative has the higher value with respect to the criterion.

2. Availability heuristics

Tversky & Kahneman (1973:207) as well as Friedlander & Stockman (1983:637-643) point out that availability heuristics assesses the probability of an event through the ease with which instances of the event come to mind. Kahneman (2003:1453) believes this ease is partly determined by genetics and partly by experience.

3. Familiarity heuristics

Research conducted by Matlin (1971:295-300) suggests that both objective and subjective familiarity play a role in influencing what is linked, with stimuli that are seen to be more liked than stimuli that are not. Moreover, as Zajonc (1980:161-162) points out, subjects acquire a more positive attitude towards an object as its exposure increases, irrespective of whether the object is recognised or not.

4. Attribute substitution heuristics

Attribute substitution is, as Kahneman & Frederick (2001:5) reflect, a heuristic where the target attribute is assessed by mapping the value of the attribute onto the target scale.

5. Representative heuristics

Representative heuristics, as defined by Kahneman, Slovic & Tversky (1974:4), imply the subjective evaluation of probabilities in relation to the degree to which A or its description resembles B.

6. Trade-off heuristics

Trade-off heuristics are a type of heuristics which, as Gigerenzer & Gaissmaier (2011:469) point out, entail the equal weighing of cues or alternatives in order to make trade-offs or compensatory strategies.

7. Social heuristics

Social heuristics are what Schwartz & Bilsky (1987:550) refer to as cognitive representations of human requirements. It is that which Gigerenzer (2010:528-554) believes includes such heuristics as default and imitation heuristics, tit for tat and social circle heuristics. As Gigerenzer (2010:528-554) goes on to point out, social heuristics include the averaging of the judgement of others during the exploitation of the wisdom of crowds; something he believes forms the basis of what is responsible for the unconscious causes of a decision-maker's moral behaviour.

Upon reflection on the above points, several key aspects emerge, the first of which, as Rieskamp & Otto (2006:207-236) point out, is that man is a learning individual whose learning is based on selection principles. Secondly that, as Seeley (2001:249-261) notes, man is evolving over time. This is a process which thirdly, as Snook, Taylor & Bennell (2004:105-121) reflect, is assisted by a wide variety of social processes that include among others imitation and explicit teaching. In addition, as Kahneman & Varey (1990:1101-1110) point out, there appears to be a suppression element involved between competing interpretations of reality, while competing propensities co-exist side by side, as the value process establishes the psychic content's ranking through its scales in terms of

their importance towards the restoration of the individual's dynamic balance. These are scales within which a pre-selection process is conducted with regards to which Pirsig (1999:311) notes the following:

> *So we preselect on the basis of Quality, or, to put it the Phaedrus' way, the track of Quality preselects what data we're going to be conscious of, and it makes this selection in such a way as to best harmonize what we are with what we are becoming.*

Quality therefore determines the data's ability to be right, seeming, fitting, fit, correct, suitable, decent, proper and worthy, with the value that result from this process, as Debreu (1959:33-35) points out, being dependent upon the index used to measure it; or, put differently, the scale used to measure it with.

4.3 FROM UNAWARENESS TO AWARENESS – BRIDGING THE DIVIDE

As part of the creation of the landscape of things that matter, the context of relational relevance towards the continuous re-establishment of the dynamic balance between the individual and the environment, the perceptual system, as Palmer (1999) as cited in Kahneman (2002:459) states, enhances the accessibility of changes and differences. It is that which is deemed to be of most value in response to the changes that occur. It is a response Osgood (1962) as cited in Zajonc (1980:155), touches on when he states:

> *…the dominant facts of evaluation, potency and activity that keep appearing certainly have a response-like character, reflecting the ways we can react to meaningful events rather that the way we can receive them.*

As such, this statement reflects a reactive responsive system. A system within which, as Bohm & Krishnamurti (1999:120) point out, the systemic structure of the mind allows for virtually limitless accumulation of past movements. This point is also noted by Frankl (1985:143) when he states:

> *For, in the past, nothing is irretrievably lost but everything irrevocably stored.*

Frankl therefore suggests that everything that is perceived is stored in the mind. It is this Bergson (1911:2) refers to as the continuous swelling of the mental state over time. This process is made possible by what Simon (1978:497-503) refers to as an infinitely large long-term memory accompanied by a very small short-term memory. As a result of the many limitations of the small short-term memory available, Bergson (2002:253-62) contends that the brain actualises the usefulness of memories, while at the same time keeping in the lower strata of consciousness those memories that are of no use. Consciousness therefore only uses what it requires in the moment.

Moreover, as Kahneman (2003:1465) points out, System 1 seems to dominate responses in separate evaluations, whereas System 2 conforms to the dominance rule when it is given an opportunity to do so. Kahneman (2003:1467) further notes that this process is automatic, with the prevalence of framing effects seeming to suggest a light monitoring by System 2 over the judgements produced by System 1. Most actions therefore, as Kahneman (2012:8) goes on to point out, involve both systems, with the automatic unconscious process quite often originating ideas or impulses for an action, while the controlled conscious process endorses these ideas or impulses without sufficiently checking them. As part of this process, Zajonc (1980:154-157) views feelings as energy transformations with affective judgements forming an intricate part of all cognition. This is a point that is also raised by Bergson (1911:143) when he states:

> *There is no intelligence in which some traces of instinct are not to be observed, more especially, no instinct that is not surrounded by a fringe of intelligence.*

This reflects what Kahneman & Frederick (2001:3) refer to as a migratory process between these two systems where on the one hand complex cognitive operations eventually migrate from System 2 to System 1 as proficiency and skill are acquired. While on the other hand, as Wundt (1907) as cited in Zajonc (1980:152) states:

> *When any physical process rises above the threshold of consciousness, it is the affective elements which, as soon as they are strong enough, first become noticeable. They begin to force themselves energetically into the fixation point of consciousness before anything is perceived of the ideational elements.*

This reflects a reciprocal process working together simultaneously at different levels of perceptual awareness within which, as Wundt (1907) as cited in Zajonc (1980:152) points out, only the most significant changes or differences in what is perceived, in other words affective valuations of significance, find their way into consciousness.

4.4 THE BEHOLDING OF VALUE PROCESS AND ITS ROLE DURING CONSCIOUS AWARENESS

4.4.1 INTRODUCTION

Because there are many different paths that lead to the establishment of stimuli's significance, it in many instances results in what Kahneman & Varey (1990:1101-1110) reflect on as competing interpretations of reality. Among these competing interpretations of reality Wundt (1907), as cited in Zajonc (1980:152), notes that only those affective valuations of greatest significance find their way into consciousness. This is a state of awareness where, despite this extensive process, the individual is still, as Prigogine (1996:5) reflects, confronted by the basic law of classical quantum physics; expressed possibilities. Along these lines Bergson (1911:152) states that consciousness is the light that plays around the zone of possible actions, the potential activity surrounding the action really performed by the living being. Coleman (2000:381) reflects on consciousness from a different perspective when he states that consciousness:

> *… transforms cause and effect into means and consequences. This is the birth of meaning.*

Coleman therefore attributes meaning to consciousness as it transforms cause and effect into means and consequences. There are of course various other interpretations such as those of Linas & Ribary (1993:2078-2081) as well as Zohar & Marshall (2011:76), who see consciousness as an intrinsic state of the brain. Capra (1983:152) provides yet a different perspective when he states:

> *At the atomic level, 'objects' can only be understood in terms of the interaction between the processes of preparation and measurement. The end of this chain of processes lies always in the consciousness of the human observer.*

All these depictions of consciousness have however one common denominator, that they all view consciousness as that most necessary requirement to choose among the expressed possibilities presented. That which, as Zukav (1979:181) points out, all individuals require in order to superimpose their own version of what must be on the real world.

4.4.2 A DECISION: A BIFURCATION POINT

In many respects a bifurcation point can be reflected upon as a place of significance. It is that place Laszlo (2006: foreword) describes as a crucial tipping point in the life of a system, that either leads to a breakdown or a breakthrough. It is the place where, as Spangler as cited in Speerstra (2005:61) states, the familiar and the unpredictable meet. This is a meeting during which uncertainty manifests itself by either, as Kapur and Kesavan (1992:3) reflect, taking on the form of a probabilistic phenomenon which entails that the uncertainty be associated with the probability of the outcome. Alternatively, as they go on to explain, it can manifest in the form of a deterministic phenomenon whereby the probability of the outcome is certain but the outcome has an element which cannot be determined. Reflecting on uncertainty from a different perspective, Howell and Burnett (1978:22-68) contend that it is something that can be categorised into an internal and external category based on the degrees to which the events are under the subject's control.

Irrespective of the point of view, it is undeniable that uncertainty is responsible for what Waldrop (1992:303) refers to as the looseness and fluidity that transpires at the bifurcation point situated at the edge of order and chaos. This requires flexibility, something Simon (1996:43) views as a necessary ingredient towards the managing of uncertainty.

This is an uncertainty that on the one hand holds the promise of a possible gain, which, as part of the change in relationships Simmel (1900:577) notes, will always be accompanied by a sacrifice of some kind. On the other hand, it holds the risk that the gain might not meet expectations or worse, possibly not even materialise, causing the sacrifice to be in vain. This is a highly complex situation during which the individual has to conceive in order to make up that which he could not perceive. It is an act which, as Bergson (1911:322) points out, requires the individual to freeze, staticise or stop the flow of a moving, changing process world, an attempt to overcome the uncertainty faced in the moment towards the anticipation of the future.

4.4.3 CONSCIOUS CHOICES: MEANS TO ENDS

To learn implies to transcend from the unknown to the known. This is a process with regards to which Dewey (1910:196-220) notes that the need to reflect intelligently is something that only enters the sphere of conscious awareness when the ordinary operation of habit or impulse is blocked. Pirsig (1999:286-287) refers to this blockage as a state of "stuckness", a state during which an individual out of necessity is forced to conceive. Pirsig (1999:286-287) believes "stuckness" to be the psychic predecessor of all real understanding and goes on to explain that during this state the individual's awareness of a particular aspect or an object's quality, becomes stronger as the aspect or object is no longer seen in isolation but rather in relation to the larger context from which it emanates. This, he contends, requires a re-evaluation of that object or aspect that "stuckness" is experienced with, causing a unique perspective to evolve wherein objects become a collection of functions and during which patterns of traditional reasoning are gradually eliminated. Bergson (2002:249) refers to this process when he states:

> *Conceiving is a make-shift when perception is not granted us, and reasoning is done in order to fill up the gaps of perception or to extend its scope.*

To conceive therefore implies to make up what is believed to be missing in order to compensate for, as Bergson (2002:249) noted, the insufficiency of our faculties of perception.

Moreover, Bergson (2002:250) goes on to state that no matter how abstract a conception may be, it always has its starting point in perception; with its only value being through the eventual perception it represents. As such, from a value perspective, it can also be argued that conception is nothing other than the making up of value to compensate for what Bergson (2002:249) refers to as the insufficiency of our faculties. It is a necessary process required to, as Holland (2000:53-57) points out, anticipate the future in order to, as Maturana & Varela (1998:95) reflect, maintain the structural unity between the individual and the environment.

It is a unity that vests on both a physical and a psychological level and which, through what Capra (2003:9-11) refers to as a continual flow of matter and energy between the living being and the environment, necessitates the allocation of scarce means towards various ends. This is an aspect Dewey (2008:84) reflects on when he states:

> *A goal cannot be intelligently set forth apart from the path which leads to it. Ends cannot be as operative ends, as directors of action, apart from consideration of conditions which obstruct and means which promote them.*

As such Dewey (2008:84) contends that means and ends are reciprocally determined. Means, which Dewey (1922:15-69) defines as socially shaped dispositions or habits, and impulses, which he notes include such aspects as drives, appetites, instincts and unconditional reflexes. Dewey (1922:15-75; 1939:207) further goes on to define ends as either needs or desires; the differentiation of which he bases on the distinction that desires are fixed by their ends while impulses can be directed and shaped towards various ends. All habits, impulses, needs and desires however share one common characteristic, one that Maslow (1954:4) reflects on when he notes that none of these drives, neither needs nor desires, relate to a specific isolated localised somatic base, but rather reflect what is required by the whole person.

As part of this allocation process of means towards ends, Kahneman & Tversky (1974:231) point out that, of perception and thought, only thought represents uncertainty and doubt.

As they go on to point out, uncertainty or doubt stem from a belief concerning the likelihood of unique events, of which the true probabilities are elusive and cannot be objectively assessed. This results in a period of deliberation during which Dewey (1915:30-35) contends that the individual assigns weights to different prized qualities. Cyert, Simon & Trow (1956:257-260) reflect upon this as an explicit or implicit level of aspiration that they contend forms a pre-requisite towards the making of a choice. It is a process which, as Bernstein (1996:274) points out, entails that probability judgements not be attached to events but rather to the descriptions of events; thereby suggesting the presence of affective judgement elements at the time that the value allocation is made.

Reflecting on the value process as it has unfolded up to this point, it appears that the value process is responsible an affective level for the establishment of the significance of stimuli, ultimately not only determining the level of awareness the stimuli will reach but also the system that will be used to process them, while on a conscious awareness level it is responsible for the establishment of the significance of that which could not be perceived but which out of necessity is conceived in order to fill in the gaps. Important here, as Bergson (2002:250) goes on to reflect, is that the value affirmation of what is conceived is dependent upon the perception that it represents. This thereby completes the necessary context required by thought as it reasons among alternative choices or different courses of action towards the management of uncertainty in anticipation of the future. This brings to the fore the question: How is a decision-maker able to wield thought during the reasoning process to make a final evaluation among known alternative courses of action?

4.4.4 MAKING A DECISION: THE WIELDING OF THOUGHT

In order for an individual to reflect among alternative courses of action, the individual is required to exert what Schopenhauer (2004:212) refers to as “the will”, an aspect about which he states:

> *…even though this intellect has advanced to the point of attaining reason, it is mere bungling compared with what proceeds directly from the will as a thing in itself and is not communicated through an idea…*

Reflecting on Schopenhauer's (2004:212) statement, two important points emerge. The first is that from his perspective, the will appears to be a thing in itself. Secondly, it is not communicated through an idea but exists independent of it. This is an aspect partly clarified by Capra (2003:34) when he states:

> *Reflective consciousness involves a level of cognitive abstraction that includes the ability to hold mental images, which allows us to formulate values, beliefs, goals and strategies.*

This holding of mental images to which Capra (2003:34) refers, is what Sudarshan & Misra (1977:756-763), explained from a quantum physics perspective in the form of the Quantum Zeno Effect. As per their explanation, according to the Quantum Zeno Effect, the mere act of observation causes the wave function describing the probability of atoms to collapse from several probabilities into a single activity. Consequentially, this affects the calcium ions responsible for triggering the vessels that are required in order to release neurotransmitters responsible for signalling a neuron to pulsate energy along its axons. Schwartz & Begley (2002:362) reflect on this phenomenon in the following way:

> *In quantum language, the wave function that represents "release neurotransmitter" exists in a superposition with the wave function that represents "don't release neurotransmitter"; each has a probability between 0% and 100% of becoming real.*

The release of a neurotransmitter is therefore not certain. According to them, attention changes the odds of a wave function and as such, influences the direction of thought. Attending to, or observing thus influences the release of neurotransmitters of which the consequences, on a large enough scale, allow the will to which Schopenhauer (2004:212) refers, to keep a thought in consciousness through the application of attention, or release it. This point is also raised by Kahneman (2003:1453) when he states:

> *…salience can be overcome by deliberate attention*.

Moreover, as research conducted by Schwartz & Begley (2002:18) indicates, this act allows for the clear and systematic altering of not only brain function but also its physical infrastructure, a process known as neuroplasticity. This allows the non-material the ability to, on a quantum level, wield the material world,

This is an act allowing for the redirection of thought as part of a final valuation, as it reasons among known choices and alternative courses of action, under the direction and guidance of the will. It is a relational context Nietzsche (1976:225) describes when he states:

> *Your will and your valuations you have placed on the river of becoming…*

It ultimately subjects value to the will, and in doing so, as Dawkins (2006:3) points out, gives us the ability to make a choice capable of upsetting the design of our genes. Within this context value, as Pirsig (1999:284) goes on to state:

> *…the leading edge of reality, is no longer an irrelevant offshoot of structure. Value is the predecessor of structure. It's the pre-intellectual awareness that gives rise to it. Our structures' reality preselected on the basis of value, and really to understand structures reality requires an understanding of the value source from which it's derived.*

It is a process which, as this chapter demonstrates, at its deepest level allows quality to, as Pirsig (1999:311) reflects; determine the fit of psychic content to a particular scale, the determination of which results in the affirmation of value. It is a measure of significance towards the restoration of a decision-maker's own unique dynamic balance that exists amid the duality of the material and psychological worlds that the decision-maker simultaneously inhabits. Neither world is an island entire of itself, as Donne, cited in Hemingway (1968:3), so eloquently puts it with regard to man.

4.5 CONCLUSION

In this chapter, as part of Activity 1 of the Mitroff model, the role of the beholding of value process was made visible, reflecting not a passive selection process of some parts of the present whole, but an active hierarchical process of perceptual construction. It is a pre-intellectual process, which to a large extent occurs outside conscious awareness, during which value affirmations are not only responsible for establishing the state of awareness that stimuli will reach, but also determine the operating system in the mind that will be used to process it.

It further indicates that the process that allows a decision-maker to make an affective valuation is congenitally inherited and that during this hierarchical process of perceptual construction, the value process makes use of various scales in order to determine the significance of perceptual information in terms of their importance towards the restoration of the individual's dynamic balance.

Still further, in conjunction with Pirsig (1999:311), it argues that as part of this process quality determines the data's ability to be right, seeming, fitting, fit, correct, suitable, decent, proper and worthy, with value, the result of this process, ultimately being dependent upon the scale used to measure it. Moreover, it indicates "stuckness" or, put differently, a lack of knowing. to be an intricate part of the conscious re-evaluation process with reasoning being used to fill in the gaps of perception, extending its scope. It also points to an intricate interrelationship within which the beholding of value process and the value it affirms play a critical role towards providing the decision-maker with the required foresight needed in anticipation of an uncertain future.

It concludes in the end that it is only the will that allows an individual to consciously subjugate value and which ultimately gives all human beings the conscious choice to upset the design of their genes.

CHAPTER 5

A PERSONAL THEORY OF VALUE: TOWARDS GENERAL PRINCIPLES FOR THE CONSTRUCTION OF A CONCEPTUAL MODEL

5.1 INTRODUCTION

In the past, many writers have pointed out through their philosophical perspectives that value resides in the mind of the individual. This is for instance reflected in the work of De Chardin (2008:33), Nietzsche (1989:11), Taylor (1991:62) and Schopenhauer (2004:69). This point was already raised by Littleton (1929:148) as early as 1929 when he stated:

> *Fundamentally, value resides in someone's mind, and is attributed to or read into an article, rather than residing inherently in it.*

Littleton already suggested then that value emerges from the mind of the beholder, as the beholder evaluates an article. This is an evaluation process during which the beholder reads value into the article, rather than value emanating from it. In a way it suggests that value is a reflection of what is in the beholder at the time of the beholding process. This proposition is supported by Zajonc (1980:157) when he notes that when we evaluate an object or an event, we describe not so much what is in the object or the event as what is in ourselves. This therefore suggests value to be a description of ourselves in relation to what we behold. A description which, as Simon (1959:256) points out, requires an outline of the process and mechanism through which the adaptation takes place, a theory that will allow what Simon (1959:253-269) refers to as economic man, a learning, estimating, searching, information-processing organism, to make sense of all the complexity.

Alternatively and perhaps more appropriately, one can reflect on this theory as that which will allow not economic man but decision-making man to, through the process described by Simon (1959:253-269), make sense of all the complexity. This thereby implies a clarity of thought and vision which Shaw, as cited in Speerstra (2005:287), states you often don't see until you have the right metaphor to let you perceive it.

One such metaphor capable of capturing the essence of this thesis, and thereby providing a clear vision beyond the complexities surrounding the beholding of value process, is to say that value is in the eye of the beholder. This suggests that value is individualistic and as such cannot be generalised in terms of a general theory of value. Any theory of value that therefore portrays value must do so with the understanding that value is something unique and individualistic, something specific to each beholder. It therefore differs dramatically from the generalised theories of value that have been presented in the past, which, despite the significant contributions they have made, have left this type of personalised theory of value as elusive and as much a mystery today as it was nearly 100 years ago when Littleton (1929:148) first made his statement.

Accordingly, the purpose of this chapter is to assess the trans-disciplinary critical literature analysis presented from a systems theory perspective in Chapters 2 to 4 and to use the beliefs obtained from the literature to formalise a set of ideas as to why the beholding of value process occurs. Put differently, to establish the general principles of a personal theory of value which then, in conjunction with Giere's (2004:745) philosophy of science approach, act as general templates for the construction of more specific abstract objects or models. These are principles to which, as Giere (2004:745-747) notes, specific conditions can be added that in turn go on to form the basic elements of the model that can then be identified with features of the real world. This, as he goes on to clarify, makes it possible to use models to represent aspects of the world by exploiting similarities between the model and aspects of the world it is being used to represent. This process is discussed in greater detail as part of Chapter 8 and Chapter 10.

As such, this chapter takes cognisance of the fact that what it portrays as general principles might in an alternative context be reflected upon as axioms, rules or even laws – but it must be stressed that from a conceptual model-building perspective within the context of this chapter, they are reflected upon as general principles required as a pre-requisite of a philosophy of science approach towards the creation of the conceptual model as outlined by Mitroff et al (1974:48).

Noting the above, the chapter therefore commences with a discussion of possible general principles out of which a conceptual model can be constructed.

It does so by reflecting on flow, change and the continuous disequilibrium they cause. The chapter then proceeds to discuss how disequilibrium leads to a continuous confrontation between the individual and uncertainty, thereby pointing to the requirement of foresight on the part of the individual in anticipation of an uncertain future. It is a process which, as the chapter goes on to reflect, requires the individual to create a landscape of things that matter, used to assist the individual in the weighing of risk and future expectations. This process occurs as part of a continuous trade-off with the environment towards the maintenance of the individual's dynamic balance and structural congruence or unity with the environment. Following this, the chapter reaches a conclusion.

5.2 TOWARDS GENERAL PRINCIPLES FOR A CONCEPTUAL MODEL

In the previous chapters it was established that man, as the inhabitant of two separate yet highly interrelated worlds, is on the one hand subjected in the physical world to physical laws and operational principles that not only define his actions but moreover, constrain them. On the other hand, man inhabits a vast and complex psychological world which he created, that consists of multiple levels of psychic processing, some of which he is aware of and some of which he is not. Between these two worlds Maturana & Varela (1998:95) claim there is, on a physical level, a structural congruence that requires constant maintenance or, as they go on to point out, the unity disappears.

Although Maturana & Varela only referred to this unity on a physical level, it is envisaged that the structural congruence and unity go much deeper than that. Partly driving this belief is that in many respects man's perceptions of his environment appear to be a virtual copy of it, even if only a functional and not a veridical copy (Gigerenzer & Gaissmaier 2011:458). Nevertheless this is a copy in which the same phenomena at work in the physical world are also present in the psychological world. Although in some instances it is distorted, so that it is a partial reflection of what manifested in the material world, these phenomena have a significant impact on the psychological world of the individual – a world the individual creates in response to what Dawkins (2006:24) refers to when he states:

Genes have no foresight. They do not plan ahead. Genes just are, some genes more so than others, and that is all there is to it."

It is a world that the individual therefore creates – due to the lack of foresight of his or her genes – in order to be able to anticipate the future. It is a world that functions on certain general principles that enable an individual to gain critical foresight towards the restoration of his or her dynamic balance on both a physical and psychological level. As such, the chapter proceeds with a discussion of these general principles in the hope that by making them more visible, it will broaden decision-makers' understanding of the beholding of value process but moreover, will contribute towards laying the foundation of a personal theory of value that until now has been as elusive as ever.

5.2.1 THE GENERAL PRINCIPLES OF FLOW, CHANGE AND DISEQUILIBRIUM

All matter is comprised of energy, which, as pointed out in Chapter 3, can neither be created nor destroyed. Yet as Dawkins (2006:12-294) points out, regardless of the fact that energy cannot be destroyed, its quality still decays. This decay occurs, from the individual's perspective, both from within and from without. It is a decay resulting in change and flow that manifests not only in the physical but also in the psychological world of the individual, affecting both the individual's inner and outer environment on every level possible. Moreover, it results in disequilibrium in the dynamic balance that exists between the individual and the environment, both physically and psychologically. It is a disequilibrium from which a need to restore dynamic balance emerges of such strength that, as Maturana & Varela (1998:80-115) as well as Jantsch (1980) as cited in Wheatley (1994:23) point out, it creates an unavoidable interconnectedness between systemic structure and function; to the extent that it affects not only the individual's movements but also his or her actions. As such it culminates in the first general principle of the conceptual model. As part of this general principle, actions imply a conversion of energy towards the restoration of the dynamic balance that existed between the individual and the environment prior to change. Zukav (1979:102-179) refers to this process as the reciprocal conversion of mass into energy and energy into mass. This implies a continuous conversion process towards the maintaining of the individual's dynamic balance.

Yet, here at this particular juncture, a problem emerges for the individual in the sense that the result of his responses is in the future while the action that is required in order for the results to occur is in the present. This therefore brings the individual face to face with the uncertainty of the outcome of his actions.

5.2.2 THE GENERAL PRINCIPLE OF UNCERTAINTY

Taking cognisance of the laws of thermodynamics as cited in Laszlo (1972:52), it is pointed out that the uncertainty principle referred to here as part of this chapter is a principle that pertains to the fulfilment of a pre-requisite of a philosophy of science approach towards the construction of a conceptual model. As such it must not be compared or confused with Heisenberg's uncertainty principle as cited in Hawking (1998:58). Rather the general principle of uncertainty as depicted in this chapter within the particular context is a principle that is derived from the laws of thermodynamics, which acknowledge that as individuals we are all limited. We are limited from a physical perspective by the size, shape and structures of our bodies and the range of our senses, as well as consciously by what we are able to perceive. It is that process which all human beings use to, as Trevarthen (1968:302-330) reflects, combine sensory inputs in order to build a unified stable space, a regulatory frame to supply the context for perception. This context is causally therefore also limited. This proposition is supported by Bergson (2002:250) when he notes:

> *They all appeal from the insufficiency of our senses and consciousness…*

Insufficiencies in turn cause uncertainty and doubt to arise from the decision-maker's thoughts (Kahneman, Slovic & Tversky 1974:231). Uncertainty and doubt with regard to the psychic context's significance or, put differently, the psychic content's value towards its future contribution in the present. Uncertainty which, as Kapur & Kesavan (1992:2) note, plays a significant role in our differing perceptions about the external world, affecting not only how decision-makers measure, understand, regulate, maximise or minimise it, but also how they go about attempting to control it. In other words, defining how an individual perceives and responds to change.

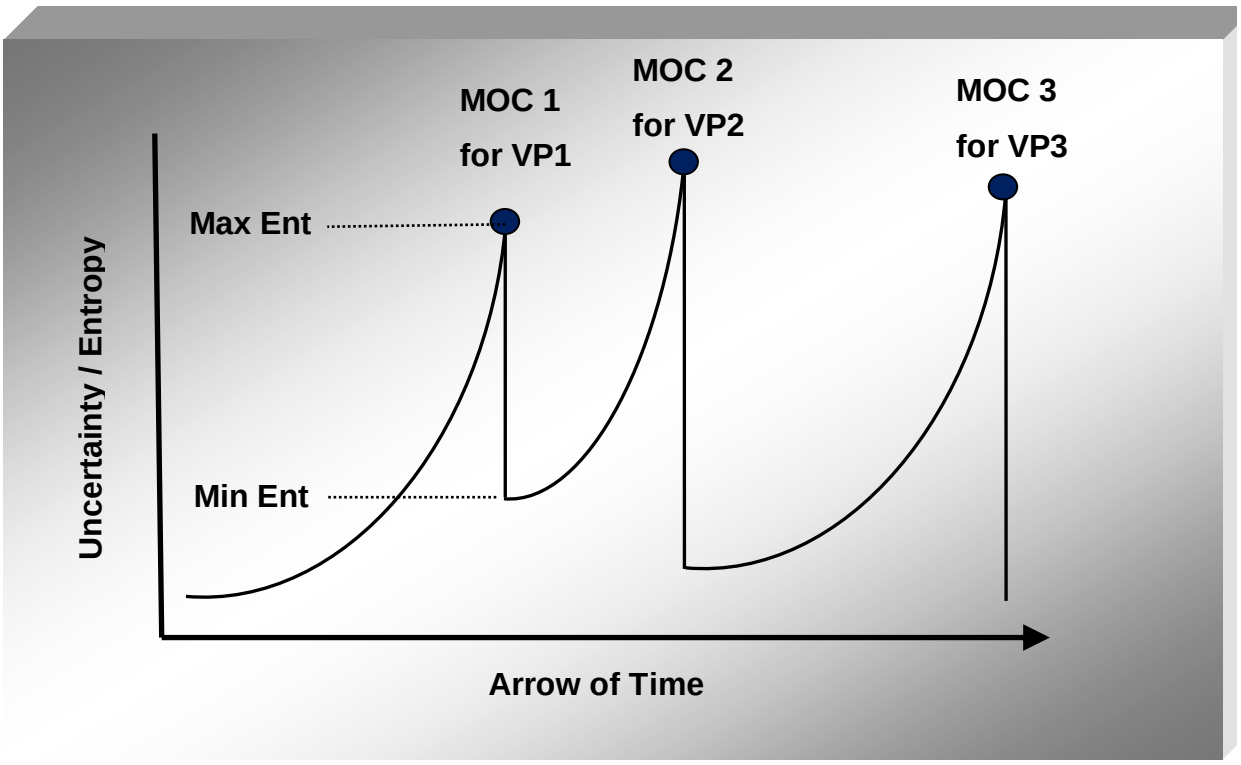
According to Ellsberg (1961:643-669), uncertainty is source-related, non-generic and manifests in degrees. This therefore implies that uncertainty does not stem from an external occurrence but rather from the individual, the source of the uncertainty in which it manifests in various degrees. As such it depicts uncertainty as something unique to each individual, who on the one hand sees the prospect of a possible gain and on the other hand the possibility of not being able to realise it. All of which, as Simmel (1900:577) noted more than 114 years ago in his article on a philosophy of value, occurs in the midst of the certainty of a sacrifice that has to be made in the present. A sacrifice that is required as part of an endless conversion process, something Simmel (1900:581) refers to when he states:

> *Here must the object, if on the one hand it is conceived immediately as valuable, and on the other hand as means to the attainment of another value, be sacrificed as a value in itself, in order to perform its office as means.*

Simmel therefore already at such an early stage points to a philosophy of value that, to a certain extent, encapsulates part of the beholding of value process as part of the financial decision-making context. It implies a trade-off of value during which the uncertainty levels, as indicated in Figure 5.1 below, keep on escalating exponentially as the moment of choice approaches. This escalation continues until the very last moment before a choice is made or a judgement expressed. It is a choice or judgement which, once made, causes, as Gouws (Personal communication 2013, February 20) goes on to explain, a dramatic drop in entropy, which is followed by another cycle of gradual increase in entropy as the decision-maker progresses towards the next moment of choice. Entropy therefore, as Capra (1983:59-60) points out, is a measure of the disorder or randomness in the system, a measure of its uncertainty. It is an uncertainty about which Kapur & Kesavan (1992:218) note that the greater the number of constraints, the greater its structure and correspondingly the smaller its entropy.

This therefore indicates that the more information is available to an individual and, as such, the greater the structures of knowledge in the individual's mind at the individual's disposal to gain foresight into the future, the less uncertainty the individual will face with regard to the future.

Figure 5.1 The relationship between choice, uncertainty and entropy



Max Ent	= Maximum Entropy
Min Ent	= Minimum Entropy
MOC	= Moment of Choice
VP	= Value Point

Source: Gouws, personal interview, 2013, February 20

Given that entropy is a measure of uncertainty, this implies that the more information and knowledge is available, the less the entropy or uncertainty will be for the individual. To an extent knowledge therefore constrains uncertainty through the structures it creates in the mind.

5.2.3 THE GENERAL PRINCIPLE OF A LANDSCAPE OF THINGS THAT MATTER

Due to the uncertainty of the future consequences of our actions, all individuals are faced with an inherent uncertainty in the present. An uncertainty that is exacerbated by the fact that, as Dawkins (2006:24) points out, our genes have no foresight to anticipate the future. This thereby necessitates, as an evolutionary pre-requisite for survival, that we build models based on our own philosophy of value which, as Maslow (1954:176) reflects, we create as part of an artificial world in order to provide us with a frame of reference. A frame of reference, as he goes on to point out, that is unique for every individual, one which forms the third general principle of the conceptual model. It is a model-building process with regards to which Bergson (2002:250) states:

> *…that the faculty of conceiving as it advances in this work of integration, is forced to eliminate from the real a great number of qualitative differences, to extinguish in part our perception, and to weaken our concrete vision of the universe.*

This therefore implies that the frame of reference the individual builds is limited due to the individual's inability to reconstruct the real in all its complexity. As such, it forces the individual out of necessity to eliminate a great number of qualitative differences that result in a diluted depiction of what is really there. In the process it extinguishes part of what is perceived, leaving each individual with a limited but also unique vision of the universe.

Although these models or visions are unique, the fact that we build them is not. Prigogine (1996:177) reflects on this when he states that all complex adaptive systems build models, which form part of a process during which, Pirsig (1999:34) reflects, quality pre-selects what data we are going to be conscious of, best harmonising what we are with what we are becoming. This therefore suggests that quality determines the fitness and the appropriateness of the stimuli received from the senses in terms of their ability to, on the one hand restore, and on the other hand cause demise, in the dynamic balance of the individual.

Upon the determination of the stimuli's quality, a value affirmation takes place. This affirmation serves as an indication of the stimuli's significance towards the individual's dynamic balance. This, as Simon (1959:272-273) goes on to point out, is not a passive selection of some parts of the present whole, but rather an active hierarchical process of perceptual construction.

It is a process during which each value affirmation triggers a neuron oscillation, the frequency of which is entirely dependent upon the value affirmed on it. This thereby creates a pattern of oscillating neurons of which the imprint it makes on the memory of the individual forms the basis of a landscape of things that matter to the individual. It is a landscape that has, as Zajonc (1980:170) notes, evolved as part of an affective system in human beings. A landscape that embodies what Taylor (1991:40) defines as a background of things that matter. One which reflects Nietzsche's (1989:10) foreground estimates or provisional perspectives. Yet, despite however elaborate and potent this landscape's construction may be, it is not enough to supply an individual with the foresight required in order to anticipate the future. For that, something different is needed. The individual is required to conceive.

5.2.4 THE GENERAL PRINCIPLE OF REASONING

Unlike the primary value affirmation from which the landscape of things that matter emerges, reasoning forms part of a secondary value affirmation and as such forms the fourth general principle of the conceptual model. It is an affirmation which, like its predecessor, occurs as part of the continuous unfolding of value process. This is a process all individuals are born into and depart from only in death. It is the predecessor of value and as such will henceforth be referred to as $V_{(un)}$ or value unfolding (Marais & Gouws, 2013). Unfolding in the sense that it uncovers, unwraps, reveals, clarifies and evolves as it progresses in time, affirming rather than assigning value in the sense that, instead of to allot, apportion, fix, distribute or set a value, it rather authenticates, corroborates, substantiates, verifies, confirms and validates what was already there from the outset but which is now merely being made visible as it is certified or stated.

The revelation of this discovery is that what has been perceived as the aggregate of value now appears to be a mere offshoot of this much larger ongoing value process V(un). An offshoot that occurs at selective bifurcation points where value affirmations are made with regard to the significance of psychic content in relation to the importance of their contribution towards the restoration of an individual's dynamic balance.

Still further, these value affirmations first take place as part of the individual's affinitive system. As such, in the beginning they do not form part of conscious awareness and only later, as part of a secondary value affirmation, manifest in the midst of conscious awareness. Only then at that point does reasoning form part of the process. Hence in order to distinguish between value affirmations and the process from which they emanate the chapter refers to the value affirmations, the offshoots of this process as V(bi) or value bifurcation as a reference to their place of occurrence as part of the process (Marais & Gouws, 2013).

Within this context, as Bergson (2002:249) points out, reasoning fulfils a unique role in the sense that it allows an individual to conceive when perception is not granted. As such, this process appears to occur only when an individual's affective system's automated responses are inadequate to deal with what it is confronted with. Examples of these automated responses, as Zajonc (1980:172) reflects, include heuristics, habits and culture. Reasoning therefore only occurs when the individual is, as Pirsig (1999:286) notes, in a state of "stuckness". This is a state which, as he goes on to explain, should not be avoided as it is the psychic predecessor of all uncertainty. It is a state that requires courage from the individual. This is the state during which the individual is forced to conceive due to the insufficiency of the individual's faculties (Bergson 2002:249). It is a state during which the individual is confronted on the one hand by what is perceived to be known while faced on the other hand by the uncertainty of the unknown.

This thereby necessitates that the individual reasons to conceive in order to fill in the gaps left by the individual's perception (Bergson 2002:249). As such, it makes use of the unknown to define the size of the gaps in his or her perception. It is a process during which, as Simon (1959:253-272) points out, alternative choices are sought, not given, as economic man, as he goes on to reflect, searches, estimates and learns in the face of complexity.

It is a process during which, as Gigerenzer & Gaissmaier (2011:452) point out, the mind makes use of different reasoning structures, in some instances applying logic while in others making use of statistics and heuristics.

Each structure resembles the index Debreu (1959:101) spoke of, each with its own pre-ordering. A pre-ordering which, as he goes on to state, reflects not only the tastes of the individual but also the individual's appraisals of the likelihood of various events and the individual's personal attitude towards risk. This thereby depicts nothing less than a pre-ordering based on a personal theory of value.

5.2.4.1 THE GENERAL PRINCIPLE OF A WEIGHING PROCESS

In order for different reasoning structures to have a pre-ordering, a weight of some sort must be applied This weight, as Harper (2006) goes on to point out, is of a private nature and as such cannot be measured on a public set of scales. Harper therefore implies that the weight, the measure used by an individual to order psychic content, is unique to each individual. Moreover, as Musvoto & Gouws (2011:373) go on to argue, it is based on future events which cannot be measured in the present. Yet, as Samuelson (1998) as cited in Beinhocker (2007:37) notes, a pre-ordering does not require measurement. This point is also raised by Georgescu-Roegen (1971:83), who states that preference ordering must not be mistaken for comparability or measurability, for that matter. This weighing process during the affirmation of value is therefore not objective nor is it measurable from beyond the context of the individual. As Stevens (1966:396) goes on to state:

> *What measurement performed by mortals can be freed of all factors that twist and warp the result?*

Stevens here points out that all measurement has inhibiting factors that influence its results. Most measurement in any event captures only a small fragment of a much larger reality. As such, rather than attempting to measure, it appears that the weighing process used by individuals includes needs, desires and such socially shaped dispositions as habits and impulses (Dewey 1922:15-75). All of which, as Zajonc (1980:154-157) goes on to point out, form an intricate part of cognition.

None of which, as Maslow (1954:4) notes, relate to a specific localised somatic base, but rather emanates from the whole person. Reflecting upon this holistic approach, Kahneman (2003:1457) states:

> *A theory of choice that completely ignores feelings such as pain of loss and the regret of mistakes is not only descriptively unrealistic, it also leads to prescriptions that do not maximise the utility of outcomes as they are actually experienced.*

Reflecting on the above, it therefore appears that the same point raised by Kahneman with regards to a theory of choice will also hold true for a theory of value. A proposition which is strengthened by Lopes (1987:291) when she states that it is a mistake to suppose even in the realm of financial risk that choice is a purely monetary matter. Moreover, as Simon (1957:264-269) goes on to point out, emotional behaviour, its expectations and the need of the individual to minimise regret, plays such a key part in the determination process that it may even affect the dynamic stability of the economy. This thereby points to the importance of the incorporation of all these subjective individualistic human characteristics into a personal theory of value and as such makes the weighing process a critical general principle that must be included as part of the conceptual model.

5.2.4.2 THE GENERAL PRINCIPLE OF RISK

As part of the weighing process that occurs during the affirmation of value, the risk surrounding the expectation of the future impact of psychic content needs to be assessed. On the one hand this risk pertains to the possibility that the expectation about the effect the psychic content will have in the future is either over or understated, while on the other hand it reflects the possibility that the future event might not even occur at all. Thereby leaving the individual at a pivot point that is depicted in a striking manner by Nin as cited in Speerstra's (2005: 391) metaphor when he states:

> *And the day came when the risk to remain tight in a bud was more painful than the risk it took to blossom.*

This metaphor captures the essence of the movement of the individual as the individual transcends from one bifurcation point to the next, constantly, painfully having to assess the risk associated with the transition. It is a process that occurs on the interface between mind and matter and during which risk takes on a personal nature. This proposition is supported by Bernstein (1996:274) when he states that risk does not vest in events themselves or even the possible realisation of future actualities, but emanates from the context with which the decision-maker approaches the possibilities of future actualities and the subjective relevance the decision-maker attributes to them. Along similar lines, Lopes (1987:260) notes that risk has neither to do with risk nor aversion but rather with the way an individual experiences quantity. This thereby implies that risk is personal, individualised and experience-based. A proposition supported by Kahneman & Tversky (1982) as cited in March and Shapira (1987:1405) when they note that different individuals see the same risk situations differently. Moreover, as Kahneman (2003:1456-1458) goes on to point out, decision-makers' preferences appear to be determined by their attitudes to gains and losses as defined relative to a reference point. A critical aspect Kahneman (2003:1457) refers to when he states:

> *The error of reference-independence is built into the standard representation of indifference maps. It is puzzling to a psychologist that these maps do not include a representation of the decision-makers current holdings of various goods – the counterpart of the reference point in prospect theory.*

Kahneman therefore points out that every individual has a unique reference point, a unique perspective from which risk assessment takes place. Considering the beholding of value process's role towards the establishment of an individual's unique context of things that matter, and taking into account that it is this context that is used as a reference point towards the establishment of the significance of what is perceived, then it follows that no substantive difference between Kahneman's (2003:1457) reference point and this context of things that matter exists; both are essentially one and the same. Moreover, considering that, as Kahneman (2003:1456-1458) points out, gains and losses are defined relative to this reference point, then it follows that $V(_{un})$ determines how an individual will reflect upon gains and losses.

From a decision-making context, gains and losses can therefore no longer be considered generic, but rather assume a personal nature. This therefore clarifies many of the deviations found by Tversky & Kahneman (1992:298). Examples of which, as they go on to point out, include that under normal circumstances, in accordance with standard economic analysis, decision-makers are assumed to be risk-averse. Yet, as Tversky & Kahneman (1992:297-321) go on to reflect, risk-seeking choices are consistently observed in two classes of decision problems. Firstly, where there is a small probability of winning a large prize over the expected value of that prospect, and secondly where a choice must be made between a sure loss and the substantial probability of a larger loss.

This thereby points to the personalisation of risk and the fact that risk is not generic when it comes to the individual by any account. Further deviations, as Kahneman & Tversky (1984:341-350) as well as Tversky & Kahneman (1991:1039-1061) point out, also include that the asymmetry between gains and losses are far too extreme to be explained by income effects or by decreasing risk aversion. This point is also raised by Camerer & Ho (1991) as cited in Tversky & Kahneman (1992:298) who say that in contrast to the expectation principle, which states that from an outcome probability perspective, the utility of a risky prospect is linear, a non-linearity to the preferences of decision-makers exists. All of the above contribute towards the belief that risk is not generic but individualistic and personal by nature and as such has a profound implication on the beholding of value process for financial decision-making, resulting in its inclusion as the sixth general principle of the conceptual model.

5.2.4.3 THE GENERAL PRINCIPLE OF EXPECTATIONS

On the other side of the same reality as risk lie the present expectations of the future significance of psychic content. The expectation that an individual has in the present about the contribution a particular piece of psychic content will make towards either, on the one hand restoring the dynamic balance that exists between the individual and the environment or alternatively causing the dynamic balance to deteriorate. This ultimately results in a disequilibrium between the individual and the environment that, if allowed to continue, will eventually cause the individual's demise.

Irrespective of the potentially positive or negative impact of psychic content, what is made clear by Simon (1959:267) is that all individuals' expectations are future-based. Moreover, as Von Wieser (1927) as cited in Littleton (1929:152) notes:

> *Every economic value is an appraisal of needs still to be experienced.*

This therefore suggests that not only are the individual's expectations based on potential future benefits but moreover, they are also based on potential future requirements. This signifies a relational structure with regard to which Simmel (1900:599), from a personal theory of value perspective, states:

> *It is always the relation of the desires of each other, realized in exchange, which makes their objects economic values.*

Simmel therefore points out that from a personal theory of value perspective, expectations only have an affirmed value bestowed upon them as a result of their unique relationship with one another. This therefore suggests that not only expectations, but also value's affirmation on the expectation, are based on a relation to context. In addition, Posner (1978) as cited in Kahneman & Tversky (1981:4), goes on to divide these expectations into what he refers to as active expectations which, as he explains, occupy consciousness and draw on the limited capacity of attention; and passive expectations, which he claims are automatic and effortless, reflecting a disposition rather than an activity.

Moreover, as Kahneman & Tversky (1981:6) point out, active expectations obey a complementary principle necessitating a high degree of preparation for a particular event. Something they go on to explain that is normally achieved at the expense of a loss of preparation for other events. But passive priming, they note, is associated with a non-complementary pattern of benefit without cost. This therefore suggests that, as is the case with the two phases of value affirmation, expectations also occur in a pre- and post-awareness phase. Both phases of expectations play a critical role towards the beholding of value process for financial decision-making, as such leading to their inclusion as the seventh general principle of the conceptual model.

5.2.4.4 THE GENERAL PRINCIPLE OF A TRADE-OFF: SACRIFICE AND THE MAKING OF A CHOICE

Every day, individuals are confronted by what Dawkins (2006:12-294) notes to be a decay in the quality of energy, both from within and from without. It is a disequilibrium and subsequent relational inequality that manifests not only in the individual but also in the economic and social constructions that surround him or her. Examples include the inequalities Marx (1955) as cited in Tinker (1985:138-152) recognised in the rights of different classes as well as inequalities in the distribution of wealth as portrayed in the study of Davies et al. (2008:20). In order to address these inequalities and restore the dynamic balance that exists between the individual and the environment, Maslow (1954:233) states that there must be a continuous trade-off between the two. A trade-off which, on a physical level, is regulated by the two laws of thermodynamics as cited in Laszlo (1972:52). The first law stipulates that in a closed system, uncertainty or entropy will continue to increase, while the second law states that a local increase in entropy in one place must be followed by a proportionate decrease in entropy elsewhere. Bergson (1911:256) also refers to this when he states:

> *The law of the conservation of energy cannot here express the objective permanence of a certain quantity of a certain thing, but rather the necessity for every change that is brought about to be counterbalanced in some way by a change in an opposite direction.*

This therefore implies that every action towards the re-establishment of dynamic equilibrium will require a counterbalance, a sacrifice of some sort. This proposition is supported by Simmel (1900:581) who, from a personal theory of value perspective, reflects:

> *Here must the object, if on the one hand it is conceived immediately as valuable, and on the other hand as means to the attainment of another value, be sacrificed as a value in itself, in order to perform its office as means.*

Simmel therefore indicates that sacrifice is a means towards and end. In addition, Simmel (1900:577) points out that sacrifice occurs in the present. What must however be made clear is that until such time as an actual exchange takes place, the sacrifice cannot pertain to an end but only to the probabilities surrounding an end and the potential that accompanies it. Within this context each act towards the restoration of dynamic balance unlocks future potential, in a sense creating the opportunity for it to manifest.

This is an aspect Bohm (1994:236) touches on when he states that each decision is a creational act born out of creational necessity in the now. Yet, at the same time, these actions also have a striking similarity to the description used by Tobias (2005:147) when he states that it is a limiting position in an infinite process applied to only a segment of the whole.

As such it implies that when a decision-maker opens up new possibilities through the making of a choice, the decision-maker also closes off other possibilities that were available to him prior to the moment the choice was made. This therefore implies that by assuming a position, a decision-maker limits the potential that is available to him. This results in a sacrifice not only on a physical level but also in the fields of potential of the future. Although a decision can therefore, as Bohm (1994:236) stated, be viewed as a creational act, it can also be reflected upon as an act of destruction. This suggests that the counterbalance Bergson (1911:256) refers to is not only on one level, but permeates every level both from within and from outside the individual, both physical and psychological, in the present and in relation to the future. It is a counterbalance that takes the form of a trade-off, therefore necessitating its incorporation as the eighth general principle of the conceptual model.

Reflecting therefore on the process as depicted above, there appears to be no indication of an element of maximisation of value, nor does this appear to be something that, given the process, is humanly possible. This proposition is supported by findings of both Simon (1959:263) and Simon & Bonini (1958:607-617) that indicate aspirations away from maximisation towards what is attainable. Optimisation, Kapur & Kesavan (1992:4) point out, includes both maximisation and minimisation, an aspect they reflect on when they state:

> *Optimization includes maximization and minimization as well as simultaneous maximization of one function and minimization of another function.*

This therefore implies the creation of a dynamic balance through the use of what are seemingly opposites. Yet despite which, as Wilber (2001:19-37) goes on to reflect, represents a single reality. It is a reality with regards to which Nietzsche (1989:11) states:

> *Behind all the logic and its seeming sovereignty of movement, too, there stand valuations or; more clearly, psychological demands for the preservation of a certain type of life.*

Nietzsche therefore points out that behind the decay, disequilibrium, flow and change, the requirement of foresight from which a landscape of things that matter emerge, the reasoning, weighing, assessment of risk, anticipation of future expectations and the trade-off towards the restoration of the individual's dynamic balance, stand valuations. These valuations preserve not life but an individualistic, personal certain type of life that is unique to each individual and that requires a most intricate continuous re-establishment of dynamic balance towards its preservation; it requires a personal theory of value.

5.3 CONCLUSION

With this chapter, as part of Activity 1 of the Mitroff model, possible general principles for a conceptual model of the beholding of value process for financial-decision making were discussed. This included a reflection on the possible general principles of flow, change and disequilibrium. It was followed by a discussion on the possible general principles of uncertainty, the creation of a landscape of things that matter, reasoning, weighing, risk, expectations and a trade-off which ultimately results in a sacrifice and the making of a choice.

Moreover, the chapter argued for the existence of a continuously unfolding beholding of value process $V_{(un)}$. It is a point of great significance as it reveals that what has until now been seen as the aggregate of value is a mere offshoot of this much larger ongoing value process $V_{(un)}$. An offshoot $V_{(bi)}$ that occurs at selective bifurcation points where value affirmations are made with regard to the significance of psychic content in relation to their importance towards the restoration of an individual's dynamic balance.

Still further, it argues that these value affirmations first occur outside the sphere of conscious awareness and that it is only later during a secondary value affirmation that occurs in the midst of conscious awareness that reasoning forms part of the process.

The chapter then concludes by pointing out that every individual has a personal theory of value and that it is this personal theory of value that forms the essence of how an individual beholds value.

CHAPTER 6

ACCOUNTING VALUATIONS AND THEIR CONTRIBUTION TOWARDS INCREASING THE QUALITY AND USEFULNESS OF INFORMATION FOR FINANCIAL DECISION-MAKING

6.1 INTRODUCTION

When a financial decision is made, the decision-maker, the beholder of value, has many different sources of information at his disposal that influence how he affirms value. Some of these sources are of a financial nature and some are not. Yet no source is excluded from the beholding of value process. As a key provider of financial information that is not only used for interpretive but also, from an auditing perspective, for validation, much has been written in accounting literature about value and decision-making. Some of it dates as far back as 1929, when Canning (1929:3) made this remark:

> *As the theory of value constitutes the very vitals of economic theory, so also does valuation constitute the chief technical pre-occupation of accounting theory.*

Canning even at that early stage implied that value constitutes the essence of both economics and accounting, thereby placing value at the very centre of both disciplines, reflecting the proud heritage of importance that value has enjoyed since then. Yet, despite being the chief technical pre-occupation of accounting theory, and the significant body of work that has been written on the respective subjects, Ball (2004:372) reflects:

> *Few stones have been left unturned in studies of how we make our decisions…and there is no consensus view on this question…*

This reflects a perspective in which Ball is not alone.

Along similar lines, March (1987:162) points out that information that has been prepared with care (careful information) about the ways in which decision-makers use information and make decisions is scarce. Burchell et al (1980:13) note that the relationship between accounting information and decision-making has rarely been examined critically. Yet it is through decision-making that accounting meets its objectives.

As such, the purpose of this chapter is to examine the constellation of interrelated variables between accounting and the beholding of value process V(un) and to determine what, from a disclosure perspective, is required in relation to V(bi) in order for it to contribute meaningfully towards the decision usefulness of the users of accounting information. It is an examination conducted by the chapter as part of a trans-disciplinary critical literature analysis in order to, from a systems theory perspective, establish a personal theory of value from which, in conjunction with a philosophy of science approach, general principles can be derived to which specific conditions are then added that in turn, as part of the Mitroff model, are used towards the construction of a model of the beholding of value process for financial decision-making.

As such, the chapter commences with a review of the relationship between accounting and the beholding of value process and establishes how this relationship has transformed accounting from a purely cost-based recorder towards a value-orientated reporter of information. It then clarifies the nature of accounting valuations, after which it proceeds to examine the relationship that exists between accounting, in the form of ASC 820 and IFRS 13 and the beholding of value process V(un). It points out what disclosure requirements already exist, while assessing what, in terms of the beholding of value process V(un), further needs to be disclosed in relation to V(bi) in order for V(bi) to, as part of the information accounting provides to its users, make a meaningful contribution towards the user's financial decision-making process.

6.2 ACCOUNTING'S RELATIONSHIP WITH THE BEHOLDING OF VALUE PROCESS: THE TRANSFORMATION OF ACCOUNTING FROM A PURELY COST-BASED RECORDER TOWARDS A VALUE-ORIENTATED REPORTER OF INFORMATION

In accounting, value has not always featured as strongly as it does today. This point was reflected by Littleton (1929:147) in 1929 when he stated:

> *Value has not always been one of the problems of accounting… down to very recent years, little or no problem of value existed because, being a record, bookkeeping dealt with what was, that is to say, with price paid or price received, and never with what might be, which is to say value.*

With this statement he demonstrates that up to that point, accounting had, to a great extent, concerned itself with closed economic transactions, ie price. That which, as he goes on to point out, reflects the value of no particular individual, but rather represents a common meeting ground of two or more valuations, a meeting of wills, a compromise between subjective estimates, measured by the amount of money for which an article is exchanged.

In contrast, despite occurring at a bifurcation point, value does not represent a point but rather represents a range of expectations of the future surrounding the potential of psychic content and the sacrifices that accompany them. The potential of which diminishes inversely in relation to the increase in entropy associated with the decision or bifurcation point, as the decision-maker progresses through time towards the moment of choice. It is a process that Littleton (1929:149) contends is future-orientated. It counters, as Dawkins (2006:12-294) points out, the continuous decay in the quality of energy. It is a process that necessitates the continuous restoration of dynamic balance between the decision-maker and the environment. This process, as Holland (2000:53-57) points out, requires an anticipation of the future; or put differently, requires foresight of the future. This foresight in turn requires information, the proverbial fuel from which its expectations emanate, and on which value is affirmed.

It is information that Wheatley (1994:104) contends organises the flow of energy through matter into form. It structures it and in the process causes a reduction in uncertainty which March (1987:154) reflects on when he states:

> *The main uncertainty in decision-making is portrayed as ignorance about future consequences of possible current actions, including ignorance about the knowledge possessed by others and the probable actions, and the main rationale for information is its role in reducing the uncertainty.*

This characteristic is also raised by Galbraith (1973) as cited in Burchell at al. (1980:14) when he states:

> *Information processing mechanisms are means towards the reduction of uncertainty.*

As such, given accounting's role as a key provider of financial information that is not only used for interpretive purposes but also from an auditing perspective for validation, it follows that the information it provides should enable its users to, in terms of its role as defined by Tinker (1985:81), resolve social conflicts, appraise the terms of exchange between social constituencies, be an institutional mechanism for arbitrage and evaluate and adjudicate social choices. These are aspects that are value- and not price-orientated. They require information towards the validation of expectations of the future. The relevancy or, put differently, the usefulness of the information will depend on the context of the user, as Burchell et al (1980:7) point out.

Based on the above information, as supplied by Tinker (1985), Burchell et al (1980) and March (1987), to limit the information supplied to the users of accounting information to the price obtained from a closed economic transaction, brings into serious question not only the usefulness of such information for financial decision-making but also deeply affects the quality of the information in terms of its ability to allow its users to validate the respective values they have affirmed on their own expectations of the future.

In recognition of the serious constraints that the exclusive recording of price places on the usefulness and quality of accounting information, a continuous integration of value into the framework of accounting has occurred.

Over the past five decades, since the American Accounting Association's (1966:1) initial departure from the Committee on Terminology of the American Institute of Certified Public Accountants (1953:par.5), during which it embraced a broader definition of accounting than the historic cost-based perspective it held in the past, a significant evolution of the concept of value within accounting has taken place. This initially progressed accounting towards defining it as the process of identifying, measuring and communicating economic information to allow for informed judgements and decisions by the users of accounting information. These judgements and decisions cannot take place without the affirmation of value which, by its nature, is subjective, individualistic and future-orientated; reflecting a transition in accounting from the recording of the prices of closed economic transactions towards the reporting of economic information, which has a future-orientated purpose associated with it.

Moreover, as part of AAA (1966:7) as cited in Wolk, Tearney & Dodd (2001:178) it, on the one hand, pushes for the disclosure of significant relationships, while on the other aims for uniformity and a consistency in practice towards the creation of a shared context within which the relationship can acquire meaning. Judgements and significant relationships that later, as part of the Accounting Principles Board (1970:par.40), acquired quality and usefulness as reflected by paragraph 40, when it defines accounting as a service activity whose function is to provide qualitative information, primarily financial in nature, about economic entities that is intended to be useful in making economic decisions and resolved choices among alternative courses of action.

Decisions involving choices among alternative courses of action cannot be made without affirming a value on each alternative course of action. This process requires foresight, and the significance of the value affirmed will be dependent upon the context and the scales used by the decision-maker making the evaluation. It thereby suggests a personalisation of the shared context as proposed in AAA (1966:7) as cited in Wolk, Tearney & Dodd (2001:178). In October 1970, the Accounting Principles Board issued Statement number 4 in which it highlighted that the objectives of financial statements are to present financial position, results of operations, and other changes in financial position fairly and in conformity with generally accepted accounting principles.

Changes in financial positions signify an attempt by the accounting profession to encapsulate the change in information emanating from the flow between consecutive financial positions on behalf of its users, the beholders of value. It thereby acknowledges that the information required for decision-making, that which is needed for foresight in order to affirm value placements, vests in the changes that occur.

This signals a transition away from that which is, towards that which is becoming. As part of this statement Belkaoui (2004:166) points out that evaluations are required of the business enterprise's profit-directed activities, which, as he goes on to explain, entails an evaluation of its strengths and weaknesses, its ability to meet its commitments as well as its expected dividend returns to investors. In addition, he notes that the accounting profession is also required to provide its users with the financial information used to estimate the earnings potential of a firm. Thereby signifying the beginning of a trend towards providing its users with future-orientated information that can not only be used towards the validation of the user, the beholder of value's own value placements, but moreover, add to the expectations of the beholder, and as such make a direct contribution towards providing the beholder with foresight in anticipation of the future.

This trend continued in 1973 with the Trueblood Report as cited in Belkaoui (2004:167-172), requiring the accounting profession to provide as part of Objective 1 of the report, information on which economic decisions can be based. Objective 3 of the report expands on Objective 1 by defining the type of information that economic decisions can be based on to be useful. Moreover, it clarifies what is useful by describing it as information that allows the user to predict, compare and evaluate potential cash flows in terms of their amount, timing and related uncertainty. Thereby not only providing guidelines with regards to the usefulness of information but also describing the process that must be used during financial decision-making. A process that, in accordance with Objective 4, allows the users of accounting information to predict, compare and evaluate an enterprise's earning power. It is a future-orientated process that enables the users to either validate the values they have affirmed on their own expectations and associated sacrifices; or provide additional information that contributes towards creating new expectations in the beholder.

That in turn alters the landscape of things that matter, causing value adjustments to a more or lesser extent to all values already affirmed. As such, the Trueblood Report appears to highlight not only many of the same critical aspects but in fact one and the same process that this thesis has worked towards describing and making visible on both a material and a psychological level, as it continues to behold value for financial decision-making. This is a process that was followed in order to provide more useful information for the users of accounting information and to obtain a more reliable measure of value to, as Ryan (2008:2) notes, improve the guidance surrounding fair value measurement in order to deal not only with illiquid but also with highly volatile and disorderly markets.

6.3 ACCOUNTING VALUATIONS IN FINANCIAL DECISION-MAKING

6.3.1 THE NATURE OF ACCOUNTING VALUATIONS

With the transformation of accounting from a cost-based to a value-based approach, it has, as Littleton (1929:150) foretold as early as 1929, been loosened from its anchor of fact and been put afloat amid a sea of psychological estimates which, as he goes on to state, however important they may be to business management, are beyond the power of accounting to express. Littleton (1929:150) here points to the future-orientated nature of value and the fact that its affirmation on psychic content is not based on the present, or, put differently, on what is, but is rather based on the unique contextual subjective estimates of the individual making the evaluations of what might possibly be.

This is a prospect that also deeply concerns Sterling (1968:481-502), who contends that it creates an undeniable future dependency; with all financial statements becoming provisional and dependent on future events whose attributes cannot be conclusively measured. In order for measurement to occur, Decoene, Onghena & Janssen (1995:234-242) state that it must be grounded in reality. This is of importance because as Musvoto & Gouws (2011:36) go on to state:

> *If a property lies in the future, its relationship with a numerical relational structure cannot be precisely specified.*

Hence if the relationship of the numerical relational structure cannot be precisely specified the property cannot be measured. Yet, as Orbach (1978) as cited In Musvoto & Gouws (2011:35) go on to reflect, expectations have legitimate properties in the present that are measurable. When the accountant therefore on behalf of the users of accounting information beholds value, the accountant's value, when supplied to the users of accounting information, is transformed by their perspective into a legitimate property of an expectation of the future. A property which the users of accounting information then use to draw their own conclusions from as they go about affirming value on their own psychic content in relation to their unique backgrounds of things that matter. Within this context, the value that the accountant supplies is not an end in itself but merely a means to an end; one which improves not only the usefulness but also the range and quality of information that is provided to the users of accounting information towards the affirmation of their own values.

6.3.2 ACCOUNTING VALUATIONS IN FINANCIAL DECISION-MAKING

Following Standard number 140, the Financial Accounting Standards Board issued Statement No 157: Fair Value (Expectation) Measurements (FAS 157) in September 2006. This statement was broadly applied to financial and non-financial assets and liabilities, but, due to the absence of a single consistent framework for applying fair value measurement, resulted in its application to non-financial assets and liabilities being deferred until 2009. At that time it was subsumed into FASB Accounting Standard Codification (ASC) Topic 820 (Fair Value Measurement); of which the IASB delivered its own version in May 2011 in the form of IFRS 13, which, as Duff & Phelps (2011:1) point out, for all intents and purposes is virtually identical, causing both documents to henceforth be addressed together.

The objective behind the introduction of ASC 820 as well as IFRS 13 was to, as Duff & Phelps (2011:1) point out, create consistency for the accounting community when arriving at an estimate of fair value. The main rationale behind their introduction is therefore, as is the case with the rationale behind all information, to, as March (1987:154) points out, reduce uncertainty. ASC 820 and IFRS 13 therefore, as Duff & Phelps (2011:1) go on to explain, help address how fair value should be measured by serving as general guides towards improving inconsistencies and comparability.

This helps the preparers and auditors of accounting information to fulfil their role while contributing towards the users' understanding of what fair value represents. ASC 820 and IFRS 13 are therefore attempts to provide structure to the accounting profession on how value must be beheld and in what manner information surrounding the compilers of accounting information's perspective of future expectations must be supplied to the users of accounting information in order to best assist them when they draw their own conclusions when predicting, comparing and evaluating potential cash flows in terms of their amounts, timing and related uncertainty.

From this perspective one can also reflect on IFRS 13 or ASC 820 as guides that in some instances provide general principles and in other instances specific conditions for the compilers of accounting information as they, albeit for a brief moment, assume the position of the beholder of value on behalf of the users of accounting information. Yet, by assuming the position of the beholder of value, the compilers of accounting information require not only the general principles and specific conditions provided by IFRS 13 and ASC 820 but first and foremost need a comprehensive personal theory of value, which, as demonstrated by this thesis, given the subject matter, necessitates the use of systems theory to conduct a trans-disciplinary critical literature analysis.

Having as part of Chapter 5 put forward a proposed personal theory of value, this thesis therefore supplements IFRS 13 and ASC 820 in the sense that, through the proposed personal theory of value that it provides, it creates a framework from which further general principles and specific conditions can be derived. It thereby provides an opportunity for the creation of a more comprehensive structure with regard to the way in which the compilers of accounting information behold value on behalf of the users of accounting information and the manner and format that the information obtained from this beholding of value process is conveyed to its users. Still further, the compilers of accounting information require a model of the beholding of value process for financial decision-making. A model of which the general principles, as derived from the personal theory of value, serve as general templates to which specific conditions can be attached to form the basic elements of the model (Giere 2004:745).

As such, towards the establishment and further refining of the general principles and their related specific conditions of the beholding of value process, the chapter proceeds to reflect on ASC 820 and IFRS 13, pointing out not only how the general principles and specific conditions identified by them relate to the proposed personal theory of value as established as part of Chapter 5, but also the subsequent contribution they make towards the decision usefulness of accounting information in terms of the beholding of value process for financial decision-making.

According to both Duff & Phelps (2011:2), and Deloitte (2014) IFRS 13.1 Fair Value is defined as:

> *The price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date.*

This is a definition, that, in accordance with International Valuation Standards (IVS 2007) 1, 2 and 3, requires that a clear distinction between Fair Value as defined by Appendix A (IFRS 13), and Market Value, as defined in the IVS (2007) 1, 2 and 3 be made. This is of special importance considering the two schools of thought that exist about the relationship between market price and fair value. On the one hand is the efficient market hypothesis as cited in Bodie, Kane & Marcus (1998: 9-10) asserting that, in an organised transparent market, the market price is generally equal to or close to the fair value. On the other hand behavioural finance, as reflected in Ricciardi & Simon (2002:27-35), which stipulates that the market price deviates from fair market value due to a range of factors, the details of which were discussed as part of Chapters 3, 4 and 5.

According to Standard 2 (IVS 2007) as part of Point 6.3, fair value requires the assessment of a price that is fair between two specific parties, taking into account the respective advantages or disadvantages that each will gain from the transaction. Although, as shown under Point 6.4, market value may meet this criterion in many instances, it is not the case with, as a result of synergies, fair value allowing for a special value to be incorporated into it; something that market value disregards.

As such, fair value is representative of information about expectations surrounding a future exchange, with both ASC Topic 820 and IFRS 13 emphasising the use of market inputs in estimating the fair value of assets or liabilities. This indicates, as Duff & Phelps (2011:1) point out, that the assumptions used to estimate fair value should be from the perspective of an unrelated market participant, in other words the beholder of value against whose context the affirmation of value takes place and without which there can be no value. Fair value, in terms of ASC Topic 820 and IFRS 13, therefore not only acknowledges the future-orientated nature of value but also the fact that it is based on the belief, the individualistic subjective perspective of the beholder thereof with regard to the beholder's future expectations in the present. In addition, as pointed out by Duff & Phelps (2011:3) as well as Deloitte (2014), IFRS 13 makes use of a three-tier fair value hierarchy which, to an extent, may also be reflected upon as part of the general principle of creating a context or landscape of things that matter to which various specific conditions are attached. Each tier reflects the level of judgement involved in estimating the fair value, with as IFRS 13.76 notes, Level 1 implying a quoted price in an active market for identical assets or liabilities. Taking cognisance of the fact that in many cases active markets for identical or similar assets and liabilities are relatively uncommon, and even when they do exist will not necessarily provide adequate data, the FASB with IFRS 13.81 provide a second level of inputs based on market observables that can be applied and which include such aspects as quoted prices for similar assets, interest rates, yield curves, credit spreads, payment spreads etc with the prerequisite being that the assumptions used to estimate the fair value must be as if they came from an unrelated party when making the assessment. Fair value estimates using unadjusted or adjusted market prices are commonly referred to as market-to-market values (Ryan 2008:3).

With IFRS 13.86, the FASB describes Level 3 inputs as "unobservable", thereby fully acknowledging that the fair value measures of these assets and liabilities are less precise. Within this level, significant assumptions or inputs that are not observable in the marketplace are used as part of the valuation techniques. As such these inputs require either internal information, which is only allowed when the cost and effort needed to obtain the external information is too high; or external information, when and where affordable. These types of fair values are what Ryan (2008:3) refers to as market-to-model values.

As part of this general principle of ASC820 and IFRS 13, each tier or level of judgement refers to the level of uncertainty faced by the accountant as the beholder of value when assessing the possibility of the outcome of his or her future expectations on behalf of the users of accounting information. This gives the users an indication of the level of certainty or uncertainty, for that matter, that surrounds the determination or assessment of the outcome of the future expectation at the time of the value affirmation. Moreover, because value, as Debreu (1959:33-35) points out, is dependent upon the index or, put differently, the scales used to measure it with, the tiers provided by IFRS 13.76, 13.81 and 13.86 serve as a numerical relational structure. With, as Narens (2002:787) reflects, the entire objective of the numerical relational structure within the scale paradigm being to attempt to map its qualitative structure. In other words to map the qualitative structure of the value affirmation made in order to provide a context for the value affirmation's interpretation by the users of accounting information. This qualifies the value affirmations presented by the compilers of accounting information to the users of the information prior to their transformation of it into legitimate properties of future expectations. Hence allowing the users of accounting information the opportunity to alter the significance they attach to the property while drawing their own conclusions as they go about affirming value on their own psychic content in relation to their unique backgrounds of things that matter. The tiers therefore limit misrepresentation and as such make a significant contribution to improving the usefulness of accounting information towards the establishment of the required foresight needed by the users of accounting information in anticipation of the future.

Apart from the mapping of the qualitative structure of the compilers of accounting information's affirmation, IFRS 13 also lays the foundation towards the structuring of a context or landscape of things that matter in relation to which the compilers of accounting information's value affirmation takes place. A general principle that Deloitte (2014) refers to as IFRS 13's guidance on measurement which includes IFRS 13:11, 13:15, 13:24, 13:27, 13:34, 13:42, 13:48 and 13:96.

In addition to the above, there are also several other external factors or specific conditions that can influence the context or landscape in relation to which a value affirmation is made, subsequently requiring a reassessment of the value affirmation as and when they occur. Examples of which, as Ryan (2008:4) points out, include that:

1. Even liquid markets get values wrong on occasion.
2. Firms may have to make adjustments in order to compensate for market illiquidity.
3. Dissimilarity in the fair values of an asset or liability when compared to the observed market price causally in many instances results in:

    - Large and judgemental adjustments;
    - Judgement being required about which valuation models and inputs to use;
    - The limitations of models being exposed, with different models capturing relevant aspects of the value position differently.

Moreover, several internal factors or specific conditions can also cause the landscape or context in relation to which a value affirmation is made to be altered, as such requiring the value affirmation to be reassessed. An example of this is for instance IFRS 13:94 where a firm is provided with options in relation to the class that an asset or liability should belong to; options that require the exertion of a judgement on the part of the entity; with the type of class also affecting the disclosures required or, as is the case with IFRS 13:7, the exceptions that apply. Yet, as is clearly stipulated by IFRS 13:94, the judgement is not that of the accountant but rather that of the entity.

Any alteration in judgement therefore on the part of the entity causally also alters the landscape or context within which the value affirmation was made, and as such, in accordance with IFRS 13:94, must be disclosed to the users of the information. IFRS 13:94 further stipulates that the entity must determine the appropriate class on the basis of the nature, characteristic and risk of the asset or liability, and the level of the fair value hierarchy within which the fair value measurement is categorised.

Apart from the abovementioned internal and external specific conditions that can cause the landscape or context in relation to which the value affirmation was made to be altered, there is also an amplification effect when dealing with expectations of the future which stems from the time lag towards verification that can cause the context or landscape against which a value affirmation is made to be altered. Examples of which Ryan (2008:11) notes include bubble prices, which result in unrealised gains or loss reversals. Furthermore, as he goes on to explain, when distributions of future cash flows are skewed, fair values will tend to be revised by relatively small amounts when they are revised in the direction of the most likely future cash flow but by relatively large amounts when they are revised in the opposite direction. Still further he notes that if investors overreact due to reported unrealised gains and losses, then fair value accounting may yield adverse feedback effects that would not occur if amortised cost accounting was used instead.

From the above it follows that the integration of value affirmations into the framework of accounting introduces an increased amount of volatility into it. An aspect to which the International Monetary Fund (2008: xiv) responded by stating:

> *[a]ccounting standard setters will increasingly need to take into account the financial stability implications of their accounting practices and guidance.*

In addition, the International Monetary Fund (2008:127) further states that while *"fair value accounting gives the most comprehensive picture of a firm's financial health… investment decision rules based on fair value accounting outcomes could lead to self-fulfilling forced sales and falling prices when valuations fell below important thresholds (either self-imposed by financial institutions or by regulation)".*

The international Monetary Fund (2008) therefore points out the dangers that accompany fair value accounting if, as Littleton (1929:150) as early as 1929 already pointed out, accounting is not anchored as it is put afloat in a sea of psychological estimates. To therefore further anchor accounting IFRS 13.61 and IFRS 13.67 add what they deem appropriate valuation techniques in order to measure fair value; with relevant observable inputs being maximised and unobservable inputs minimised as far as possible.

By placing a higher value on stimuli that are seen rather than on stimuli that are not, IFRS 13.61 and IFRS 13.67 confirm information of expectations of the future in the same manner that the beholder would do as part of familiarity heuristics. A heuristic which, as Matlin (1971:295-300) goes on to explain, suggests that in general stimuli that are seen are more liked than stimuli that are not, thereby causing the stimuli that are seen to obtain a higher level of significance than those that are not.

Further contributing towards the specific conditions attached to the general principle of a context or landscape of things that matter, IFRS 13:62 puts forward three widely used valuation techniques which include:

- Market approach – uses price and other relevant information generated by market transactions involving identical or comparable (similar) assets, liabilities or groups of assets and liabilities;
- Cost approach – reflects the amount that would be required currently to replace the service capacity of an asset (current replacement cost);
- Income approach – converts future amounts (cash flow or income and expenses) to a single current (discounted) amount, reflecting current market expectations about those future amounts.

In this regard, as Ryan (2008:4) goes on to point out, it must be remembered that all valuation models are limited with different models capturing value-relevant aspects of positions differently. Hence as he goes on to explain, firms must often apply valuation models using inputs derived from historical data that predict future cash flows or correspond to risk-adjusted discount rates imperfectly. Still further, as he reflects, the period firms choose to analyse historical data to determine these inputs can have a very significant effect on their market-to-model values. This indicates that the type of technique will be dependent upon the context from which the information is derived. As such, IFRS 13:63 indicates that in some instances a single valuation technique will be more appropriate, whereas in others multiple valuation techniques will be required.

Adding further specific conditions in relation to the general principle of a context or landscape of things that matter, IFRS 13:91 stipulates that an entity must disclose information that helps the users of its financial statements to access the valuation techniques and inputs used to develop the measurements used to measure assets and liabilities at fair value. Where, as is the case during Level 3, significant unobservable inputs are used in order to establish a fair value measurement, the effect of the measurements on the profit or loss or other comprehensive income for the period must be disclosed. Specific conditions are also, as part of IFRS 13:94, attached to how an entity should determine the class to which an asset or liability should belong, with the appropriate class being determined based on the nature, characteristic and risks of the asset or liability, and the level of fair value hierarchy with which the fair value measurement is categorised.

Nature and character here imply an assessment of an asset or liability's inherent features, its basic qualities (Turnbull et al 2010:984; Soares & Stevenson 2008:954). These are qualities that, once established, are then – in accordance with IFRS 13:94 – placed in relation to the uncertainty associated with the possibility of their loss. Because on a conscious level IFRS constructs a landscape in relation to which the compilers of accounting information can behold value on behalf of the users of accounting information, it follows that – unlike with an individual's personal landscape of things that matter, in relation to which quality forms part of the individual's affinitive system during conscious unawareness – quality within the context of the IFRS landscape forms part of the reasoning process of the conscious awareness of the compilers of accounting information. Significantly, IFRS 13:94 therefore demonstrates that once those processes that form part of a beholder of value's conscious unawareness are made visible, it is possible to consciously recreate them. This creates a framework against which the compilers of accounting information can consciously behold value in relation to guidelines that conform to the same processes that the users of accounting information themselves would have used to behold value. With the guidelines or, put differently, the general principles and the specific conditions associated with them merely making the contextual relationship within which the value affirmation takes place visible to the users of the accounting information.

On the same principle as outlined above, IFRS 13:93 goes on to provide a list of specific disclosure requirements based on the level of the fair value hierarchy within which the fair value measurements are categorised. In this instance, apart from the contextual nature of the information it provides, it also creates accountability on the part of both the compilers of accounting information in terms of the fair value measurements they provide, and on the part of the management of the entity with regard to how non-financial assets are used. An example of this is reflected by the fact that if the highest and best use of a non-financial asset differs from its current use, IFRS 13:93 requires that the entity must disclose that fact, and also clarify why the non-financial asset is being used in a manner that differs from its highest and best use. In relation to fair value measurements categorised as part of Level 3 of the fair value hierarchy, IFRS 13:93 also requires the disclosure of a narrative describing the sensitivity of the fair value measurement to changes in unobservable inputs as well as a description of the interrelationships between the unobservable inputs, with an indication of how they might magnify or mitigate the effect of changes in the unobservable inputs.

The narrative therefore on one level implies an account of the connected events that resulted in the value affirmation (Soanes & Stevenson 2008:951). While on another level it implies the act of describing, of making the process responsible for the value affirmation visible (Turnbull et al 2010:981). IFRS 13:93 therefore refers to the same process that this thesis has attempted to make visible as it went about unfolding it in order to establish its origin, purpose and role. This is a feat made possible through the use of a systems theory approach that, as part of a trans-disciplinary critical literature analysis, was used to establish a personal theory of value. A theory from which, in conjunction with a philosophy of science approach, general principles could be derived and with regards to which specific conditions could be added that in turn, as part of the Mitroff model, could then be used towards the construction of a model of the beholding of value process for financial decision-making.

By its own account, IFRS 13:93 notes that this process entails the establishment of the sensitivity of the fair value measurement to changes in unobserved inputs. This aspect, as was indicated in Chapter 5, firstly requires a general principle that encapsulates not only change but also flow and disequilibrium.

Furthermore, as outlined in Chapter 5, from a modelling perspective it will also require a general principle of uncertainty. Only when these general principles have been established and clearly defined does the general principle come into play with regards to which both ASC 820 and IFRS 13 are dedicated, to a large extent, to the general principle of a landscape of things that matter.

Furthermore, in order to determine the magnifying or mitigating factors raised by IFRS 13:93 in relation to change, the trans-disciplinary critical literature analysis conducted in Chapters 2 to 5 indicate that several other general principles are also required which include a general principle for the reasoning and weighing process used during the value affirmation process.

Still further, as part of the weighing process that occurs during the affirmation of value, a general principle of risk in relation to the expectations of the future impact of the content under consideration needs to be assessed. As such, it follows that a general principle of the expectations of the future significance of that in relation to which the value affirmation is made, must also be established. Only once this is done is it possible to determine the effects that the constellation of interrelated variables between the unobservable inputs will have in relation to change.

6.4 CONCLUSION

In this chapter, as part of Activity 1 of the Mitroff model, the point was made that although value has a proud heritage of importance at the very centre of the discipline of accounting, no consensus on how human beings go about making financial decisions exists, with the relationship between accounting information and decision-making rarely being examined critically; this while it is only through decision-making that accounting can meet its objectives.

As such, by first examining accounting's relationship with the beholding of value process, the chapter found that over the past five decades, accounting has been transformed from a cost-based recorder towards a value-orientated reporter of information.

Furthermore, in terms of the nature of accounting valuations, the chapter pointed out that when the compilers of accounting information on behalf of the user of accounting information beholds value, the compilers of accounting information's value, when supplied to the users, is transformed into a legitimate property of an expectation of the future which the users then, on their part, use to draw their own conclusions as they go about affirming value on their own psychic content in relation to their own unique background of things that matter.

Still further, the existing constellation of interrelated variables between accounting and the beholding of value process V(un) was examined in order to determine what, from a disclosure perspective was, in relation to V(bi), required in order for it to make a meaningful contribution towards the decision usefulness of the users of accounting information. From this examination it was ascertained that in order for ASC 820 as well as IFRS 13 to meet their disclosure requirements, a personal theory of value must first be established from which general principles can then be derived. Moreover, it demonstrated that, as this process has already been followed as part of Chapter's 2 to 5 of this thesis, several general principles have as part of Chapter 5 been identified that are capable of, from a disclosure perspective, making significant contributions towards improving the decision usefulness of accounting information in relation to both V(un) and V(bi). Still further, the chapter goes on to point out that the general principles derived from the personal theory of value serve as general templates to which further specific conditions can then be attached, eventually forming the basic elements of a model of the beholding of value process (Giere 2004:745). This is a model in relation to which value affirmation can take place, thereby still further improving the quality of information that accounting presents in relation to V(un) and V(bi) to the users of its information.

CHAPTER 7

THE CONCEPTUAL FINANCIAL VALUE DECISION-MAKING MODEL

7.1 INTRODUCTION

Literature indicates that man creates complex models in order to not only describe and make sense of the world that surrounds him but also to anticipate an uncertain future. This is reflected by, among others, Prigogine (1996:177) and Holland (2000:53-57). Moreover, as Maslow goes on to point out, these models provide a frame of reference that is unique for every individual. This frame of reference reflects structure on all levels, fitting detail into general frameworks and relationships. As such it takes on what Laszlo (1972:13; 1984:20) refers to as a systems theory approach. This is a broad-based approach that cannot be studied or researched from narrow specialist and disciplinary aims because it transcends them.

Despite this, disciplinary thinkers, as Mitroff et al (1974:46) go on to reflect, continue to persist in their study of science in this manner as they:

> *…have become more concerned with obtaining their narrow specialist and disciplinary aims than with obtaining a broad-based systems characterization of science which, almost by definition, is bound to conflict with any of the disciplinary characterizations in its attempt to transcend them.*

Mitroff et al therefore suggest that where a systems characterisation of science is required, it will almost definitely lead to a conflict with the disciplinary characterisations of any one particular discipline as it transcends it. Yet researchers who conduct research on trans-disciplinary constructs such as value have no alternative but to engage in this conflict.

This is a point made evident by Mitroff et al (1974:46) when they state:

> *…there are certain aspects of science which can only be studied from a whole systems perspective and anything less than a holistic view of science will fail to pick up certain of science's most essential characteristics.*

As such the purpose of this chapter is to, through the use of Mitroff et al's (1974:46-48) programme that was designed to study science from a holistic or systems point of view, use Circle 1 Activity 1 of its problem-solving model to address the conceptualisation of the model of this thesis whose aim is to make the process responsible for the creation of each individual's frame of reference visible.

To assist in the design of Mitroff et al's (1974:48) conceptual model, Giere's (2004:745) philosophy of science approach is used whereby principles act as general templates for the construction of more specific abstract objects or models. This is a process during which, as he goes on to explain, specific conditions are attached to general principles which in turn go on to form the basic elements of the model. In addition Giere's (2004:743) representational formula is applied:

> *S uses X to represent W for purposes P.*

S represents the researcher who uses X in the form of a statement obtained from leading figures in those fields contributing most to the researcher's understanding of value to represent an aspect of the real world – W for purposes P. Each statement pertains to a specific model element that as Giere (2004:747 notes can be identified with features of the real world, thereby making it possible to use models to represent aspects of the real world. This process eventually leads to P, the purpose of which is to test the statement and the subsequent model element it relates to for its representational faithfulness when compared to the aspects it represents in the real world.

In order to assist in obtaining the general principles and their subsequent specific conditions from which the statements could be formulated, a personal theory of value was constructed by, from a systems theory perspective, conducting a critical trans-disciplinary literature review based on the three postulates of Nicolescu (2005:5).

They stipulate that there are in nature, and in our knowledge of nature, different levels of reality and correspondingly different levels of perception, with the passage from one level of reality to another being ensured by the logic of the included middle. Moreover, as he goes on to point out, they are based on the acknowledgement that the structure of the totality of levels of reality or perception is complex, with every level being what it is because of all the levels existing at the same time.

Hence the chapter commences with a discussion of Circle 1, the reality of the problem statement. It then proceeds with Activity 1, which pertains to the conceptualisation of the model. This is followed by an overview of the critical trans-disciplinary literature review that was conducted and from which general principles emerged on which the financial value decision-making model could be based. The chapter then proceeds to discuss the general principles as part of the conceptual financial value decision-making model before reaching a conclusion.

7.2 DEVELOPMENT OF THE CONCEPTUAL MODEL OF THE BEHOLDING OF VALUE PROCESS

7.2.1 THE MITROFF MODEL

7.2.1.1 CIRCLE 1 – REALITY PROBLEM SITUATION

Using Mitroff et al's (1974:46-58) problem-solving model, research commenced in Chapter 1 with the defining of a problem statement which indicated that at present it is not clear at what level of consciousness value formation occurs, nor what process is responsible for its formation nor what the interrelationship is between this process, change and the future-orientated aspect of decision-making. As such it leaves open the possibility that if, as is suspected, this process occurs pre-intellectually, a large part of the financial decision-making process has been left unaccounted for, or worse, is misrepresented by an ambiguous and often limited concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process. Following the outline of the problem, the study then proceeds with Activity 1, which entails the process of conceptualisation.

7.2.1.2 ACTIVITY 1 – CONCEPTUALISATION

To behold value for financial decision-making requires a beholder. Furthermore, it necessitates something for the beholder to behold, that on which value can be affirmed. Lastly it requires a process through which the affirmation can take place, an all-encompassing process that involves the entire beholder. As such, it reflects a process that cannot be confined to any particular discipline and therefore necessitates that a critical trans-disciplinary study be conducted around the beholder, value and the process the beholder uses during decision-making towards the affirmation of value. It is a necessary process aimed towards the conceptualisation phase of the Mitroff model.

7.2.1.2.1 CRITICIAL LITERATURE REVIEW

Chapter 2

Using philosophy as a point of departure, the chapter reflects on the ontological and philosophical perspectives of the beholder and their impact on the beholding of value process. By placing man and his ontological perspectives of what he perceives to be real at the centre of the decision-making process, the chapter reveals that from an ontological perspective only idealism, and from a philosophical perspective only relativism, can provide the value process with the freedom it requires to fulfil the role Nietzsche (1989:11) envisaged for it, as the preserver of a certain type of life. The chapter further contributes towards the conceptual model by identifying two critical components of the beholding of value process. Firstly it requires the material world, that of which an individual's physical body and its surroundings form part. Secondly, and equally importantly, it requires the coming to a belief, a process which by its nature has strong psychological connotations. Hence it guides the study to Chapters 3 and 4 with these insights.

Chapter 3

Using systems theory Chapter 3 unfolds the origin, purpose and role of the beholding of value process from within the context of the material world. It begins by pointing out that all psychological motivations have a physical origin that is not only constrained by physical laws, but is also bound by systemic operational principles that allow them to function in a sustainable manner. This thereby points to the fact that any psychological estimate, which also includes any value that is conferred during the beholding of value process, will not only have to take these physical and operational principles into account, but will also have to manifest in such a way that it conforms to them. It further stipulates that this conformation occurs prior to conscious awareness, and that the value affirmation during conscious awareness is a mere by-product of this much larger process that manifests itself in many different forms. The chapter then continues to contribute towards the model by defining a financial decision-maker as a natural open-ended complex adaptive system capable of creating an artificial world or artifact. It further points out that it is this artificially created world that the financial social sciences form part of, resulting in a dualism embedded in the heart of every financial decision being made: On the one hand, the decision-maker is confined to a natural body forming part of the real world, requiring a dialect among structure, mechanism and function in a perpetuate dynamic balancing towards the maintaining of structural congruence or unity between the individual and the environment. On the other hand, the decision-maker reflects upon reality through an artificially created world, as the decision-maker attempts to make sense of the continuous confrontation with change caused by the physical flow of energy.

Moreover, Chapter 3 demonstrates that there is an intrinsic knowledge of what choice or direction to take in order to maintain and preserve the structural unity of the system, with the beholding of value process being causally responsible for providing the foresight needed by the decision-maker in the face of an uncertain future. It further argues that system stability arises from within the system itself and is not imposed on the system by its environment. It also demonstrates that, as a specific condition of the financial value decision-making model, all value decisions occur far from equilibrium, causing flexibility to form an important specific condition; with feedback becoming a reflection of the causality emanating from what is being valued and the actions undertaken as a result.

In closing, as a final contribution to the conceptual model, the chapter points out that the value process does not occupy itself with a single variable but rather with how sets of events are structured and how this relational structuring will affect the structural unity that exists between the decision-maker's inner and outer environment.

Chapter 4

Chapter 4 makes its first contribution towards the conceptual model by pointing out that a significant part of the decision-making process occurs prior to conscious awareness. It further establishes the beholding of value process's role during the pre-and post-awareness phases of decision-making. As part of this explanatory process the chapter clarifies how psychic content emerges from the material world of the individual and eventually manifests in the psychological world of the individual. It then, as part of the beholding of value process and its role during conscious awareness, discusses dual process theory and value's relationship with the affective system of the mind. Moreover, it explains how the beholding of value process determines significance. It also reflects on the relationship between conscious unawareness and awareness, pointing out how the one affects the other in relation to decision-making. As such it clarifies the role the beholding of value process plays during conscious awareness. In addition, the chapter reflects on decisions as bifurcation points. It reviews how means and ends are brought together during the beholding of value process towards the affirmation of a value and finally it clarifies how a decision-maker is able to wield thought, pointing to the implications of this for the beholding of value process and its affirmation of value. As a result of the above, the chapter makes the role of the beholding of value process visible, thereby reflecting what Simon (1959:272-273) contends is not merely a passive selection of some parts of a present whole, but an active hierarchical process of perceptual construction.

It reflects a process that, at its deepest level, allows quality to, as Pirsig (1999:311) notes, determine the fit of psychic content to a particular scale. The determination of this results in the affirmation of value. This affirmation serves as a measure of significance towards the restoration of a decision-maker's own unique dynamic balance that exists between the material and psychological worlds that the decision-maker simultaneously inhabits.

Chapter 5

In Chapter 5 general principles for a personal theory of value are established. Contributing towards the conceptual model, the chapter identifies flow, change and disequilibrium as some of the general principles that the beholding of value process functions on. It then reflects on disequilibrium, concluding that as a result of it, a continuous confrontation between the individual and uncertainty emerges that requires foresight by the individual in anticipation of the future. The chapter then identifies the individual's landscape of things that matter as a general principle. It then discusses the relationship of this landscape with other general principles identified, such as the weighing of significance, the assessment of risk and the establishment of future expectations. Moreover, it recognises that the beholding of value process only occurs as part of a continuous trade-off that takes place between the individual and the environment with regards to the maintenance of the individual's dynamic balance and structural congruence or unity.

The chapter further contributes to the conceptual model by arguing for the existence of a continuously unfolding beholding of value process $V_{(un)}$ out of which, as a by-product at specific bifurcation points, value affirmations take place $V_{(bi)}$. Moreover, it contends that structural congruence exists not only on a physical but also on a psychological level, concluding that there appears to be no indication of value maximisation as part of $V_{(un)}$.

Chapter 6

In this chapter the point was made that although value has a proud heritage of importance at the very centre of the discipline of accounting, no consensus on how human beings go about making financial decisions exists, with the relationship between accounting information and decision-making rarely being examined critically; this while it is only through decision-making that accounting can meet its objectives.

As such, by first examining accounting's relationship with the beholding of value process, the chapter found that over the past five decades, accounting has been transformed from a cost-based recorder towards a value-orientated reporter of information.

Furthermore, in terms of the nature of accounting valuations, the chapter pointed out that when the compilers of accounting information on behalf of the user of accounting information beholds value, the compilers of accounting information's value, when supplied to the users,

is transformed into a legitimate property of an expectation of the future which the users then on their part use to draw their own conclusions as they go about affirming value on their own psychic content in relation to their own unique background of things that matter.

Still further, the existing constellation of interrelated variables between accounting and the beholding of value process V(un) was examined in order to determine what, from a disclosure perspective was, in relation to V(bi) required in order for it to make a meaningful contribution towards the decision usefulness of the users of accounting information. From this examination it was ascertained that in order for ASC 820 as well as IFRS 13 to meet their disclosure requirements, a personal theory of value must first be established from which general principles can then be derived. Moreover, it demonstrated that as this process has already been followed as part of Chapters 2 to 5 of this thesis, several general principles have as part of Chapter 5 been identified that are capable of, from a disclosure perspective, making significant contributions towards improving the decision usefulness of accounting information in relation to both V(un) and V(bi). Still further, the chapter goes on to point out that these general principles derived from the personal theory of value serve as general templates to which further specific conditions can then be attached, eventually forming the basic elements of a model of the beholding of value process (Giere 2004:745). It is a model in relation to which value affirmation can take place, thereby still further improving the quality of information that accounting presents in relation to V(un) and V(bi) to the users of its information.

7.2.1.2.2 THE DESIGN OF THE CONCEPTUAL MODEL

From the critical trans-disciplinary literature review eight dominant general principles emerge as part of the continuous trade-off that occurs between the two worlds that the decision-maker simultaneously inhabits, mind and matter. These principles are displayed as part of Figure 7.1 and Figure 7.2

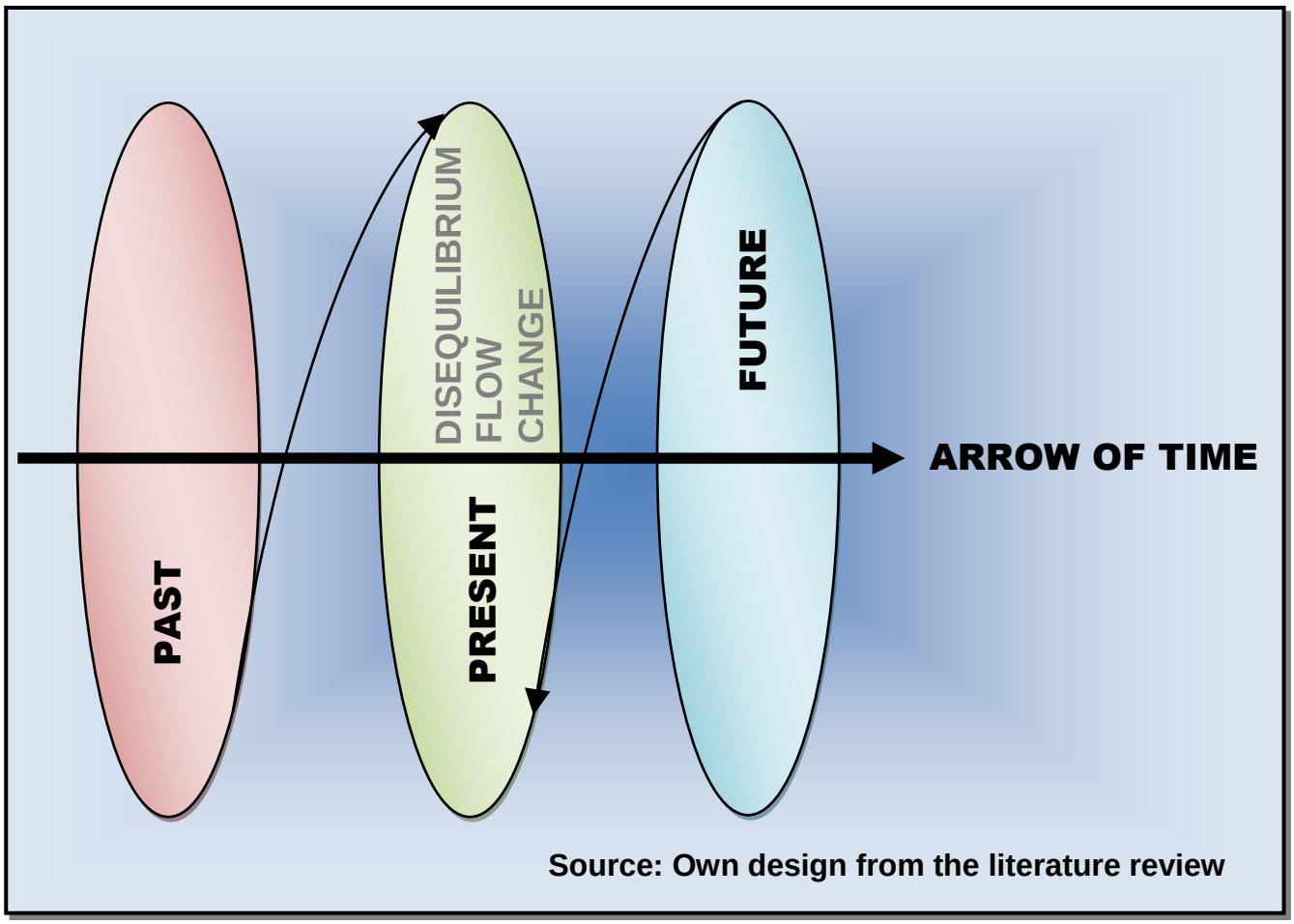
Figure 7.1 depicts those general principles that permeate the entire beholding of value process, both from inside the individual as well as from without.

These general principles are placed on the arrow of time axis as an indication of their movement in time throughout both the material and the psychological worlds of the individual.

Moreover, despite occurring in the present, Figure 7.1 demonstrates that although we as individuals move forward with the arrow of time, there is also another movement as the future moves through us in the present towards the past. Disequilibrium, flow and change therefore in a sense are the cause of past movements that now affect the present while at the same time also being the effect of what were once future movements that have now manifested in the present.

Figure 7.1 therefore starts with the decay in the quality of energy that is both inside and outside the individual, thereby depicting a natural state of disequilibrium from which the general principles of flow and change emerge.

Figure 7.1 General principles of the conceptual financial decision-making model that permeate the entire beholding of value process



Source: Own design from the literature review

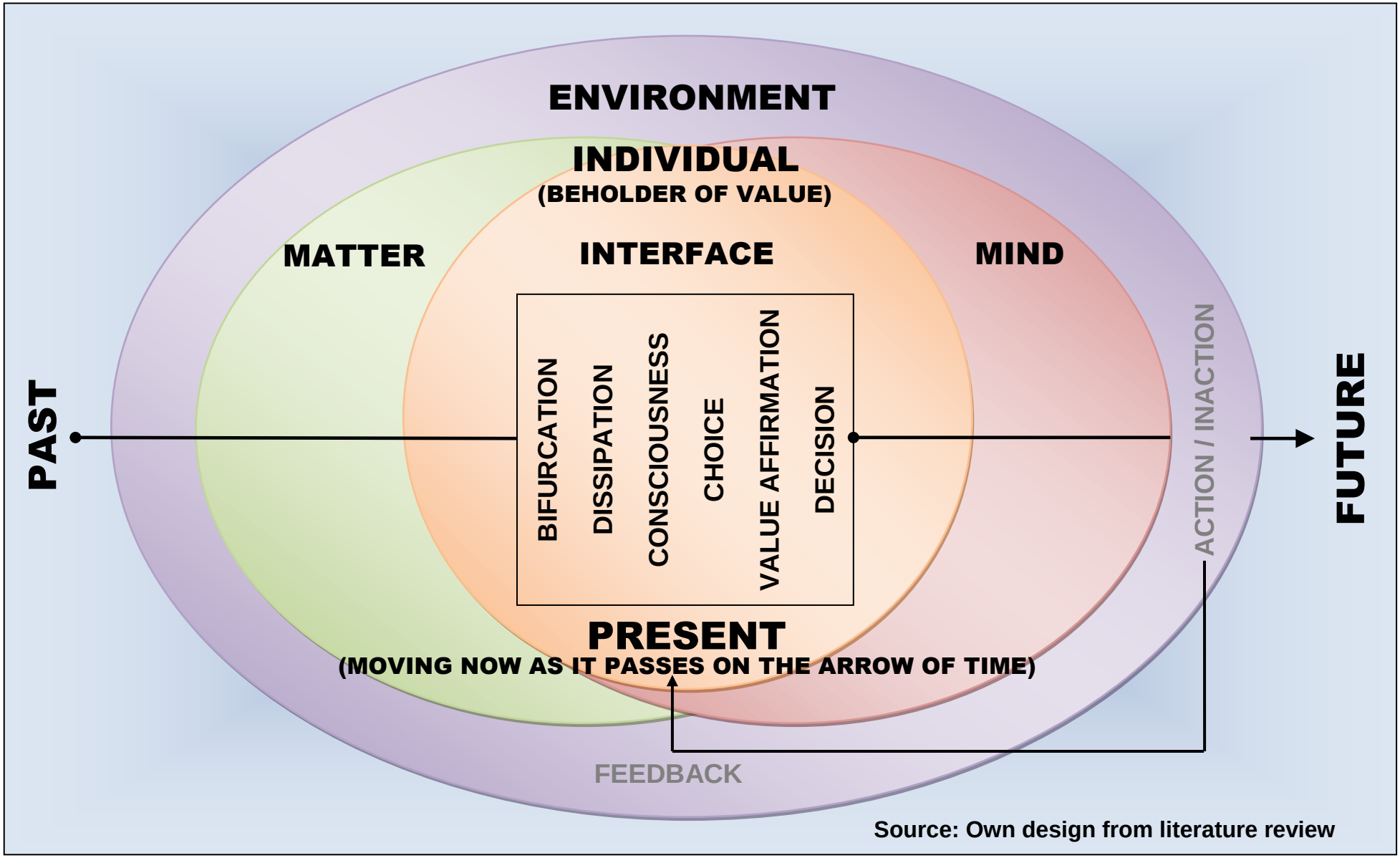
Where a general principle manifests at a specific place within the beholding of value process it is placed where it manifests as depicted by Figure 7.2. As can be observed from Figure 7.2, the beholding of value process comprises two primary areas. The first is the external environment that surrounds the individual. The second is the individual himself who in turn comprises three distinct areas. The first is matter, the physical components of the individual. The second is mind, pointing to the individual's psychological composition. The third is the interface Simon (1996:6) speaks of, the meeting place between mind and matter from where it is envisaged the beholding of value process operates and as such is also the place where the majority of the general principles manifest.

Having explained the respective areas comprising Figure 7.2, it begins its depiction of the general principles of value with a bifurcation point that emanates from a confrontation with the disequilibrium, change and flow depicted in Figure 7.1.

This forces the individual to, as an evolutionary pre-requisite, respond towards the restoration of his or her dynamic equilibrium. Each such response gives rise to the general principle of bifurcation, either leading to a breakthrough or a breakdown. This is a place where sacrifices must be made in the present as part of a trade-off in the future – a future that is uncertain and as such requires foresight in anticipation of it.

This uncertainty culminates in the general principles of dissipation and self-organisation and gives rise to a vast and complex artificially created world within which an elaborate landscape of things that matter materialises. This is a landscape from which the general principle of consciousness arises and within which reasoning is used to, as Simon (1959:253-272) contends, search among alternative choices as the individual estimates and learns in the face of complexity. From this the general principle of a value affirmation emerges that eventually leads to the general principle of making a decision. Once a decision is made it leads to an action, even if that action is an inaction, from which feedback from the external environment is then obtained. This is a conversion process between mind and matter of which a visual depiction is supplied and discussed in detail as part of Figure 10.2.

Figure 7.2 General principles of the conceptual financial value decision-making model that manifest at a specific place as part of the beholding of value process



Source: Own design from literature review

Because, as Giere (2004:751) points out, one cannot directly test principles by empirical means, but only test the fit to the world of particular models that incorporate the principles, models were designed based on statements made by leading figures in those disciplines where the general principle features predominantly. As such, by using these statements, a model was created for each respective general principle that allowed it to indirectly be considered in terms of the statements, degree of fit between their similarities and the perception of the respondents in the real world. It is a consideration therefore of their representational faithfulness. Exact details of the construction process are discussed as part of Chapter 8; with a detailed account of the models themselves being provided as part of Chapter 10.

7.3 CONCLUSION

In this chapter, Circle 1 of the Mitroff model was discussed. As part of the discussion an outline of the problem statement was provided. The chapter then commenced with Activity 1 of the Mitroff model by providing an overview of the critical trans-disciplinary literature review that was conducted as part of Chapters 2 to 6, while pointing out which general principles emerged from the review that could be used towards the creation of a conceptual financial value decision-making model. As part of Circle 2 of the Mitroff model the conceptual financial value decision-making model was presented as part of Figures 7.1 and 7.2. Both Figures depict the areas in and around the individual where these general principles manifest, while also as part of Activity 2 of the Mitroff model provide a brief description of the envisaged sequence that they follow as part of the beholding of value process.

CHAPTER 8

RESEARCH METHODOLOGY

8.1 INTRODUCTION

In Chapter 1 a problem statement is formulated highlighting a lack of clarity with regard to the level of consciousness at which value formation takes place. Moreover, it expresses uncertainty surrounding the process responsible for its formation, and the interrelationship between this process, change and the future-orientated aspect of decision-making. Making the claim that the status quo ante leaves open the possibility that if, as is suspected, this process occurs pre-intellectually, a large part of the financial decision-making process has been left unaccounted for, or worse, is misrepresented by an ambiguous and often limited concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

Taking into account that it is the nature of the problem and the defined research objectives that direct the type of research methodology used, this chapter aims to reflect on the research design used to encapsulate those research methodologies and procedures deemed most appropriate to make value and its role in the financial decision-making process more observable (Mouton 2001, Mouton & Marais 1990:60). Research in terms of this thesis is defined as that particular process of intellectual discovery that has the potential to transform people's knowledge and understanding of the world. Methodology in terms of this thesis refers to what Henning (2004:36) calls a coherent group of methods that on the one hand complement one another and on the other have what is referred to as the "goodness of fit" to deliver data and findings that not only reflect the research questions but also serve the purpose of the research (Ryan, Scapens & Theobold, 2002).

Research methodology therefore refers to the methods and tools used during the research process, while research design refers to the blueprint, the way in which the study is structured in order for it to be successful; all specifically chosen in such a way as to address the problem statement (Babbie & Mouton 2007:74). This chapter begins with an overview of the research design and methodology used by the thesis. It commences with this process by reflecting on models as autonomous agents in scientific activity and enquiry. Moreover, it addresses their similarity, relevance and measurement requirements. It then proceeds with a detailed discussion of the Mitroff model and how, as part of the thesis, it was used as a framework for scientific activity and enquiry (Mitroff et al 1974:46-58). As part of this process, the chapter not only outlines the various Circles and Activities of the Mitroff model but also indicates where each scientific activity or enquiry conducted by the thesis fits into the Mitroff model's structure.

As such the chapter commences with Circle 1, the reality problem situation. This is followed by Activity 1, conceptualisation, where, with the generic application of systems theory and a methodological approach as presented by Ruby (1950:349), a broad trans- and multi-disciplinary cross-sectional critical literature review is discussed. As part of Circle 2, the conceptual model, the use of a philosophy of science approach towards the structuring of the conceptual model is reviewed. This is followed by Activity 2, modelling, during which the qualitative interviews, their data saturation, analysis and objectivity are discussed. Moreover, as part of Activity 2, feedback from the World Finance Conference in Cyprus 2013 is discussed. The chapter then briefly touches on Circle 3, the scientific model, after which it progresses to Activity 3, the model-solving activity, where it discusses the use of a philosophy of science approach towards the construction of the questionnaire used as part of the study. Along these lines the chapter also discusses the pilot testing of the questionnaire, its revision, the determining of the target population, the sampling design and methods used during the distribution of the questionnaire. It also discusses the data preparation and recording of the responses. Finally, as part of Circle 4, the solution, as well as Activity 5, feedback in the narrow sense, the chapter provides details of the statistical methods used during the data analysis.

This is followed by a discussion of the validity and reliability tests conducted on the data as well as on the scientific model presented as part of Circle 3 of the Mitroff model. Lastly, the chapter embarks on a critical analysis of the research limitations of the study before reaching its conclusion.

8.2 RESEARCH DESIGN AND METHODOLOGY

At present there are two distinct research approaches for the collection of data, each according to Welman, Kruger & Mitchell (2005:6) being governed by different paradigms in the social studies.

On the one hand is qualitative research, which is associated with the interpretive social sciences paradigm based on the significance of the subjective experiences and perceptions of human beings. Bryman & Bell (2007) as well as Ryan, Scapens &Theobald (2002) contend that this type of research approach captures a participant's interpretation of the complexities of the world around him or her. According to Patton (1990:10-14) qualitative methods permit the evaluator to study selected issues in great depth and detail. As such, as part of this data collection method and in order to establish a context for the interpretation of the answers obtained from the quantitative research, in-depth open-ended interviews were conducted.

On the other hand is quantitative research, which is based on the philosophical approach known as logical positivism and which limits research to the observable (Babbie & Mouton, 2007; Saunders, Lewis &Thornhill, 2003). As Patton (1990:14) points out, quantitative methods require the use of standardised measures so that the varying perspectives and experiences of people can be fitted into a limited number of predetermined response categories to which numbers are assigned.

This, as he goes on to explain, has the advantage that it makes it possible to measure the reaction of a great many people to a limited set of questions, facilitating comparison and statistical aggregation of the data. As part of this data collection method, questionnaires were issued as part of the study.

Neither of these two approaches, as Patton (1990:10) goes on to explain, is mutually exclusive. Qualitative findings may therefore, as he goes on to point out, either be presented alone or, as is the case in this study, in combination with quantitative data; resulting in a mixed method approach.

8.3 MODELS – AUTONOMOUS AGENTS IN SCIENTIFIC ACTIVITY AND ENQUIRY

Science is a social construct consisting of theories that define natural systems through the use of approximations and idealisation (Giere 1996:271; Cartwright 1983:15-147). A theory may also be reflected upon as a loose collections of models, organised inexactly in terms of laws, methods, and all other aspects which may be deemed necessary to characterise it (Teller 2001:395-396). Through these models, laws connect with the physical world; each law only being true in relation to the model it defines and characterises. This is an aspect Teller (2001:395) reflects on when he states:

> *Physics works not by deduction from first principles but by carefully prepared descriptions or models which purchase one or another kind of generality, but always at the price of sacrificing accuracy*.

Knowing from models therefore involves a particular and limited kind of knowing, the kind that is not represented by an isomorphic relationship between the model and the world but by a looser relation of similarity, a degree of accuracy, a relative relationship (Morrison 1999:40; Teller 2001:395-410); with the only perfect model of the world being the world itself.

8.3.1 SIMILARITY – RELEVANCE

Models therefore provide a limited approximate representation that is based on the relevant similarity between the model and the real world. This poses several questions, the first being what determines similarity and the second whether similarity requires a general account and if so, what does this involve?

In view of these questions and as a point of departure it is noted that it is the specifics of a case that provide the basis for determining relevant similarity (Teller 2001:402-410). It is contended that no general account is needed because similarity will involve both the agreement and differences of properties with only the needs of the case at hand determining the sufficiency of the agreement and the tolerability of the differences.

This is an assessment with which Giere (1996:275) concurs when he notes that the primary representational relationship is not the truth of a statement relative to the facts, or even the applicability of a predicate to an object, but rather the similarity of a prototype to putative instances. What is meant by this is that the similarity referred to in this instance does not emanate from the relationship that exists between the linguistics used to establish the model and what it deems to represent.

This point is also raised by Teller (2001:400) who states:

> *In particular, the fact that language is used to indicate which function (construed, say, as a set of ordered pair of values) constitutes (part of) the model does not show that linguistic entities are the objects of comparison. Such a suggestion would make the mistake of confusing language with what language is used to describe*.

Putting it another way, to represent a phenomenon does not imply a similarity to it in any relevant respect (Suarez 2003:17). Rather a theory's proximity to the truth is interest-relative (Smith 1998:264-271). Reflecting on this from another perspective, it can also be argued that a theory's proximity to the truth is dependent on the beholder's unique point of view, his or her ability to see the similarity of representation between the model and what it claims to represent. It is because of this crucial element that Suarez (2003:23) views the skill and activity required to bring about the experience of seeing into whatever it is you are looking at, at that particular point in time when the agent's appreciation of the "representational" qualities of a source is established, not as a consequence of the relation of representation but as a precondition for it. Access to any model is therefore always indirect. As Teller (2001:407) reflects:

> *All our access is indirect, so that there are only differences in degree, but not in principle, between our epistemic access to apples and atoms.*

This however does not imply that a model cannot be assessed for its accuracy. To the contrary, since there is no context-independent distinction to be made between observable and theoretical phenomena, any aspect of a model can be assessed for its accuracy (Teller 2001:407).

So, from a semantic point of view, models provide us with concepts which, although much simpler than the systems they represent, still allow us to fit our theories to concrete situations, leading Morrison (1999:42-43) to conclude that models can also be viewed as autonomous agents in scientific activity and inquiry.

8.3.2 SIMILARITY – MEASUREMENT

A further point surrounding models that needs to be assessed is if, as is the case with the value decision-making model, the lack of observation and as such objective measure, will make it impossible to measure the similarity between the model and the real system it claims to represent. Shedding light on the problem, Hertz (1958:428) states:

> *… the relation of a dynamic model to the system, of which it is regarded as a model, is precisely the same as the relation of the images which our mind forms of things to the things themselves*.

He goes on to state that the mind and the world should be reflected upon as two systems that are models of each other, with the similarity of the mind being due to its ability to make actual dynamic models of things, and then working with them.

In this thesis, the “experiment” is therefore not one in which a model’s ability to represent similarities pertaining to physical aspects in the real world is being considered but rather where a model of the model, the system on which we base our understanding and decisions about the real world, is reflected upon. It is because of this particular complication that Suarez (2003:53) claims that in the study of value, science is unable to reduce it to fact. Reflecting on this, Suarez (2003:31) states:

Representation can no longer be established by means of a scientific investigation of the fact of the matter for there are elements in the relation of representation, namely the representational forces that essentially involve value judgements and are not reducible to facts.

Yet, here, at this juncture, Giere (2004:748) notes:

> *I wish to emphasise that representing aspects of real systems in this way does not require the existence of an objective measure of similarity between the model and the real system. Nor does the lack of such an objective measure introduce an undesirable amount of relativity in claims of similarity between the model and the real system. Claims about the features of the world remain as objective as they ever were.*

With Giere it is argued that, given the unique nature of what is being considered, and despite the apparent lack of objective measurement and empirical observation involved, it is indeed possible to reflect upon the value decision-making model's representational similarity to the real system, our own internal decision-making process which it claims to represent. Put another way, given what is being considered, what better to reflect on it with for representational similarity than the very thing it claims to represent? What better to measure it with?

8.4 THE MITROFF MODEL

This thesis utilises the problem-solving model designed by Mitroff et al (1974:48), as depicted by Figure 8.1, to construct a scientific model of value and the relationship it has with the financial decision-making process.

8.4.1 CIRCLE 1 – REALITY PROBLEM SITUATION

It does so by proceeding with Circle 1 of the Mitroff model with the identification of an existing problem.

8.4.2 ACTIVITY 1 – CONCEPTUALISATION THROUGH A CRITICAL LITERATURE REVIEW

Being true to the Socratic principle to follow the evidence wherever it may lead, the problem statement is used as a "looking glass", a particular perspective that, with the assistance of a functionalist methodological approach accompanied by organisation and in particular systems theory, allows for a systematic critical multi-disciplinary literature review. It is multi-disciplinary in the sense that the research topic is not just studied in one discipline alone but in several disciplines at the same time, and trans-disciplinary in that, as Nicolescu (2005:5) points out, it is founded on the postulates that:

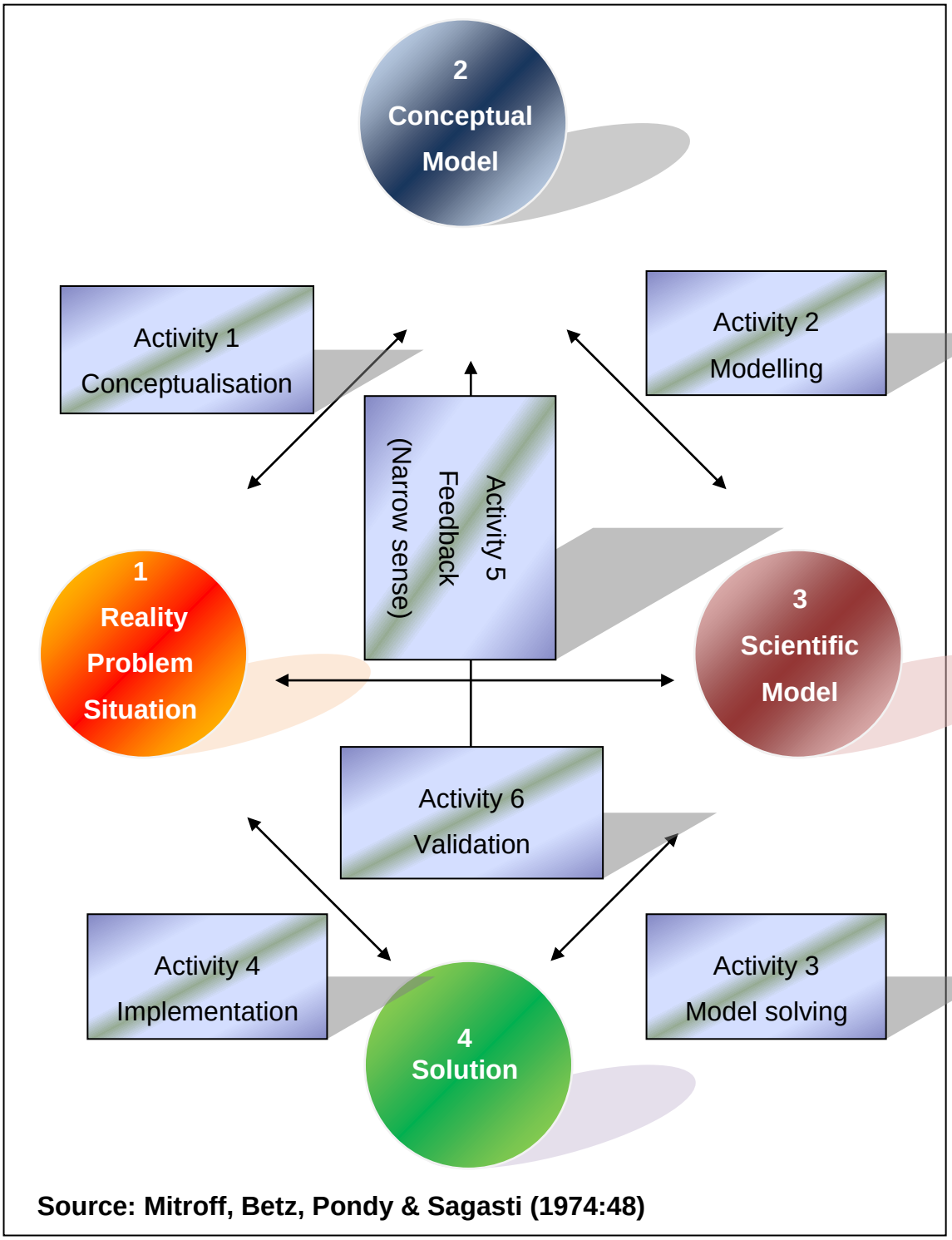
1. There are in nature and in our knowledge of nature, different levels of reality and correspondingly, different levels of perception;
2. The passage from one level of reality to another is ensured by the logic of the included middle;
3. The structure of the totality of levels of reality or perception is a complex structure of which every level is what it is because all the levels exist at the same time.

This process, it is argued with Nicolescu (2005:15), allows for the establishment of links between persons, facts, images, representations, fields of knowledge and actions which, through the incorporation of the perspectives of several disciplines, enrich and deepen our understanding of what value is and the role it plays as part of the financial decision-making process. It is an attempt, as Ryan, Scapens &Theobald (2002:181) remark, to distinctively link methodology to method. Part of this process entails gaining a broader and more in-depth understanding of value's relationship with ontology and how it affects the financial decision-making process. It thereby forms what Mouton (2001:87) refers to as a "scholarship review" that not only saves time in the sense that it avoids the duplication of previous studies, but provides clues and suggestions about existing and new avenues that can be explored.

Another part of the review entails the establishment of a personal theory of value from which general principles can be derived to which specific conditions can be attached.

Each principle represents, and in many instances is depicted as, a model in its own right, forming a collection of models used to characterise the value process and its role in financial decision-making. This process entails gathering reference samples from books, articles, theses, dissertations, technical reports and the World Wide Web.

Figure 8.1: A systems view of problem-solving



Source: Mitroff, Betz, Pondy & Sagasti (1974:48)

8.4.3 CIRCLE 2 – A CONCEPTUAL MODEL CONSTRUCTED WITH THE ASSISTANCE OF A PHILOSOPHY OF SCIENCE APPROACH

As part of Circle 2 of the Mitroff model, a philosophy of science approach was used to, through general principles, provide structure to the conceptual model. The conceptual model, as Koornhof (2001:256) points out, establishes in broad terms the definition of the particular problem to be solved. In addition, as she goes on to note, it specifies the field variables that will be used to define the nature of the problem.

8.4.4 ACTIVITY 2 – MODELLING

This was followed by Activity 2, a formulation or development activity that Mitroff et al (1974:48) refer to as modelling, during which specific conditions were attached to the general principles. As part of this process Giere's (2004:743) formula was applied:

S uses X to represent W for purposes P.

This formula was used to, on a piecemeal basis, account for and classify the sequence of theoretical and phenomenological results as obtained from literature and experience. The result is a visual model constructed with no particular theory governing its development, serving as an organising template for whatever other potentially relevant information the agent may possess, regardless of how that information is encoded (Giere 1996:284). Morrison (1999:43) believes this allows us to find out how the decision-making process as a system actually functions by informing us how specific mechanisms might be organised to produce certain behaviour.

Considering the non-linearity and partial differentials involved, this model at its core not only draws from the disciplines of physics, biology, philosophy, psychology, economics, financial management and accounting, but is also motivated by several partial theoretical justifications and phenomenological considerations. It is a model whose representative similarity leads to the affirmation or rejection of the proposed problem statement, which as Giere (2004:742) reflects, allows for focusing on designated similarities between aspects of the model and the real world; in turn allowing for the formation of a hypothesis and generalisations.

Once the specific conditions were attached, interviews were conducted through structured questionnaires focused on a combination of constructs and concepts central to the model.

8.4.4.1 QUALITATIVE INTERVIEWS

According to Kvale (1996) as cited in Sewell (2001:1), a qualitative interview is a process during which an attempt is made to understand the world from a particular participant's point of view. This is a process which, prior to any scientific explanations being available to verify the findings, entails the unfolding of the meaning of people's experiences to uncover or lift the veil of their respectively lived worlds.

The process was combined with purposive sampling in order to select those disciplines and people within the disciplines represented that were best suited to verify if any important general principles or specific conditions were missed during the initial model-building phase (Henning 2004:71). Leading figures in the fields of physics, biology, philosophy, psychology, economics, financial management and accounting were targeted. As such, one qualitative interview per field was conducted (Henning 2004:71). In the field of accounting, two in-depth interviews were conducted, bringing the total number of in-depth interviews to eight. The number of interviews being an aspect in relation to which Patton (1990:184) notes:

> *There are no rules for sample size in qualitative inquiry. Sample size depends on what you want to know, the purpose of the inquiry, what's at stake, what will be useful, what will have credibility, and what can be done with available time and resources.*

Each participant was also given a letter as approved by the research ethics committee of the University of Pretoria, ensuring their confidentiality and a strict adherence to ethical research principles while at the same time inviting them to participate in the research study. A copy of the letter is attached as Annexure 1A.

Given the particular area of interest, a semi-structured open-ended interview was conducted (De Vos et al 2005:292-296; Terre Blanche & Durrheim 1999:281-282). This entailed providing each interviewee with a set of questions, a copy of which has been attached as Annexure 1B.

The interview questions were broken up into three distinct categories, the first of which, Category A, dealt with the composition of value. This was followed by Category B that reflected on the reflationary aspect of value, with Category C attempting to gain insight into value and its relationship to the financial decision-making process.

From the answers obtained from these three categories and their underlying questions, several correction factors were added to, as Morrison (1999:52) puts it, enhance the prototype model's "power".

This entailed:

1. The introduction of genetics as that which provides the mechanism for sustaining dynamic balance;
2. The establishment of a direct association between dynamic balance and value;
3. Linking a wealth threshold towards the sustainability of value;
4. Establishing values as the foundational direction-giver but also as a constraint of value;
5. Linking entropy and the arrow of time to value;
6. Developing the relationship between culture and values;
7. Building the concept of wealth as surplus physical, emotional and intellectual capacity towards resilience;
8. Expanding on the evolving unfolding process of value during the construction of artificial reality.

In addition, the interviews also provided a context for the interpretation of the answers obtained from the qualitative questionnaires that were issued as part of a purposive non-probability judgement sample to the respective contributing fields as outlined in the literature review of the study. The following is a summary of the contributing context-creating responses obtained from the interviews:

1. What is your understanding of the construct of value?

   Value is a subjective and time-dependent construct that only has meaning within a horizon of significance; a particular context. It is holistic, multi-dimensional and has both a qualitative and a quantitative component. As the product of a process that is genetically encoded into all human beings, it continuously evolves as it unfolds reality into perception. This is a continuous process that is not only responsible for the re-establishment of an individual's dynamic balance but which also forms a reciprocal pre-requisite of survival. It also has a strong correlation with meaning.

2. Is value created or discovered? Please clarify.

   Unanimous consensus among the interviewees indicates that when it comes to the real or external world, value is discovered while, when it relates to the internal or artificially created world, value is created.

3. Can value be measured? If yes, please elaborate how.

   Although the fields of economics and biology were of the opinion that value could be measured, either in a monetary currency or some or other biological currency, the majority of disciplines believed value could not be measured. Those who did believe it could be measured strongly linked the measurement of value to the available information at the moment of measurement.

4. What is your understanding of wealth?

   All the interviewees had a broad definition of wealth which encapsulated being healthy; having enough time to be able to do what is meaningful to them, and financial independence. In general, it was seen as a continuous process that occurs as a result of the flow from one system to another. Some linked wealth to having found a balance. Others viewed it as the development of a capacity that will enable them to be resilient in the face of risk, thereby entailing the acquisition of physical, emotional and intellectual reserves.

5. Do you believe a relationship exists between value and wealth? If so, please clarify what your understanding of the relationship is.

   On the one hand some interviewees from disciplines such as philosophy, physics, economics, accounting and finance, believe very strongly that wealth enables value and as such forms a key requirement in sustaining it. In contrast, interviewees from disciplines such as psychology and biology feel it is value that contributes towards the establishment and maintenance of wealth, with those from the discipline of biology saying that in many instances wealth often impacts very negatively on value.

6. Do you believe a relationship exists between value and values? If so, please clarify what your understanding of the relationship is.

   Among the interviewees from the respective disciplines there was a general consensus that values provide the foundation for the creation of value and that they serve as direction-givers to a process that ultimately culminates in the creation of wealth. In addition, there was also a general consensus that culture is built around values, and as such, as the interviewee from the discipline of economics pointed out, is in many instances responsible for constraining value.

7. Does the accountant merely reflect value, or does he or she play an active role in the value determination process on behalf of the users of accounting information? Please elaborate.

   On this question, conflicting answers were obtained from the respective fields with physics, economics, financial management and accounting holding the conviction that the accountant merely reflects value while biology, philosophy and psychology believe he or she plays an active role in the value-determination process.

8. Do you believe that from a decision-usefulness perspective the existing structures of the financial social sciences of economics, finance and accounting reflect value appropriately?

   Among all the interviewees the general consensus was that the existing structures of the financial social sciences of economics, finance and accounting do not appropriately reflect value and that adjustments to these fields will have to be made.

8.4.4.1.1 DATA SATURATION

From the interviews it became clear that each field of expertise uses its own terminology to describe similar phenomena, with different meanings being attached to the same words. Once the different meanings associated with each word were established, data saturation soon followed with many interviewees, although using different terminology in their own way of describing the same phenomena.

8.4.4.1.2 DATA ANALYSIS AND OBJECTIVITY

Due to the interviewees attaching different meanings to the same words, and using different words to describe the same phenomena, it was, after a careful review of Stemler (2001), decided not to make use of content analysis. By making use of observation and documentation that included both interview notes as well as the use of a Philips Voice Tracer LFH0862 digital voice recorder, the researcher was able to, as Patton (1990:244) suggests, utilise different data sources to validate and cross-check the findings. Considering that each type of source data has strengths and weaknesses, the use of a combination of data types, as Marshall & Rossman (1989:79-111) reflect, increases the validity of the qualitative inquiry, with the strength of one approach often compensating for the weaknesses of another.

In order to further ensure that the collected and recorded data was analysed from as contextually correct and complete a perspective as possible, each interview was reviewed on a monthly basis over a three-month period.

The lapses of time between each review were used to attempt to distance the researcher from the recorded data and as such ensure objectivity when the data was reviewed again. Moreover, each review's notes were carefully compared with the reviews that preceded it.

8.4.4.2 FEEDBACK FROM THE WORLD FINANCE CONFERENCE IN CYPRUS 2013

Supplementing the interviews on July 1, 2013 an article with the title "*The unfolding of value in a decision-making context*" was presented at the World Finance Conference in Cyprus. The presentation provided an opportunity to test several general principles of the model that included, but which were not limited to, value, decision-making, flow, change, choice and bifurcation. In response to the presentation, valuable questions were asked by the financial community with regard to the application of the research and its impact on the existing financial value decision-making context. All these aspects were incorporated as part of the specific conditions or statements of the qualitative questionnaire.

8.4.5 CIRCLE 3- SCIENTIFIC MODEL

From information obtained during the interviews and the conference, corrections and additions were made to the general principles and their attached specific conditions that later went on to form the elements of the scientific model. Using the general principles as templates, as Giere (2004:745) suggests, they, when combined with their specific conditions, formed a set of qualitative logical relationships. These are relationships that, as Rivette (1972:9) goes on to note, link together the relevant features of reality.

This thereby results in the scientific model that, in accordance with both Koornhof (2001:257) as well as Mitroff (1974:48), was presented as part of Circle 3 of the Mitroff model in Chapter 10 of this thesis.

8.4.6 ACTIVITY 3 – MODEL SOLVING

This was followed by Activity 3 of the Mitroff model, the model solving activity.

8.4.6.1 USING A PHILOSOPHY OF SCIENCE APPROACH TOWARDS DETERMINING THE SHAPE STRUCTURE OF THE QUESTIONNAIRE

As part of Activity 3 of the Mitroff model, a qualitative questionnaire was compiled consisting of statements based on the specific conditions or elements of the scientific model. Complementing this process were procedures recommended by Saunders, Lewis and Thornhill (2003) as well as a philosophy of science approach as outlined by Giere (2004:743) whereby:

> S uses X to represent W for purposes P.

S represents the researcher who uses X in the form of statements obtained from leading figures in those fields contributing most to the researcher's understanding of value to represent an aspect of the real world – W for purposes P. P in this case tests the statement and the subsequent model element it relates to for its representational faithfulness when compared to the aspect it represents in the real world. Each statement therefore pertains to a specific model element that Giere (2004:747) notes can be identified with features of the real world, making it possible to use models to represent aspects of the real world.

8.4.6.1.1 DEVELOPMENT OF THE QUESTIONNAIRE

From the literature review, which included academic journals, the internet, magazines, newspapers, television, radio broadcasts and similar questionnaires used in prior surveys, eight categories emerged that consisted of 228 statements. Noting, as Babbie & Mouton (2007), Mouton (2001) as well as Saunders, Lewis & Thornhill (2003) explain, that the length of a questionnaire and its statements can have a direct and often negative impact on the quality of the responses obtained, a process of statement elimination began which was coupled with the shortening of statements as and where possible in order to make the statements more precise.

From these efforts a second list emerged that consisted of the same number of categories but with only 122 statements. A review of the statements revealed a lack of representation in several critical areas and necessitated that a third list of statements be compiled.

Following a review of these statements, a prototype questionnaire consisting of eight categories and 104 statements was compiled that was later reduced to the same number of categories but which consisted of only 82 statements. The final questionnaire therefore consists of eight sections; each representing a successive general principle of the financial value decision-making model that is used to illuminate value and the role it plays in the financial decision-making process. The first section of the questionnaire therefore encapsulates the general principle of movement or flow, with the second reflecting on change or transformation. This was followed by the general principles of bifurcation, dissipation, self-organisation and dynamic balance, all from a decision-making perspective leading to the general principles of artificial reality and consciousness. This therefore steered the respondent towards an inevitable brush with the principles of value, measurement and choice.

Attached to each principle are specific conditions and characteristic concepts that are reflected by the statements as obtained from leading figures in those particular fields where the principles were found to play the most predominant roles. Each statement tests a particular aspect of the general principle in terms of its representative similarity to the actual decision-making process as experienced by the respondent. Representation was determined in terms of a numerical rating or Likert scale that provides a valid basis for adequate comparative analysis through its standardised response categories (Babbie & Mouton 2007:160, Cooper & Schindler 2006, Dillman 2000).

Each statement in the eight sections was therefore evaluated on an eight-point Likert scale, the range of representation of which is outlined below; each numeral representing a degree of belief or an epistemic judgement.

Table 8.1 Summary of the Likert scale's range of representation

1	**Strongly disagree**
2	**Disagree**
3	**Disagree slightly**
4	**Neutral**
5	**Agree slightly**
6	**Agree**
7	**Strongly agree**
8	**Not sure**

In Section A, the questionnaire begins by reflecting on the general principle of flow and its involvement in the creation and the movement of patterns and form. It presents statements on the interrelationship between flow and the complex adaptive system that is man and asks participants if value, thought and decision-making are causal effects that occur as a result of this process. It presents statements on the origin and nature of value, thought and financial decision-making and in Statement A1 introduces the theory of relativity into the construct of value by linking its flow or motion to its correlation with its position in time, thereby testing the respondent's perspective on value's relative nature.

In Statement A2, it tests where the necessity to value and to decide on it is perceived to come from. Statement A3 raises the question of optimality and tests for its perceived attainability, while Statement A4 reflects on the relationship between flow and information, testing if respondents perceive information to be a consequence of flow. With Statement A5, the questionnaire attempts to establish a clearer understanding of the concept of time as used in Statement A1. It also attempts to test the respondent's perception about the relationship that exists between thought, succession and time.

With Statement A6 the questionnaire tests the idea that, as complex adaptive systems, human beings are always in transition; a transition or evolutionary movement which Statement A7 claims cannot be captured by thought in its purest logical form, thereby implying a “moreness” that exceeds the realm of logic. Statement A8 tests the respondent’s perspective with regard to the proposition that thought does not emanate from logic but from our whole physical existence, introducing both a biological and structural component to the process. Statement A8 tests the respondent’s perception of the discontinuity of thought with Statement A9 testing how the duration of the discontinuity and the progressive expansion that occurs as a human being progresses from the past into the future is perceived.

From a model perspective, Statements A1, A2 and A4 therefore reflect upon the representational similarity of the model’s depiction of the general principle of flow and its relationship to time, information, movement and necessity while Statements A3, A5, A6, A7, A8 and A9 reflect upon the representational similarity of the model with regard to its portrayal of the relationship between flow, time, thought, duration, movement and transition.

In Section B, the questionnaire reflects on the general principle of change. It tests various concepts and constructs associated with the principle, defining, giving meaning and creating a context for them as it progresses. Along these lines Statement B1 tests the respondent’s perspective with regard to the unpredictability of change, with B2 testing the participant’s point of view about the proposition of a link existing between change and the sustaining of life. In Statement B3 it is put forward for consideration that change occurs as a result of the decay in the quality of energy with Statement B4 testing if information is perceived by participants as the positive difference between two uncertainty levels. Statement B5 tests the respondent’s perspective with regard to creation and the transformational aspects of change. It tests how, as a general principle, as part of this transformation, the fact that nothing is ever lost is perceived. Statement B6 attempts to define how feelings and thoughts are perceived by utilising their relationships with change to highlight their differences.

Part of Statement B7 tests whether respondents perceive probability judgements to be dependent on events or on a context and if so, if this context is dependent on the explicitness of its description; creating an inextricable link between change and the perceptual context reflecting it. Statements B8 and B9 both test if risk is perceived as an associative aspect of change.

From a model perspective, Statements B1, B2, B4, B5 and B6 reflect upon the representational similarity of the model with regard to its portrayal of the general principle of change and the relationship it has with all life, uncertainty, predictability and transformation, while Statements B3, B7, B8 and B9 reflect upon the representational similarity of the model with regard to its portrayal of the general principle of change and its relationship with risk, probability and the decaying quality of energy.

In order to gain insight into the context that gives rise to a decision, Section C of the questionnaire reflects on and tests several aspects of the general principle of bifurcation. Statement C1 tests if bifurcation is reflected upon by the participant as a source of diversification and innovation. Statement C2 attempts to establish the participant's perspective as to the place where bifurcation occurs. Statement C3 puts forward a proposed definition for bifurcation with Statement C4 providing further clarification of the definition as provided in Statement C3. From the participant's perspective Statement C5 tests the importance of the concept of balance, introducing it into the financial decision-making process. Statement C6 tests if the balance as referred to in Statement C5 is perceived to be dynamic by linking it to decision windows that build into a critical threshold that Statement C7 tests for, in terms of the perceived emergence of structure.

Statements C1 and C5 of Section C of the questionnaire therefore, from a model perspective, reflect upon the model's representational similarity to its representation of the general principle of bifurcation and the relationship it has with diversification, innovation and balance while Statements C2, C3, C4, C6 and C7 establish the relational relevance and representational similarity of the model with regard to the general law of bifurcation and a decision window at the edge of chaos; that place where the familiar and unpredictable meet, the crucial critical tipping point from which structure emerges.

In Section D the questionnaire introduces the systemic biological structural requirements that are necessary in order for value and financial decision-making to occur. It tests for characteristics associated with the particular type of structure and attempts to determine if these characteristics influence the financial decision-making process and how human beings value, reflecting on the general principle of dissipation, self-organisation and the yearning for dynamic balance.

From the respondent's perspective, Statement D1 tests if irreversibility leads to coherence, with D2 testing if new forms of coherence occur far from equilibrium. Statement D3 tests the respondent's perspective on the relationship that exists between dissipative structures and self-organisation. Statement D4 tests how structure formation is perceived with D5 testing if, as a pre-requisite, these structures have to be open systems; thereby requiring a continuous exchange of energy and matter with their environment as part of autopoiesis. Statement D6 tests the participant's understanding of how dissipative structures sustain themselves with Statement D7 testing if dynamic balance is perceived to form a critical part of this process. This aspect is expanded as part of Statement D8, which tests if, from the respondent's point of view, the maintaining of structural integrity forms a pre-requisite of survival. In Statement D9 the questionnaire tests if the participant perceives function and structure to be imposed by the environment or if they are established by the system itself.

With Statements D1, D2, D3, D4, D6, D8 and D9, Section D reflects upon the representational similarity of the model to its portrayal of the general principle of dissipation and the structural relationship it has with far-from-equilibrium situations and the formation of new structures. It also reflects on the relationship that exists with self-organisation, the establishment of temporary solutions, irreversibility, coherence, the internal establishment of structure and function, metabolism and structural integrity. It also, with Statements D5 and D7, reveals the relational relevance and representational similarity proposed in the model between structural integrity, autopoiesis, dynamic balance, external change and the necessity for internal adaptation to change.

In Section E, the questionnaire reflects on the general principle of consciousness and tests if respondents concur with the assessment that it emanates from an artificial reality that is responsible for the unfolding of a mutual context.

This is done by, in Statement E1, testing if the respondent's perceived reality is the movement of vision before intellectualisation takes place. Exploring this further, Statement E2 tests whether participants, during the initial "becoming aware" phase, see the external world in well-defined segments or reflect upon it as a whole all at once and then unfold it. As part of Statement E3 the questionnaire tests if respondents agree that artificial reality is created as a frame of reference, the purpose of which it tests in Statement E4. In Statement E5 the questionnaire tests if the respondents believe meaning and language stem from shared interpretations, with Statements E6, E7, E8, E9 and E10 testing different aspects of the ontological positions of the participants; serving as a context for further interpretation. Section E therefore considers the representational similarity of the model's depiction of the general principle of consciousness with regards to the specific conditions attached to it when compared to the actual decision-making process as experienced by the respondent; entailing a reflection on, among other constructs, reality, vision, intellectualisation, artificial reality, context, meaning, thought and creation.

In Section F, the questionnaire reflects on the construct of value and attempts to establish what its relationship is with the general principle of measurement. To do so, the section begins with Statement F1 testing the participant's perception of the proposition that value imposes constraints on the feasibility of probability distributions to reduce entropy. It then with Statement F2 proceeds to test if respondents believe that all value-creating economic transformation and transactions are thermodynamically irreversible. With Statement F3, F10 and F12, the questionnaire personalises value by testing if participants perceive value to be an expression of themselves, a personal measure of sorts that embraces their total nature. Statement F4 on the other hand attempts to test the participant's perception of the manner in which scales are framed as foreground estimates of provisional perspectives. Statement F5 test the participant's perspective on the importance of value when making economic considerations.

In Statement F6 the participant's perspective on the nature of value as well as the relationship it has with weighing and scales are tested. Statement F7 continues to explore the nature of value by testing its perceived relativity in relation to the appraisal of each individual.

Along these lines of thought Statement F8 tests if participants believe value to have any predetermined fixed quantities while Statement F9 reviews the respondent's perception of the role value plays as a facilitator of uncertainty amid the burden of ignorance. Statement F10 attempts to establish the respondent's philosophical position.

From a model perspective Statements F1-F12 reflects upon the representational similarity of the model to its portrayal of the general principle of value and the relationship it has with entropy, thermodynamics, expressionism, scales, economic considerations, weight, appraisal, quantification, uncertainty and measurement.

In Section G, the questionnaire tests the general principle of choice as a direction-giver for change by, as was the case with Section B, testing various concepts and constructs associated with the principle, defining them, giving meaning to them and creating a context from them. Statement G1 tests if respondents agree with the proposition that to know is to disrupt. With Statement G2 the questionnaire tests the participant's perception of how he or she defines choice. Statement G3 introduces uncertainty as a specific condition of change and tests the participant's perception with regard to the relationship that exists between them. With Statement G4 and G5 the questionnaire expands on the specific condition of change by testing the participant's perception of its relationship with prediction and possibilities. Statement G6 on the other hand tests the participant's perception of his or her ability or inability for that matter to upset the design of his or her genes through choice. With Statement G7 the proposition is tested that an individual should be perceived as an active planner and not a passive reactor. Statement G8 tests the participant's perspective about the brain's ability to detect features while G9 tests their point of view on the role that model building plays in anticipating the world. In Statement G10 a proposed definition of risk is presented to the participants for consideration.

Statement G11 introduces cognitive interpretation as a special condition of choice and asks participants to express if, from their perspective, it can be viewed as the creational act of ascertaining possibilities of meaning.

As part of the interpretation process, Statement G12 introduces the concept of minding and attempts to ascertain from participants what this process involves. Statement G13 tests how, as part of this process, participants reflect on numbers by defining them as representational structures that permit functional reasoning. In Statement G14 the questionnaire tests the participant's perspective on the relationship that exists between learning, anticipation and the use of models as activity guides. As part of Statement G15 the questionnaire tests the participant's perspective regarding its portrayal of exchange as a social activity. Statement G16 tests the respondent's perception about the measurability of the attributes of future events. Statement G17 introduces the construct of quality into the questionnaire and tests the participant's perception of its ability to harmonise what we are with what we are becoming while Statement G18 tests for causality between social truth and social ideology.

From the model's perspective, Statements G2, G5 to G9 as well as G14 reflects upon its representational similarity with regard to its portrayal of the general principle of choice and the relationship it has with flow, genetics, feature detection, possibilities, model-building and active planning in anticipation of the world, while Statements G1, G3, G17 and G18 on the other hand considers the representational similarity of constructs used as part of the specific conditions of the model in relation to the actual decision-making process as experienced by the respondent. Statements G4, G10, G11, G12, G13, G15 and G16 reveal the representational similarity of the model with regard to a wide range of specific conditions that have been attached to the general principle of choice.

In Section H, the questionnaire reflects on the general principle of decision-making. It does so by, as part of Statement H1, testing the participant's perception of the relationship that exists between judgement and decision-making. In Statement H2 and H3 participants are given definitions of decision-making which they are asked to reflect on and provide an opinion of.

As a specific condition, Statement H5 introduces the concept of satisficing into the questionnaire by asking respondents whether, when they make decisions, they make "good enough" rather than optimal decisions because it is simply not possible for them to determine what is best.

Statement H6 tests if participants believe meaning to arise from interactions with social groups. In Statement H7 the questionnaire reflects on economic decisions and tests if participants believe they can be delegated by one person to another or whether they can only be abdicated. With Statement H8 the questionnaire asks participants to reflect on their own decision-making process to ascertain if they are cognitively aware of every decision being made.

From the model's perspective Statements H1 to H8 therefore reflects upon the representational similarity of the model to its portrayal of the general principle of decision-making and the relationship it has with judgement, creation, imposing limitations, evolution, adaptation, satisficing and meaning. It also reflects upon aspects of the model with regard to delegation and pre-cognition.

Apart from the research questionnaire, of which a copy is provided as Annexure 1D, each respondent was also, as per Annexure 1C, provided with a letter of invitation to participate in the research study. Approved by the research ethics committee of the University of Pretoria, the letter of invitation ensures the participants of their confidentiality and of the researcher's strict adherence to ethical research principles.

8.4.6.1.2 PILOT TESTING AND FINAL REVISION OF THE QUESTIONNAIRE

Upon completion of the questionnaire, it was submitted to the research ethics committee at the University of Pretoria, which requested that changes be made to clarify several technical terms in it. As a result, minor changes were made to the wording of the questionnaire and in some extreme cases clarification was added. An example of this is reflected by Statement D5 with regard to the term autopoiesis where self-creation was included in brackets to improve the respondent's understanding.

8.4.6.1.3 SAMPLING DESIGN AND SAMPLING METHODS

8.4.6.1.3.1 GEOGRAPHY OF THE TARGET POPULATION

Having completed the research questionnaire, the next phase towards the collection of the data entailed the establishment of the population, that universe of units to which Bryman & Bell (2007:17) refer and from which the sample is selected. Considering that the research study was conducted from Pretoria, the capital of South Africa, situated in the Gauteng region of the country, which, although constituting only 1.4% of South Africa's land area, contributes more than 33% of the economy's GDP and approximately 10% of the GDP of the entire African continent, it was decided to limit the target population to this region (South African Info: Unknown). Apart from the high correlation between the research topic and the large concentration of wealth in this area, the surplus, as Mandel (1968:39) points out, also leads to higher and ultimately a more diverse base of specialisation. Given that as part of the sampling frame, several specialised fields were chosen and that, as Cooper & Emory (1995:200) point out, the general idea behind sampling is that by selecting part of the elements of a population, conclusions may be obtained about the entire population, it was believed that a sample from this population would, given the research constraints, best serve the research objectives of this particular study.

8.4.6.1.3.2 SAMPLING FRAME

From the critical trans-disciplinary literature review seven disciplines emerged that made substantial contributions towards improving the researcher's understanding of the research topic. Considering the complex nature of the research topic and the complexity of what the research was trying to access, it was decided to limit the research to only expert opinions from respondents in those particular disciplines that contributed most towards the research topic. The main pre-requisite was that the respondents must, as far as possible, be experts in their respective disciplines. The seven disciplines that were chosen were philosophy, biology, physics, psychology, economics, accounting and finance. Each discipline was chosen for a specific reason, of which a brief outline is provided below.

Respondents from the field of philosophy were selected as part of the study on the basis that philosophy allowed the researcher to place man and his ontological and philosophical perspectives at the very centre of the beholding of value process for financial decision-making, thereby allowing for the determination of the impact that these perceptions have on the beholding of value process. This is a unique perspective that leads to the identification of the two primary pre-requisites for the beholding of value process to emerge, the first being a physical and the second a psychological world. Both worlds are simultaneously inhabited by man.

In recognition of the fact that all psychological motivations have physical origins that are not only constrained by physical laws, but also by systemic operational principles that allow them to function in a sustainable manner, respondents from the discipline of biology were included as part of the study. This acknowledged that any value process would not only have to take these physical laws and operational principles into account, but would have to manifest in such a way as to conform to them.

Taking into account the important role that physics plays in the beholding of value process, it was decided to include respondents from this discipline in the study. This selection was based not only on the contribution that the discipline of physics made with its conservation of energy and entropy laws but also due to its introduction of the Quantum Zeno Effect in decision-making. This thereby explains how it is possible for something that is non-material such as the will to influence the material world and in doing so be able to wield thought as part of the reasoning process.

As an intricate part of the beholding of value process, respondents from the discipline of psychology were included as part of the study. This was done for two reasons. Firstly, because the entire beholding of value process occurs in the mind of the beholder and secondly because of psychology's invaluable contribution towards making the part of the beholding of value process that occurs outside of conscious awareness visible. Out of recognition of the substantial contribution made by economics in the establishment of the general principles towards a personal theory of value, respondents from the discipline of economics were included as part of the study.

Considering that a key part of the thesis consists of a critical analysis between accounting information and decision-making as well as an examination of the relationship between accounting and the beholding of value process towards the making of a financial decision, it was decided to include respondents from both the disciplines of finance and accounting as part of the study.

Having established the respective contributory disciplines from which respondents were required, an internet search was conducted to establish which of these disciplines had representative bodies in South Africa. Through an internet search the contact details for the various bodies were obtained after which personal calls were made to invite them to participate in the study.

In the discipline of physics, The South African Council for National Scientific Professionals (SACNASP) was approached. In the discipline of biology, The South African Association of Physicists in Medicine and Biology (SAAPMB) and The South African Society for Biochemistry and Molecular Biology (SASBMB) were contacted. This was followed by invitations to The Philosophical Society of South Africa (PSSA), The South African National Association of Practicing Psychologists (SANAPP) and The Economic Society of South Africa (ESSA).

Reflecting on the accounting community, it was decided to extend letters of invitation to the four largest accounting and auditing firms in South Africa, which included PricewaterhouseCoopers (PWC), Deloitte, Ernst & Young and KPMG. Working under the pre-supposition that the greater the wealth under management, the more experienced and skilled the person will be that manages it, only financial managers working with medium-sized companies with an annual turnover in excess of R50 million in the Gauteng region were invited to participate in the study.

Where the chosen representative bodies were not able to assist, or could not provide the required number of respondents, experts within the respective disciplines were sought at either the Tshwane University of Technology or the University of Pretoria.

Where the accounting and auditing firms were unable to assist, or could not provide the required number of respondents, companies in the private sector in the greater Pretoria and Johannesburg region of Gauteng were approached.

These participants were, given the study's exploratory nature, approached on a non-probabilistic convenience-sampling basis.

8.4.6.1.3.3 SAMPLE SIZE / STRATIFICATION ADEQUACY

Given the exploratory nature of the study, the objective of the questionnaire was to establish the degree to which a group of respondents – as leading figures from the fields of expertise encountered during the trans-disciplinary literature review – would agree or disagree with statements made by and subsequent model elements obtained from them.

This is an aspect in relation to which Kaiser (1970:402) states:

> *In exploratory work, on the other hand, we know very little ahead of time; the best we can do is take observations on a whole pot-full of random variables which we suspect may be relevant, and then see what happens. We're engaged, as it were, in a fishing expedition.*

In this study's case the "fishing expedition" includes not only a number of different fields but moreover, a wide range of institutions and organisations, making it very difficult to determine the exact size of the population. Moreover, as Tabachnick & Fidell (1983:379) point out, the adequacy of a sample size depends on a wide variety of factors.

Given that exploratory research often encounters these obstacles, certain writers provide general rules about sample size. As such Gorusch (1983) & Kline (1994) in Pearson & Mundform (2010:359) require a minimum of 100 subjects; a point of view also shared by Bryman & Bell (2007) as well as Field (2009). This is a requirement this study not only meets but surpasses. Still further, Tabachnick & Fidell (1983:379) state:

> *If there are strong, reliable correlations and few distinct factors, a sample size of 50 may even be adequate, as long as there are notably more cases than factors.*

Reflecting upon this line of thought, it appears to be possible to determine the adequacy of the sample size by determining the strength and reliability of the correlations between the section scores of the respondents. This is especially so if it is done in conjunction with the determination of the number of distinct factors. As such, taking cognisance of the Pearson correlation analysis provided as part of Table 9.38 of the study, where the minimum correlation coefficient among the scores amounted to .349, as well as the Intraclass Correlation for the scores provided as part of Table 9.39, which amounted to 0.901, it is clear that a high or, put differently, a reliable correlation among the sectional scores for the respondents exists. Moreover, the factor analysis provided as Table 9.41, from which only two distinct factors emerged, provides strong support in favour of the proposition that the sample size was indeed adequate.

8.4.6.1.4 DISTRIBUTION OF THE QUESTIONNAIRES

As part of the research study, structured questionnaires were administered in both a hard copy and an electronic format. Making use of key individuals, questionnaires accompanied by a letter of invitation were sent out to associates and persons of known interest. Dramatically increasing the response rate, this method does however complicate matters in the sense that for this part of the research it is not possible to establish an accurate response rate. What can however be confirmed is that 13 e-mail responses were received, 8 of which pertained to the field of financial management, 2 to the field of accounting, 1 to economics and 2 indicating that they specialised in other fields. Inclusive of the 13 e-mail responses, 135 questionnaires were administered in total to the respective representative bodies, the four large accounting and auditing firms, which include PricewaterhouseCoopers (PWC), Deloitte, Ernst & Young and KPMG, as well as the Tshwane University of Technology and the University of Pretoria and various other companies in the private sector in the greater Pretoria and Johannesburg region of Gauteng.

Their combined response rates are stipulated below.

Table 8.2 Summary of the response to hard copy questionnaires distributed

Field of primary expertise	Distributed	Participants responded	Response rate
Physics	15	10	66.67
Biology	15	10	66.67
Philosophy	10	6	60.00
Psychology	15	10	66.67
Economics	10	8	80.00
Accounting	20	16	80.00
Financial	20	16	80.00
Other	30	25	83.33
Total	**135**	**101**	**74.81**

Due to the personalised nature with which the hard copy responses were obtained, a high response rate was realised, which compares well with studies conducted by both Shuttleworth (2009:286) and Khomba (2011) who respectively obtained a 76.80% and 82.4% response rate using similar methods.

8.4.7 CIRCLE 4 – SOLUTION

Following the distribution of the questionnaires, the questionnaires were later collected, the data prepared, recorded and then statistically presented as part of Circle 4 of the Mitroff model. This is a process which is discussed in more detail below.

8.4.7.1 STATISTICAL APPROACH FOLLOWED IN THE STUDY

Upon receipt, each questionnaire was scrutinised to ascertain if it was appropriately completed. This was done to, as Terre Blanche & Durrheim (1999:10-522) suggest, “clean” the data before any statistical calculations are done. Each corrupt statement was given a 0 value and excluded from the data analysis process. Where a respondent failed to indicate his or her gender, the participant was classified as not specified. In two extreme cases questionnaires had to be discarded due to large sections not being completed.
Following this process the data was, as recommended by Bryman & Bell (2007) as well as Babbie & Mouton (2007), compared with the original data on the questionnaire.

The raw data was then codified by assigning a unique numerical code to each response, which was then inserted into SPSS version 21 for further statistical analysis.

8.4.7.1.1 DESCRIPTIVE STATISTICS

As part of this process and in accordance with Saunders, Lewis & Thornhill (2003:351) as well as Welman, Kruger & Mitchell (2005:231) descriptive statistics were used to differentiate among the different types of analysis; those areas with only one variable statistically being referred to as a univariate analysis. Where two variables are involved, it is referred to as a bivariate analysis, and where there are more than two variables involved, it is referred to as a multivariate analysis.

8.4.7.1.1.1 UNIVARIATE ANALYSIS

Univariate analysis entails the study of only one variable at a time; a process conducted as part of this study through the use of a frequency table displaying the allocations made by the participants towards the different ranges of the Likert scale (Bryman & Bell 2007:357). Each allocation culminates in a percentage representing the respondents' degrees of beliefs, their epistemic judgements about the representative similarity of the statements made about general principles and specific conditions, when compared to the actual decision-making process as experienced by the respondents. This assisted the researcher to, in conjunction with those points outlined as part of point **8.4.7.1.2.3,** test the validity and reliability of the scientific model presented as part of Circle 3 of the Mitroff model in Chapter 10 of the thesis.

In addition, a statistical mean was also calculated measuring the average rating of the responses of each statement, as well as for each of the respective disciplines that contributed towards the study. The frequency tables as well as the related data are presented for consideration as part of Chapter 9.

8.4.7.1.1.2 BIVARIATE ANALYSIS

Following the univariate analysis, tests were performed on the scores for each respondent for each section of the questionnaire, ie the mean of all the answers supplied in the section by the respondent. The tests were conducted in order to determine if the scores were parametric or non-parametric, thereby ultimately determining the type of correlation coefficient test to be used, as well as if the use of factor analysis and the ANOVA model on the data is appropriate.

According to Lunenburg & Irby (2008:77) parametric statistics have three basic requirements, namely that:

1) The population must be normally distributed;
2) There must be homogeneity of variance within the different groups;
3) The data must be interval or rational in scale.

If the above criteria are not met, non-parametric statistics must be used to determine the correlation figures. In contrast to parametric tests, non-parametric techniques do not test the characteristics of a population. Rather they test hypotheses about the relationship between categorical variables, the particular shape of the distribution, and whether the distribution is normally shaped. Parametric procedures therefore use means while non-parametric procedures use frequencies, percentages and proportions.

Considering that a Lickert scale was used as part of the questionnaire to structure the respondents' responses, it is clear that variables emanating directly from this process cannot be normally distributed. Yet, as Steffens (Personal communication, June 23, 2014) points out, in accordance with the central limit theorem, means of variables tend to be normally distributed even though the variables themselves are not. To confirm that this is also the case in this study, a One-Sample Kolmogorov-Smirnov test, as supplied in Table 9.36 of the thesis was conducted to determine if the score for each respondent per section, namely the mean of all the answers supplied in the section by the respondent, were normally distributed.

In the case of Section D, two respondents did not supply answers and scores could not be computed. In all other cases a score was obtained. From the Kolmogorov-Smirnov test it was established that the *p*-values were all large and as such the hypothesis of normality cannot be rejected. Still further, the skewness and kurtosis were also found to be satisfactory (Steffens, personal communication 2014, June 16).

In testing for homogeneity of variance the variability of scores for each of the groups were tested for their similarity (Pallant 2007:204). Statistically, also referred to as homoscedasticity, the homoscedasticity of the groups were analysed by inspecting the residuals which in turn were determined by taking the score of each respondent and then subtracting the group average. The residuals were then tested using Levene's test for equality of variance. The results of the test is reflected in Table 9.37 and clearly indicate that all the *p*-values are above .05, indicating as Pallant (2007:234) points out, that it is safe to assume homogeneity of variance.

Still further, Nunnally (1978:16) outlines three basic requirements for an interval scale:

1) The rank-ordering of objects must be known with respect to an attribute ;
2) It must be known how far apart the objects are from one another with respect to an attribute;
3) No information is available about the absolute magnitude of the attribute for any object.

Given that the score calculated for each respondent, ie the mean of all the answers supplied in the section by the respondent, meets not only all of the above requirements but also the requirements outlined by Lunenburg & Irby (2008:77) for the use of parametric statistics, it was possible to perform a Pearson correlation analysis on the section scores of the questionnaire, which is provided as part of Table 9.38. In the case of Section D, two respondents did not supply answers and scores could not be computed. In all other cases a score was obtained. Although this correlation, as Bryman & Bell (2007:361) as well as Hofstee (2006:215) clearly state, does not in any way imply causality, it nevertheless assisted the researcher to, in accordance with Tabachnick & Fidell (1983:379), verify if the use of factor analysis as part of the study is appropriate.

Still further, the Pearson correlation analysis indicated if the eight general principles forming the conceptual framework of the scientific model presented as part of Circle 3 of the Mitroff model were not only positively correlated to one another to a statistically high significant level but also significantly interconnected with one another.

8.4.7.1.1.3 MULTIVARIATE ANALYSIS (EXPLORATORY FACTOR ANALYSIS)

Excluding the biographical and background questions, the study consists of 101 subjects and 82 questions or variables. In order for factor analysis to be conducted on the 82 questions or variables, Nunnally (1978:421) requires a minimum of 10 times as many subjects as variables.

This implies that in this particular case a minimum of 820 subjects are needed in order to use factor analysis to determine the shape structure of the questionnaire. Even on the minimum requirements outlined by Tabachnick & Fidell (183:379) of five times as many subjects as variables, the study is still not able to meet the set minimum requirements for the use of factor analysis to assist in determining the shape structure of the questionnaire.

Despite the fact that the sample size is not adequate to allow factor analysis to assist in the shape structure of the questionnaire, it nevertheless meets the minimum requirement of 100 subjects as outlined by Gorusch (1983) and Kline (1994) in Pearson & Mundform (2010:359). Moreover, it surpasses the sample size requirements stipulated by Tabachnick & Fidell (1983:379).

Taking cognisance of the above, it was decided to reduce the 82 questions or variables by determining a score for each respondent for each section of the questionnaire, ie the mean of all the answers supplied in the section by the respondent. In the case of Section D, two respondents did not supply answers and scores could not be computed. In all other cases a score was obtained.

This process reduced the number of variables from 82 to eight, allowing the researcher to use factor analysis to determine which sections of the questionnaire grouped together. As part of this process and in accordance with Pallant (2007:181), the study proceeded to determine the strength of the intercorrelations among the scores.

This is an aspect in relation to which Tabachnick & Fidell (1983:379) recommend an analysis of the correlation matrix for evidence of correlation coefficients greater than .3. As indicated, as part of the Pearson correlation analysis provided as part of Table 9.38 of the thesis, the minimum correlation coefficient among the scores amounted to .349, indicating, as stipulated by Tabachnick & Fidell (1983:379) that, within this context, the use of factor analysis is appropriate.

Moreover, an Intraclass Correlation test on the scores was also conducted, indicating as provided as part of Table 9.39, that the Intraclass Correlation for the scores amounted to 0.901. This points to significantly high Intraclass Correlations, indicating both strong interconnectivity and interdependence among the scores, reaffirming the appropriateness of the use of factor analysis in this context. Further still, Bartlett's test of Sphericity was conducted, which is supplied as part of Table 9.40. Sphericity is an indication of the independence of the variables from one another. In the event that the variables are completely independent of one another, it will not be possible to determine factors consisting of more than one variable (Steffens, personal communication, June 19, 2014). In this particular case the *p*-value amounted to .000 which is significant in that it is smaller than $p<.05$, indicating that the use of factor analysis is appropriate (Pallant 2007:181). Moreover, as part of Table 9.40 Kaiser-Meyer-Olkin's Measure of Sampling Adequacy was determined, which amounted to .883, thereby surpassing the threshold of .6 as prescribed by Tabachnick & Fidell (2007) in Pallant (2007:181), also indicating it is appropriate to use factor analysis in this instance. The study then proceeded with factor extraction by determining the smallest number of factors that can be used to best represent the interrelations among the set of variables. There are, as Pallant (2007:181-182) points out, a wide variety of approaches that can be used to identify the number of underlying factors or dimensions, which include principal components, principal factors, image factoring, maximum likelihood factoring, alpha factoring, unweighted least squares and generalised least squares.

Using the standard procedures of the Statistics Department of the University of Pretoria, Principal Axis Factoring was used as the extraction method. In addition, Kaiser's criterion was used whereby, as Pallant (2007:182) points out, only factors with an eigenvalue of 1.0 or more are retained for further investigation. The eigenvalue of a factor, as she goes on to explain, represents the amount of the total variance explained by that factor. The results of the eigenvalues for each factor are presented in tabular format as part of Table 9.41.

Once the number of factors had been determined, the next step was to rotate the factors which, as Pallant (2007:183) points out, does not change the underlying solution but rather presents the patterns of loadings in a manner that is easier to interpret.
There are two different types of rotation, Orthogonal Rotation and Oblique Rotation (Tabachnick & Fidel 1983:399). Using Varimax with an Orthogonal Rotation technique, the goal was to make the factors used in the study as simple as possible by maximising the variance of the loadings across variables within factors. This is an aspect Tabachnick & Fidel (1983:399) go on to explain when they state:

> *In this way, loadings tend to become higher for those variables with high correlations with a factor and smaller for the other variables. Interpreting a factor is facilitated because the composite of variables with which a factor is correlated is obvious.*

Moreover, as they point out, Varimax tends to reapportion the variance among factors so that they become relatively equal in importance, by taking variances from factors first extracted and distributing them among the later ones. The result of the Orthogonal Rotation is presented as part of Table 9.42.

This was followed by the use of an Analysis of Variance or ANOVA model in order to establish if there are any significant differences among the groups in terms of gender, ethnicity, age, field of expertise, experience, sector, capacity or level of seniority in relation to the design (Pallant 2007:207). In order to ensure the validity and reliability of the One-way ANOVA model used in the study, an assessment was done to determine if the model met the criteria outlined by Pallant (2007:203). The first of these requirements entail that the dependent variable must be measured at the interval or ratio level. This implies the use of a continuous scale rather than discrete categories.

Taking into account that the questionnaire makes use of a Lickert Scale, the raw data clearly does not meet this requirement. However, considering that instead of raw data a score for each respondent for each section of the questionnaire was determined by calculating the mean of all the answers supplied in the section by the respondent – and that it is on these scores that the One-way ANOVA model was based – the study does meet the set requirement.

The second requirement for the use of a One-way ANOVA model is that the sample must be random. Because the sample used to calculate the scores for the ANOVA model was random, it follows that the study also meets this requirement set by Pallant (2007:203).

As a third requirement, the ANOVA model requires an independence of observations. The observations making up the data must therefore be independent of one another. Given that each respondent completed his or her questionnaire alone and as such could not be influenced by the other, the study also meets this requirement.

As a fourth requirement for the use of a One-way ANOVA model, a normal distribution is required. Given that a Lickert scale was used in the questionnaire to structure the data, it is clear that, within this context, the data is not normally distributed.

Yet, as Steffens (Personal communication, June 23, 2014) points out, in accordance with the central limit theorem, means of variables tend to be normally distributed even though the raw data may not be normally distributed. Moreover, Tabachnick & Fidell (1983:78) state:

> *With sampling distributions, the central limit theorem protects against failures of normality when sample size is large and there are roughly the same number of cases in all the groups. So evaluation of normality of variables is not as critical when inferences about differences in central tendency are the goals of analysis.*

In order to ensure that the requirement of a normal distribution was met, a One-Sample Kolmogorov-Smirnov Test for normality was conducted on the scores for each respondent per section, ie the mean of all the answers supplied in the section by the respondent. The One-Sample Kolmogorov-Smirnov Test for normality is supplied as part of Table 9.36.

The results indicated that the *p*-values are all large and as such the hypothesis of normality cannot be rejected. The study therefore also in this regard meets this set requirement for the use of a One-way ANOVA model.

As the fifth requirement that Pallant (2007:204) lists, the One-way ANOVA model requires samples obtained from populations to be of equal variances. She refers to this as homogeneity of variance which, as she goes on to explain, means that the variability of scores for each of the groups is similar. Statistically this is referred to as homoscedasticity (Steffens, personal communication, June 23, 2014). The homoscedasticity of the groups were analysed by inspecting the residuals which in turn were determined by taking the score of each respondent and then subtracting the group average. The residuals were then tested using Levene's test for equality of variance.

From Levene's test for equality of variance as presented as part of Table 9.37 it was clear that all the *p*-values were above .05, indicating as Pallant (2007:234) points out, that it is safe to assume homogeneity of variance.

Still further, Pallant (2007:205) lists other factors that can influence the power of the test, which include:

1. Sample size;
2. Effect size (the strength of the difference between groups, or the influence of the independent variable); and
3. Alpha level set by the researcher.

In terms of the first point Stevens (1996:6) points out that when the sample size is large ie more than 100, then the power of a test is not an issue. Given that in this sample the number of respondents exceeds 100, ie was 101, then it follows that it is not necessary to adjust the alpha level of .05 mentioned under point 3 above.

This was followed by a post-hoc comparison also referred to by Pallant (2007:207) as a posteriori.

This was used to conduct a whole set of comparisons to explore the differences between each of the groups or conditions in the study. As she goes on to explain, post-hoc comparisons are designed to guard against the possibility of Type 1 errors whereby the null hypothesis is rejected when it is in fact true.

As such, an F-test was conducted during which an F-ratio was calculated in order to establish if there are any significant differences among the groups in terms of gender, ethnicity, age, field of expertise, experience, sector, capacity or level of seniority in relation to the design (Pallant 2007:207). The F-test therefore tested if the difference between the groups means dominate the variability within the groups. From the F-tests a *p*-value was established which if small, ie lower than .05, indicates that the means in the respective groups are different (Steffens, personal communication, June 23, 2014). These tests were supplied as part of Table 9.43 to Table 9.49 of the thesis. Still further, a partial eta squared was performed as presented in Table 9.50 which was then overlapped with the *p*-values from the F-tests to establish the strength of the effect size or strength of association (Pallant 2007:207). Ultimately as Pallant (2007:207) points out, indicating if, where differences were found between the groups, these differences were not only statistically significant, but also not likely to have occurred by chance. From the information outlined above as well as that supplied by the partial eta squared it was established that the ANOVA model not only from a measurement, sampling, observation, distribution and homogeneity of variance perspective but also from a sample size, alpha level as well as effect size, meets all the requirements to be regarded as both valid and reliable.

8.4.7.1.2 VALIDITY AND RELIABILITY TESTS CONDUCTED

As part of any survey, three aspects are measured. Firstly the intended construct is measured. This is followed by irrelevant constructs and random measurement errors (Cooper &Schindler 2006:165-166).

Random measurement errors refer to accidental factors and as such are unsystematic and only give rise to problems pertaining to data reliability. Measurements of the intended and irrelevant construct however, are systematic sources of variation and therefore give rise to problems of data validity.

8.4.7.1.2.1 DATA VALIDITY

According to Cooper &Schindler (2006:166-171) data validity is a reflection of the extent to which research findings accurately demonstrate what is really happening in a particular situation. Alternatively data validity can also be viewed as an indication of whether or not an indicator or set of indicators devised to measure a concept actually measure it; a concept known as construct validity (Bryman & Bell 2007:165). Construct validity therefore refers to the extent to which measuring instruments measure the intended construct, while data validity refers to the extent to which an empirical measure adequately reflects the real meaning of the subject under investigation (Babbie & Mouton 2007:122). In this study great care has been taken in gaining a comprehensive understanding of exactly what it is that requires measuring. In other words, what are the general principles and specific conditions required to form a value decision-making model in order for the model to achieve representative similarity? To obtain an answer to this question the Mitroff model was used to provide structure to the process. Using the model an extensive cross-disciplinary literature review was conducted to obtain content for the model. This was then combined with a philosophy of science approach that provided a definitive structure for the way in which the value decision-making model needed to be built. In addition, to further verify the appropriateness of the general principle and the specific conditions obtained from the review, both qualitative interviews as well as a presentation at the World Finance Conference in Cyprus in 2013 were done. Following a clear understanding of what it was that needed to be measured, a process of statement reviews commenced to ensure the representative similarity of the statement with regard to the general principle or specific condition it aims to represent. This process entailed three submissions prior to the first prototype questionnaire being presented for consideration, of which the fifth and final review was only accepted more than two months into the process.

Accompanying the questionnaire was a letter of invitation explaining the purpose and topic of the study to each respondent. Respondents were also assured of confidentiality and anonymity, encouraging them to complete the questionnaire openly, honestly and frankly. In addition, great care went into determining the target population and the sampling frame of the study.

8.4.7.1.2.2 DATA RELIABILITY

Data reliability signifies the degree to which an instrument consistently measures what it is supposed to measure (Lunenburg & Irby 2008:182-183; Cooper & Schindler 2006:171-174). Looking at this from another perspective, one can also conclude that it determines whether the same results will be achieved if the same technique is repeated to do the same study after a given timeframe (Babbie & Mouton 2007:119). Reliability therefore refers to the extent to which scores that were obtained may be generalised to different measuring occasions, forms and administrators.

Using the Cronbach Alpha statistic to measure the consistency of the respondents' replies, Cronbach's alpha (α) coefficients were determined for each section of the questionnaire. In general, a value of 0.8 or more indicates very reliable data with a value of between 0.6 and 0.8 indicating moderate reliability. Where the sample comprises a very diverse group of respondents, a value of between 0.6 and 0.8 is statistically acceptable. This feat, as reflected by Annexure 1E with the exclusion of Statement B3, was achieved for all the sections of the questionnaire. By making use of the averages of all the items in the section, a score per section was calculated. As part of this process, missing values were replaced by the mean of the non-missing values for the respondent of that section after which a reliability analysis was performed for the section scores. Yielding a Cronbach Alpha of 0.912, it indicates that although there was only moderate consistency in the detailed answers provided by respondents with regard to each section, there was overall a strong consistency in the replies received from the respondents. It can therefore be concluded that in general the data is reliable and that its conclusions can be relied upon.

8.4.7.1.2.3 VALIDITY AND RELIABILITY OF THE SCIENTIFIC MODEL PRESENTED AS PART OF CIRCLE 3 OF THE MITROFF MODEL

In experiments, before variables can be related to one another they must, as Nunnally 1978:95-98) points out, first be measured. As such, as he goes on to reflect, in order for statements of relationships to have any meaning, each measure must, in some sense, validly measure what it purports to measure.

Moreover, the degree to which it is necessary and difficult to validate measures of psychological variables will, as Nunnally (1978:98) points out, be proportional to the degree to which the variables are concrete or abstract.

According to Nunnally (1978:87) there are three distinct types of validity, namely predictive, content and construct validity. Predictive validity, as he goes on to explain, is an issue when the purpose is to use an instrument to estimate some independent form of behaviour that is external to the measuring instrument itself, the latter being referred to as the criterion. In contrast, he notes that for some instruments, validity depends primarily on the adequacy with which a specified domain of content is sampled. Considering that this particular question focuses on the validity of the model, then, as Nunnally (1978:98) points out, three major aspects come into play:

The first aspect pertains to the specification of the domain of observables related to the construct. In this particular study the problem-solving model designed by Mitroff, Betz, Pondy & Sagasti (1974:46-58) was used in conjunction with an extensive multi- and trans-disciplinary literature review. Multi-disciplinary in the sense that the research topic was not just studied in one discipline alone but in several disciplines at the same time, and trans-disciplinary in that, as Nicolescu (2005:5) points out, it was founded on the postulates that:

1. In nature and in our knowledge of nature, there are different levels of reality and correspondingly, different levels of preparation.
2. The passage form one level of reality to another is ensured by the logic of the included middle.
3. The structure of the totality of levels of reality or perception is a complex structure of which every level is what it is because all the levels exist at the same time.

Complementing this, a philosophy of science approach as outlined by Giere (2004:743) was used. All necessary aspects required in order to specify the domain of observables related to the construct.

From a construct validity perspective, the second aspect Nunnally (1978:98) raises is the use of experimental research and statistical analysis to determine the extent to which the observables tend to measure the same thing, several different things, or many different things.

Through the use of Giere's (2004:743) philosophy of science approach, it was possible to construct a questionnaire based on the formula of:

S uses X to represent W for purposes P.

S represents the researcher who uses X in the form of statements obtained from leading figures in those fields contributing most to the researcher's understanding of value to represent an aspect of the real world W for purposes P. Each statement pertains to a specific model element that can be identified with features of the real world, thereby making it possible to use models to represent aspects of the real world. This process leads to P, the purpose of which was to test the statement and the subsequent model element it relates to for its representational faithfulness when compared to the aspect it represents in the real world.

Incorporating these statements into a questionnaire, a Lickert scale with a range of representation of between 1 and 8 was used to determine the representational faithfulness of the model element being tested. Each allocation culminates in a percentage representing the respondents' degrees of beliefs, their epistemic judgements about the representative similarity of the statement made about the general principles and specific conditions when compared to the actual decision-making process as experienced by the respondents.

Through a univariate analysis and the use of frequency tables to display the allocations made by the participants, it was established that in general the respondents agreed with the representational faithfulness of the model elements when compared to the aspect it represents in the real world, thereby validating the representational faithfulness of the model elements.

As the third and last aspect of construct validity, Nunnally (1978:98) notes that in order to determine the extent to which supposed measures of the construct produce results that, from a highly accepted theoretical hypotheses about the construct are predictable, studies of individual differences and/or controlled experiments are required. In this regard scores for each respondent per section was determined based on the mean of all the answers supplied in the section by the respondent. Still further a One-Sample Kolmogorov-Smirnov test was conducted for normality on the scores.

Moreover, a Pearson correlation analysis as well as an Intraclass Correlation analysis was done on the scores. Even further, Bartlett's test of Sphericity as well as Kaiser-Meyer-Olkin's measure of sampling adequacy was also conducted. This was followed by a factor analysis, the details of which have been discussed at length above. The above process culminates in a model that meets Nunnally's (1978:99) requirements in the sense that it is:

1. Well-defined in terms of a variety of observables;
2. There are one or several variables that well represent the domain of the observables;
3. It eventually proves to relate strongly with other constructs of interest.

This process was followed by a reliability test that was conducted using Cronbach's alpha (α), thereby determining the degree to which an instrument consistently measures what it is supposed to measure (Lunenburg & Irby 2008:182-183; Cooper & Schindler 2006:171-174). Using the Cronbach Alpha statistic to measure the consistency of the respondents' replies, Cronbach's alpha (α) coefficients were determined for each section of the questionnaire. In general, a value of 0.8 or more indicates very reliable data with a value of between 0.6 and 0.8 indicating moderate reliability.

Where the sample comprises a very diverse group of respondents, a value of between 0.6 and 0.8 is statistically acceptable. This feat, as supplied as Annexure 1E of the thesis, was obtained with the exclusion of Statement B3 for all the sections of the questionnaire. By making use of the averages of all the items in the section, a score per section was calculated.

As part of the process, missing values were replaced by the mean of the non-missing values for the respondent of that section, after which a reliability analysis was performed for the section scores. Yielding a Cronbach Alpha of 0.912, it indicates that although there was only moderate consistency in the detailed answers provided by the respondents with regard to each section, there was overall a strong consistency in the replies received from the respondents. It can therefore be concluded that in general the data and its conclusions are reliable.

Given the representational faithfulness and reliability of the individual model elements, inductive reasoning leads one to conclude that a model comprised of these reliable and representationally faithful elements may also be deemed to be not only representationally faithful but also reliable (Cooper & Schindler 2006:466).

Alternatively, causality may be used to argue that, given the representational faithfulness and reliability of the individual model elements, they will produce a model that is not only representationally faithful but also reliable (Cooper & Schindler 1998:142).

8.5 CRITICAL ANALYSIS OF THE RESEARCH LIMITATIONS

In the research study, the “experiment” conducted is not one in which a model’s ability to represent similarities pertaining to physical aspects in the real world is being considered but rather where a model of the model, the system on which we base our understanding and decisions about the real world, is reflected upon. As such, representation cannot be established by an isomorphic relationship between the model and the world but has to be defined by a looser relation of similarity, a degree of accuracy, a relative relationship that essentially involves value judgements that cannot be reduced to facts. Therefore all the responses received from the respondents are subjective and rely heavily on the text and discourses of the participants under study.

Considering the enigmatic subject matter as well as the exploratory nature of this study and the fact that in many instances it asks as many questions as it answers, it is doubtful whether a clear and concise answer as to exactly how and precisely in what sequence the value process will unfold within each individual decision-maker can be obtained. To a large extent this is so because much of the process is by nature contextual and individualistic. This leaves the outcome of this study inconclusive with regard to how a general theory of value capable of conclusively quantifying value can be established.

Perhaps in this instance it is the researcher with his limited context, perception and inherent limitations that is the most significant limitation of the study in the sense that the research only reflects what the researcher is able to “see” at the time.

The study is also not able to meet the minimum requirements of 10 times as many subjects as variables set by Nunnally (1978:421) in order for it to be able to use factor analysis to assist in determining the shape structure of the questionnaire.

Even on the minimum requirements outlined by Tabachnick & Fidell (183:379) of five times as many subjects as variables, it is still not able to meet the set minimum requirements.

Still further, the research results obtained from the qualitative interviews and questionnaires are cross-sectional by nature and as such can only identify the relationship between variables at a particular point in time (Ryan, Scapens & Theobald 2002:84). As such it cannot explain how these relationships came about.

Another limitation of the research study was time. Had more time been available, the study could have been extended to include additional disciplines that might have contributed further to a better understanding of the construct of value and the role it plays in the financial decision-making process.

As a closing remark it must also be noted that the general lack of standardisation of the meaning of specialised terms within different disciplines posed a significant problem for the respondents, who each brought his or her own context to the interpretation of the terminology.

This problem was exacerbated by the number of disciplines involved and the complexity of the terminology required to describe the principles and their specific conditions used.

8.6 CONCLUSION

In this chapter an overview was provided of the research design and methodology used in the study. As part of this overview the chapter reflected on models as autonomous agents in scientific activity and enquiry. Moreover, it addressed their similarity relevance and measurement requirements. Still further it discussed the Mitroff model and how as part of the thesis it was used as a framework for scientific activity and enquiry (Mitroff et al 1974:46-58). As part of this process the chapter not only outlined the various Circles and Activities of the Mitroff model but also indicated where each scientific activity or enquiry conducted by the thesis fitted into the Mitroff model's structure.

Although the chapter briefly touches on all the aspects of the Mitroff model, its primary contribution is towards Activity 2 and Activity 3 of the Mitroff model as it goes about providing details of the statistical methods used during the data analysis; also discussing the validity and reliability tests conducted on the data as well as on the scientific model presented as part of Circle 3 of the Mitroff Model. Lastly, the chapter provided a critical analysis of the research limitations of the study. In the next chapter, the details of the research findings as well as the analysis of the research results based on the collected data are discussed.

CHAPTER 9

FINDINGS

9.1 INTRODUCTION

In Chapter 1 it was pointed out that to make a financial decision and exert a choice among alternatives is perhaps the most complex challenge financial decision-makers face. This is especially so considering that their decisions are often made against the backdrop of an ill-defined and uncertain future, guided only by the individual's unique perspective, that individualistic context from which reflection and interpretation takes place. It is this perspective and context that Nietzsche, as cited in Tobias (2005:145), refers to as fiction, a reality that Pirsig (1999:251) notes we invent for ourselves. It is what Schopenhauer (1970:69,232) points out decision-makers use to make sense of their surroundings. It is an aspect which is of critical importance in order to determine what they see when they behold and contemplate what is of value to them when making a financial decision.

Yet, as the chapter points out, very little is known about this enigmatic process. From a financial literature perspective, it is not even clear at what level of consciousness value formation occurs. Despite the apparent lack of understanding of this process, Lao Tzu's (2006:29) writings in the Tao Te Ching, dating as far back as the 6th Century BC, indicate that this process is as old as humanity itself and, as he goes on to explain, is associated with our most ancient beginning. As pointed out in Chapter 3, it forms a key component of the mind's ability to build complex models in anticipation of the future, forming a critical part of the survival of all human beings and providing, as Dawkins (2006:24) points out, human beings with the choice to upset the design of their genes.

In addition, Chapter 1 also indicated that it was not clear what the interrelationship between the value process, change and the future-orientated aspects of decision-making was. Still further, it pointed out that if this cumbersome situation was left unaddressed, it would leave open the possibility that a large part of the financial decision-making process would be left unaccounted for, or worse, misrepresented by an ambiguous and often limited concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

As such, this thesis commenced with a process during which it attempted to, from a systems theory perspective, unfold this most intricate and complex of processes. Gradually revealing it and making it known as it spread the process out and open, uncovering it and classifying it as the concept surrounding it evolved (Turnbull et al 2010:1627; Soanes & Stevenson 2008:1575; Crozier, Gilmour & Hucker 2008:739). Hence, as part of Chapters 2 to 6, a trans-disciplinary critical literature analysis was conducted in order to establish a personal theory of value from which, in conjunction with a philosophy of science approach, general principles could be derived that, as part of the Mitroff model, could be used towards the construction of a conceptual model. Once, as part of Chapter 7, the conceptual model was constructed, interviews were conducted through structured qualitative questionnaires focused on a combination of constructs and concepts central to the model. In addition, a presentation at the World Finance Conference in Cyprus in 2013 was conducted in an attempt to ascertain if important general principles or specific conditions were left out during the initial model-building phase. This led to corrections and additions to the general principles and their attached specific conditions. These specific conditions later, in accordance with Giere's (2004:745-747) requirements, went on to form the basic elements of the scientific model that is presented as part of Circle 3 of the Mitroff model in Chapter 10.

As part of Activity 3 of the Mitroff model, the model-solving activity, a philosophy of science approach was used to assist in determining the shape structure of the questionnaire. As such a questionnaire was compiled consisting of statements based on the specific conditions or elements of the scientific model. This was followed by the pilot testing and final revision of the questionnaire after which the sampling design and methods were established.

The questionnaires were then distributed and later collected. The data was prepared, decoded and tested statistically from a validity and reliability perspective. As part of this process and in conjunction with the information provided as part of this chapter, the validity and reliability of the scientific model presented as part of Circle 3 of the Mitroff model were also established. This was followed by a critical analysis of the research limitations.

Subsequently, having concluded the above process, this chapter now moves on to, as part of Circle 4 of the Mitroff model, present the statistical data derived from the questionnaires by providing an analysis of the research participants' ethnicity, age, and field of primary expertise, number of years' experience, sector of participation and level of management. This is followed by a detailed analysis of the data, a process conducted in three phases.

The first phase is a univariate analysis that makes use of frequency tables to display the allocations made by the research participants towards the different ranges of the Likert scale; each allocation culminating in a percentage representing the respondents' degrees of beliefs, their epistemic judgements about the representative similarity of the statements made about general principles and specific conditions when compared to the actual decision-making process as experienced by the respondents. In addition, a statistical mean is also calculated measuring the average rating of the responses for each statement, as well as for each of the respective disciplines that contributed towards the study. This assisted the researcher to, in conjunction with those points outlined as part of point 8.4.7.1.2.3, test the validity and reliability of the scientific model presented as part of Circle 3 of the Mitroff model in Chapter 10.

This is followed by a Bivariate analysis during which tests are performed on the scores for each respondent for each section of the questionnaire, ie the mean of all the answers supplied in the section by the respondent in order to determine if the scores are parametric or non-parametric. As part of these tests a One-Sample Kolmogorov-Smirnov test is used to determine if the score for each respondent per section, namely the mean of all the answers supplied in the section by the respondent, are normally distributed. This is followed by Levene's test for equality of variance to analyse the homoscedasticity of the groups.

Once it is confirmed that the scores meet all the requirements as set out by Nunnally (1978:16) as well as Lunenburg & Irby (2008:77) for the use of parametric statistics, a Pearson correlation analysis on the section scores of the questionnaire is performed. This, as Tabachnick & Fidell (1983:379) point out, assists the researcher to verify if the use of factor analysis is appropriate in the study. Still further, the Pearson correlation analysis indicates if the eight general principles forming the conceptual framework of the scientific model presented as part of Circle 3 of the Mitroff model are not only positively correlated to one another to a statistically highly significant level but also significantly interconnected with one another.

To further reaffirm the appropriateness of the use of factor analysis, the chapter, as part of its multivariate analysis, conducts an Intraclass Correlation test on the scores. Still further, Bartlett's test of Sphericity is conducted to determine the interdependence of the variables from one another. Kaiser-Meyer-Olkin's Measure of Sampling Adequacy is also determined to assess the appropriateness of the use of factor analysis (Tabachnick & Fidell (2007) in Pallant (2007:181). The chapter then proceeds with factor extraction by using the standard procedures of the Statistics Department of the University of Pretoria ie Principal Axis Factoring. In addition, Kaiser's criterion is used whereby, as Pallet (2007:182) points out, only factors with an eigenvalue of 1.0 or more are retained for further investigation. The factors are then rotated using Varimax with an Orthogonal Rotation technique.

This is followed by an Analysis of Variance or ANOVA; the validity and reliability of which is discussed at length as part of point 8.4.7.1.1.3 in Chapter 8. As part of the ANOVA model an F-test is conducted during which an F-ratio is calculated in order to establish if there are any significant differences among the groups in terms of gender, ethnicity, age, field of expertise, experience, sector, capacity or level of seniority in relation to the design (Pallant 2007:207). From the F-tests a *p*-value is established which indicates if the means in the respective groups are different (Steffens, personal communication, June 23, 2014). Still further, a partial eta squared is performed. The findings of the partial eta squared are then overlapped with the p-values from the F-tests to establish the strength of the effect size or strength of association (Pallant 2007:207).

Ultimately, as Pallant (2007:207) points out, indicating where differences are found between the groups, if these differences are not only statistically significant but also not likely to have occurred by chance. Following this the chapter then reaches a conclusion.

9.2 SOCIO-DEMOGRAPHICS OF THE PARTICIPANTS

The objective of the analysis of the sociodemographics of this study is to determine how the actual sample obtained from the target population compares to the envisaged sampling frame. Part of this entails a review of the discriminatory factors that have been built into the questionnaire in order to qualify the data obtained from the research participants, as such reflecting on the various research participants' gender, ethnicity, age, field of primary expertise, number of years' experience, sector of participation and level of management.

9.2.1 GENDER OF THE RESEARCH PARTICIPANTS

Establishing the gender of the research participants is of importance for two reasons. Firstly, it determines the representative similarity of the sample when compared to the population. Secondly it allows the research findings to be grouped, determining if men and women reflect differently on the statements made by the questionnaire with regard to the financial value decision-making model. Although in accordance with the 2011 census survey South Africa's population is comprised of 48.7% males and 51.3% females, figures indicate that in the Gauteng province the male numbers are in excess of 50% (Statssa: Unknown).

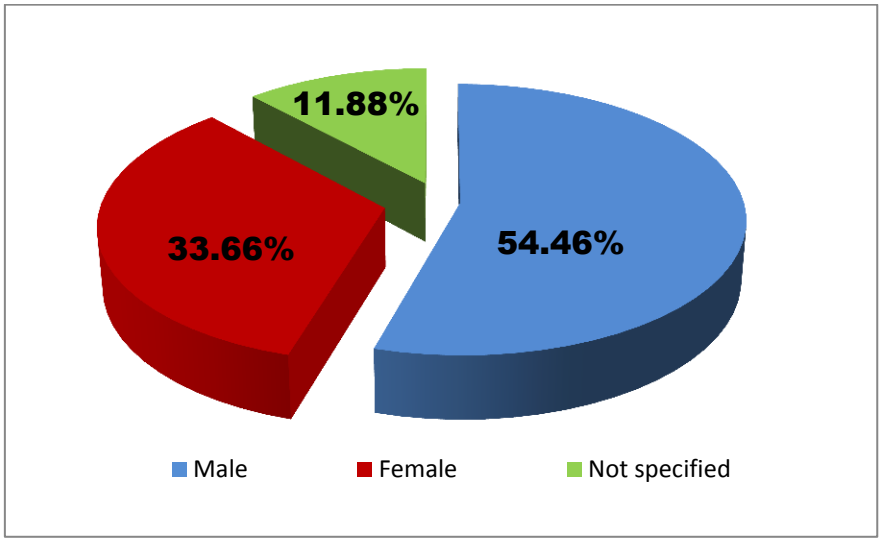
Considering therefore that out of the data obtained from the research questions it was established that 54.5% of all the participants were male, 33.67% were female and 11.83% did not specify their gender, then it becomes clear that the sample is skewed towards the male respondents in the population. An aspect which should be taken into account if the research indicates that male and female respondents have significantly different views about the statements made about the financial value decision-making model.

A summation of the gender of the survey respondents is provided below as part of Table and Figure 9.1.

Table 9.1 Gender of the research participants

Gender	Frequency	Percentage	Cumulative Percentage
Male	55	54.46%	54.46%
Female	34	33.66%	88.12%
Not specified	12	11.88%	100%
Total	101	100%	

Figure 9.1 Gender of the research participants



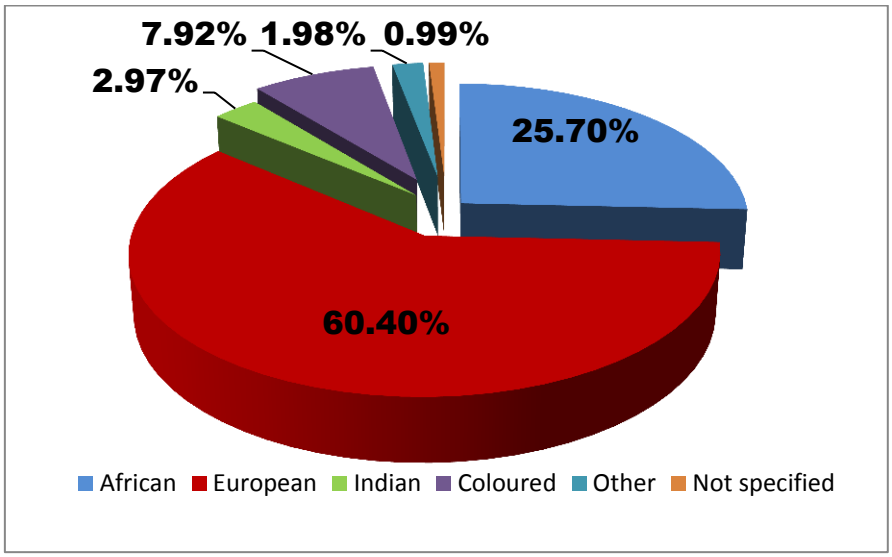
9.2.2 ETHNICITY OF THE RESEARCH PARTICIPANTS

Although the wider South African population consists of approximately 79.2% Africans, 8.92% Coloured, 8.86% European, 2.49% Indian and Asian and 0.54% others, it is not clear what the proportional ethnic allocations are within the various fields from which the sample was obtained (Statssa: Unknown). As such, given this limitation, an opinion with regard to the sample's ethnic representation within the respective fields cannot be reached.

Table 9.2 Ethnicity of the research participants

Ethnicity	Frequency	Percentage	Cumulative Percentage
African	26	25.74%	25.74%
European	61	60.40%	86.14%
Indian	3	2.97%	89%
Coloured	8	7.92%	97.03%
Not specified	2	1.98%	99.01%
Other	1	0.99%	100%
Total	101	100%	

Figure 9.2 Ethnicity of the research participants



What can however be stated is that with 25.74% of the sample's respondents being of African descent, 60.40% of European descent, 2.97% of Indian decent, 7.92% of Coloured decent and 1.98% indicating that they are of other decent, with 0.99%failing to specify their origin, the sample does not, from an ethnic perspective, proportionally represent the broader South African population. As such, all research findings extended to the broader population must first be qualified. Considering this, and for the sake of further clarification, a summary of the ethnicity of the survey respondents have been included as part of Table and Figure 9.2 above.

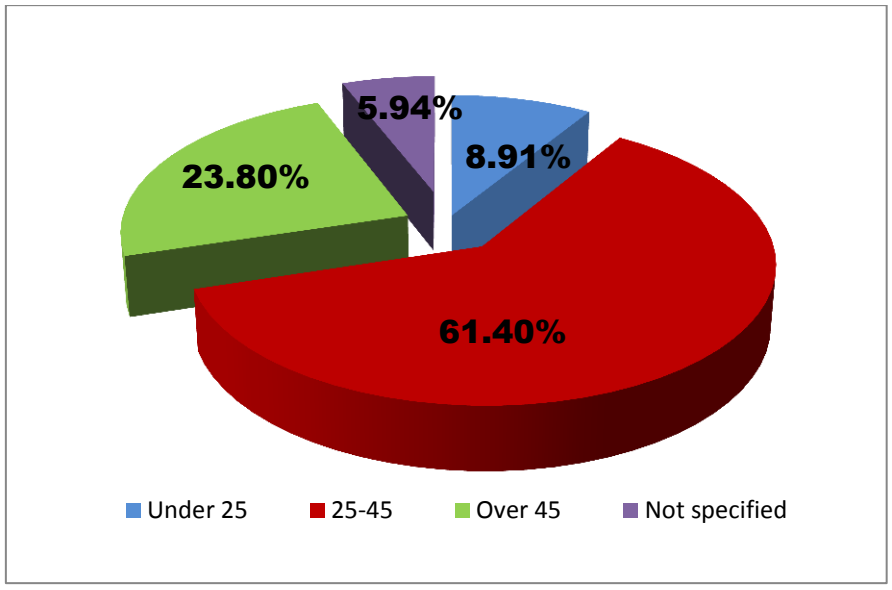
9.2.3 AGE OF THE RESEARCH PARTICIPANTS

From the 2011 survey, it was established that at the time of the survey 10.4% of South Africa's population was between the ages of 20 and 24 years, 30% between the ages of 25 and 44 years and 17.5% between the ages of 45 and 69 years, thereby comprising 51.81% of the entire South African population. Considering that nearly the entire sample is comprised of respondents between 20 and 69 years of age then if the 51.81% is converted to 100% it implies that approximately 17.96% of the sample should have been between the ages of 20 and 24 years, 51.81% between the ages of 25 and 44 years and 30.22% between the ages of 45 and 69 years.

Table 9.3 Age of the research participants

Age Group	Frequency	Percentage	Cumulative Percentage
Under 25	9	8.91%	8.91%
25-45	62	61.39%	70.30%
Over 45	24	23.76%	94%
Not specified	6	5.94%	100.00%
Total	101	100%	

Figure 9.3 Age of the research participants



This is something which, given the lack of clarity pertaining to the proportional age allocations within the various fields the sample was obtained from, appears to be quite close to the actual age representation of the sample, with 8.91% of the research participants being under the age of 25, 61.39% being between 25 and 45 years of age, 23.76% over the age of 45 years and 5.94% failing to specify their age group. Please find above, as part of Table and Figure 9.3, a brief summary of the ages of the survey respondents.

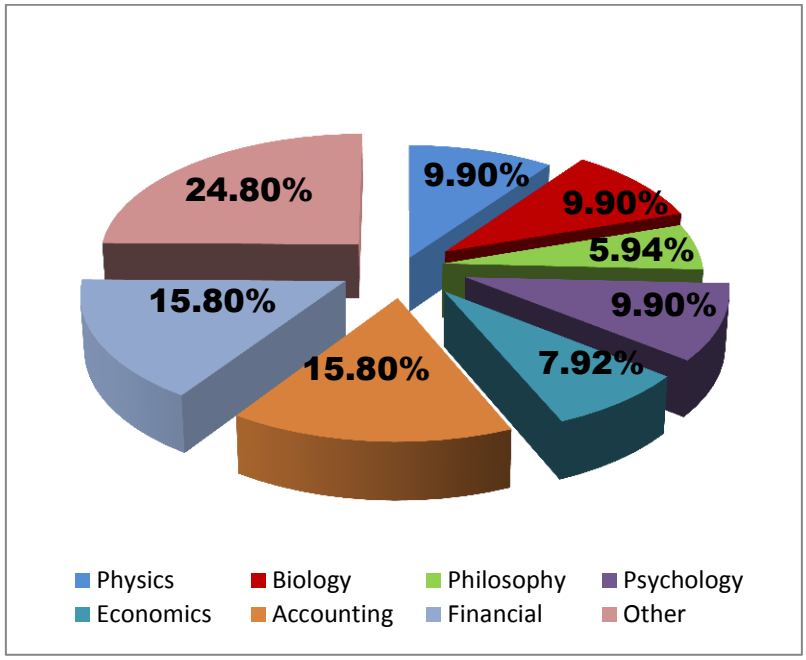
9.2.4 FIELDS OF THE RESEARCH PARTICIPANTS

Given that it is not clear what the proportionate allocation of the respective fields within the target population is, no unqualified claims of representation of the research with regard to the larger population can be made. Despite this, it can however be concluded that when asked to indicate their field of expertise, 9.9% of the research participants indicated their field to be physics, 9.9% biology, 5.94% philosophy, 9.9% psychology, 7.92% economics, 15.8% accounting and 15.8% financial management, with the remaining 24.8% being comprised of a wide variety of fields, the details of which have been supplied as part of Table and Figure 9.4

Table 9.4 Fields of the research participants

Field of Expertise	Frequency	Percentage	Cumulative Percentage
Physics	10	9.90%	9.90%
Biology	10	9.90%	19.80%
Philosophy	6	5.94%	26%
Psychology	10	9.90%	35.64%
Economics	8	7.92%	43.56%
Accounting	16	15.84%	59%
Financial	16	15.84%	75%
Other	25	24.75%	100%
Total	101	100%	

Figure 9.4 Fields of the research participants



9.2.5 EXPERIENCE OF THE RESEARCH PARTICIPANTS

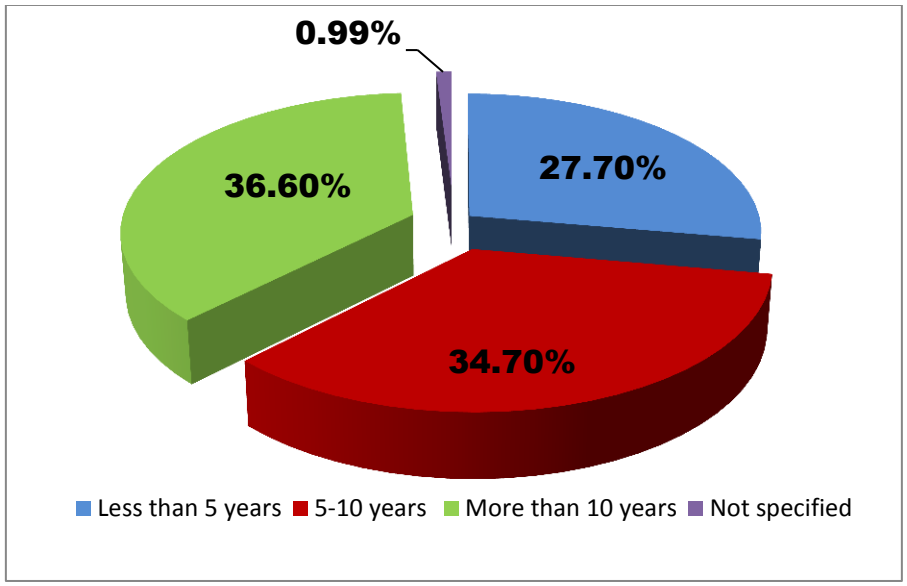
When the respondents were asked to indicate their work experience, the demographics showed that the vast majority of them (71.29%) have work experience of 5 years and above with 36.63% of the respondents' experience exceeding 10 years, indicating a relatively high level of experience for the research sample obtained.

Table 9.5 Experience of the research participants

Years of Experience	Frequency	Percentage	Cumulative Percentage
5 years	28	27.72%	27.72%
5-10 years	35	34.65%	62.38%
More than 10 years	37	36.63%	99%
Not specified	1	0.99%	100%
Total	101	100%	

Further analysis indicated that 27.7% of the sample consisted of participants who had less than five years' work experience, 34.7% had 5 to 10 years of work experience, and 36.6% had more than 10 years of experience with 0.99% failing to specify their years of experience. An outline is presented here as part of Table and Figure 9.5.

Figure 9.5 Experience of the research participants



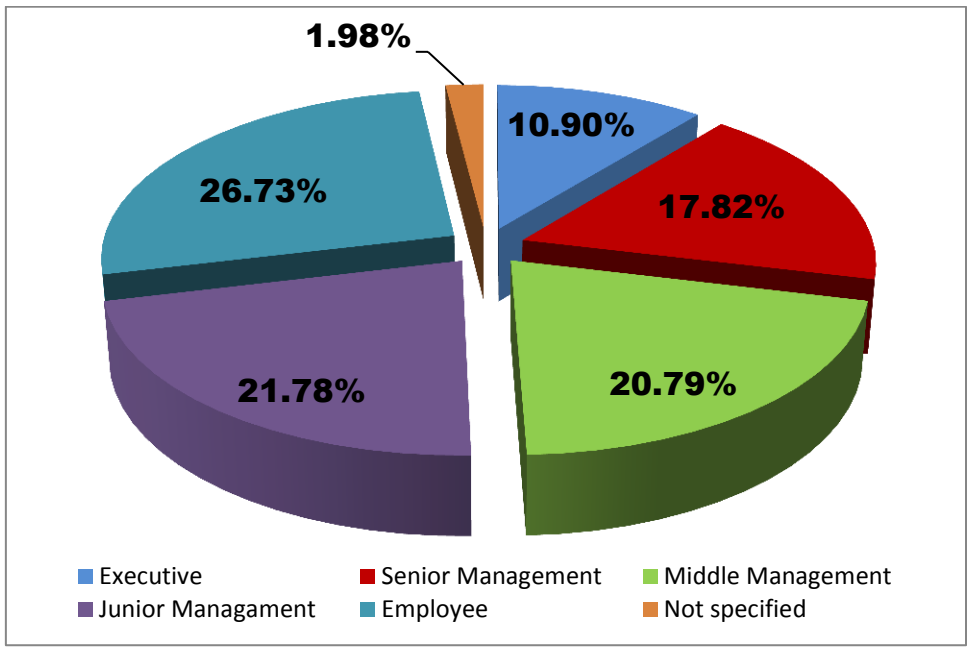
9.2.6 DECISION-MAKING LEVEL OF THE RESEARCH PARTICIPANTS

From a seniority perspective, 11.9% of the research study consisted of executives, 17.8% of senior management, 20.8% of middle management, 21.8% of junior management and 26.7% of employees. A depiction of the above is provided below as part of Table and Figure 8.6

Table 9.6 Decision-making level of the research participants

Decision Making Level	Frequency	Percentage	Cumulative Percentage
Executive	11	10.89%	10.89%
Senior Management	18	17.82%	28.71%
Middle Management	21	20.79%	50%
Junior Management	22	21.78%	71.29%
Employee	27	26.73%	98.02%
Not specified	2	1.98%	100%
Total	101	100%	

Figure 9.6 Decision-making levels of the research participants



9.2.7 ECONOMIC SECTOR OF INVOLVEMENT

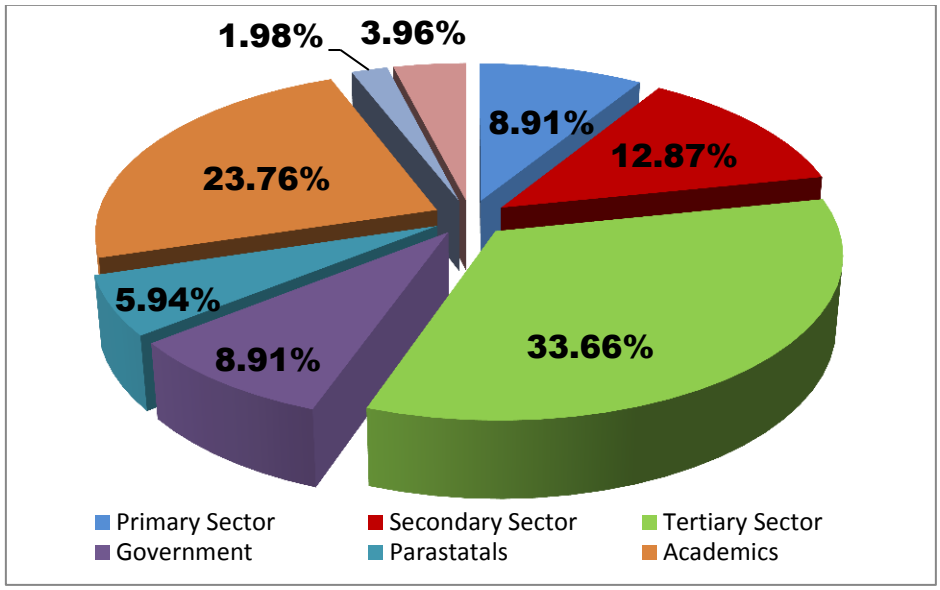
Further information obtained indicated that 9.9% of the research participants were actively involved with the primary sector, 12.9% with the secondary sector, 33.7% with the tertiary sector, 8.91% with the government sector, 5.94% with parastatals, 21.8% with academic institutions and 0.99% failed to indicate any specific sector.

A summation of the economic sector of involvement of the survey respondents is provided below as part of Table and Figure 9.7.

Table 9.7 Economic sector of involvement

Economic Sector of Involvement	Frequency	Percentage	Cumulative Percentage
Primary Sector	9	8.91%	8.91%
Secondary Sector	13	12.87%	21.78%
Tertiary Sector	34	33.66%	55%
Government	9	8.91%	64.36%
Parastatals	6	5.94%	70.30%
Academics	24	23.76%	94%
Other	2	1.98%	96%
Not specified	4	3.96%	100%
Total	101	100%	

Figure 9.7 Economic sector of involvement



9.3 UNIVARIATE ANALYSIS OF THE QUESTIONNAIRE STATEMENTS

Using frequency tables, a univariate analysis was conducted showing the respondents' ratings with regard to each statement. Each research participant indicated to what extent he or she agreed with each specific condition or statement of the conceptual framework in relation to the general principle or strategic theme it is associated with. In the event that a respondent failed to indicate a preference, the response was excluded from the analysis with the remaining answers being converted to represent 100% of the response. Following the establishment of the response ratings, means were determined per discipline as well as for the respondents overall; thereby providing valuable insight about the conceptual framework of the financial value decision-making model, its general principles and the specific conditions associated with them. All were necessary prerequisites in order to answer the first research question:

Research Question 1: To what extent do research participants agree with the representational similarity of the questionnaire's statements when compared to the actual decision-making process as experienced by them?

For the benefit of the reader, the research findings of the univariate analysis are condensed to include only a summation of the category averages and the average means of the converted response ratings for each field of expertise. Where research results of individual statements justified further interpretation, the results were included and discussed under the summation of the category findings that they emanate from. This allows the reader to focus on the essence of the findings.

Supplementing this information is a consolidated group mean per category. All the remaining univariate research findings are included as part of Annexure 2A of this document, which can, depending on the reader's preference, be analysed in conjunction with the univariate research findings of this chapter. As such, the univariate analysis commences with a reflection on the general principle of movement or flow by change or transformation, bifurcation, dissipation, self-organisation, dynamic balance, artificial reality, consciousness, value, measurement and choice.

9.3.1 SECTION A FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM

9.3.1.1 SECTION A: CONSOLIDATED SECTION FINDINGS

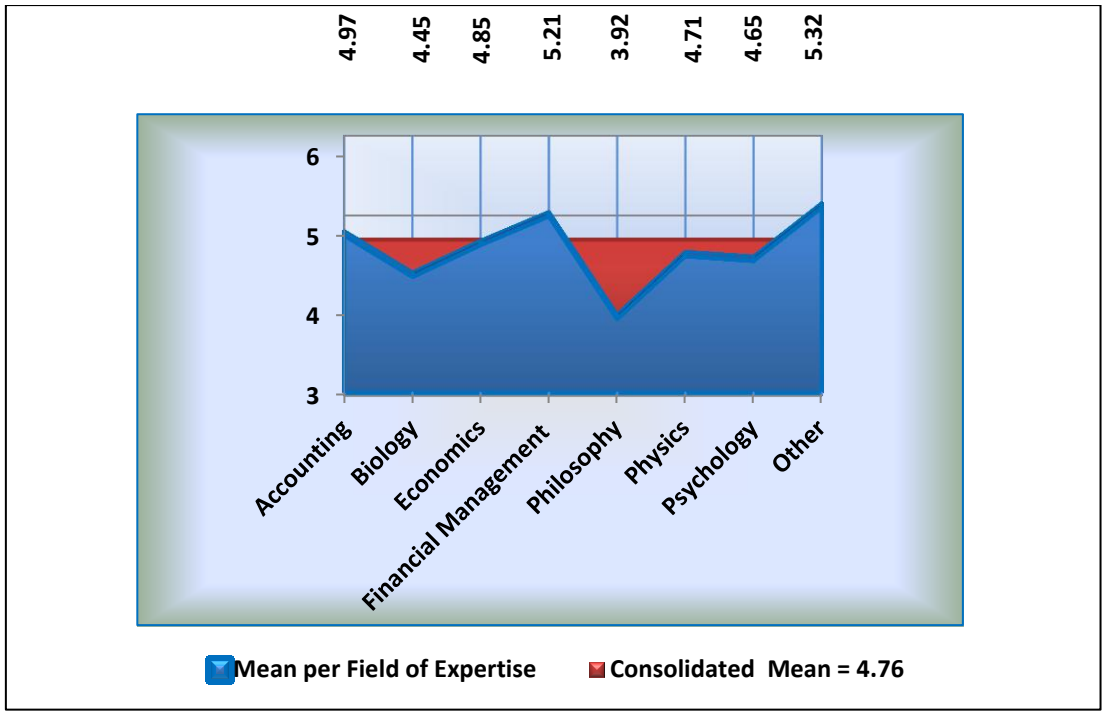
In Section A, the questionnaire reflects on the general principle of flow and its involvement in the creation and movement of patterns and form. It presents statements with regard to the interrelationship that exists between flow and the complex adaptive system that is man and asks participants if value, thought and decision-making are causal effects that occur as a result of this process. It further presents statements with regard to the origin and nature of value, thought and financial decision-making.

From a model perspective, Statements A1, A2 and A4 reflected upon the representational similarity of the model's depiction of the general principle of flow and its relationship to time, information, movement and necessity, while Statements A3, A5, A6, A7, A8 and A9, established the representational similarity of the model with regard to its portrayal of the relationship that exists between flow, time, thought, duration, movement and transition. Research conducted on the general principle of flow indicates that 63.49% of all the respondents agree to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the first general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position that appears to be strengthened by the consolidated group mean of the various fields of 4.76.

Table 9.8 Statistical summary of the average converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.74%	7.12%	9.13%	16.52%	15.48%	31.40%	16.61%	100.00%

Figure 9.8 Average means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.1.2 SECTION A: FINDINGS THAT REQUIRE FURTHER EXPLANATION

Statement A3

An open-ended system in dynamic balance is always unfolding and in transition, exploring its way through an immense space of possibilities with no realistic hope of ever finding the single best place to be.

Statement A3 tests the respondent's perception about the attainability of optimality amid what Holland in Waldrop (1992:167) describes as an unfolding dynamic balance in continuous transition; thereby testing for the concept of satisficing as a critical element of the financial value decision-making model. He is a professor in both psychology and electrical engineering specialising in computer science, so it represents no anomaly that biologists have a different perspective to his. What is however an anomaly is that a similar statement is also made by Kauffman (1996:249), a theoretical biologist, when he states:

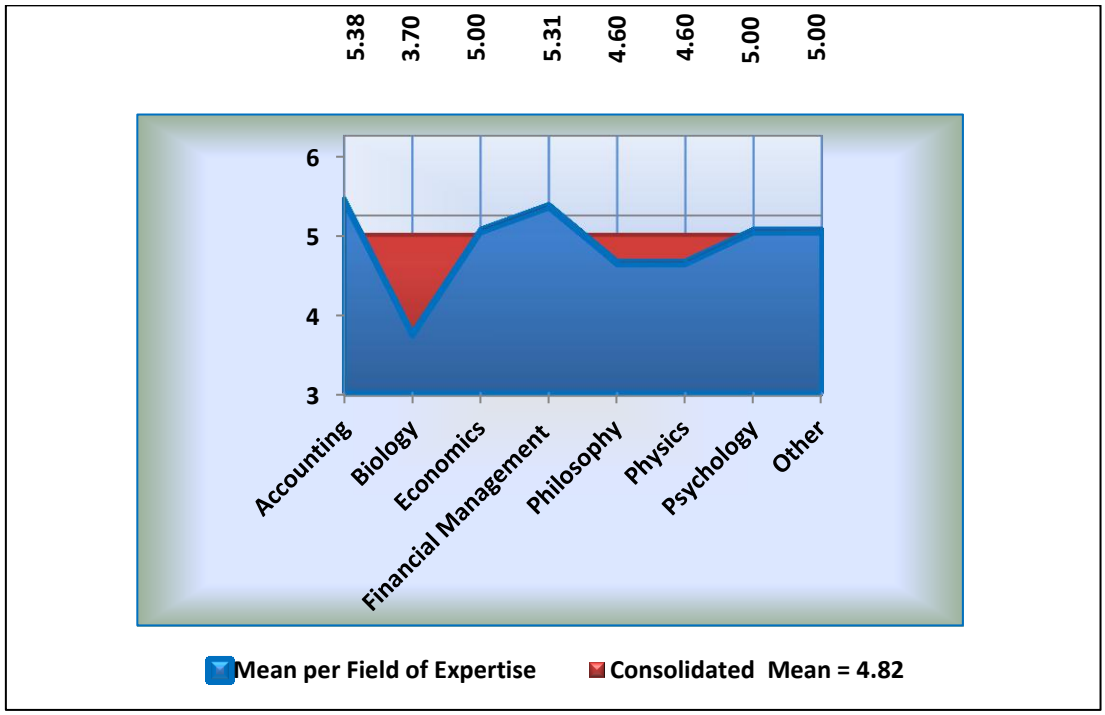
The best thing to do – indeed, the only practical thing to do – is to choose a route that is excellent, but not necessarily the very best. As in all of life, the salesperson in search of excellence will have to settle for less than perfection.

It therefore appears that among biologists there is a general tendency towards the belief that optimisation is to some extent possible, although as demonstrated above; this view is not shared by all biologists. Contrary to this belief, an overwhelming majority of 64.89% of the respondents tended to support Holland's statement, resulting in a consolidated mean of 4.82. This indicates that most respondents accept that in the real world optimisation is simply not possible

Table 9.9 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.19%	4.26%	10.64%	17.02%	20.21%	27.66%	17.02%	100.00%

Figure 9.9 Means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.2 SECTION B CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN

9.3.2.1 SECTION B: CONSOLIDATED SECTION FINDINGS

In Section B the questionnaire reflects on the general principle of change. It tests various concepts and constructs associated with the principle, defining, giving meaning and creating a context for them as it progresses.

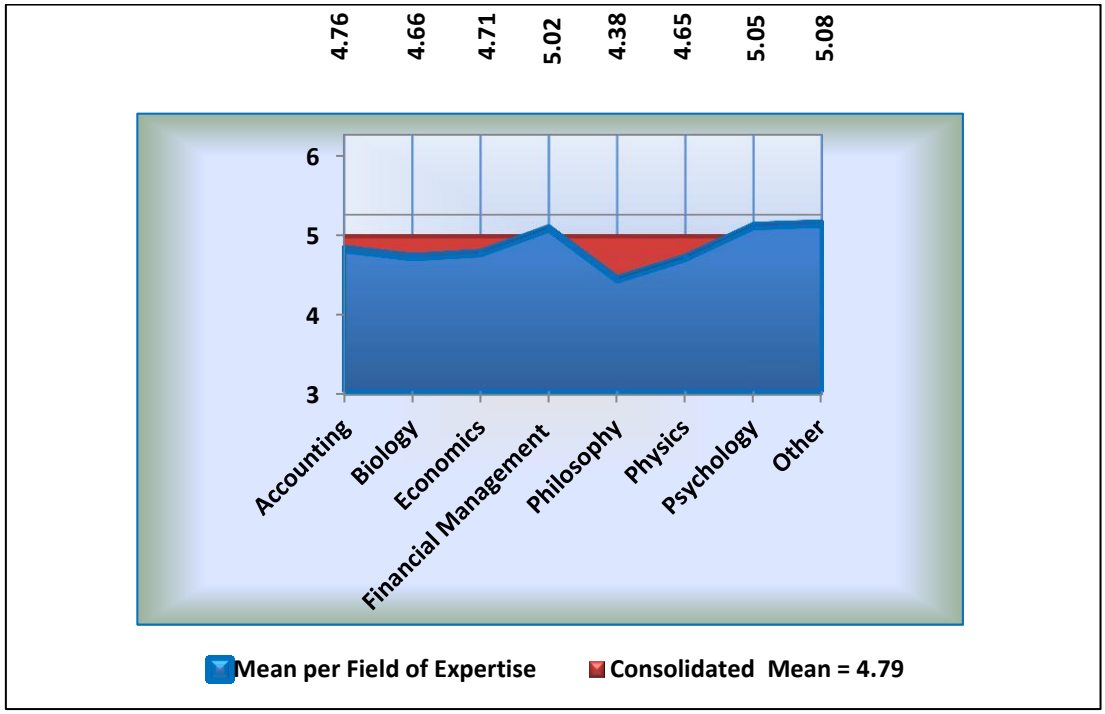
From a model perspective Statements B1, B2, B4, B5 and B6 reflects upon the representational similarity of the model with regard to its portrayal of the general principle of change and the relationship it has with all life, uncertainty, predictability and transformation while Statements B3, B7, B8 and B9 establishes the representational similarity of the model with regard to its portrayal of the general principle of change and its relationship with risk, probability and the decaying quality of energy.

Research conducted on the general principle of change indicates that 61.06% of all the respondents agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the second general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position that appears to be strengthened by the consolidated group mean of the various fields of 4.79.

Table 9.10 Statistical summary of the average converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.07%	6.87%	9.24%	18.76%	18.19%	27.24%	15.63%	100.00%

Figure 9.10 Average means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.2.2 SECTION B: FINDINGS THAT REQUIRE FURTHER EXPLANATION

Statement B1

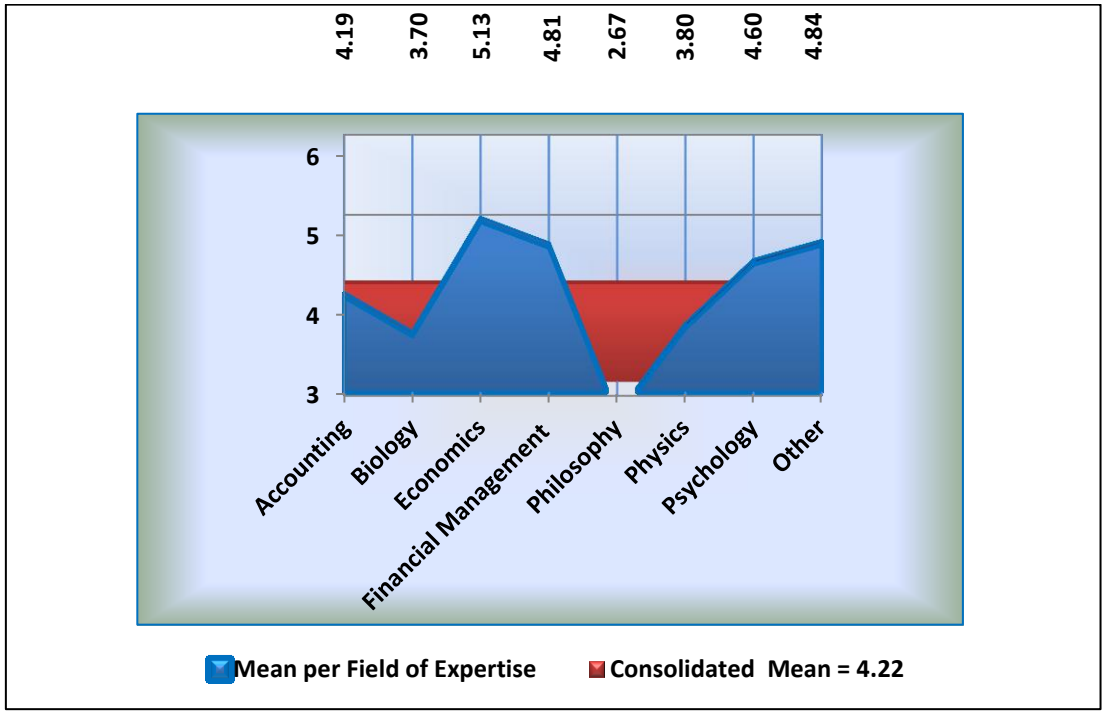
Change is anything but predictable.

With Statement B1 obtained from Amidon as cited in Speerstra (2005:59), a global innovation strategist, the respondents' perspective with regard to the predictability of change is assessed. Reflecting on the statement, the fields of philosophy, biology and physics provided substantially lower response ratings that the other fields of expertise. This suggests that to some extent there is a belief among these fields that change can at least to some extent be predicted. A possibility reflected in the research findings with 47.52% of the respondents agreeing with the statement to a more or lesser extent, 18.81% being neutral about the matter and 33.66% disagreeing to some extent.

Table 9.11 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
8.91%	14.85%	9.90%	18.81%	5.94%	25.74%	15.84%	100.00%

Figure 9.11 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement B5

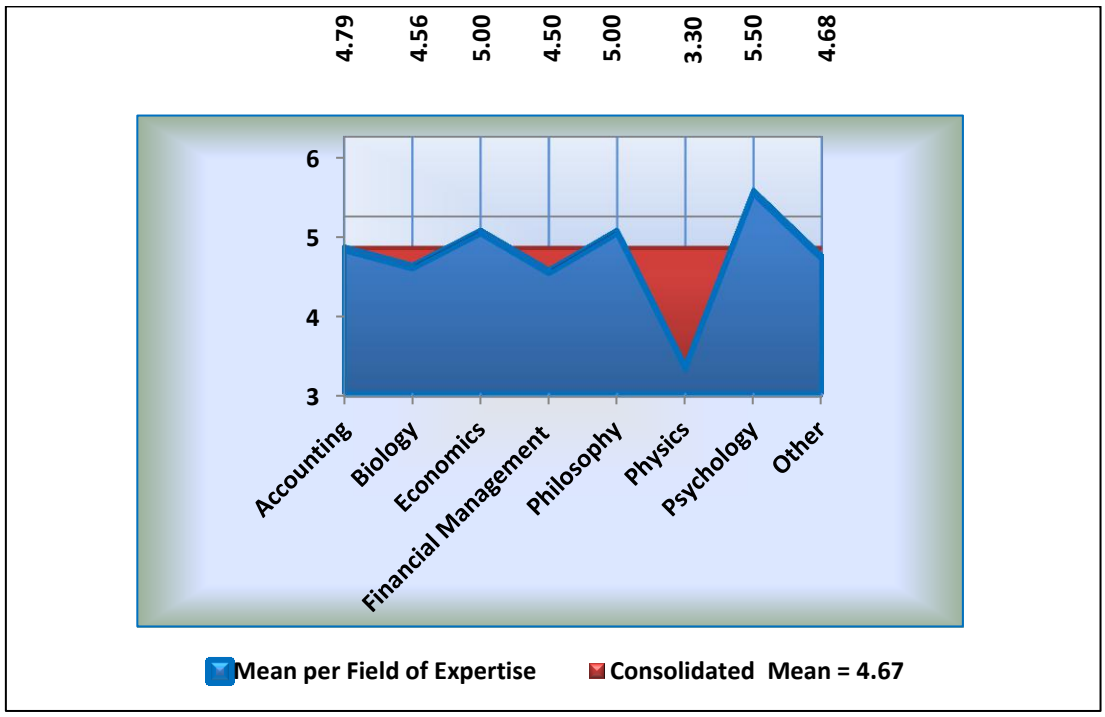
Nothing is created, nothing is lost, everything is transformed.

Statement B5, tests the respondents' perspective with regard to the creation and the transformational aspects of change. It tests how as a specific condition, as part of this transformation, the fact that nothing is ever lost is perceived by the respondents.

Table 9.12 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
7.45%	12.77%	8.51%	17.02%	12.77%	20.21%	21.28%	100.00%

Figure 9.12 Means of the converted response ratings for each field of expertise as well as for the consolidated group



In this regard the research results indicate that 54.26% of the respondents agree with the statement to a more or lesser extent with 17.02% being neutral on the matter and a further 28.73% disagreeing with the statement. When compared to the consolidated group mean of 4.67 for all the disciplines combined, it appears to be physics with a mean of 3.3 that is the most opposed to this statement. Considering that the statement made by Lavoisier, a French nobleman and chemist, as cited in Speerstra (2005:475), emanates from one of the two fundamental laws of entropy and as such forms one of the foundations of the field of physics, then there should not be any disagreement on the part of the respondents in this field.

However, when considering that the statement does not qualify the “noting” and the “everything” it refers to, then it follows that some respondents in this field most likely felt that the statement is not correct under all circumstances; illustrating how important the individual respondent’s context is when interpreting and assigning meaning to a statement.

9.3.3 SECTION C BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN

9.3.3.1 SECTION C: CONSOLIDATED SECTION FINDINGS

In order to gain insight into the context that gives rise to a decision, Section C of the questionnaire reflects on and tests several aspects of the general principle of bifurcation.

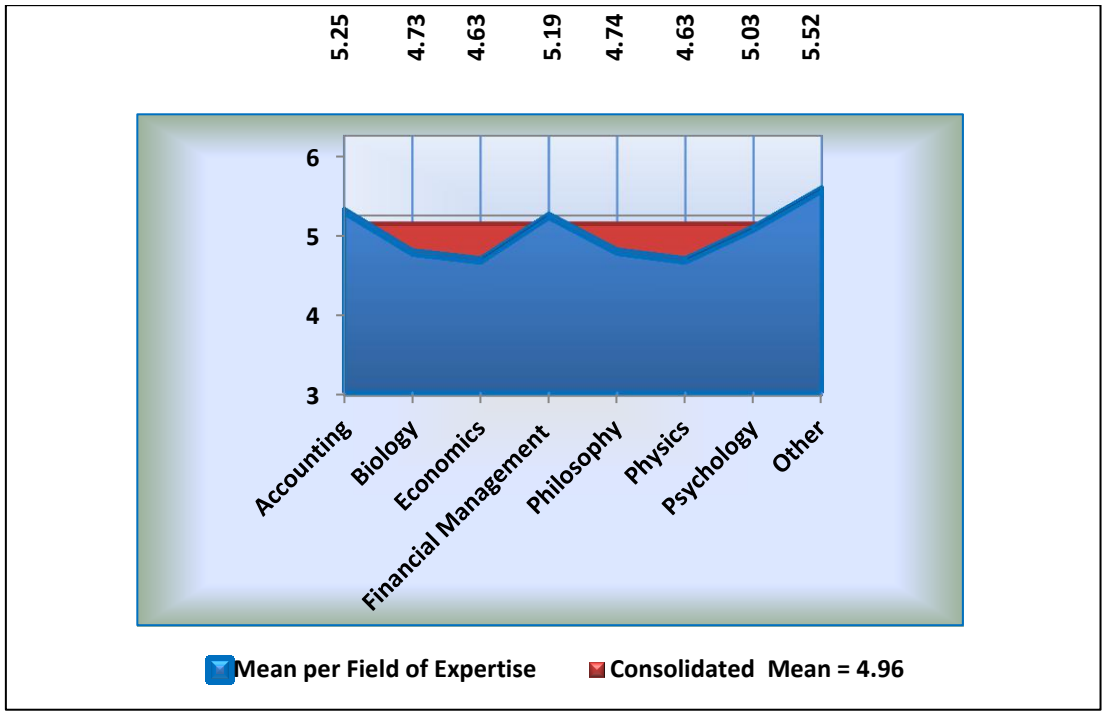
Statements C1 and C5 of Section C of the questionnaire therefore from a model perspective reflects upon the model’s representational similarity with regard to its representation of the general principle of bifurcation and the relationship it has with diversification, innovation and balance while Statements C2, C3, C4, C6 and C7 establishes the relational relevance and representational similarity of the model with regard to the general law of bifurcation and a decision window at the edge of chaos; that place where the familiar and unpredictable meet, the crucial critical tipping point from which structure emerges.

Research conducted on the general principle of bifurcation indicates that 68.6% of all the respondents agrees to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the third general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position that appears to be strengthened by the consolidated group mean of the various fields of 4.96, as well as the relatively high means obtained across all the fields tested by the study.

Table 9.13 Statistical summary of the average converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.36%	4.85%	7.42%	15.76%	18.73%	31.39%	18.48%	100.00%

Figure 9.13 Average means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.3.2 SECTION C: FINDINGS THAT REQUIRE FURTHER EXPLANATION

Statement C7

Complexity reaches a threshold from which structure emerges.

Statement C7 builds on Statement C6 by proposing to the respondent that it is from the critical threshold as suggested by C6 that structure emerges; testing the participant's perspective about the origin of structure. From the findings it was established that 60.21% of the respondents agreed with the statement made by Waldrop (1992:117), a particle physicist, with 18.29% of the respondents disagreeing with it, and a further 21.51% choosing to remain neutral on the matter.

A review of the means indicate that with the exception of the relatively low mean obtained from the field of biology, all the other fields provided means in excess of 4, resulting in a consolidated group mean of 4.82, reflecting clear support for the statement by the majority of the respondents tested at the time. One of the possible reasons why respondents from the field of biology showed reservation about the statement is that in the field of biology the origin of life and structure is not depicted as something that occurs beyond a particular threshold. This is an aspect demonstrated by Kaufman (1996:18) when he states:

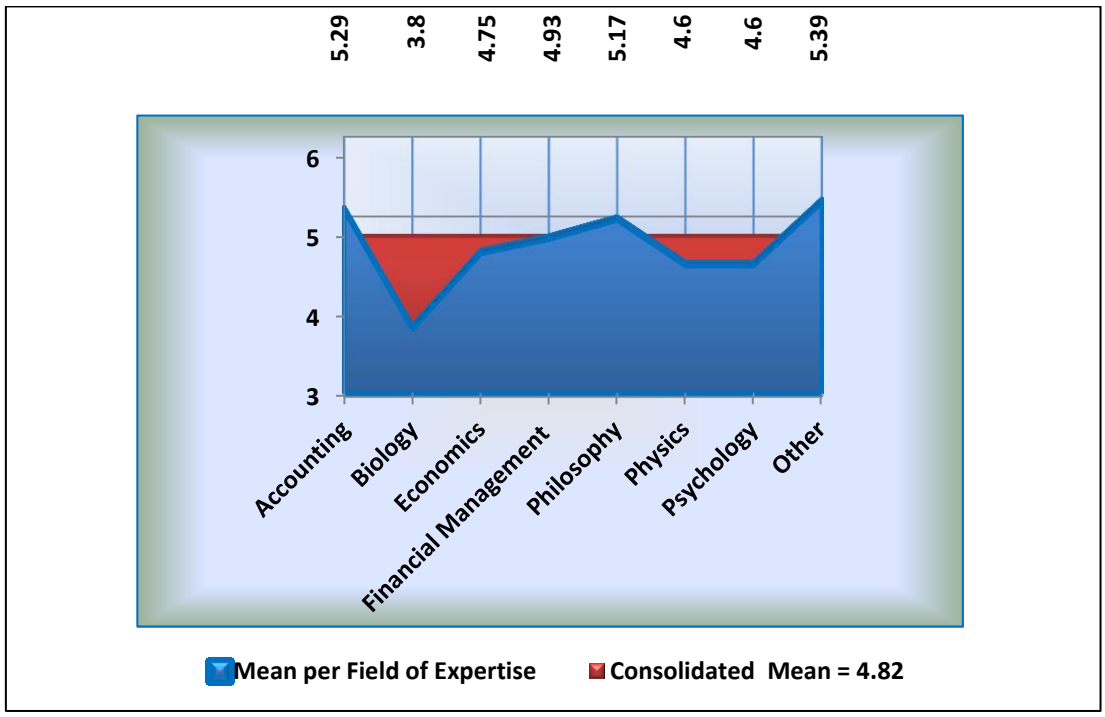
> *Organisms are not simple random systems, but highly complex, heterogeneous systems that have evolved for almost 4 billion years.*

This therefore depicts life as a continuous unfolding evolving process devoid of any thresholds, and as such clarifies the reservations of the respondents in the field of biology about the statement made by Waldrop.

Table 9.14 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.23%	5.38%	9.68%	21.51%	15.05%	31.18%	13.98%	100.00%

Figure 9.14 Means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.4 SECTION D DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE

9.3.4.1 SECTION D: CONSOLIDATED SECTION FINDINGS

In Section D the questionnaire introduces the systemic biological structural requirements that are necessary in order for value and financial decision-making to occur.

It establishes the characteristics associated with the particular type of structure and attempts to determine if these characteristics influence the financial decision-making process and how human beings value. With Statements D1, D2, D3, D4, D6, D8 and D9, Section D reflects upon the representational similarity of the model with regard to its portrayal of the general principle of dissipation and the structural relationship it has with far-from-equilibrium situations and the formation of new structures.

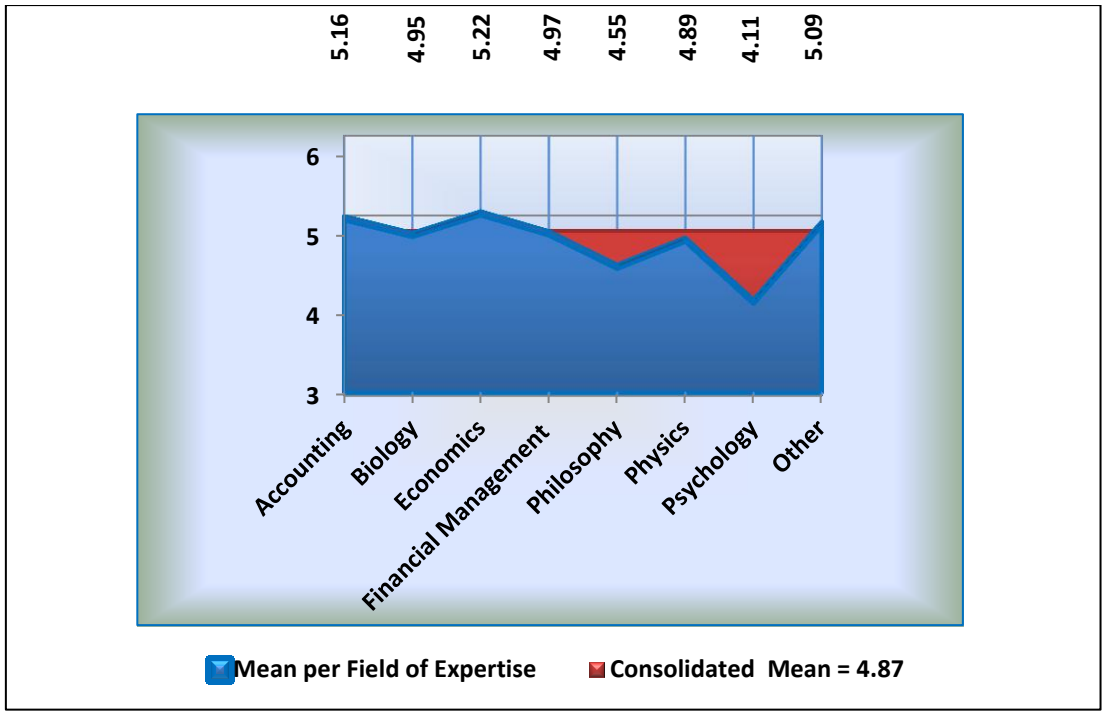
It also reflects on the relationship that exists with self-organisation, the establishment of temporary solutions, irreversibility, coherence, the internal establishment of structure and function, metabolism and structural integrity.

It furthermore, with Statements D5 and D7, establishes the relational relevance and representational similarity proposed in the model between structural integrity, autopoiesis, dynamic balance, external change and the necessity for internal adaptation to change.

Table 9.15 Statistical summary of the average converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.00%	4.84%	9.04%	17.49%	23.34%	27.21%	15.08%	100.00%

Figure 9.15 Average means of the converted response ratings for each field of expertise as well as for the consolidated group



Research conducted on the general principle of dissipation indicates that 65.63% of all the respondents agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the fourth general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position strengthened by the consolidated group mean of the various fields of 4.87 as well as the relatively high means obtained across all the respective fields tested by the study.

9.3.4.2 SECTION D: FINDINGS THAT REQUIRE FURTHER EXPLANATION

Statement D1

Irreversibility leads to coherence.

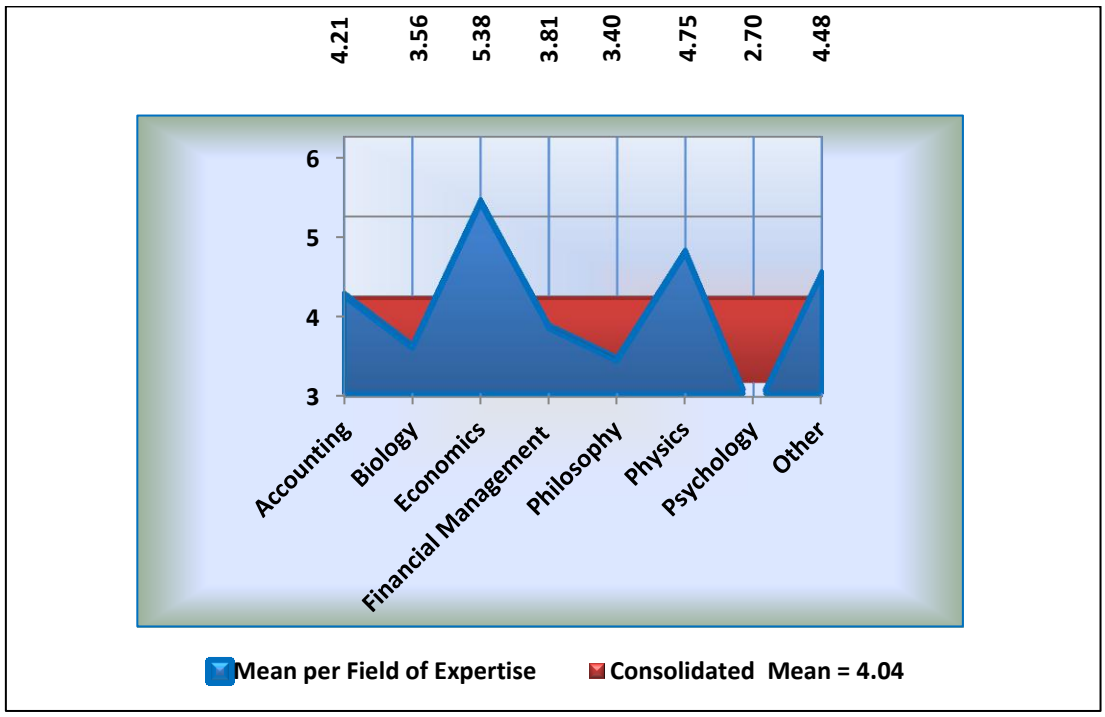
Statement D1 tests if respondents believe irreversibility to lead to coherence. A proposition which 42.39% of the respondents agree with, 22.83% are neutral about and 34.78% are in disagreement with. Reflecting upon the means of the respective fields, strong opposition is found among the fields of psychology, biology, philosophy and financial management, who respectively had means of 2.7, 3.56, 3.4 and 3.81, thereby resulting in a consolidated group mean of 4.04, leaving the result pertaining to this statement made by Prigogine (1996:2) a chemist, somewhat inconclusive.

Reflecting on the statement from the perspectives of the fields of expertise that provided the lowest ranking, a picture emerges of exactly how important a part context plays when assessing a statement. For example, from a psychological perspective, the irreversibility of thought does not lead to coherence but to neurosis. From a biological point of view, irreversibility in the conversion process of energy and matter does not lead to coherence; it leads to certain death. Philosophically irreversibility has serious ontological and philosophical implications that will cause significant problems in how an individual comes to a belief.
If a financial manager cannot reverse a decision, then it prohibits him in the long run from making any meaningful contribution to any business. The incoherence in the responses from the respondents therefore reflects each individual's unique context that is used, and against which the statement is interpreted. This points to the fact that different fields of expertise will view the same statement from remarkably different perspectives, ultimately coming to very different conclusions.

Table 9.16 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.52%	13.04%	15.22%	22.83%	17.39%	18.48%	6.52%	100.00%

Figure 9.16 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement D9

Structure and function are not imposed by the environment but are established by the system itself.

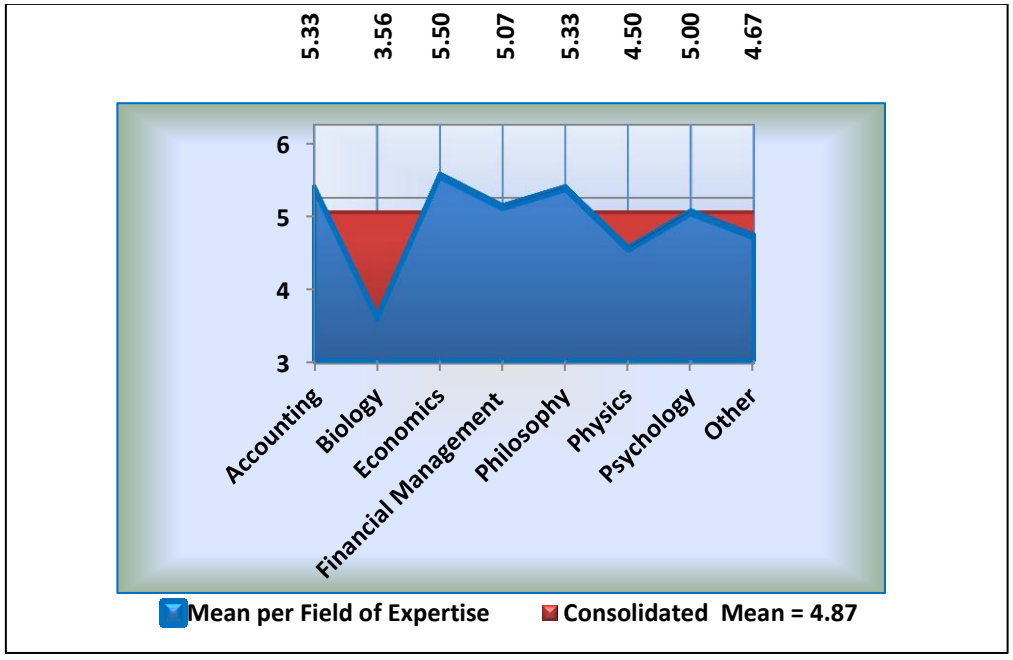
With Statement D9 the questionnaire tests if the participants perceive function and structure, as Capra (1983:290), a theoretical physicist, did as something that is established by the system itself, or as something that is imposed on the system by the environment.

Research findings indicate that 61.7% of the respondents tested agreed with the statement that structure and function are established by the system itself, with 13.83% remaining neutral on the subject and a further 24.47% disagreeing with the statement. Apart from the relatively low mean obtained from the field of biology, all the other fields provided means in excess of 4.5, resulting in a consolidated group mean of 4.87, indicating a general consensus among respondents in favour of the statement at the time that the research was conducted.

Table 9.17 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.19%	5.32%	15.96%	13.83%	20.21%	24.47%	17.02%	100.00%

Figure 9.17 Means of the converted response ratings for each field of expertise as well as for the consolidated group



What is of concern with regard to the relatively low rating obtained from the field of biology, is that a similar statement was made by Maturana & Varela (1998:135), a philosopher and biologist respectively, when they stated:

…the structure of the system determines its interactions by specifying which configurations of the environment can trigger structural changes in it.

Maturana &Varela therefore state much the same thing as Capra. This suggests that, given the low rating obtained from the field of biology, biologists are divided on the issue of whether structure and function are imposed by the environment or if they are established by the system itself.

9.3.5 SECTION E CONSCIOUSNESS, ARTIFICIAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT

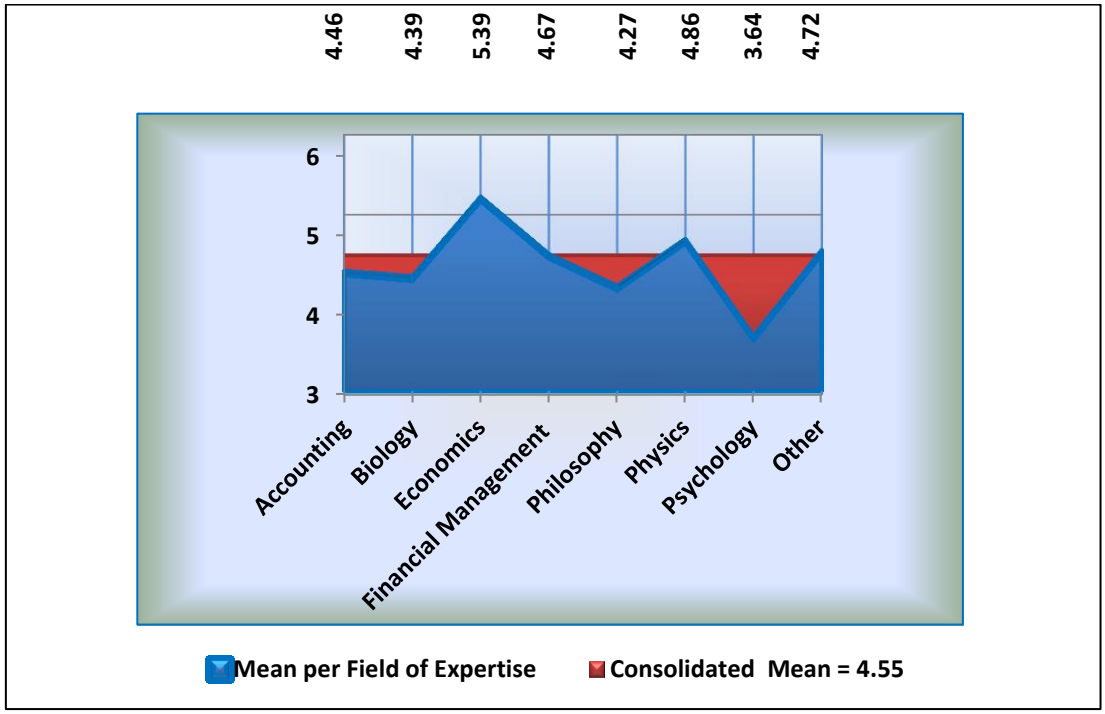
9.3.5.1 SECTION E: CONSOLIDATED SECTION FINDINGS

Reflecting on the above, Section E of the questionnaire therefore establishes the representational similarity of the model's depiction of the general principle of consciousness with regard to the specific conditions attached to it when compared to the actual decision-making process as experienced by the respondent; entailing a reflection on, among other constructs, reality, vision, intellectualisation, artificial reality, context, meaning, thought and creation. Research conducted indicates that 57.78% of all the respondents tested agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the fifth general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position also reflected by the consolidated group mean of the various fields of 4.55 with only the field of psychology demonstrating a general reservation with regard to the principle, with a mean of 3.64.

Table 9.18 Statistical summary of the average converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.31%	10.16%	11.42%	14.33%	18.07%	25.69%	14.02%	100.00%

Figure 9.18 Average means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.5.2 SECTION E: FINDINGS THAT REQUIRE FURTHER EXPLANATION

Statement E1

Reality is always the moment of vision before the intellectualisation takes place.

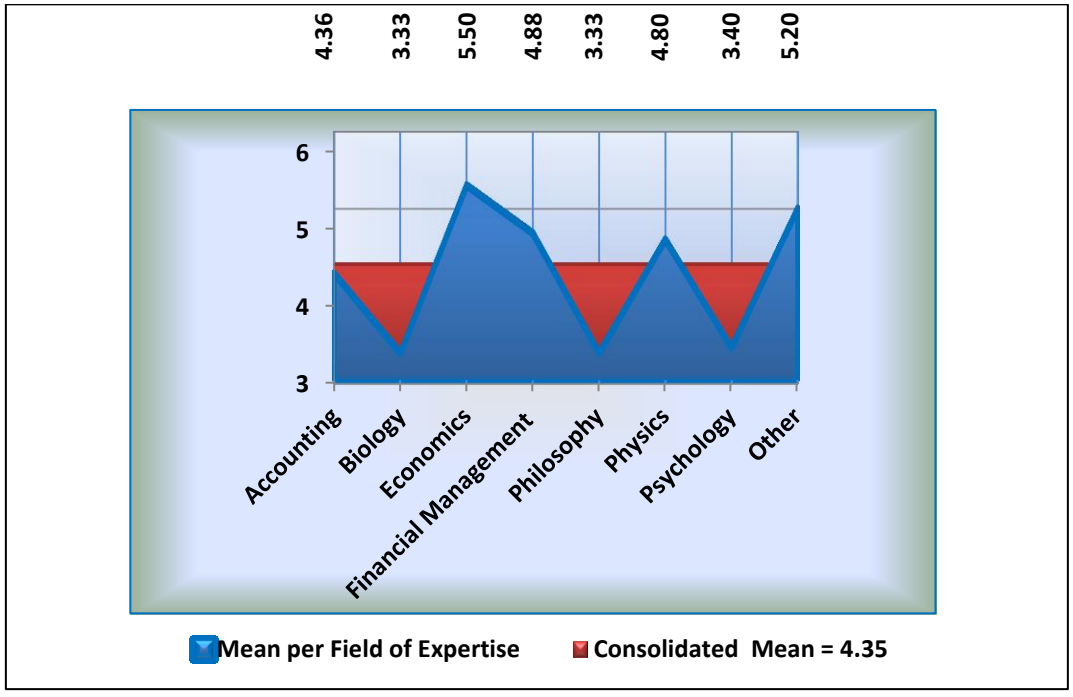
Statement E1 tests if respondents perceive reality to be the moment of vision before the intellectualisation takes place. A proposition of considerable importance which if accepted implies a pre-intellectual reality that occurs prior to conscious awareness. Research findings indicate that 55.11% of the respondents agree with the statement made by Pirsig (1999:247), a philosopher and writer, with 27.54% of the respondents disagreeing with the statement, and a further 17.35% of the respondents remaining neutral on the matter. This thereby results in a consolidated group mean of 4.35 indicating relatively strong support by the other fields in favour of the statement.

Table 9.19 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
7.14%	9.18%	11.22%	17.35%	19.39%	21.43%	14.29%	100.00%

A further review of the mean indicates that the fields of biology, philosophy and psychology all displayed reservations about the statement. This is reflected by their respective means of 3.33, 3.33 and 3.4. A possible reason for the respondents' reservations is that the reality mentioned by Pirsig in the statement is not defined. This leaves reality open to interpretation which in turn results in each field reflecting upon it from their own particular context. This implies that among the respondents tested in the field of biology and psychology, there is a belief that reality is not merely an aspect grounded in pure phenomenalism, but is rather a construction that requires intellectualisation in order for it to manifest.

Figure 9.19 Means of the converted response ratings for each field of expertise as well as for the consolidated group



This suggests that the type of reality the respondents in these fields refer to involves both the affinitive and the cognitive processing systems of the mind. Given the polarisation that exists in the field of philosophy between the realists and the idealists, it comes as no surprise that respondents from this field were divided. As such, it again emphasises the importance of the context of the individual reflecting on the statement, it demonstrates how an individual's context influences perception and eventually leads to alternative interpretations.

Statement E6

The observer and the observed are all one thought process.

Statement E6 tests different aspects of the ontological positions of the participants; serving as a context for further interpretation.

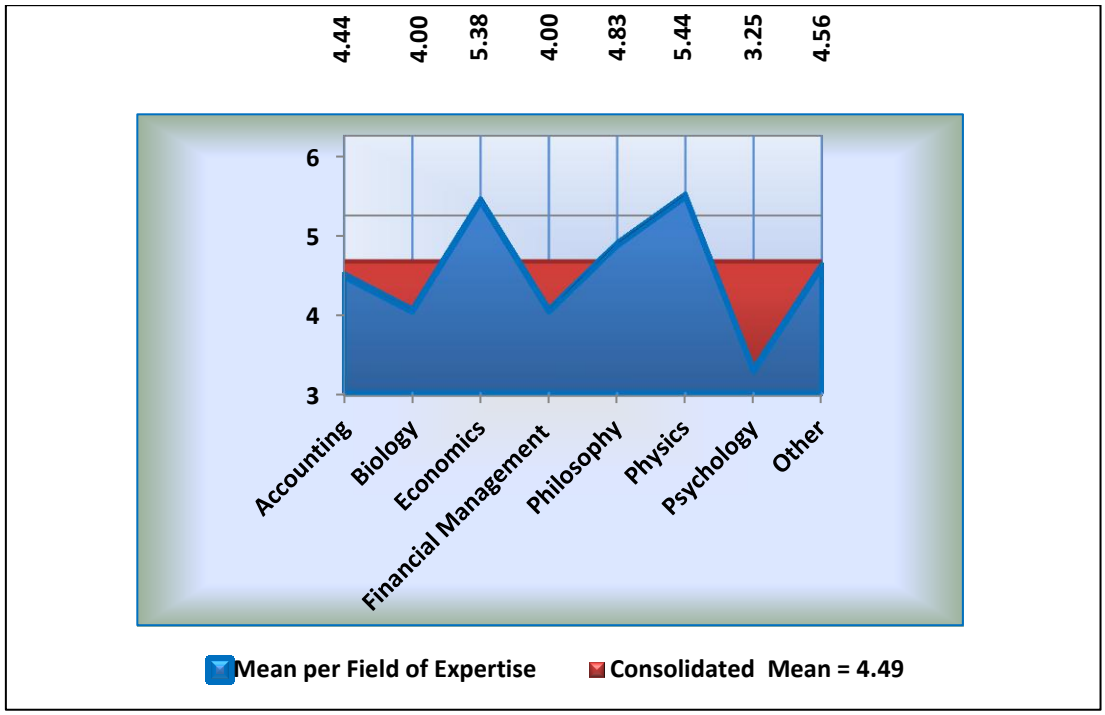
With regard to the statement research findings indicate that 55.8% of the respondents agree with the statement made by Bohm (1994: 237), a theoretical physicist, with 32.64% of the respondents disagreeing with it, and a further 11.58% of the respondents remaining neutral on the matter.

An analysis of the means indicate that with the exception of the field of psychology, all the other fields tested displayed means in excess of 4 and above, indicating a general support among the respondents in favour of the statement. A possible explanation for the ratings received by the respondents from the field of psychology is that the respondents in this particular field focused on thought as an occurrence rather than on thought as a process. This implies that from their perspective there is a definite separation between the observer and the observed in thought as an occurrence. As such, they were reflecting on the statement from a totally different context than the context from which the statement was made, demonstrating the powerful influence that context has on the perceptions of individuals.

Table 9.20 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.32%	11.58%	14.74%	11.58%	18.95%	22.11%	14.74%	100.00%

Figure 9.20 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement E7

The intellect combines and separates; it arranges and disarranges and co-ordinates; it does not create.

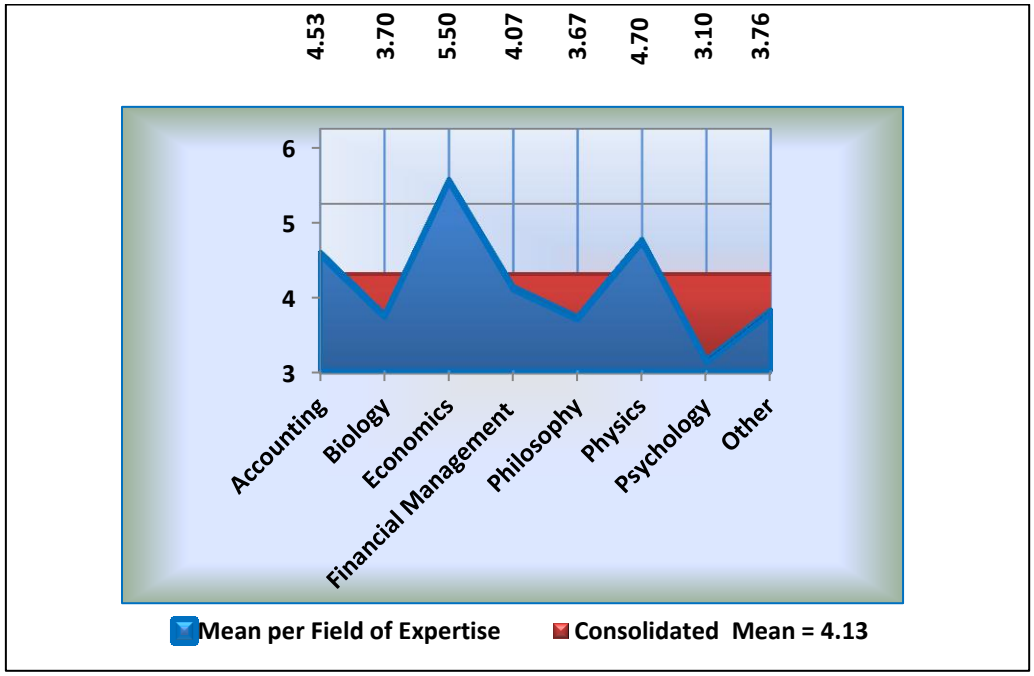
Statement E7 attempts to determine what the participants' perspectives are with regard to the role that the intellect plays in the creation process. It is an aspect that requires clarification and needs to be well-defined in order to establish if it is correctly portrayed as part of the proposed financial value decision-making model.

Research findings indicate that 39.8% of the respondents agreed with the statement by Bergson (2002:249-50), a philosopher, with 36.74% of the respondents disagreeing with it, and a further 23.47% of the respondents remaining neutral on the matter. Reflecting on the means, it was apparent that several disciplines including biology, philosophy, psychology and the field allocated to other disciplines, showed serious reservations about the statement, resulting in a consolidated group mean of 4.13; implying mixed reservations with no clear dominant opinion emerging.

Table 9.21 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.08%	17.35%	15.31%	23.47%	14.29%	16.33%	9.18%	100.00%

Figure 9.21 Means of the converted response ratings for each field of expertise as well as for the consolidated group



A possible explanation for the reservations displayed by the respective fields is that they may very well have an alternative understanding of what it means to create.

In the field of biology, for instance, to combine and separate is the foundation of creation and life itself. Philosophically to combine and separate, arrange and disarrange, forms the basis of coming to a belief about reality, nothing short of creation itself. This therefore suggests that in rating the statement the respective fields assigned their particular meaning to the words making up the statement. This suggests that alternative meanings to the same word can cause profoundly different ratings among respondents.

This illustrates how complex and elusive research around an abstract subject such as the beholding of value for financial decision-making is, with each respondent bringing his own personalised context, meaning and perceptions to the beholding process.

Statement E8

We do not see what we do not see and what we do not see does not exist.

With this statement the questionnaire tests the respondent's ontological position, linking the respondent's reality, and as such the context for all decision-making, to that which the respondent is aware of.

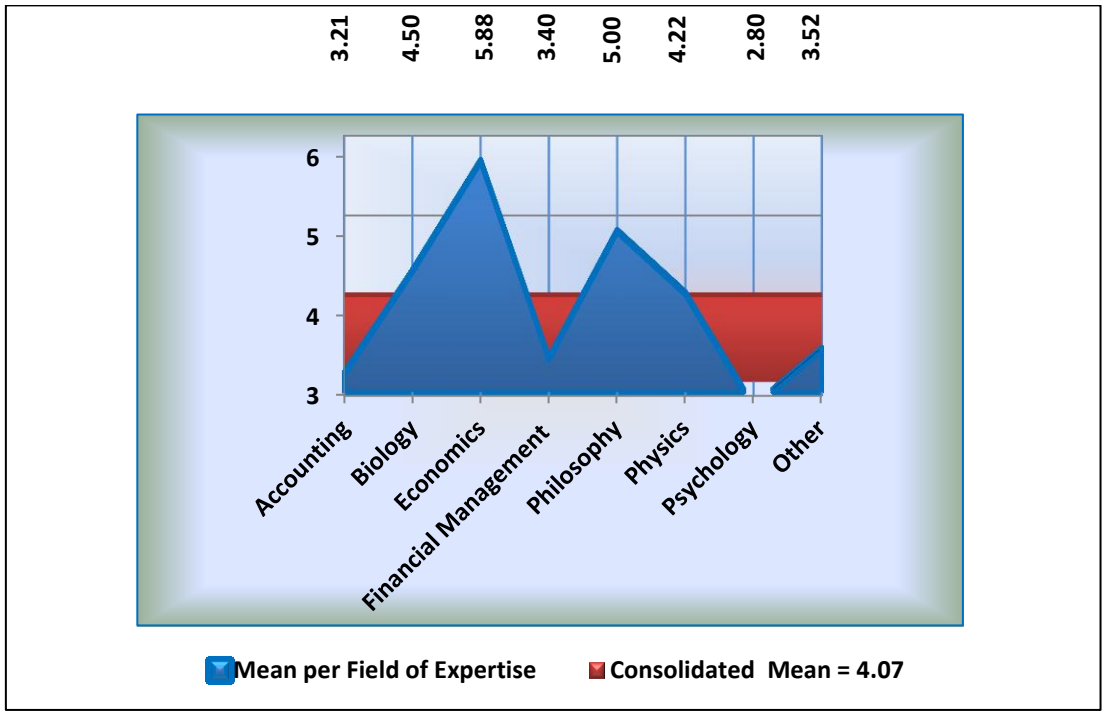
Research findings pertaining to this statement indicate that 42.55% of the respondents agreed with the statement made by Maturana & Varela (1998:242), a philosopher and biologist respectively, with 46.81% of the respondents disagreeing with it, and a further 10.64% of the respondents remaining neutral on the matter. From a means perspective several fields including the fields of accounting, financial management, psychology and other displayed reservations about the statement made, with psychology displaying the strongest reservations with a mean of only 2.8. This is a fact that, given the consolidated group mean of 4.07, tends to suggest a great number of conflicting opinions among the respondents resulting in no dominant opinion emerging from the analysis. This displays that among the respondents tested there was no clear dominant ontological position with regard to reality.

This again illustrates how complex and elusive research around such abstract subjects as the beholding of value for financial decision-making is, with the beholding part of it depending entirely on the perspective of the beholder, which by nature is subjective, individualistic and unique.

Table 9.22 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
20.21%	12.77%	13.83%	10.64%	11.70%	15.96%	14.89%	100.00%

Figure 9.22 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement E10

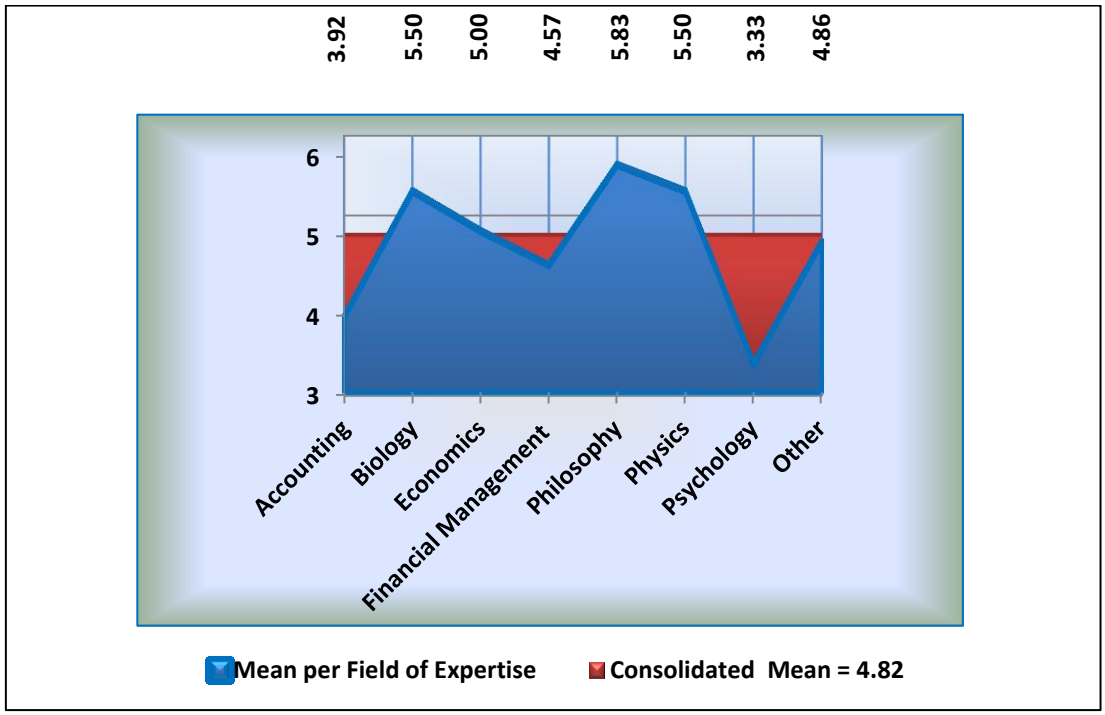
We carry within us the wonders we seek without us.

With this statement the questionnaire tests the respondent's ontological position about how perception formation occurs. From the research findings it was established that 61.36% of the respondents agreed with the statement by Browne, an English polymath, as cited in Van der Post (1976:53) with only 17.05% of the respondents disagreeing with it, and a further 21.59% of the respondents remaining neutral on the matter.

Table 9.23 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.82%	4.55%	5.68%	21.59%	19.32%	30.68%	11.36%	100.00%

Figure 9.23 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Apart from the relatively low means obtained from the fields of psychology and accounting, all the other fields provided means in excess of 4.57, resulting in a consolidated group mean of 4.82, indicating a general consensus among respondents in favour of the statement at the time that the research was conducted. The ratings from the respondents of the fields of psychology and accounting therefore reflect that within these fields there is an externally orientated approach towards the attainment of the wonders we seek.

9.3.6 SECTION F VALUE – A PERSONAL MEASURE

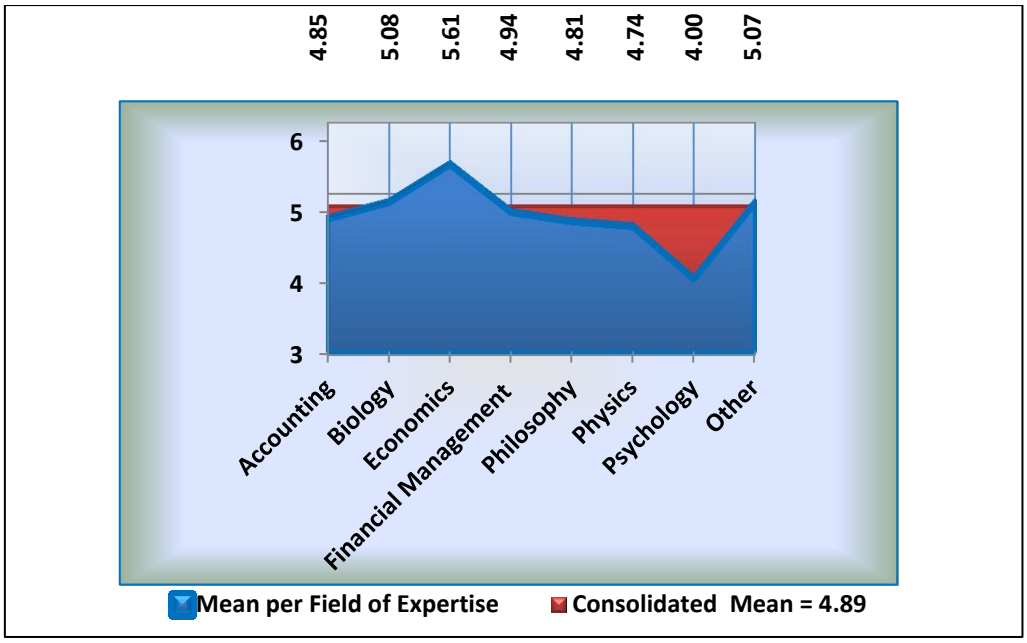
9.3.6.1 SECTION F: CONSOLIDATED SECTION FINDINGS

In Section F the questionnaire reflects upon the construct of value and attempts to establish what its relationship is with the general principle of measurement. From a model perspective Statements F1-12 therefore reflects upon the representational similarity of the model with regard to its portrayal of the general principle of value and the relationship it has with entropy, thermodynamics, expressionism, scales, economic considerations, weight, appraisal, quantification, uncertainty and measurement.

Table 9.24 Statistical summary of the average converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.77%	6.32%	7.44%	17.14%	18.31%	28.36%	17.66%	100.00%

Figure 9.24 Average means of the converted response ratings for each field of expertise as well as for the consolidated group



Research conducted indicates that 64.33% of all the respondents tested agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the sixth general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position also reflected by the consolidated group mean of the various fields of 4.89 and the fact that none of the individual fields exhibited a mean of below 4.

9.3.6.2 SECTION F: FINDINGS THAT REQUIRE FURTHER EXPLANATION

Statement F5

Value is at the very base of every economic consideration.

Statement F5 tests the respondent's perspective about how important value is when making economic considerations.

Research findings indicate that 68.68% of the respondents agreed with the statement made by (Harper 2006:1), an economist, with 19.19% of the respondents disagreeing with it, and a further 12.12% of the respondents remaining neutral on the matter.

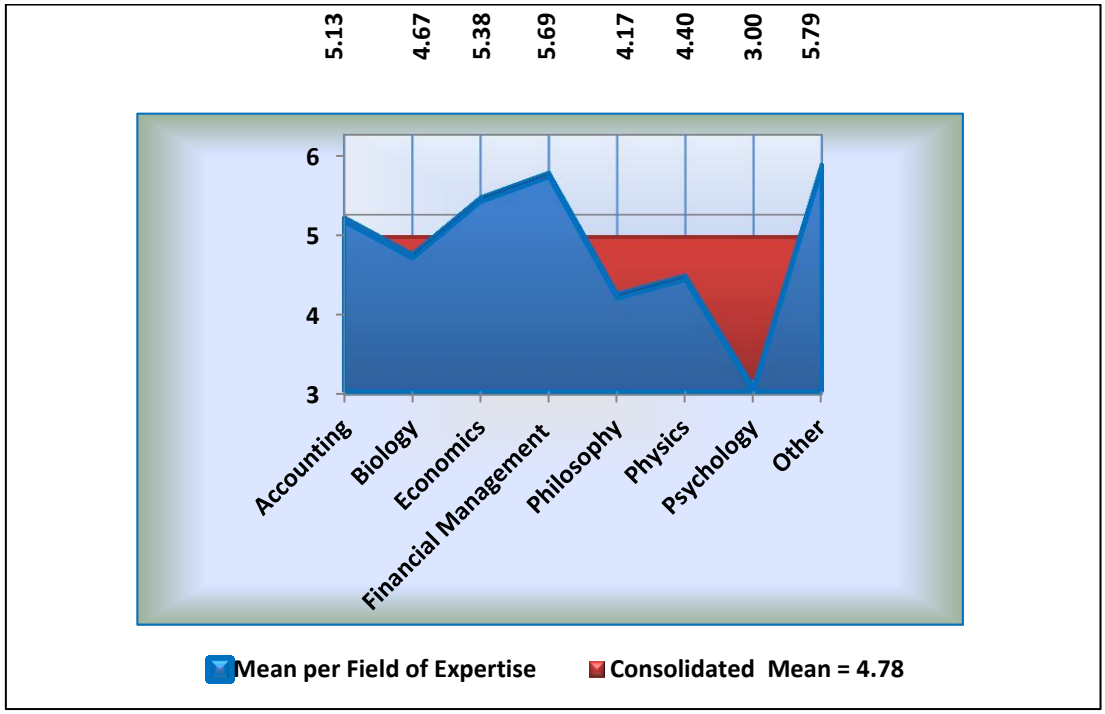
An analysis of the means indicate that, with the exception of the field of psychology, all the other fields tested displayed means in excess of 4.17, indicating general support among the respondents in favour of the statement. A point also reflected by the consolidated group mean of 4.78.

One possible explanation for the respondents in the field of psychology's low rating of the statement made by Harper is that the statement generalises without qualification. For instance if greed, power plays or politics come into the equation during an economic decision, then value is of course not at the base of every economic consideration. Because psychologists are more attuned to the various dimensions of the nature of man and their impact on the decision-making process, they are more reluctant than economists to generalise value in this way. This therefore illustrates how knowledge alters perception.

Table 9.25 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.06%	4.04%	9.09%	12.12%	18.18%	33.33%	17.17%	100.00%

Figure 9.25 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement F9

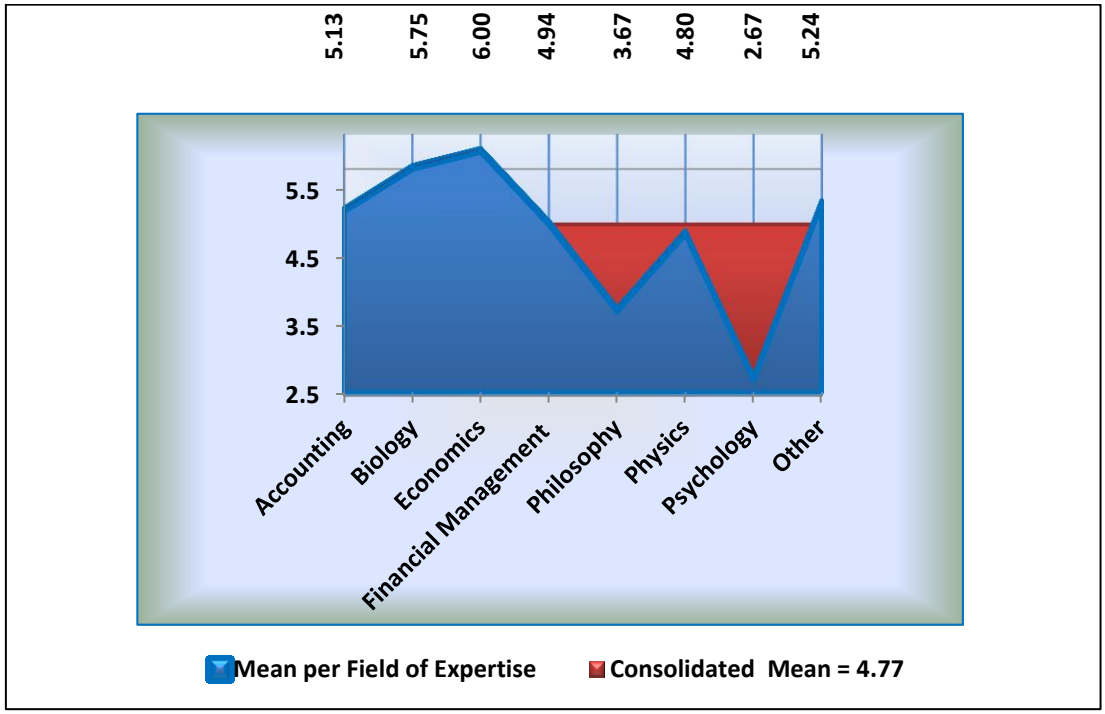
Value is a barometer in the present which is used to facilitate the currency of uncertainty in the moment blended with the burden of ignorance.

Statement F9 reviews the respondent's perception with regard to the role that value plays as a facilitator of uncertainty amid the burden of ignorance. Research findings indicate that 64.52% of the respondents agreed with the statement made by Gouws (Personal communications 2013, March 13), an accounting science professional, with 15.06% of the respondents disagreeing with it, and a further 21.43% of the respondents choosing to remain neutral on the matter.

Table 9.26 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
5.38%	1.08%	8.60%	20.43%	21.51%	30.11%	12.90%	100.00%

Figure 9.26 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Reflecting on the means of the respective fields, it appears that with the exception of the field of philosophy and psychology, all the other fields provided means of 4.8 or above, resulting in a consolidated group mean of 4.77 indicating a general consensus among the respondents tested in favour of the statement. A possible explanation for the low ratings provided by the respondents in the fields of philosophy and psychology is that they either attach a broader or an alternative definition to value than the one presented by Gouws in his statement.

Statement F11

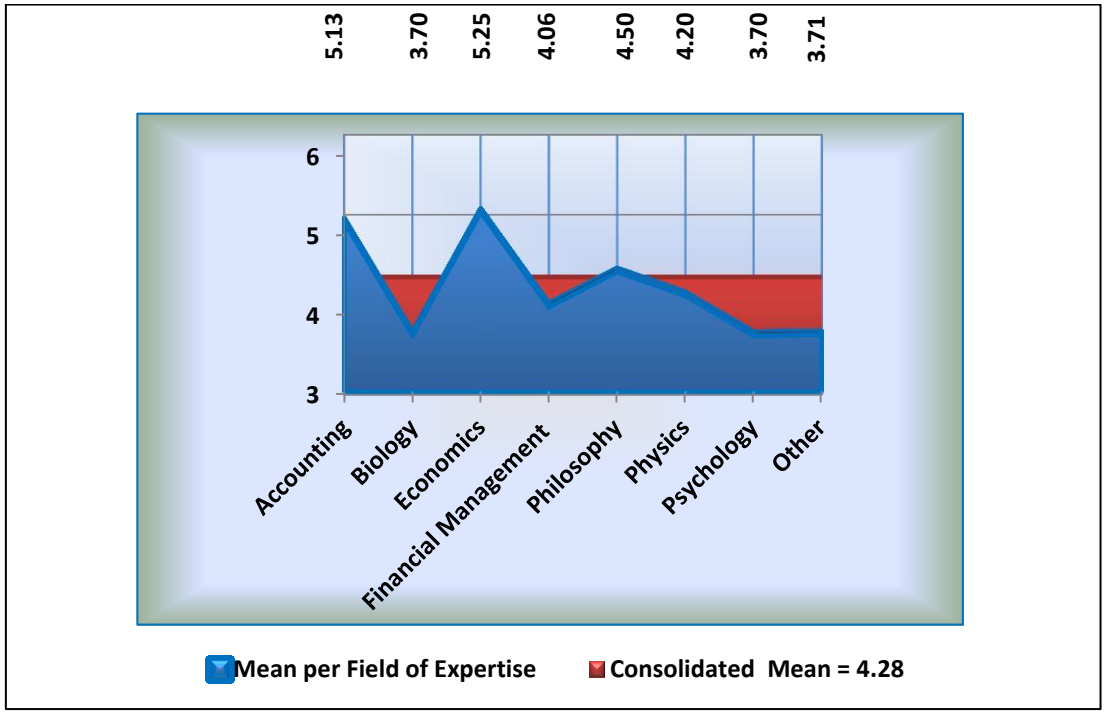
Man is the measure of all things.

Noted by Pythagoras and Socrates, both philosophers, Statement F11 attempts to gain further insight into the philosophical position of the respondents by putting forward for consideration that man is the measure of all things. This is a proposition which, if accepted, implies that all forms of measurement are subjective. Research findings indicate that 51.03% of the respondents agreed with the statement, with 35.71% of the respondents disagreeing with it, and a further 13.27% of the respondents choosing to remain neutral on the matter. Reflecting on the means of the respective fields, it appears that reservations with regard to the statement are made by the fields of biology, psychology and the other fields, displaying means of 3.7, 3.7 and 3.71 respectively resulting in a consolidated group mean of 4.28. The low ratings received from respondents in the fields of psychology and the other fields indicate both ontological and philosophical differences with the statement made by Pythagoras and Socrates. A possible reason why respondents from the field of biology showed reservations about the statement is that in accordance with evolutionary theory as Dawkins (2006: forward to the first edition) reflects: *There exists no objective basis on which to elevate one species above another.* By making man the measure of all things, biologists may very well interpret this as an elevation of man as a species above all others, something about which they will, as the research indicates, have reservations.

Table 9.27 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
8.16%	18.37%	9.18%	13.27%	21.43%	15.31%	14.29%	100.00%

Figure 9.27 Means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.7 SECTION G CHOICE – THE CARING DIRECTION-GIVER OF CHANGE

9.3.7.1 SECTION G: CONSOLIDATED SECTION FINDINGS

In Section G, the questionnaire reflects upon the general principle of choice as a direction-giver for change by, as was the case with Section B, testing various concepts and constructs associated with the principle, defining them, giving meaning to them, and creating a context from them.

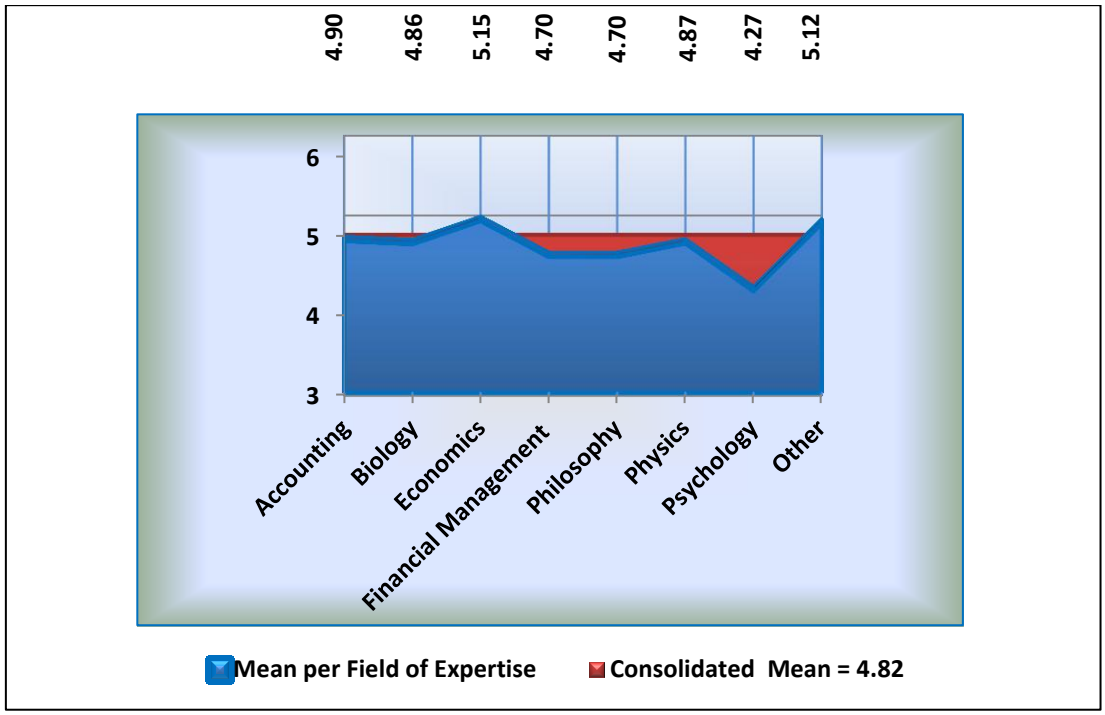
From the model's perspective Statements G2, G5 to G9 as well as G14 establishes its representational similarity with regard to its portrayal of the general principle of choice and the relationship it has with flow, genetics, feature detection, possibilities, model building and active planning in anticipation of the world.

Statements G1, G3, G17 and G18 on the other hand establishes the representational similarity of constructs used as part of the specific conditions of the model in relation to the actual decision-making process as experienced by the respondent. This while Statements G4, G10, G11, G12, G13, G15 and G16 reflects upon the representational similarity of the model with regard to a wide range of specific conditions that have been attached to the general principle of choice.

Table 9.28 Statistical summary of the average converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.88%	7.48%	8.21%	14.37%	19.32%	28.75%	17.00%	100.00%

Figure 9.28 Average means of the converted response ratings for each field of expertise as well as for the consolidated group



Research conducted indicates that 65.07% of all the respondents tested agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the seventh general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position also reflected by the consolidated group mean of the various fields of 4.82 and the fact that none of the individual fields exhibited a mean of below 4.27.

9.3.7.2 SECTION G: FINDINGS THAT REQUIRE FURTHER EXPLANATION

Statement G1

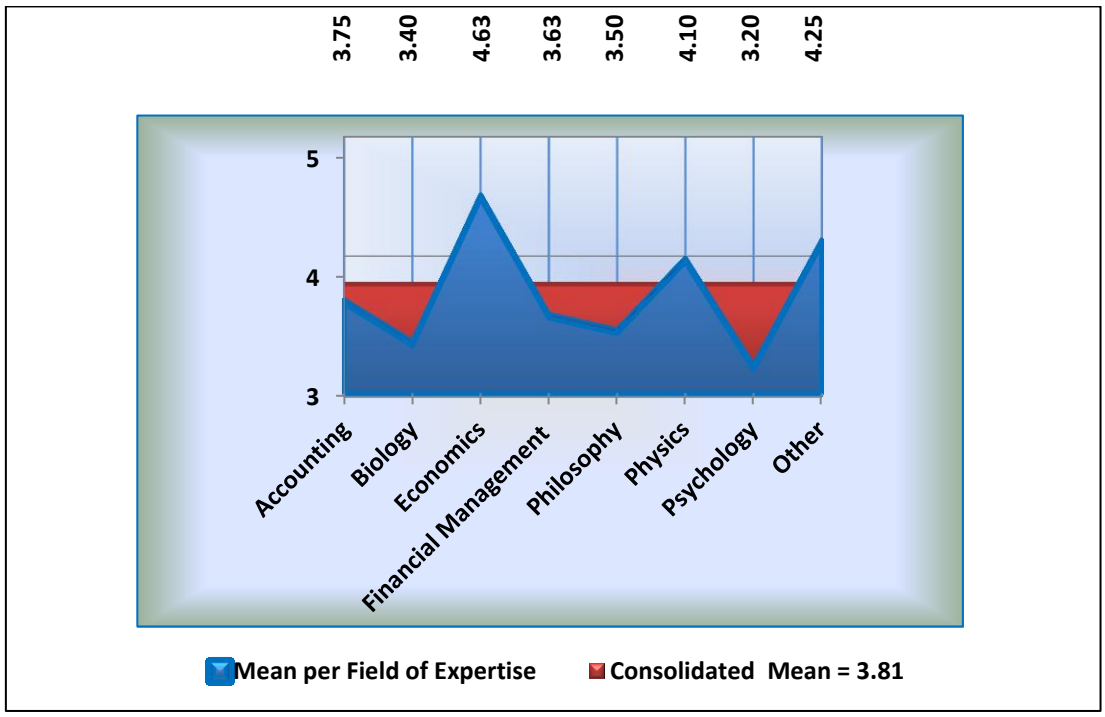
Knowing is disrupting.

With Statement G1 the questionnaire tests if the respondents agree with the proposition that to know is to disrupt. Research findings pertaining to this statement indicate that 42% of the respondents agreed with the statement made by Wolf (1989) a physicist, as cited in Wheatley (1994:62), with 42% indicating that they disagreed with the statement and 16% of the respondents choosing to remain neutral on the matter. A further analysis of the means indicates that the majority of the fields tested showed serious reservations with this statement, with 5 of the fields having means of below 4. A point also reiterated by the low consolidated group mean of 3.81. This indicates that a significantly large group of the respondents do not perceive the process towards the acquisition of knowledge to be disrupting. The uncertainty principle in quantum physics as depicted by Hawkins (1998:57-66) indicates that the observer cannot measure a particle's position and speed at the same time. This is so because measurement disrupts. To know therefore disrupts. Moreover Sudarshan & Misra's (1977:756-763) work on wave functions indicate that by observing a wave function, the mere act of observation causes the wave function describing the probability of atoms to collapse from several probabilities into a single activity. Although these principles in quantum theory therefore corroborate Wolf's statement, it does not alter the fact that a significant number of the respondents tested do not perceive their acquisition of knowledge in this way.

Table 9.29 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
21.00%	14.00%	7.00%	16.00%	14.00%	15.00%	13.00%	100.00%

Figure 9.29 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G2

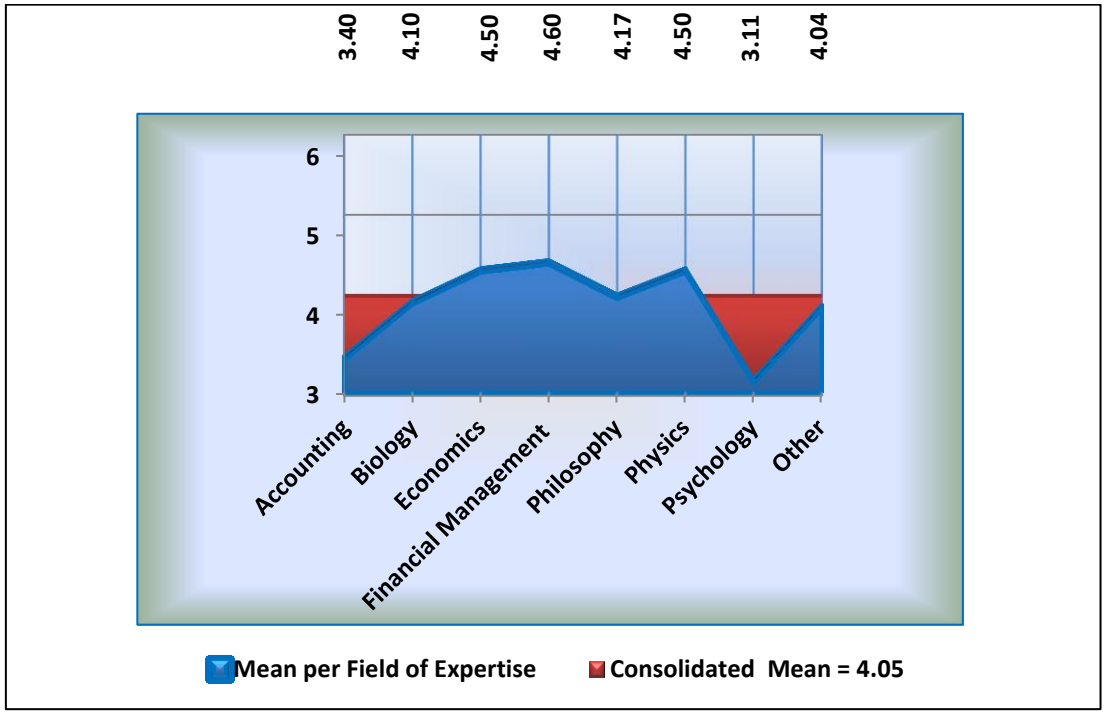
Choice is an attempt to freeze or stop the flow of a moving or changing process world.

Statement G2 of Bergson (1911:323), a philosopher, tests the respondent's perception about what choice is and how it should be defined, presenting it as an attempt to freeze or stop the flow of a moving or changing process world. A proposition which 47.36% of the tested respondents agreed with, with 43.15% of the respondents indicating that they disagreed with the statement and 9.47% choosing to remain neutral about it.

Table 9.30 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
8.42%	21.05%	13.68%	9.47%	13.68%	21.05%	12.63%	100.00%

Figure 9.30 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Considering the almost even ratings for and in opposition of the statement, when compared against the consolidated group mean of 4.05, it indicates that the respondents are sharply divided with relatively few respondents choosing the middle ground. This indicates how widely respondents' perceptions differ about decision-making and the principles it is made up of; an aspect which further complicates the beholding of value process for financial decision-making.

Statement G9

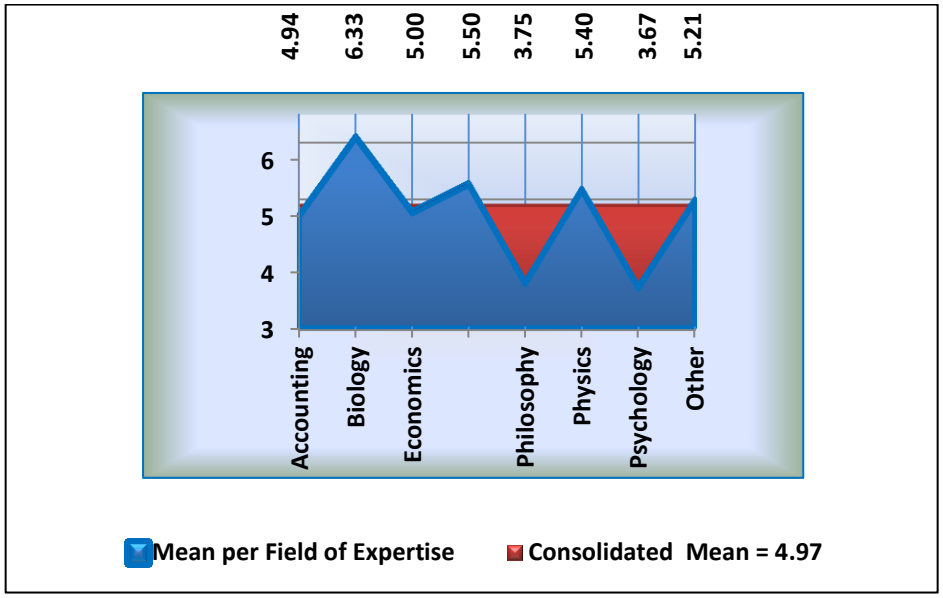
All complex adaptive systems build models that allow them to anticipate the world.

With Statement G9, the questionnaire tests the respondent's perspective about the objective behind the model-building process, portraying it as something that is done in anticipation of the world; implying a future-orientated aspect to it. Research findings indicate that 71.11% of the respondents agree with this assessment by Prigogine (1996:177), a chemist, with 11.11% of the respondents disagreeing with the statement and a further 17.78% choosing to remain neutral on the subject. An analysis of the respective means show that with the exception of the fields of psychology and philosophy all the other fields produced means in excess of 4, indicating a general consensus in favour of the statement, which is also reflected by the consolidated mean of 4.97. A possible explanation for the respondents in the field of philosophy's reservations about the statement made by Prigogine is the ontological and philosophical implications of the statement, which if accepted, implies an ontologically idealistic position with a philosophical relativistic perspective. The division in the ratings therefore indicate alternative ontological and philosophical perspectives by the respondents in the field of philosophy. Moreover, on the part of the respondents in the field of psychology, the research findings indicate that a significant number have an alternative perspective about what it means to build a model, possibly attaching a different connotation to this than the one outlined by Prigogine.

Table 9.31 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.22%	3.33%	5.56%	17.78%	22.22%	33.33%	15.56%	100.00%

Figure 9.31 Means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.8 SECTION H DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING

9.3.8.1 SECTION H: CONSOLIDATED SECTION FINDINGS

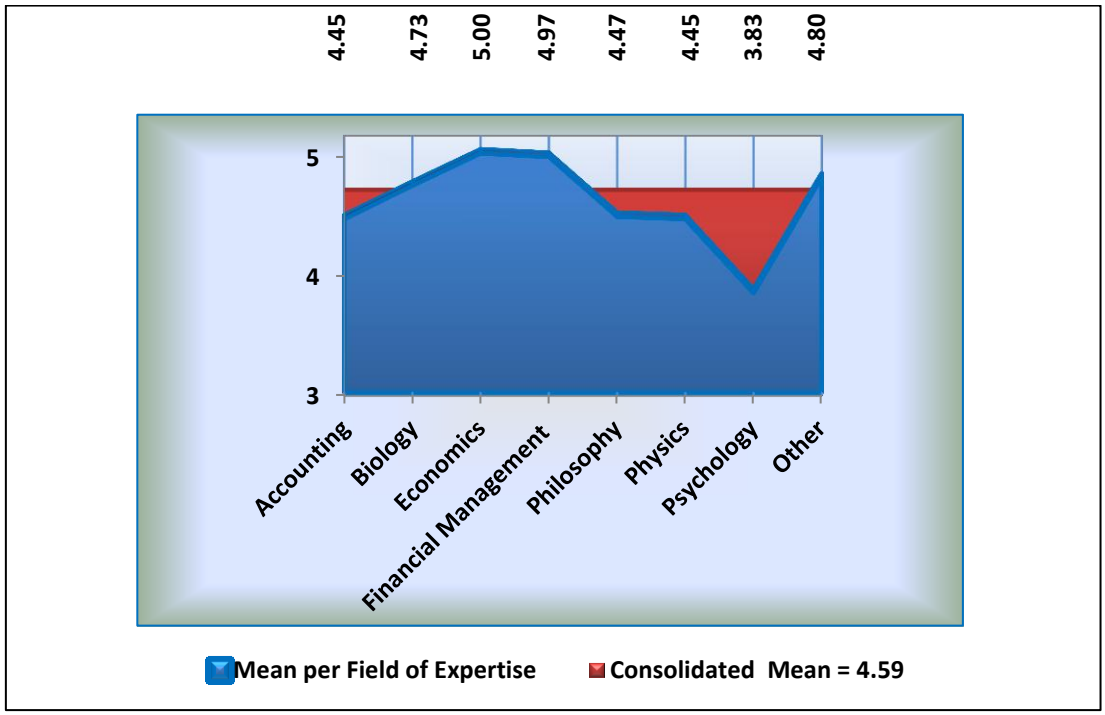
In Section H, the questionnaire reflects on the general principle of decision-making. From the model's perspective, Statements H1 to H8 establishes the representational similarity of the model with regard to its portrayal of the general principle of decision-making and the relationship it has with judgement, creation, imposing limitations, evolution, adaptation, satisficing and meaning. It also reflects upon aspects of the model with regard to delegation and pre-cognition.

Research conducted indicates that 58.19% of all the respondents tested agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the eighth general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position also reflected by the consolidated group mean of the various fields of 4.59 and the fact that none of the individual fields except the field of psychology exhibited a mean of below 4.45.

Table 9.32 Statistical summary of the average converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
5.60%	9.50%	10.90%	15.81%	18.09%	27.60%	12.50%	100.00%

Figure 9.32 Average means of the converted response ratings for each field of expertise as well as for the consolidated group



9.3.7.2 SECTION H: FINDINGS THAT REQUIRE FURTHER EXPLANATION

Statement H5

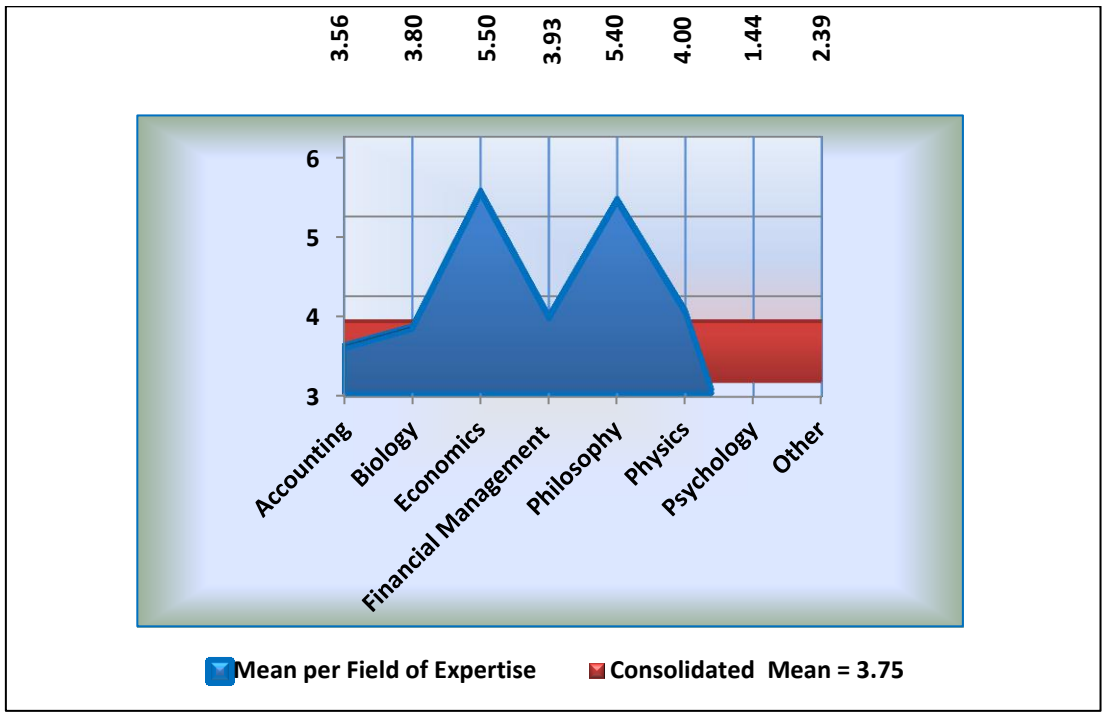
The real economic actor is in fact a satisficer, a person who accepts "good enough" alternatives, not because less is preferred to more but because there is no choice.

Statement H5 introduces the concept of satisficing into the questionnaire by asking respondents if, when they make decisions, they make “good enough” rather than optimal decisions because it is simply not possible for them to determine what is best. Research findings pertaining to this statement by Simon (1996:29), a scientist, indicates that only 33.33% of the respondents agreed with this statement, with 55.21% of the respondents disagreed and a further 11.46% opting for neutrality. A further analysis of the means obtained from the respective fields indicate strong reservations from all the fields except the fields of economics, philosophy and physics; an aspect also reflected by the low consolidated group mean of 3.75. A possible explanation for the reservations of the respondents in the fields of psychology, other, accounting, biology and financial management is that the “there is no choice” part of Simon’s statement is not qualified. This can create the perception among respondents that they have to accept what they get because there is no alternative. This is something far removed from what was intended by Simon with the statement in its original context. This therefore highlights the importance of the context of a statement and demonstrates the risk of interpreting statements outside of the context in which they were made. As such this demonstrates the impact that the context of a statement has on the perception of the beholder of the statement.

Table 9.33 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
13.54%	29.17%	12.50%	11.46%	13.54%	14.58%	5.21%	100.00%

Figure 9.33 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement H7

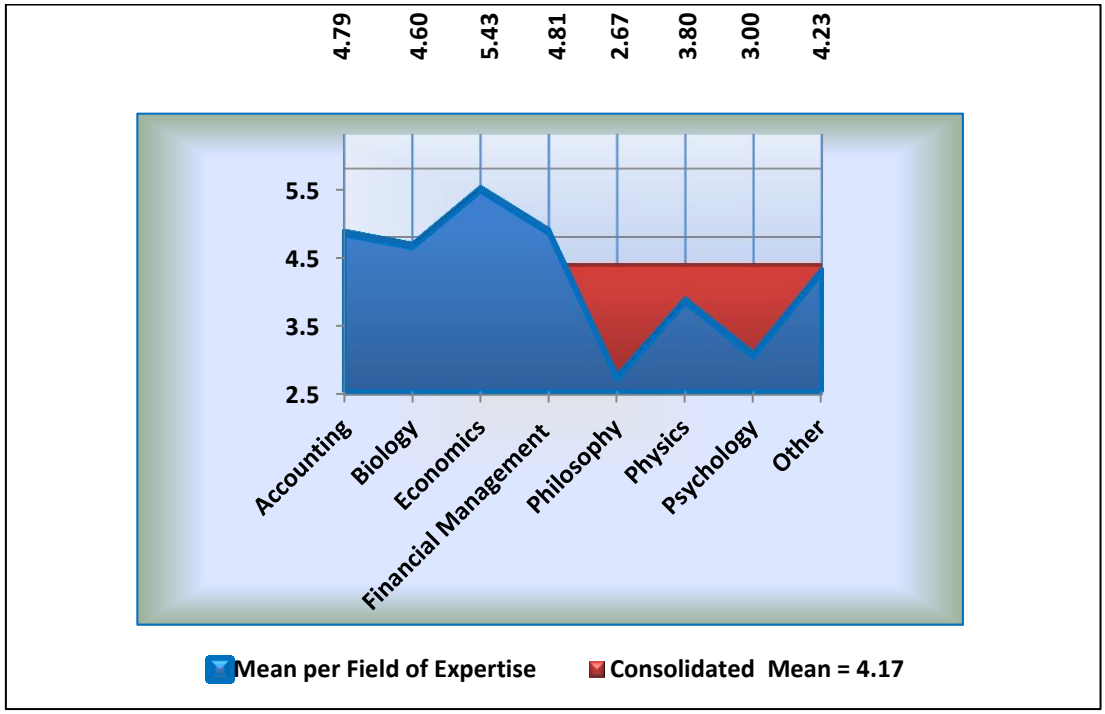
Economic decisions cannot be delegated by one person to another, they can only be abdicated to the other person.

Reflecting upon this statement made by Harper (2006:5), an economist, research findings indicate that 48.38% of the respondents are in favour of the statement with 30.11% disagreeing with it and a further 21.51% choosing to remain neutral on the matter.

Table 9.34 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
7.53%	9.68%	12.90%	21.51%	19.35%	19.35%	9.68%	100.00%

Figure 9.34 Means of the converted response ratings for each field of expertise as well as for the consolidated group



A further analysis of the means indicate that reservations about the statement are displayed by the fields of philosophy, physics and psychology, with means of 2.67, 3.8 and 3 respectively; resulting in a consolidated group mean of 4.17 which suggests slightly more support in favour of the statement than against it. This implies that respondents from the fields of philosophy, physics and psychology to a large extent believe that economic decisions can be delegated from one person to another, suggesting that the respondents from these fields view economic decisions as something impersonal and generic.

Statement H8

There is no evidence of a prior cognitive process when a decision is made.

H5 tests if respondents believe the cognitive process to be a pre-requisite for decision-making to occur. Research pertaining to the statement associated with findings from, among others, Zajonc (1980:155), a psychologist, indicates that 44.33% of the respondents appear to agree

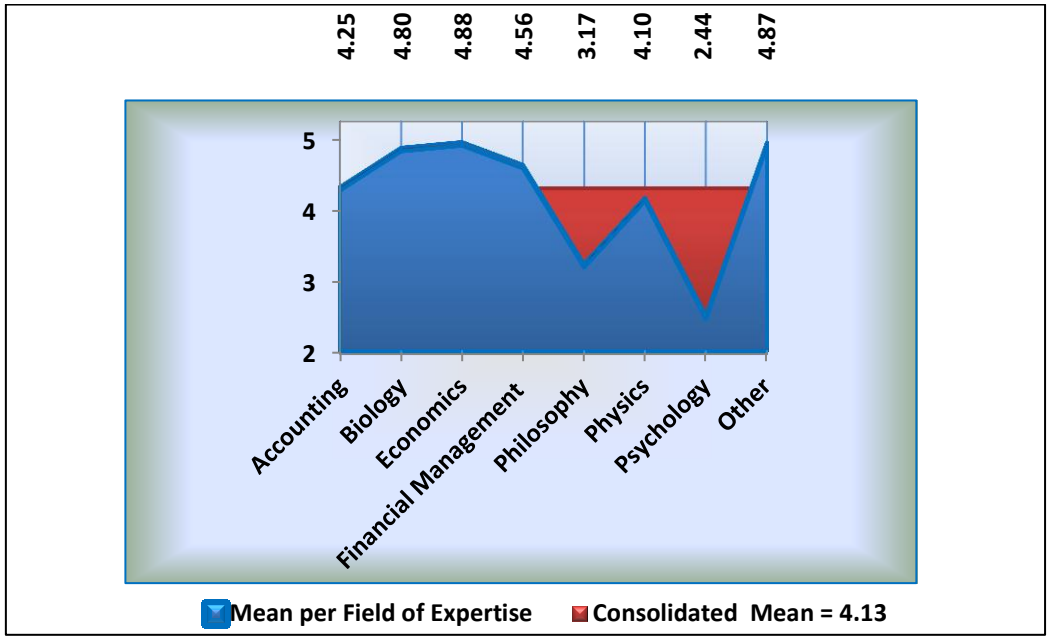
with the statement, with 27.83% disagreeing with it and a further 27.84% of the respondents choosing to remain neutral on the matter.

A further analysis of the means from the respective fields indicates that strong reservations about the statement are displayed by both the fields of psychology and philosophy, resulting in a consolidated group mean of 4.13. Further analysis of the literature indicates that in the field of psychology, as Kahneman (2002:449) goes on to point out, a distinction is made between two generic modes of cognitive functioning. On the one hand there is an intrinsic mode of operation, the functioning of which the individual will not be aware of, and on the other, a controlled mode of operation of which all individuals are consciously aware.

Table 9.35 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.12%	11.34%	12.37%	27.84%	17.53%	15.46%	11.34%	100.00%

Figure 9.35 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Both modes are classified under cognitive functioning. What Zajonc (1980:155) was referring to in his statement, was conscious awareness, something that becomes clear when reflecting on his entire statement:

> *It is generally believed that all decisions require some conscious or unconscious processing of pros and cons. Somehow we have come to believe, tautologically, to be sure, that if a decision has been made, then a cognitive process must have preceded it. Yet there is no evidence that this is indeed so.*

This therefore suggests that the lack of qualification of the type of cognitive process Zajonc was referring to in the statement is the result of the objection. This is a possibility which also extends to the reservations raised by the respondents in the field of philosophy.

9.4 BIVARIATE ANALYSIS (CORRELATION ANALYSIS) OF THE GENERAL PRINCIPLES AND SPECIFIC CONDITIONS OF THE FINANCIAL VALUE DECISION-MAKING MODEL

Prior to the use of any parametric statistic Lunenburg & Irby (2008:77) point out that three basic requirements must first be met, namely:

1) The population must be normally distributed;
2) There must be homogeneity of variance within the different groups;
3) The data must be interval or rational in scale.

9.4.1 TEST FOR NORMALITY OF THE SCORES

Considering that a Lickert scale was used as part of the questionnaire to structure the respondents' responses, it is clear that variables emanating directly from this process cannot be normally distributed. Yet, as Steffens (Personal communication, June 23, 2014) as part of Chapter 8 points out, in accordance with the central limit theorem, means of variables tend to be normally distributed even though the variables themselves are not. To confirm that this is also the case in this study, a One-Sample Kolmogorov-Smirnov test on the scores, ie the mean of all the answers supplied in the section by the respondent, was conducted. In the case of Section D, two respondents did not supply answers and scores could not be computed. In all other cases a score was obtained. The result of the One-Sample Kolmogorov-Smirnov test is provided below as part of Table 9.36.

Table 9.36 One-Sample Kolmogorov-Smirnov Test for normality conducted on the scores of the respondents

Section	N	Kolmogorov-Smirnov Z	Asymp. Sig. (2-tailed)
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	101	.915	**.372**
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	101	.710	**.694**
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	101	.866	**.441**
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	99	.572	**.899**
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	101	.580	**.890**
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	101	.611	**.849**
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	101	.868	**.439**
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	101	.864	**.445**

As can be seen from the Kolmogorov-Smirnov test, the *p*-values are all large, providing little to no evidence against the hypothesis of normality. As such the hypothesis of normality cannot be rejected.

9.4.2 TEST FOR HOMOSCEDASTICITY WITHIN THE GROUPS (HOMOGENEITY OF VARIANCE)

Statistically, the homoscedasticity of the groups were analysed by inspecting the residuals which in turn were determined by taking the score of each respondent and then subtracting the group average. The residuals were then tested using Levene's test for equality of variance. The results of the test are reflected in Table 9.37.

Table 9.37 Levene's Test for Equality of Variances

	Levene Statistic	df1	df2	Sig.
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	.958	2	95	.387
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	.462	2	95	.631
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	1.678	2	95	.192
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	1.516	2	93	.225
E. CONSCIOUSNESS, ARTIFICIAL REALITY AND THE ENFOLDING OF A MUTUAL CONTEXT	.661	2	95	.519
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	2.104	2	95	.128
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	.161	2	95	.852
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	.737	2	95	.481

From Levene's test for equality of variance it is clearly that all the *p*-values are above .05, indicating as Pallant (2007:234) points out, that it is safe to assume homogeneity of variance.

9.4.3 PEARSON CORRELATION ANALYSIS OF THE SECTION SCORES OF THE QUESTIONNAIRE

Given that as indicated under point 8.4.7.1.1.2 the score calculated for each respondent, ie the mean of all the answers supplied in the section by the respondent, meets all the requirements outlined by Nunnally (1978:16) as well as Lunenburg & Irby (2008:77) for the use of parametric statistics, it is possible to perform a Pearson correlation analysis on the section scores of the questionnaire.

In accordance with Tabachnick & Fidell (1983:379) the Pearson correlation analysis allows for the verification of the appropriateness of the use of factor analysis as part of the study. Still further, the Pearson correlation analysis indicates if the eight general principles forming the conceptual framework of the scientific model presented as part of Circle 3 of the Mitroff model are positively correlated to one another to a statistically high significant level and also, if they are significantly interconnected with one another. As such answering the second research question:

Research Question 2: **What is the strength of the relationships between the general principles of the financial value decision-making model?**

Using the correlation analysis to assess the relationships among the eight general principles of the model, it allowed the researcher to test the first hypothesis (H_1) of the research study:

H_1: *The interrelationships between the eight general principles of the financial value decision-making model which forms the conceptual framework of the model are significantly positively correlated.*

As indicated, as part of the Pearson correlation analysis provided as part of Table 9.38 the minimum correlation coefficient among the scores amounted to .349, indicating, as stipulated by Tabachnick & Fidell (1983:379) that, within this context, the use of factor analysis is appropriate.

Table 9.38 Pearson correlation analysis for the relationships between the general principles of the financial value decision-making model

VARIABLE	A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	F. VALUE – A PERSONAL EXPRESSION OF MEASURE	G. CHOICE – THE CARING DIRECTION GIVER OF CHANGE	H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	1	.685**	.644**	.517**	.349**	.416**	.415**	.468**
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	.685**	1	.628**	.486**	.349**	.511**	.514**	.461**
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	.644**	.628**	1	.622**	.410**	.533**	.522**	.498**
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	.517**	.486**	.622**	1	.609**	.674**	.714**	.575**
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE ENFOLDING OF A MUTUAL CONTEXT	.349**	.349**	.410**	.609**	1	.642**	.682**	.519**
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	.416**	.511**	.533**	.674**	.642**	1	.674**	.595**
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	.415**	.514**	.522**	.714**	.682**	.674**	1	.633**
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	.468**	.461**	.498**	.575**	.519**	.595**	.633**	1

** **Correlation is significant at the 0.01 level (2-tailed), p<0.01**

N=101

Still further, with correlation coefficients ranging from *r* =.349 up to *r* =.685 the results indicate significant interconnectivity as well as interdependence between the eight general principles forming the conceptual framework of the model, indicating that although the eight general principles are measuring different constructs they are nevertheless highly related. Taking cognisance of the above, the research tends to support the first hypothesis stipulating that the interrelationships between the eight general principles of the financial value decision-making model are significantly positively correlated.

9.5 MULTIVARIATE ANALYSIS

By determining the mean of all the answers supplied in each section by a respondent, the researcher could, except in the case of Section D where two respondents did not supply answers and scores could not be computed, determine a score for each respondent for each section of the questionnaire. This process reduced the number of variables from 82 to eight, allowing the researcher to determine the strength of the Intraclass Correlation among the scores and in the process affirm the use of factor analysis as part of the thesis.

9.5.1 INTRACLASS CORRELATION COEFFICIENT TEST

Being defined as a descriptive statistic, Intraclass Correlation Coefficients are used to establish how strong units in the same group resemble each other.

Table 9.39: Consolidated Section A to H – Intraclass Correlation Coefficient test of all the specific conditions of all the general principles of the financial value decision-making model

		Interval		F Test with True Value 0			
	Intraclass Correlation[b]	Lower Bound	Upper Bound	Value	df1	df2	Sig
Single Measures	.531[a]	.451	.616	10.062	98	686	0.000
Average Measures	.901[c]	.868	.928	10.062	98	686	0.000

With an average measure of .901 the Intraclass Correlation Coefficient Test points to both strong interconnectivity and interdependence among the scores, as such reaffirming the appropriateness of the use of factor analysis within the applied context of this study. Following this, Bartlett's test of Sphericity as well as Kaiser-Meyer-Olkin's Measure of Sampling Adequacy are used to further affirm the use of factor analysis on the calculated scores.

9.5.2 BARTLETT'S TEST FOR SPHERICITY AND KAISER-MEYER-OLKIN'S MEASURE OF SAMPLING ADEQUACY

Bartlett's test of Sphericity is an indication of the independence of the variables of one another, the results of which are provided below.

Table 9.40: Bartlett's test of Sphericity and Kaiser-Meyer-Olkin's Measure of Sampling Adequacy

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	0.883
Bartlett's Test of Sphericity. Approx. Chi-Square	450.155
df	28
Sig.	.000

As can be seen from the test result, the *p*-value amounts to .000 which is significant in that it is smaller than .05, indicating that the use of factor analysis is appropriate (Pallant 2007:181). Moreover Kaiser-Meyer-Olkin's Measure of Sampling Adequacy amounts to .883, thereby surpassing the threshold of .6 prescribed by Tabachnick & Fidell (2007) in Pallant (2007:181), also indicating the appropriateness of the use of factor analysis.

9.5.3 PRINCIPAL AXIS FACTORING

Given the above affirmation for the use of factor analysis on the scores, a factor extraction is done in order to determine the smallest number of factors that can be used to best represent the interrelations among the set of variables. Making use of the standard procedures of the Statistics Department of the University of Pretoria, Principal Axis Factoring is used as extraction method.

In addition, Kaiser's criterion is used whereby, as Pallant (2007:182) points out, only factors with an eigenvalue of 1.0 or more are retained for further investigation.

The results of the eigenvalues for each factor are presented in tabular format as part of Table 9.41 below.

As is clearly visible from Table 9.41, only factor 1 and 2 exceeded Kaiser's minimum requirements with the third eigenvalue amounting to 0.486. Still further, using Varimax with an Orthogonal Rotation technique as outlined by Tabachnick & Fidel (1983:399), the factors are rotated in order to, as Pallant (2007:183) reflects, present the patterns of loadings in a manner that is easier to interpret. The result of these findings is attached as Table 9.42 below.

Table 9.41: Principal Axis Factoring table with eigenvalues

Total Variance Explained

	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Factor	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.782	59.772	59.772	4.487	56.084	56.084
2	1.075	13.441	73.213	.828	10.351	66.435
3	.486	6.080	79.292	.183	2.285	68.721
4	.433	5.415	84.707	.138	1.725	70.446
5	.393	4.911	89.618			
6	.331	4.143	93.762			
7	.292	3.645	97.406			
8	.207	2.594	100.000			

Table 9.42: Orthogonal Rotated Factor Matrix

Rotated Factor Matrix[a]		
	Factor	
	1	2
G. CHOICE - THE CARING DIRECTION-GIVER OF CHANGE	**.806**	.305
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	**.767**	.160
F. VALUE - A PERSONAL EXPRESSION OF MEASURE	**.742**	.337
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	**.708**	.441
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	**.600**	.386
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	.215	**.821**
B. CHANGE - AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	.295	**.728**
C. BIFURCATION - A BREAKTHROUGH OR A BREAKDOWN	.387	**.675**
Extraction Method: Principal Axis Factoring. Rotation Method: Varimax with Kaiser Normalization a. Rotation converged in 3 iterations.		

From the research findings presented in Table 9.42 it is clear that Sections A, B and C of the questionnaire group together as a factor (Factor 1) with Sections D-H grouping together to form the second factor (Factor 2).

9.5.4 ANALYSIS OF VARIANCE OR ANOVA MODEL

Given that all the requirements outlined by Pallant (2007:203-204) under point **8.4.7.1.1.3** for the use of the ANOVA model are met, F tests are conducted.

9.5.4.1 THE CONDUCTING OF F-TESTS

As part of the conducted F-tests a F-ratio is calculated on the mean of the scores per group in order to establish if there are any significant differences among the groups in terms of gender, ethnicity, age, field of expertise, experience, sector, capacity or level of seniority in relation to the design (Pallant 2007:207). The F-test therefore tests if the difference between the group means dominate the variability within the groups. This is done in order to answer the third research question:

Research Question 3: Does belonging to a different group affect how respondents perceive and reflect upon the general principles of the financial value decision-making model?

From the F-tests a *p*-value is established which if small, ie lower than .05, indicated that the means in the respective groups are different (Steffens, personal communication, June 23, 2014). This in turn either leads to the affirmation or rejection of the hypothesis made in relation to the particular group, ultimately assisting the researcher in answering the third research question. The results of the F-tests conducted on the groups and their respective *p*-values are provided below.

9.5.4.1.1 GENDER

Using an Analysis of Variance or ANOVA model to conduct an F-test to compare the mean of the scores per group, it allows the researcher to, in partial answer to research question 3, test the second hypothesis (H_2) of the research study:

H_2: *Gender will significantly impact on respondent's perceptions of the general principles of the financial value decision-making model.*

Table 9.43: F-test for differences in the group means for gender

		Sum of Squares	df	Mean Square	F	Sig.=P-value
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	Between Groups	.456	1	.456	.500	**.481**
	Within Groups	79.328	87	.912		
	Total	79.784	88			
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	Between Groups	.069	1	.069	.101	**.752**
	Within Groups	59.490	87	.684		
	Total	59.558	88			
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	Between Groups	1.202	1	1.202	1.065	**.305**
	Within Groups	98.150	87	1.128		
	Total	99.352	88			
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	Between Groups	.038	1	.038	.069	**.793**
	Within Groups	46.520	85	.547		
	Total	46.558	86			
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	Between Groups	1.196	1	1.196	1.699	**.196**
	Within Groups	61.244	87	.704		
	Total	62.440	88			
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	Between Groups	.842	1	.842	1.134	**.290**
	Within Groups	64.556	87	.742		
	Total	65.398	88			
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	Between Groups	1.077	1	1.077	1.496	**.225**
	Within Groups	62.637	87	.720		
	Total	63.714	88			
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	Between Groups	1.879	1	1.879	2.690	**.105**
	Within Groups	60.765	87	.698		
	Total	62.643	88			

Research findings indicate that the means per group are not significantly different, suggesting that gender does not have a significant impact on the respondent's perceptions with regard to the general principles of the financial value decision-making model; ultimately leading to a rejection of the second hypothesis (H_2) of the research study.

9.5.4.1.2 ETHNICITY

Using an Analysis of Variance or ANOVA model to conduct an F-test to compare the mean of the scores per group, it allows the researcher to, in partial answer to research question 3, test the third hypothesis (H_3) of the research study:

H_3: Ethnicity will significantly impact on respondent's perceptions of the general principles of the financial value decision-making model.

Table 9.44: F-test for differences in the group means for ethnicity

		Sum of Squares	df	Mean Square	F	Sig.
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	Between Groups	7.835	4	1.959	2.256	.069
	Within Groups	80.746	93	.868		
	Total	88.581	97			
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	Between Groups	7.081	4	1.770	2.744	.033
	Within Groups	60.005	93	.645		
	Total	67.087	97			
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	Between Groups	4.570	4	1.142	.927	.452
	Within Groups	114.553	93	1.232		
	Total	119.122	97			
D. DISSIPATION, SELF- ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	Between Groups	2.099	4	.525	.904	.465
	Within Groups	52.838	91	.581		
	Total	54.937	95			
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	Between Groups	2.553	4	.638	.835	.506
	Within Groups	71.069	93	.764		
	Total	73.622	97			
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	Between Groups	2.322	4	.580	.696	.597
	Within Groups	77.552	93	.834		
	Total	79.874	97			
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	Between Groups	3.453	4	.863	1.171	.329
	Within Groups	68.537	93	.737		
	Total	71.990	97			
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	Between Groups	4.301	4	1.075	1.417	.234
	Within Groups	70.562	93	.759		
	Total	74.863	97			

Reflecting upon the above research results it appears that with a *p*-value of .033 for Section B pertaining to change, different ethnic groups reflect on and interact with change in meaningfully different ways; causally resulting in an affirmation of the third hypothesis (H_3) of the research study.

9.5.4.1.3 AGE

Using an Analysis of Variance or ANOVA model to conduct an F-test to compare the mean of the scores per group, it allows the researcher to, in partial answer to research question 3, test the forth hypothesis (H_4) of the research study:

H_4: *Age will significantly impact on respondents' perceptions with regard to the general principles of the financial value decision-making model.*

Table 9.45: F-test for differences in the group means for age

		Sum of Squares	df	Mean Square	F	Sig.
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	Between Groups	3.544	2	1.772	2.651	.076
	Within Groups	60.822	91	.668		
	Total	64.365	93			
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	Between Groups	4.331	2	2.166	3.467	.035
	Within Groups	56.840	91	.625		
	Total	61.172	93			
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	Between Groups	8.825	2	4.413	4.238	.017
	Within Groups	94.760	91	1.041		
	Total	103.586	93			
D. DISSIPATION, SELF- ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	Between Groups	4.149	2	2.074	3.819	.026
	Within Groups	48.345	89	.543		
	Total	52.494	91			
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	Between Groups	2.247	2	1.124	1.527	.223
	Within Groups	66.961	91	.736		
	Total	69.208	93			
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	Between Groups	1.695	2	.848	1.031	.361
	Within Groups	74.815	91	.822		
	Total	76.510	93			
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	Between Groups	1.772	2	.886	1.258	.289
	Within Groups	64.118	91	.705		
	Total	65.890	93			
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	Between Groups	3.799	2	1.899	2.756	.069
	Within Groups	62.723	91	.689		
	Total	66.522	93			

With a *p*-value of .035, .017 and .026 for Sections B, C and D respectively, the research findings tend to suggest that different age groups reflect and interact differently with change. In addition age also appears to affect how an individual views a decision point and as a dissipative structure interacts with the environment; consequently validating the fourth hypothesis (H_4) of the research study.

9.5.4.1.4 FIELD OF EXPERTISE

Using an Analysis of Variance or ANOVA model to conduct an F-test to compare the mean of the scores per group, it allows the researcher to, in partial answer to research question 3, test the fifth hypothesis (H_5) of the research study:

H_5: The type of field of expertise of a respondent will have an impact on respondent's perceptions of the general principles of the financial value decision-making model.

Table 9.46: F-test for differences in the group means for expertise

		Sum of Squares	df	Mean Square	F	Sig.
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	Between Groups	7.710	6	1.285	1.448	.205
	Within Groups	81.638	92	.887		
	Total	89.348	98			
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	Between Groups	3.419	6	.570	.822	.556
	Within Groups	63.783	92	.693		
	Total	67.202	98			
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	Between Groups	10.456	6	1.743	1.448	.205
	Within Groups	110.760	92	1.204		
	Total	121.216	98			
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	Between Groups	4.244	6	.707	1.254	.287
	Within Groups	50.750	90	.564		
	Total	54.994	96			
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	Between Groups	11.108	6	1.851	2.721	.018
	Within Groups	62.600	92	.680		
	Total	73.708	98			
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	Between Groups	7.275	6	1.213	1.530	.177
	Within Groups	72.896	92	.792		
	Total	80.172	98			
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	Between Groups	4.357	6	.726	.968	.451
	Within Groups	68.993	92	.750		
	Total	73.351	98			
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	Between Groups	6.548	6	1.091	1.455	.202
	Within Groups	68.987	92	.750		
	Total	75.535	98			

With a *p*-value of .018 for Section E of the questionnaire, the research results as reflected above tend to suggest that different fields of expertise reflect on consciousness, artificial reality and the unfolding of a mutual context differently than others; resulting in an affirmation of the fifth hypothesis (H_5) of the research study.

9.5.4.1.5 EXPERIENCE

Using an Analysis of Variance or ANOVA model to conduct an F-test to compare the mean of the scores per group, it allows the researcher to, in partial answer to research question 3, test the sixth hypothesis (H_6) of the research study:

H_6: *The experience of the respondent will significantly impact on the respondent's perception of the general principles of the financial value decision-making model.*

Table 9.47: F-test for differences in the group means for experience

		Sum of Squares	df	Mean Square	F	Sig.
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	Between Groups	2.084	2	1.042	1.134	.326
	Within Groups	87.264	95	.919		
	Total	89.348	97			
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	Between Groups	.190	2	.095	.135	.874
	Within Groups	66.986	95	.705		
	Total	67.176	97			
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	Between Groups	1.971	2	.986	.789	.457
	Within Groups	118.713	95	1.250		
	Total	120.685	97			
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	Between Groups	.195	2	.097	.168	.845
	Within Groups	53.757	93	.578		
	Total	53.952	95			
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDINGOF A MUTUAL CONTEXT	Between Groups	.530	2	.265	.349	.707
	Within Groups	72.186	95	.760		
	Total	72.716	97			
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	Between Groups	.858	2	.429	.514	.600
	Within Groups	79.270	95	.834		
	Total	80.128	97			
G. CHOICE – THE CARING DIRECTION GIVER OF CHANGE	Between Groups	.212	2	.106	.138	.871
	Within Groups	72.963	95	.768		
	Total	73.175	97			
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	Between Groups	1.187	2	.593	.759	.471
	Within Groups	74.251	95	.782		
	Total	75.438	97			

Research findings as displayed above indicate that the means per group are not significantly different, suggesting that experience does not have a significant impact on the respondents' perceptions with regard to the general principles of the financial value decision-making model; ultimately leading to a rejection of the sixth hypothesis (H_6) of the research study.

9.5.4.1.6 SECTOR

Using an Analysis of Variance or ANOVA model to conduct an F-test to compare the mean of the scores per group, it allows the researcher to, in partial answer to research question 3, test the seventh hypothesis (H_7) of the research study:

H_7: The sector the respondent works in will significantly impact on respondent's perceptions with regard to the general principles of the financial value decision-making model.

Table 9.48: F-test for differences in the group means for the sector

		Sum of Squares	df	Mean Square	F	Sig.
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	Between Groups	16.863	6	2.810	3.542	.003
	Within Groups	70.620	89	.793		
	Total	87.483	95			
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	Between Groups	4.573	6	.762	1.116	.360
	Within Groups	60.796	89	.683		
	Total	65.370	95			
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	Between Groups	15.684	6	2.614	2.270	.044
	Within Groups	102.483	89	1.151		
	Total	118.167	95			
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	Between Groups	9.384	6	1.564	3.162	.007
	Within Groups	43.028	87	.495		
	Total	52.412	93			
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	Between Groups	4.468	6	.745	1.008	.425
	Within Groups	65.733	89	.739		
	Total	70.201	95			
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	Between Groups	10.648	6	1.775	2.358	.037
	Within Groups	66.998	89	.753		
	Total	77.647	95			
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	Between Groups	4.635	6	.772	1.013	.422
	Within Groups	67.845	89	.762		
	Total	72.480	95			
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	Between Groups	3.649	6	.608	.774	.592
	Within Groups	69.904	89	.785		
	Total	73.553	95			

From the research results reflected above it appears that with a *p*-value of .003 for Section A there is a significant difference in the means scores per group, implying a strong difference in how different sectors experience and reflect upon flow, creation and the movement of patterns and forms. With a *p*-value of .044 for Section C it also appears that different sectors view and experience decision points differently. The *p*-value of .007 for Section D further indicates that there is a significant difference in how respondents from different sectors, from a systemic perspective, reflect upon themselves and the environment that surrounds them. The *p*-value of .037 for Section F also tends to suggest that individuals of different sectors have significantly different perceptions about value. Taking cognisance of the above it is clear that the research findings validate the seventh hypothesis (H_7) of the research study.

9.5.4.1.7 CAPACITY (LEVEL OF SENIORITY)

Using an Analysis of Variance or ANOVA model to conduct an F-test to compare the mean of the scores per group, it allows the researcher to, in partial answer to research question 3, test the eighth hypothesis (H_8) of the research study:

H_8: *The level of seniority of the respondent will significantly impact on respondent's perceptions with regard to the general principles of the financial value decision-making model.*

Table 9.49: F-test for differences in the group means for capacity (level of seniority)

		Sum of Squares	df	Mean Square	F	Sig.
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	Between Groups	2.002	4	.500	.543	.705
	Within Groups	85.732	93	.922		
	Total	87.734	97			
B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	Between Groups	1.371	4	.343	.484	.747
	Within Groups	65.805	93	.708		
	Total	67.176	97			
C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN	Between Groups	8.291	4	2.073	1.719	.152
	Within Groups	112.163	93	1.206		
	Total	120.455	97			
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	Between Groups	2.393	4	.598	1.040	.391
	Within Groups	52.333	91	.575		
	Total	54.726	95			
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	Between Groups	1.854	4	.463	.623	.647
	Within Groups	69.225	93	.744		
	Total	71.079	97			
F. VALUE – A PERSONAL EXPRESSION OF MEASURE	Between Groups	1.634	4	.408	.484	.748
	Within Groups	78.494	93	.844		
	Total	80.127	97			
G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE	Between Groups	1.207	4	.302	.391	.815
	Within Groups	71.833	93	.772		
	Total	73.041	97			
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	Between Groups	4.201	4	1.050	1.397	.241
	Within Groups	69.902	93	.752		
	Total	74.103	97			

As displayed as part of Table 9.49 the research findings indicate that the means per group are not significantly different, suggesting that the level of seniority of the respondent do not have a significant impact on the respondent's perceptions with regard to the general principles of the financial value decision-making model; causally leading to a rejection of the eight hypothesis (H_8) of the research study.

Following the F-tests a partial eta squared is performed.

9.5.4.2 PARTIAL ETA SQUARED

As part of the partial eta squared, aspects such as gender, ethnicity, age, field of expertise, experience, sector, capacity or level of seniority are treated as independent variables.

In turn, the sections of the questionnaire are treated as dependent variables of these independent variables. From this a strength of the effect size or strength of association as Pallant (2007:207-208) refers to it, is calculated. This, as she goes on to explain, indicates whether the dependent variables in relation to the independent variables are statistically significant and as such are not likely to have occurred by chance. The partial eta squared therefore establishes the effect size.

The findings of the partial eta squared is then overlapped with the *p*-values from the F-tests provided in Table 9.43 to Table 9.49 in order to, where a *p*-value of less than .05 is found, establish the strength of the effect size or strength of association (Pallant 2007:207). The results of the findings are displayed as part of Table 9.50 below. Each case is, in accordance with the criteria as outlined by Pallant (2007:2008), assessed with a partial eta squared of .01 or less being regarded as small, .06 as medium and .138 or more considered large. For ease of reference, those areas with *p*-values of less than .05 are colour-coded in terms of the strength of association based on the partial eta squared.

Table 9.50 Partial eta squared (% of variance explained)

Dependant Variables	Independent Variables						
	Gender	Ethnicity	Age	Field	Experience	Sector	Capacity
A. Flow	0.006	0.088	0.340	0.086	0.023	0.193	0.023
B. Change	0.001	0.106	0.710	0.051	0.003	0.070	0.020
C. Bifurcation	0.012	0.038	0.085	0.086	0.016	0.133	0.069
D. Dissipation	0.001	0.038	0.079	0.077	0.004	0.179	0.044
E. Consciousness	0.019	0.035	0.032	0.151	0.007	0.064	0.026
F. Value	0.013	0.029	0.022	0.091	0.011	0.137	0.020
G. Choice	0.017	0.048	0.027	0.059	0.003	0.064	0.017
H. Decision-making	0.030	0.057	0.057	0.087	0.016	0.050	0.057

Partial eta squared of medium strength is highlighted in yellow and those of large strength highlighted in red.

From this process it transpires that in all the cases where differences are found between the groups, these differences are not only statistically significant but also, as Pallant (2007:207) points out, not likely to have occurred by chance.

9.5.4.3 SUMMATION

Reflecting upon the research results obtained from the F-tests conducted as part of the Analysis of Variance or ANOVA model it appears that gender, experience and level of seniority do not cause respondents to perceive and reflect upon the general principles of the financial value decision-making model differently. When it comes to ethnicity, age, field of expertise and the sector the respondents operate in, it is an entirely different matter with research findings suggesting that in these particular cases the type of group the respondents belong to does matter; affecting not only how the respondent perceives but also reflects upon the general principles of the financial value decision-making model, leading to a partial affirmation of the third research question in the sense that in certain instances the type of group the respondent belongs to does matter. Still further, the results from the partial eta squared indicates that where differences are found between the groups, these differences are not only statistically significant but also, as Pallant (2007:207) points out, not likely to have occurred by chance.

9.6 CONCLUSION

Using descriptive statistics, this chapter reported on the data collected by the questionnaire from the target population. Through the use of frequency tables and graphs the chapter analysed the research participants' ethnicity, age, field of primary expertise, number of years' experience, sector of participation and level of management.

With a univariate analysis, it, with the help of frequency tables and mean graphs, reported on and provided a detailed analysis of the results of the respondents' Likert scale ratings of the 82 questionnaire statements. This assisted the researcher to test the validity and reliability of the scientific model presented as part of Circle 3 of the Mitroff model in Chapter 10.

This was followed by a Bivariate analysis during which tests were performed on the scores for each respondent for each section of the questionnaire, ie the mean of all the answers supplied in the section by the respondent in order to determine if the scores are parametric or non-parametric. As part of these tests, a One-Sample Kolmogorov-Smirnov test was used to determine if the score for each respondent per section, namely the mean of all the answers supplied in the section by the respondent, are normally distributed. This was followed by Levene's test for equality of variance to analyse the homoscedasticity of the groups. Once it was confirmed that the scores met all the requirements as set out by both Nunnally (1978:16) as well as Lunenburg & Irby (2008:77) for the use of parametric statistics, a Pearson correlation analysis on the section scores of the questionnaire was performed. This further assisted the researcher to verify if the use of factor analysis was appropriate in the study. Moreover, the Pearson correlation analysis indicated if the eight general principles forming the conceptual framework of the scientific model presented as part of Circle 3 of the Mitroff model were not only positively correlated to one another to a statistically high significant level but also significantly interconnected with one another.

To further reaffirm the appropriateness of the use of factor analysis the chapter commenced with a multivariate analysis during which an Intraclass Correlation test on the scores was conducted.

Still further, Bartlett's test of Sphericity was conducted to determine the interdependence of the variables from one another. Moreover, Kaiser-Meyer-Olkin's Measure of Sampling Adequacy was used to access the appropriateness of the use of factor analysis (Tabachnick & Fidell (2007) in Pallant (2007:181). The chapter then proceeded with factor extraction using the standard procedures of the Statistics Department of the University of Pretoria; Principal Axis Factoring. In addition, Kaiser's criterion was used whereby only factors with an eigenvalue of 1.0 or more were retained for further investigation. The factors were then rotated using Varimax with an Orthogonal Rotation technique in order to establish which sections of the questionnaire grouped together.

This was followed by an Analysis of Variance or ANOVA. As part of the ANOVA model, F-tests were conducted during which an F-ratio was calculated in order to establish if there were any significant differences among the groups in terms of gender, ethnicity, age, field of expertise, experience, sector, capacity or level of seniority in relation to the design (Pallant 2007:207). From the F-tests a *p*-value was established which indicated if the means in the respective groups were different.

Still further, a partial eta squared was performed. The findings of the partial eta squared were then overlapped with the p-values from the F-tests to establish the strength of the effect size or strength of association. Ultimately indicating, where differences were found between the groups, these differences were not only statistically significant but also not likely to have occurred by chance.

Having analysed the data it appears that the contextual nature of value cannot be over-emphasised, with value, as Bateson (1979:15) also noticed in the case of words and actions, having no meaning without a context. The research results therefore indicate that while value may be responsible for the creation of the individual's context, the individual still remains the source from which it emanates and in whose service it reflects on the significance of his multitude of relationships. This thereby, as Marais & Gouws (2013) point out, forms part of the beholding of value process V(un) that is responsible for the creation of a context, a landscape of things that matter to the individual.

The creator V(un) and the created (context) are therefore inextricably tied to their source (the individual) with neither having the right to existence in the individual except through each other. This thereby explains why most people believe they know exactly what value is until they are asked to explain it.

The question requires an explanation of value outside of man, thereby necessitating the respondent to distance himself from V(un), a process that causes V(un) to be loosened from its source, and as such places V(un) outside of man, where it becomes, as it should, a reflection of nothing.

CHAPTER 10

TOWARDS A SCIENTIFIC MODEL OF THE BEHOLDING OF VALUE PROCESS FOR FINANCIAL DECISION-MAKING

10.1 INTRODUCTION

As complex adaptive systems, all human beings build models that allow them to anticipate the world. These are models that, as Maslow (1954:176) points out, each of us builds in an artificial world we create in order to provide us with a unique frame of reference that, as Holland (2000:53-57) points out, we use to anticipate the future. Models therefore, as he goes on to explain, guide us in our activities as we predict the consequences of our actions and then reassess our actions if the prediction is not verified after the action has been taken. As such, models form an integral part of how we as human beings cope with uncertainty while as beholders we unfold on the moving now of the arrow of time.

Despite being aware of the tremendous power of models to, among other things, shift existing paradigms, the financial social sciences have in the past been greatly influenced by the research methodology of the natural sciences. This, as Quattrone (2000:130) goes on to state, has resulted in a dualism and fragmentation in research, with the inter-disciplinary research causally resulting in a hierarchical organisation of human knowledge. This is a point also reiterated by Mitroff et al (19074:46) when they state:

> *Most of what we pretend to know of science is the product of non-systems or disciplinary thinking.*

This type of approach, as they go on to note, works well for obtaining narrow specialist and disciplinary aims. Yet, as Koornhof (2001:254) points out, despite realistic positivistic research approaches contributing greatly towards the growth of knowledge within the respective areas, this is but one type of knowledge that is incapable of providing a broad-based system characterisation of science (Mitroff et al 1974:47).

As such Koornhof (2001:255) suggests that a solution to this problem may be to look for appropriate research approaches or methods in related disciplines.

Hence Mitroff, Betz, Pondy & Sagasti's (1974:46) model, which forms part of an interdisciplinary approach, was introduced. It is a model capable of providing a broad-based system characterisation of science with regard to which they state:

> *Unlike earlier scientific disciplines which sought to separate themselves from each other and subdivide, the new interdisciplines seek to enlarge themselves to combine to take into account more and more aspects of reality.*

This model therefore has significant benefits which Koornhof (2001:255) goes on to highlight when she states:

> *Although the flexibility of the model's design makes it appropriate to a wide spectrum of research, it is particularly useful in less formal, experimental and naturalistic research.*

The model deploys a simple whole systems view of the activity of problem-solving that can be extended to cover a broader range of more generic scientific activities (Mitroff et al 1974:47). Something of considerable importance since there are, as Mitroff et al (1974:47) go on to point out, questions which cut across the history, the philosophy, the psychology and the sociology of science. The Mitroff model assists the researcher with trans-disciplinary research by documenting various steps in the research inquiry, thereby allowing the researcher to identify and follow those steps deemed appropriate to the researcher's research activity. This thereby, as was the case with this study, leading to the creation of a scientific model as depicted by Circle 3 of the Mitroff model.

Supplementing the Mitroff model at Circle 2 as well as Activity 3 is a philosophy of science approach as outlined by Giere (2004:745) whereby principles act as general templates for the construction of more specific abstract objects or models. As part of the philosophy of science approach Giere's (2004:743) formula is applied:

> *S uses X to represent W for purposes P.*

S representing the researcher which uses X in the form of a statement as obtained from leading figures in those fields contributing most to the researcher's understanding of value to represent an aspect of the real world – W for purposes P. Each statement pertains to a specific model element that as Giere (2004:747) goes on to note can be identified with features of the real world, thereby making it possible to use models to represent aspects of the real world. This process eventually leads to P, the purpose of which is to test the statement and the subsequent model element it relates to for its representation faithfulness when compared to the aspects it represent in the real world.

As such this chapter begins with a discussion of Activity 2 of the Mitroff model. Briefly explaining how the feedback from the World Finance Conference in Cyprus in 2013, the personal interview and the philosophy of science approach contributes towards the scientific model that is in accordance with both Mitroff et al (1974:48) as well as Koornhof (2001:257) presented as part of Circle 3 of the Mitroff model. It also explains how the general principles of the scientific model form qualitative logical relationships that link together to form the relevant features of reality (Rivette, 1972:9). This is followed by a brief outline of the process that was followed in Chapter 8 and Chapter 9 as part of Activity 2 and 3, the respective modelling and model-solving activities of the Mitroff model. The chapter then proceeds to derive a solution from the scientific model which it presents as part of Circle 4 of the Mitroff model after which, as part of Activity 5, it explains where and how feedback in the narrow sense to the problem-solving activities were not only supplied as part of previous chapters, but have still to be supplied as part of Chapter 11.

10.2 ACTIVITY 2: MODELLING

10.2.1 PHILOSOPHY OF SCIENCE APPROACH

As part of Circle 2 of the Mitroff model Giere's (2004:745) philosophy of science approach was used during which principles served as general templates in the construction of the conceptual model.

As part of the general principles, specific conditions were attached from which model elements were developed. Supplementing this process the general principles and attached specific conditions were presented for feedback at the World Finance Conference in Cyprus as well as personal interviews conducted through qualitative questionnaires.

10.2.2 FEEDBACK FROM THE WORLD FINANCE CONFERENCE IN CYPRUS

As part of the modelling process, an article on the unfolding of value in a decision-making context was presented at the World Finance Conference in Cyprus in 2013. During the presentation several proposed general principles of the model including value, decision-making, flow, change, choice and bifurcation, as well as several proposed specific conditions, were presented and feedback obtained. In response to the presentation, valuable questions were asked by the financial community with regard to the application of the research and its impact on the existing financial value decision-making context. These are all aspects that were incorporated as part of the specific conditions that form the elements of the scientific model, in some instances also requiring adjustments to some of the general principles.

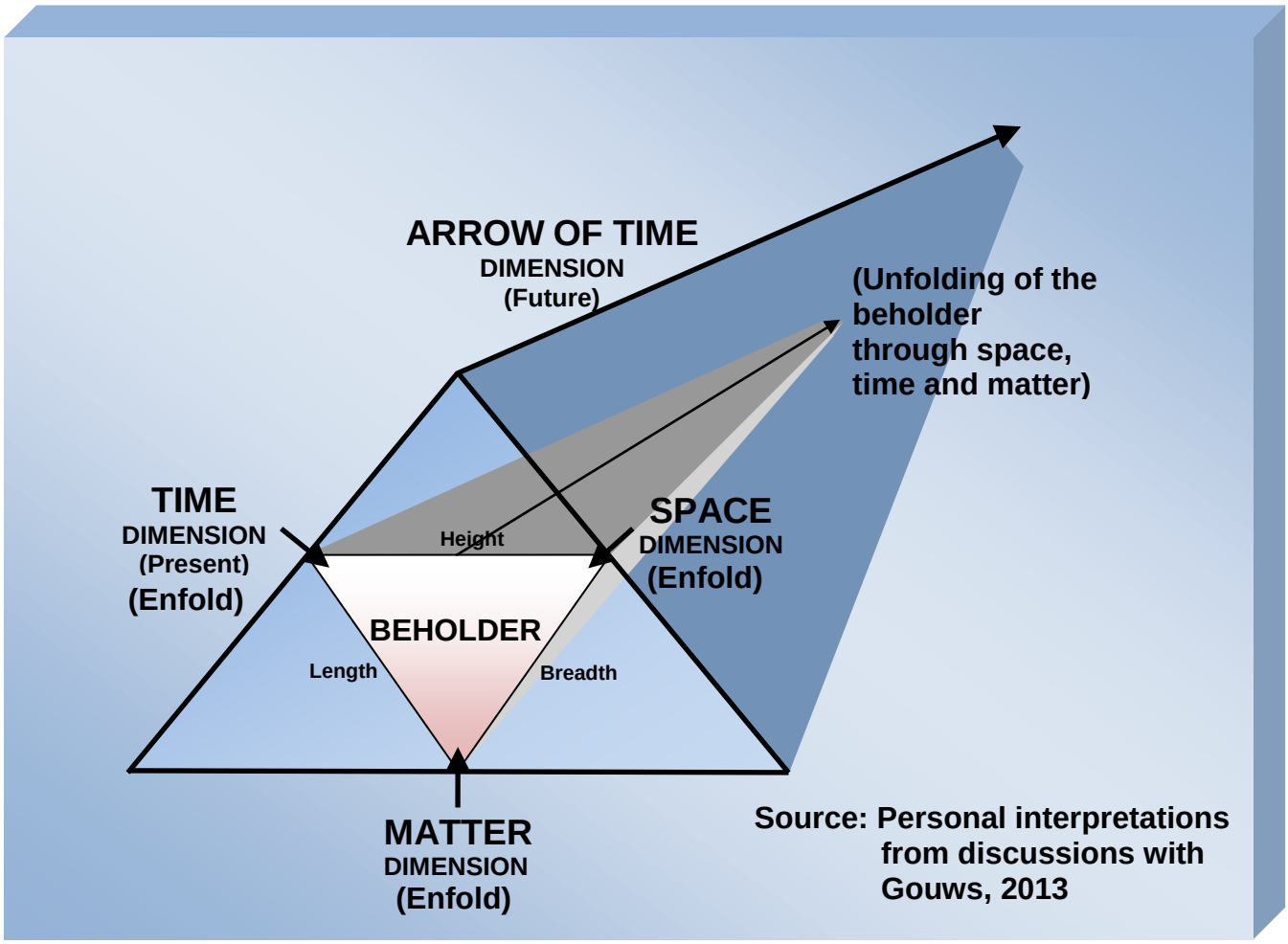
10.2.2.1 INTERVIEWS

In addition to the feedback obtained from the World Finance Conference, interviews were conducted through structured qualitative questionnaires that focused on a combination of constructs and concepts central to the model. This was done in order to ascertain if important general principles or specific conditions were left out during the initial model-building phase. As a result of the feedback obtained and discussed under point 8.4.4.1 in Chapter 8, several correction factors were made to both the general principles as well as the specific conditions forming the elements of the scientific model.

10.3 CIRCLE 3 – TOWARDS A SCIENTIFIC MODEL

As part of the physical world, all beholders of value are subjected to what Bohm (1988:179) refers to as the implicate order, the general structure of matter. This process is depicted as part of Figure 10.1 which as Gouws (Personal interview, 2013 October 10) goes on to explain entails that on the one hand matter, time and space are enfolded into the beholder while on the other hand, as part of a continuous ongoing process, the beholder unfolds in matter, time and space. This depicts a continuous reciprocal enfolding-unfolding process that on a physical level is bound by the laws of thermodynamics. These laws stipulate that every local decrease in entropy in one place must be followed by a proportionate increase in entropy elsewhere. This therefore necessitates a continuous conversion on the part of matter if it is to endure, but moreover it requires a continuous redirection of conversion. It requires that the matter the beholder is comprised of becomes self-conscious. A self-consciousness that as Dawkins (2006:3-24) points out, although orchestrated by the beholder's genes, is not limited to them. As such it causes him to proclaim that each individual has the choice to upset the design of his or her genes. Upset perhaps, but it appears not elude, as traces of the memory of matter in the form of instincts and impulses keep on seeping through the pores of what Simon (1996:6) refers to as the interface where the beholder's mind and matter converge.

Figure 10.1 A visual depiction of the unfolding of the beholder through space, time and matter



As such it reflects the congenital tendencies mentioned by Mautz & Sharaf (1961:93), instincts and impulses that, as Dewey (1922:45-75; 1929:207) points out, can be directed and shaped towards various ends. Moreover, as Maslow (1954:4) reflects, they do not relate to a specific isolated localised somatic base, but rather reflect what is required by the whole person. This is an aspect which, in the case of instincts and impulses, occurs prior to perception. A moment during which, as Simon (1978:501-503) points out, the affective value affirmation serves as a suitable outcome, an approximation.

As part of the process depicted in Figure 10.2, sensory inputs in the form of sights, smells, hearing, taste and touch pass from the external environment that surrounds the beholder through the physical body of the beholder, the matter the beholder is comprised of, onto the interface where the stimuli cause an affective evaluation to occur. An aspect with regards to which Kahneman & Frederick (2001:6) go on to state:

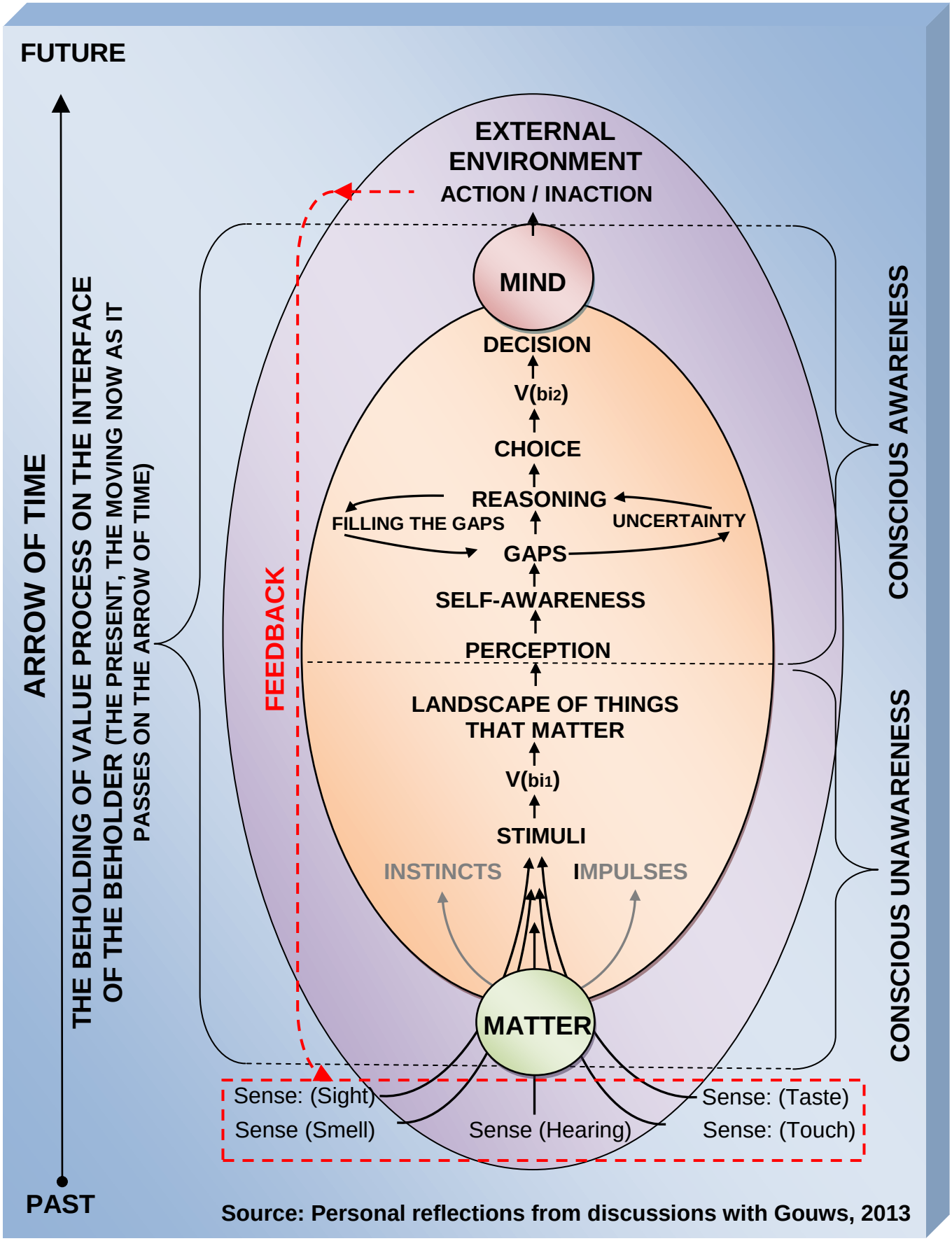
> *There is now compelling evidence for the proposition that every stimulus evokes an affective evaluation, and that this evaluation can occur outside of awareness.*

This first value affirmation therefore occurs outside the conscious awareness of the beholder and henceforth will be referred to as $V(bi_1)$. Through the affirmation of $V(bi_1)$, a landscape of things that matter to the individual is created from which perception emanates and from which in turn, once it passes through a threshold, self-awareness emerges. Once this occurs, the beholder starts to perceive matter as something separate from him or herself and at that moment Heisenberg's uncertainty principle manifests with regard to which Hawkins (1998:59) goes on to state:

> *…the more accurately you try to measure the position of the particle, the less accurately you can measure its speed, and vice versa.*

Heisenberg's uncertainty principle, as he explains, is a fundamental, inescapable property of the world. An inherent physical uncertainty that, it appears, manifests as a result of the separation of mind and matter and requires that the beholder, as demonstrated by Figure 10.2, constructs a landscape of things that matter in order to anticipate the future, to be ready for whatever it may bring.

Figure 10.2 A visual depiction of the convergence of mind and matter and the places where V(bi) occurs as part of the beholding of value process on the interface of the beholder



Source: Personal reflections from discussions with Gouws, 2013

Yet here, as the beholder's self-awareness sheds light on selective sections of this vast pre-existing landscape created prior to conscious awareness, gaps appear in the landscape. Gaps that, as Bergson (2002:249) goes on to point out, occur as a result of the insufficiency of an individual's faculties of perception.

As such it causes another form of uncertainty to emerge that is not related to Heisenberg's uncertainty principle. This uncertainty, that manifests in the mind as a result of the gaps in the perception of the beholder, requires, as Bergson (2002:249) goes on to state, that the beholder starts to conceive in order to make-shift for the limits of his perceptibility, using reason to fill up the gaps of perception or extend its scope. This is a process that, as depicted by Figure 10.2, allows the beholder to consider all the options, the choices, before making a decision. A choice with regards to which Taylor (1991:37) goes on to state, that once made, confers value onto an option. This is a conscious considered value affirmation forming part of conscious awareness that henceforth will be referred to as $V(bi_2)$.

Figure 10.1 and Figure 10.2 therefore provide a background, a context in relation to which the detail provided by the Financial Value Decision-Making Model can be interpreted. Figure 10.1 and Figure 10.2 may therefore also be reflected upon as proverbial "keys" to unlock and interpret the detail provided by the Financial Value Decision-Making Model in relation to the beholding of value process aimed at the affirmation of value in anticipation of the future. Alternatively Figure 10.1 and Figure 10.2 may also be reflected upon as "lenses" with which to contextually behold the detail of the Financial Value Decision-Making Model. Hence the chapter now proceeds to reflect on the general principles of the scientific model.

The general principles that the scientific model is comprised of have their origin from principles identified during the critical trans-disciplinary literature review conducted as part of Chapter 2-6 that were subsequently presented and discussed as part of Chapter 5. General principles that later, as part of Circle 2 of the Mitroff model in Chapter 7, assisted in the construction of the conceptual model and still later as part of Activity 2 of the Mitroff model, were adjusted with feedback obtained from the World Finance Conference and interviews conducted from qualitative questionnaires.

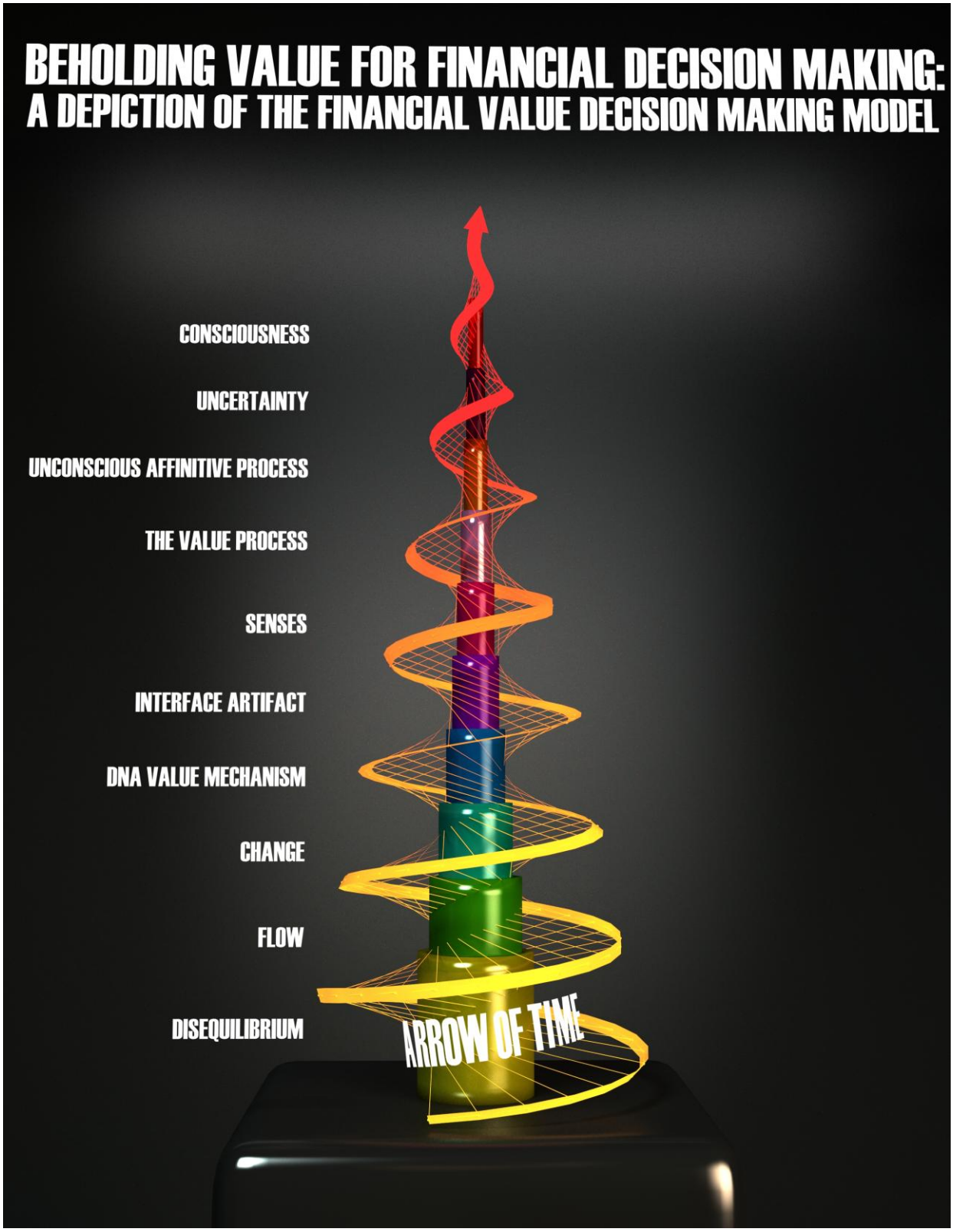
Representing these general principles, Figure 10.3 attempts to simplify the Financial Value Decision-Making Model by first focusing on the interrelationship that exists among the general principles that the Financial Value Decision-Making Model is comprised of. Moreover, through its cylindrical “retractable telescope-like” representation of the general principles, and its depiction of the cylinders fitting into one another, Figure 10.3 attempts to, on a multi-dimensional level, display that each representational cylinder or general principle on the outside enfold all the other principles inside it.

This is a point of great significance, as it indicates that the principle on the outside permeates all the other principles enfolded inside it. Furthermore, by demonstrating how each general principle or representational cylinder rises above the other, Figure 10.3 attempts to reveal the natural order or sequence of the general principles in relation to the arrow of time in order for consciousness to have first emerged.

Still further, with the intertwined web-like patterns that flow out of the spiralling arrow of time, touching each cylinder or general principle as it progresses until finally becoming one with consciousness, Figure 10.3 aims to reflect the reciprocal intertwined nature of the continuous interaction that occurs on multiple levels among all the general principles. Once the intricate nature of this process is clearly understood, the reader is invited to, in his or her mind’s eye, collapse the cylindrically shaped telescope into the first cylinder representing the general principle of disequilibrium. In doing so revealing the true nature and complexity among the general principles of the Financial Value Decision-Making Model, as each general principle interacts on multiple levels at the same time from both an inner and an outer direction, simultaneously enfolding and unfolding in the present on the moving now of the arrow of time.

Moving on, a wide range of specific conditions were attached to each general principle or template depicted as part of Figure 10.3. These specific conditions went on to form the basic elements of the Financial Value Decision-Making Model (Giere 2004:745-747).

Figure 10.3 A summary of the general principles of the financial value decision-making model



Source: Own design from the literature review and feedback obtained from interviews and presentation at the World Finance Conference.

Hence it culminates in a scientific model that Rivett (1972:9) describes as a set of qualitative logical relationships which link together the relevant features of the reality that the researcher is concerned with. This thereby, as Hakanson (1978) as cited in Koornhof (2001:257), points out, representing a simplified version of reality.

Due to the large amount of information and detail contained as part of the Financial Value Decision-Making Model, the model is provided in a digital format as Annexure 3A. The digital format of the model allows the beholder to see the detail associated with the beholding of value process or V(un) from a holistic perspective and not, as would have been the case on paper, requiring of the beholder to reflect on it in a fragmented form. These are all attempts made towards making the beholding of value process for financial decision-making more visible. To further contextualise the detail provided by the digital model, Figure 10.1, 10.2 and 10.3 serve as “layered process guides”, with each figure revealing different layers of the process as the chapter goes on to unfold it. Figure 10.1 begins by providing a visual depiction of the unfolding of the beholder through space, time and matter. As part of this unfolding process, Figure 10.2 provides a visual depiction of how mind and matter converge, pointing out the places where V(bi) occurs as part of the beholding of value process V(un) on the interface of the beholder. This while Figure 10.3 explains the general principles, the colour-coded platforms on which the detail of the Financial Value Decision-Making Model is provided, outlining not only the sequence of their interrelationships but also the characteristics of their enfolding-unfolding nature.

Within the broader contextual structure that these three figures provide, the Financial Value Decision-Making Model, as supplied as Annexure 3A, begins with its supplementary detail of the beholding of value process for financial decision-making. It does so by pointing out that the origin of this process is a state of disequilibrium. From there it progresses with the general principle of flow, after which it depicts change and its biological implications. In doing so it also reflects on the general principles of bifurcation, dissipation, self-organisation and dynamic balance. As part of this process, the model demonstrates how our biological composition and subsequent systemic requirements impact not only on how but also on why and what we value.

The model then goes on to demonstrate that it is on the interface or artifact that the beholder's sensory inputs are assimilated into the beholder's context or landscape of things that matter, revealing not only how the beholder perceives but also how he reflects on the external environment that surrounds him. From there the Financial Value Decision-Making Model points out that, as part of the unconscious affinitive process, the first value affirmation or $V(bi_1)$ takes place. This necessary process is required in order to create a context or landscape of things that matter for the beholder in anticipation of the future. This is a landscape from which conscious awareness and perception-formation emerge. As part of this process, the model highlights the process characteristics involved as well as the manner and direction in which it takes place. Moreover, the model reflects on the unconscious affinitive process, pointing out its origin, characteristics and the fact that its content is continuously expanding as new stimulus is introduced. It further points out that despite this continuous increase in content, the unconscious affinitive process still remains bounded in the sense that it can only reflect what the beholder perceives. Furthermore, the model reveals that intuition, impulses and instincts form part of conscious unawareness and that it is only once these impulses or habits are blocked and the beholder is confronted with uncertainty, that minding, hesitating and the postponing of overt action takes place in order to reflect and assign meaning. As such, the model depicts this blockage as a momentary confrontation with the unknown in the now. It also reflects that only once uncertainty and the risks and possibilities associated with it are introduced, does conscious awareness come into play.

Still further, the model describes and provides the characteristics of a conscious considered decision, pointing out that this type of decision is always made as a result of a need, a desire or a feeling. It also points out that a conscious considered decision can only occur once a conscious affirmation of value, $V(bi_2)$ has been made.

This is a judgement that, in turn, not only directly goes on to influence the landscape of things that matter to the individual, the individual's context, but also leads to action, albeit the action and inaction which, for its part, affects the external environment surrounding the beholder and with regards to which feedback from new sensory inputs will eventually be obtained. Figures 10.1, 10.2 and 10.3 therefore, in conjunction with the Financial Value Decision-Making Model complement one another in an attempt to make this most complicated and enigmatic process $V(un)$, visible to the reader.

10.4 ACTIVITY 3: MODEL SOLVING

As part of Activity 3 of the Mitroff model, the elements of the scientific model that manifested as a result of the specific conditions attached to the general principles were used to, as part of procedures recommended by Saunders, Lewis & Thornhill (2003), identify statements made by leading figures encountered during the trans-disciplinary literature review. These statements were used as part of Giere's (2004:743) formula of:

> *S uses X to represent W for purposes P.*

S representing the researcher which uses X in the form of statements as obtained from leading figures in those fields contributing most to the researcher's understanding of value to represent aspects of the real world – W for purposes P. Each statement pertaining to a specific model element with regards to which Giere (2004:747) go on to note:

> *"What is special about models is that they are designed so that elements of the model can be identified with features of the real world. This is what makes it possible to use models to represent aspects of the world."*

This process eventually leads to P, the purpose which is to test the statement and the subsequent model element it relates to for its representational faithfulness when compared to the aspects it represents in the real world. Part of this process entailed the creation of a questionnaire, the establishment of the geography of the target population as well as the sampling frame to be used. All aspects are discussed in detail as part of Chapter 8.

Following the completion of the above the questionnaires were, in accordance with the sampling frame distributed, completed by the respondents, collected, their data prepared, recorded and statistically presented and later assessed for validity and reliability. All aspects were discussed as part of Chapter 8. The data was then analysed through a univariate, bivariate and multivariate analysis of which the design was discussed as part of Chapter 8 and of the findings included as part of Chapter 9.

10.5 CIRCLE 4: SOLUTION

In Chapter 1 a problem statement is provided which stipulates that it is not clear at what level of consciousness value formation occurs, nor what process is responsible for its formation or what the interrelationship is between this process, change and the future-orientated aspect of decision-making. As such, it left open the possibility that if, as is suspected, this process occurs pre-intellectually, a large part of the financial decision-making process has been left unaccounted for, or worse, is misrepresented by an ambiguous and often limited concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

From the problem statement, 4 distinct research questions emerged that gave rise to the four research objectives of the study. As such, apart from the solutions presented as part of Circle 4 of the Mitroff model in Chapter 9, further solutions derived from the scientific model are now paired with the respective research objectives they relate to.

- **Research objective 1**

Determine at what level of consciousness value formation takes place.

- **Derived solution**

The segment of the scientific model that relates to the critical trans-disciplinary literature review conducted as part of Chapter 3, displays that, as with all psychological processes, the beholding of value process has its origin in the physical world. Hence the beholding of value process is not only constrained by physical laws but also bound by systemic operational principles that allow the beholder thereof to function in a sustainable manner. The scientific model further points out that the beholding of value process not only has to take these physical and operational principles into account, but must manifest in such a way that it conforms to them, a process that occurs prior to conscious awareness. This is also reflected by that segment of the scientific model that relates to Chapter 4 of the critical trans-disciplinary literature review which reveals that a significant part of the decision-making process occurs prior to conscious awareness, and that it is the beholding of value process that is responsible for the determination of stimuli's significance and as such also for the determination of the beholder's landscape of things that matter.

Moreover, it points to a second value affirmation that takes place during conscious awareness, thereby demonstrating the important role that the beholding of value process plays during both the pre-and post-awareness phases of consciousness. As such, in Chapter 5 of the critical trans-disciplinary study, a clear distinction is made between the beholding of value process $V_{(un)}$ and value as an affirmation $V_{(bi)}$ (Marais & Gouws 2013). The scientific model thereby clarifies at what level of consciousness value formation takes place by pointing out that it does not occur on a single level but on multiple levels simultaneously as part of a process of which the value affirmations $V_{(bi)}$ that occur at specific bifurcation points are mere by-products of a much larger ongoing unfolding process.

- **Research objective 2**

Illuminate the process responsible for value formation.

- **Derived solution**

In order to illuminate the process responsible for value's formation, Mitroff et al's (1974:48) problem-solving model was used, whereby the study progressed from Circle 1 Activity 1 to Circle 2 Activity 2 and then later Circle 3 as it went about meeting its set objectives. As part of this process a critical trans-disciplinary literature review was conducted in accordance with the guidelines as set by Nicolescu (2005:5). Moreover, a philosophy of science approach was deployed as outlined by Giere (2004:743-747). This ultimately culminates in the scientific financial value decision-making model represented by Circle 3 of the Mitroff model, which illuminates the process responsible for value's formation.

- **Research objective 3**

Ascertain what the relationship is between the value process, change and the future-orientated aspects of financial decision-making.

- **Derived solution**

In response to this research objective a detailed account of the relationship between the value process, change and the future orientated aspects of financial decision-making were provided as part of Chapter 5 under points 5.2.1 to 5.2.4.4 of the critical trans-disciplinary

literature review. This was done as part of a process during which general principles that later formed templates during the construction of the scientific model were established.

- **Research objective 4**

Determine if a large part of the financial decision-making process has been left unaccounted for in present financial literature and/or if this leads to a misrepresented, ambiguous and often-limited portrayal of the concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

- **Derived solution**

Reflecting upon the scientific model, it reveals that the beholding of value process originates in repose to the beholder's confrontation with disequilibrium and the change and flow that emanate from it. The scientific model further demonstrates that the beholding of value process not only extends beyond the scope of conscious awareness but moreover shapes the beholder's consciousness in unique and complex ways as it determines what is valued at selective bifurcation points in the form of $V(_{bi})$. As such, the scientific model reveals that a large part of the financial decision-making process is unaccounted for in present financial literature, leading to misrepresentations that in many instances result in an ambiguous and often-limited portrayal of the concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

10.6 ACTIVITY 5: FEEDBACK IN THE NARROW SENSE

As part of Activity 5 of the Mitroff model, feedback in the narrow sense was supplied in Chapter 8 in the form of feedback obtained from personal interviews and from the World Finance Conference in Cyprus. The vast majority of feedback however was supplied in Chapter 9 where the research findings were discussed, with more feedback also being provided as part of Chapter 11. Koornhof (2001:257) points out that feedback in the narrow sense is applied when the goal is to derive better scientific solutions and that:

It is typical in this research cycle that no reference is made to reality and implementation does not occur.

Hence clarifying that feedback in the narrow sense should not be confused with Activity 4 of the Mitroff model, implementation, which, with Activity 6, validation, was excluded from this thesis due to the exploratory nature of the research.

10.7 CONCLUSION

In this chapter, Activity 2 of the Mitroff model was discussed, during which an outline was provided of how feedback obtained from the World Finance Conference in Cyprus and the personal interviews contributed towards the construction of the scientific model. In addition the chapter went on to explain what contribution the philosophy of science approach as outlined by Giere (2004:743-747) made towards the scientific model. Following this explanation, in accordance with both Koornhof (2001:257) and Mitroff (1974:48), the scientific model was presented as part of Circle 3 of the Mitroff model.

The chapter then went on to provide the “keys” necessary to behold the scientific model and went on to explain how the general principles of the scientific model form qualitative logical relationships that link together to reflect relevant features of reality (Rivette, 1972:9). This was followed by a brief outline of the process that was used in Chapter 8 and Chapter 9 as part of Activity 2 and 3, the respective modelling and model-solving activities of the Mitroff model. The chapter then proceeded to derive a solution from the scientific model which it presented as part of Circle 4 of the Mitroff model after which, as part of Activity 5, it explained where and how feedback in the narrow sense on the problem-solving activities was not only supplied as part of previous chapters, but has still to be supplied as part of Chapter 11.

CHAPTER 11

SUMMARY, CONCLUSION AND RECOMMENDATIONS

11.1 INTRODUCTION

In Chapter 1 the importance of the beholding of value for financial decision-making was revealed. Yet, despite its significance, the chapter points out that it is not clear at what level of consciousness value formation occurs, nor what process is responsible for its formation nor what the interrelationship is between this process, change and the future-orientated aspect of decision-making. As such, it leaves open the possibility that if, as is suspected, this process occurs pre-intellectually, a large part of the financial decision-making process has been left unaccounted for or worse, is misrepresented by an ambiguous and often limited concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

In an attempt to unfold this enigmatic mystery that has until now eluded mankind, as part of Activity 1 of the Mitroff model, a trans-disciplinary critical literature analysis was conducted to, from a systems theory perspective, establish a personal theory of value. In conjunction with a philosophy of science approach, this was used to derive general principles to which specific conditions were added that in turn, as part of Circle 2 of the Mitroff model, were used towards the construction of a conceptual model of the beholding of value process. As part of Activity 2 of the Mitroff model, interviews were conducted through structured qualitative questionnaires that focused on a combination of constructs and concepts central to the Financial Value Decision-Making Model. Moreover, a presentation was held at the World Finance Conference in Cyprus. Both were conducted in an attempt to ascertain if important general principles or specific conditions were left out during the initial model-building phase.

Still further, as part of Activity 3 of the Mitroff model, questionnaires were compiled consisting of statements based on the specific conditions or elements of the scientific model. This culminated in a comprehensive research study of which a partial solution was presented as part of Circle 4 of the Mitroff model in Chapter 9.

As part of Activity 5 of the Mitroff model, this chapter provides a brief summation of the study findings. This includes relating back solutions obtained during the course of Activity 1 to research objectives outlined as part of Chapter 1. This is followed by a discussion of the significance of the study, its research limitations and recommendations for further research.

11.2 SUMMARY OF FINDINGS

11.2.1 MITROFF MODEL – ACTIVITY 5: FEEDBACK (IN THE NARROW SENSE) WITH REGARDS TO RESEARCH OBJECTIVES PRESENTED IN CHAPTER 1

Research objective 1

Determine at what level of consciousness value formation takes place.

The critical trans-disciplinary literature review indicates that on the one hand value is a continuous unfolding process $V_{(un)}$ while on the other hand it is an affirmation that occurs at bifurcation points at both the pre- and post-awareness stages of consciousness $V_{(bi)}$. As such, the study concluded that value formation occurs at not one but multiple levels at both the pre- and post-awareness stages of consciousness.

Research objective 2

Illuminate the process responsible for value formation.

In order to illuminate the process responsible for value's formation, Mitroff et al's (1974:48) problem-solving model was used, whereby the study progressed from Circle 1 Activity 1 to Circle 2 Activity 2 and then later Circle 3 as it went about meeting its set objectives. As part of this process a critical trans-disciplinary literature review was conducted in accordance with the guidelines as set by Nicolescu (2005:5). Moreover, a philosophy of science approach was deployed as outlined by Giere (2004:743-747). This ultimately culminated in the scientific financial value decision-making model represented by Circle 3 of the Mitroff model, which illuminates the process responsible for value's formation.

Research objective 3

Ascertain what the relationship is between the value process, change and the future-orientated aspects of financial decision-making.

The critical trans-disciplinary literature review reveals an intricate relationship that was discussed at length as part of Chapter 5 under points 5.2.1 to 5.2.4.4.

Research objective 4

Determine if a large part of the financial decision-making process has been left unaccounted for in present financial literature and/or if this leads to a misrepresented, ambiguous and often limited portrayal of the concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

Research findings indicate that a large part of the financial decision-making process is unaccounted for in present financial literature, leading to misrepresentations that in many instances result in an ambiguous and often limited portrayal of the concept of value that not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

11.2.2 MITROFF MODEL ACTIVITY 5: FEEDBACK IN THE NARROW SENSE

In order to, as part of Activity 5 of the Mitroff model, provide feedback in the narrow sense about Circle 1, Activity 1; Circle 2, Activity 2; Circle 3, Activity 3 and Circle 4 of the Mitroff Model, several secondary research objectives were formulated that included:

a) **A review of related literature to determine what general principles and specific conditions are required to create a financial value decision-making model capable of providing representational similarity when compared to the actual decision-making process as experienced by decision-makers in the real world.**
b) **An assessment of the representational similarity of the statements made as part of the questionnaire when compared to the actual decision-making process as experienced by the research participants.**
c) **An assessment of the strength of the relationships between the general principles of the financial value decision-making model.**
d) **The determination of whether or not belonging to a different group affects how respondents perceive and reflect upon the general principles of the model.**
e) **The determination of which groups cause respondents to perceive and reflect upon the general principles of the model differently.**

In order to meet these research objectives and provide feedback in the narrow sense about Circle 1, Activity 1, Circle 2, Activity 2, Circle 3, Activity 3 and Circle 4 of the Mitroff Model, several research questions were formulated, each with their own hypothesis or groups of hypotheses necessary to answer them. As such, the research results from Research question 1 achieve Secondary research objective b of the study. By achieving Secondary research objective c, H_1 answers Research question 2 of the study with H_2 to H_8 answering Research question 3, in doing so achieving Secondary research objectives d and e of the study. Chapters 1 to 6 of the study go on to meet Research objective a, that forms part of the critical trans-disciplinary review that was conducted as part of the study.

Research Question 1:

To what extent do research participants agree with the representational similarity of the questionnaire's statements when compared to the actual decision-making process as experienced by them?

In order to answer this question, frequency tables of response ratings and graphs of the average response ratings were used to ascertain the representative similarity of the statements in relation to the general principles and specific condition they pertain to, when compared to the respondent's actual experience of the process in the real world. This was done on a principle to principle basis, the summation of which is outlined below.

- **Flow, creation and the movement of patterns and form**

Research conducted on the general principle of flow indicates that 63.49% of all the respondents agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of the first general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position that appeared to be strengthened by the consolidated group mean of the various fields of 4.76.

- **Change – an endless transformation into the great unknown**

Research conducted on the general principle of change indicated that 61.06% of all the respondents agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of the second general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position that appeared to be strengthened by the consolidated group mean of the various fields of 4.79.

- **Bifurcation – a breakthrough or a breakdown**

Research conducted on the general principle of bifurcation indicated that 68.6% of all the respondents agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the third general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position that appeared to be

strengthened by the consolidated group mean of the various fields of 4.96, as well as the relatively high means obtained across all the fields tested by the study.

- **Dissipation, self-organisation and the yearning for dynamic balance**

Research conducted on the general principle of dissipation indicated that 65.63% of all the respondents agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of the fourth general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position strengthened by the consolidated group mean of the various fields of 4.87 as well as the relatively high means obtained across all the respective fields tested by the study.

- **Consciousness, artificial reality and the enfolding of a mutual context**

Research conducted indicates that 57.78% of all the respondents tested agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of the fifth general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position also reflected by the consolidated group mean of the various fields of 4.55 with only the field of psychology demonstrating a general reservation with regards to the principle, with a mean of 3.64.

- **Value – A personal expression of measure**

Research conducted indicates that 64.33% of all the respondents tested agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of the sixth general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position also reflected by the consolidated group mean of the various fields of 4.89 and the fact that none of the individual fields exhibited a mean of below 4.

Choice – The caring direction-giver of change

Research conducted indicates that 65.07% of all the respondents tested agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of the seventh general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position also reflected by the consolidated group mean of the various fields of 4.82 and the fact that none of the individual fields exhibited a mean of below 4.27.

- **Decision-making, judgement and the search for meaning**

Research conducted indicates that 58.19% of all the respondents tested agreed to a more or lesser extent with the representative similarity of the specific conditions as reflected by the statements as part of this, the eighth general principle of the financial value decision-making model, when compared to the actual decision-making process as experienced by them; a position also reflected by the consolidated group mean of the various fields of 4.59 and the fact that none of the individual fields except the field of psychology exhibited a mean of below 4.45.

From the above a consolidated summary of the average converted univariate analysis was compiled. This is presented below as Table 11.1. In addition, a table of the average consolidated group means was also compiled, which is presented as part of Table 11.2.

Table 11.1 Consolidated summary of the average converted univariate analysis

	Rating scale (%)							
Questionaire Section	**Strongly Disagree**	**Disagree**	**Disagree Slightly**	**Neutral**	**Agree Slightly**	**Agree**	**Strongly Agree**	**Total**
A	3.74%	7.12%	9.13%	16.52%	15.48%	31.40%	16.61%	100.00%
B	4.07%	6.87%	9.24%	18.76%	18.19%	27.24%	15.63%	100.00%
C	3.36%	4.85%	7.42%	15.76%	18.73%	31.39%	18.48%	100.00%
D	3.00%	4.84%	9.04%	17.49%	23.34%	27.21%	15.08%	100.00%
E	6.31%	10.16%	11.42%	14.33%	18.07%	25.69%	14.02%	100.00%
F	4.77%	6.32%	7.44%	17.14%	18.31%	28.36%	17.66%	100.00%
G	4.88%	7.48%	8.21%	14.37%	19.32%	28.75%	17.00%	100.00%
H	5.06%	9.50%	10.90%	15.81%	18.09%	27.60%	12.50%	100.00%
Average	**4.40%**	**7.14%**	**9.10%**	**16.27%**	**18.69%**	**28.46%**	**15.87%**	**100.00%**

Table 11.2 Average consolidated group mean

Questionaire Section	Consolidated Group Mean
A	4.76
B	4.79
C	4.96
D	4.87
E	4.55
F	4.89
G	4.82
H	4.59
Average	**4.78**

From the respective tables in response to Research question 1, the research indicates that 63.02% of the respondents agree to a more or lesser extent with the representational similarity of the questionnaire's statements when compared to the actual decision-making process as experienced by them, with 20.64% disagreeing with it to a more or lesser extent and 16.27% of the respondents choosing to remain neutral on the matter. Reflecting a point of view supported by a relatively high average consolidated group mean of 4.78.

Research Question 2:

What is the strength of the relationships between the general principles of the financial value decision-making model?

Research findings that relate to Hypothesis 1 which was made in relation to Research question 2 indicate:

H1: The interrelationships between the eight general principles of the financial value decision-making model which forms the conceptual framework of the model are significantly positively correlated.

In addition to answering Research question 2 the above hypothesis also achieved Secondary research objective c of the study. Moreover, the correlation analysis established that the general principles were positively correlated to one another to a statistically highly significant level. The results further indicate significant interconnectivity as well as interdependence between the eight general principles of the model, with correlation coefficients ranging between $r = 0.349$ up to $r = 0.685$, indicating that the eight general principles forming the conceptual framework of the model are measuring different yet highly related constructs. Research findings therefore support the first hypothesis stipulating that the interrelationships between the eight general principles of the financial value decision-making model are significantly positively correlated.

Research Question 3:

Does belonging to a different group affect how respondents perceive and reflect upon the general principles of the financial value decision-making model?

Research findings of Hypotheses 2 to 8 in relation to Research question 4 indicate:

H2: Gender will <u>not</u> significantly impact on a respondent's perceptions of the general principles of the financial value decision-making model.

H3: Ethnicity will significantly impact on a respondent's perceptions of the general principles of the financial value decision-making model.

H4: Age will significantly impact on a respondent's perceptions with regards to the general principles of the financial value decision-making model.

H5: The type of field of expertise of a respondent will have an impact on the respondent's perceptions of the general principles of the financial value decision-making model.

H6: The experience of a respondent will <u>not</u> significantly impact on the respondent's perception of the general principles of the financial value decision-making model.

H7: The sector a respondent works in will significantly impact on the respondent's perceptions with regards to the general principles of the financial value decision-making model.

H8: The level of seniority of a respondent will <u>not</u> significantly impact on the respondent's perceptions with regards to the general principles of the financial value decision-making model.

In addition to answering Research question 3 the above hypothesis also achieved Secondary research objectives d and e.

11.3 CONCLUSION

In the beginning of this thesis a problem area in the financial social sciences was identified which suggested that it is not clear at what level of consciousness value formation occurs. Moreover it pointed out that it is not clear what process is responsible for value's formation or what the interrelationship is between this process, change and the future-orientated aspect of decision-making. Still further, it revealed that this lack of knowledge leaves open the possibility that if, as is suspected, this process occurs pre-intellectually, then a large part of the financial decision-making process has been left unaccounted for, or worse, is misrepresented by an ambiguous and possibly limited concept of value that not only distorts in its portrayal of wealth but moreover, deeply affects the financial social sciences' ability to assist in the financial decision-making process.

In response to this cumbersome proposition, a critical trans-disciplinary literature review as stipulated by Nicolescu (2005:5) was undertaken that stretched across a significant body of knowledge of which only some parts have been included as part of Chapters 2 to 6 of this thesis. This process was, from a systems theory perspective, undertaken towards the establishment of a personal theory of value. In addition a philosophy of science approach as outlined by Giere (2004:743-747) was used, with both research techniques being incorporated as part of Mitroff et al's (1974:48) problem-solving model in an attempt to pierce this mysterious veil that has enfolded the beholding of value process within not only financial decision-making but decision-making in general, for millennia. It reaches as far back as the Tao Te Ching of Lao Tzu (2006:29) in which he writes:

Thus it is called the form of the formless

The image of the imageless

This is called enigmatic

Confront it, its front cannot be seen

Follow it, its back cannot be seen

Wield the Tao of the ancients

To manage the existence of today

One can know the ancient beginning

It is called the Tao Axiom

Lao Tzu – The Tao Te Ching (2006:29)

Being in a position to now reflect on both the research process and the knowledge acquired from it, and as a fellow beholder of value and decision-maker, it appears at least to this beholder that what this study has attempted to make visible is precisely that which Lao (2006:29) refers to as the Tao Axiom. The beholding of value process, V(un) which, as was demonstrated in this thesis, through a landscape of things that matter, provides form to the formless, gives an image to the imageless. It is a process that, when confronted or followed, cannot be seen because it only becomes visible in relation to a context. This is the process that wields the Tao, assisting each decision-maker to manage his or her own existence. To therefore understand the beholding of value process and how it interweaves in the decision-making process is, as Lao (2006:29) states, to come to know our most ancient of beginnings. It is to know how we as beholders have, through value, come to wield our own existence, an enigmatic process of intricate complexity of which this thesis is but a mere shimmer.

11.4 SIGNIFICANCE AND CONTRIBUTIONS OF THE STUDY

11.4.1 PHILOSOPHICAL CONTRIBUTIONS

Reflecting on the study from a philosophical perspective, several noteworthy contributions emerge. Firstly from a value perspective, the study reveals that before value can be practically implemented it must first be understood philosophically. Hence the study points out that from an ontological perspective only idealism and from a philosophical perspective only relativism provide value with the freedom it requires to extend beyond the observable present in order to embrace its future-orientated nature. Moreover, the study reveals that value can only be researched and understood from a trans-disciplinary perspective as it surpasses the boundary of any single discipline. It further demonstrates that value is a human property that determines the worth of psychic content, its significance in terms of its potential foreseeable or anticipated future actualisation. Still further it demonstrates that it is only when the decision-maker, the beholder, is confronted with the future, that value manifests. As such, it demonstrates value to be personal by nature and dependent upon the manner in which each decision-maker beholds and interacts with the future.

It is a personal dependency which has, considering the research theme and the research approach followed, caused both the researcher and the research to become intertwined to the extent that the researcher has become the research, with the research reflecting the researcher's own beholding of value process during financial decision-making; with literature, models and research findings serving as guides along the way. It is a process which culminated in the beholding of value process being made visible, revealing a continuously unfolding process that occurs amid constant shifts in direction as sacrifices are made in the present in anticipation of the future.

Furthermore, the study reveals that the origin of decision-making extends beyond the mind, with its roots penetrating into the very heart of matter as it allows the mind to direct matter during the conversion of energy. As such, it plays a critical role in the evolution of mankind, demonstrating that decision-making is not an offshoot but forms part of the essence of what it means to be human.

11.4.2 THE REALITIES OF THE STUDY AND THEIR CONTRIBUTIONS

From the above philosophical contributions cascade several realities that in their own way also made significant contributions towards broadening the knowledge base surrounding the beholding of value for financial decision-making.

- The study demonstrates that as a result of the fact that genes have no foresight, a mechanism in the form of a process must exist that comes from an individual's genes but which is not limited to them, that supplies the individual with foresight in anticipation of the future.
- It further indicates that this process not only has to take the physical laws such as the laws of thermodynamics, Heisenberg's uncertainty principle and biological operational principles into account but must also manifest in such a way that it conforms to them.
- It further reveals that this conforming process occurs prior to conscious awareness with the actual value affirmation that occurs during conscious awareness being a mere by-product of this much larger ongoing process that manifests itself in many different forms.
- Moreover, the study shows that the structural congruence between the individual and the environment that Maturana &Varela (1998:95) found in the physical world also extends to the psychological world of the individual, forming a dynamic balance, both from a physical and psychological perspective, which must be maintained or the unity disappears.
- Still further it demonstrates that the beholding of value process is responsible for assisting in the construction of the context of decision-making.
- The study also introduces Simon's (1996:6) concept of an artifact as that place from which the beholding of value process operates.
- It argues that it is the beholding of value process that is responsible for the pre-awareness assessment of how an affirmation of value will affect the structural congruence and unity that exists between the decision-maker and the environment.
- Moreover it argues that the beholding of value process is the mechanism within the decision-maker that allows him or her to counterbalance change.

- It depicts the beholding of value process as that which, on a pre-awareness level, weighs stimuli towards the maintenance of the decision-maker's structural unity,

thereby providing the foresight that ultimately allows the decision-maker to anticipate the future.

- The study further establishes the beholding of value process's role during the pre- and post-awareness phases of decision-making.
- It points out that in accordance to the fit of psychic content to a particular scale, a value affirmation takes place as a measure of its significance towards the restoration of a decision-maker's own unique dynamic balance that exists amid the duality of the material and psychological worlds the decision-maker simultaneously inhabits.
- Still further it contributes to the beholding of value process for financial decision-making through the establishment of several general principles on which it functions.
- In addition, the study introduces a personal theory of value.
- The study also differentiates between value as an ongoing unfolding process $V_{(un)}$ and value as an affirmation that occurs at specific bifurcation points $V_{(bi)}$.
- Moreover, the study indicates that there appears to be no indication as part of $V_{(un)}$ of value maximisation in the traditional sense with value being established in a relational context towards the continuous restoration of an individual's dynamic balance.
- The study further demonstrates that although value has a proud heritage at the very centre of the discipline of accounting, no consensus exists on how human beings go about making financial decisions, with the relationship between accounting information and decision-making rarely being examined critically; this while it is only through decision-making that accounting can meet its objectives.
- It further demonstrates how accounting was transformed from a cost-based recorder towards a value-orientated reporter of information.
- It also demonstrates that when the compiler of financial information on behalf of the users of accounting information beholds value, the beholder's value, when supplied to the users, is transformed into a legitimate property of an expectation of the future which the users then on their part use to draw their own conclusions as they go about affirming value on their own psychic content in relation to their own unique background of things that matter.

- Still further, it points to the fact that in order for ASC 820 as well as IFRS 13 to meet their disclosure requirements, a personal theory of value must first be established from which general principles can be derived.

- Moreover, it demonstrated that as this process has already been followed as part of Chapter 2 to 5 of this thesis, several general principles have already, as part of Chapter 5, been identified that from a disclosure perspective are capable of making significant contributions towards improving the decision usefulness of accounting information in relation to both V(un) and V(bi).
- The study further contributes towards the beholding of value process by making its origin, purpose and role from within the context of both the material and psychological realms more visible.

11.5 RESEARCH LIMITATIONS

11.5.1 CROSS-SECTIONAL ASPECT OF THE STUDY

Considering that this is a cross-sectional study, and as such can only identify the relationship between variables at a particular point in time, it is limited in the sense that it cannot explain how relationships came about. As such, no statements pertaining to causality can be made; limiting any claims that the study may have of being representational of the wider population, with its data representing a mere snapshot of the participants taken at the time the study was conducted.

11.5.2 DIVERSITY OF RESPONDENTS AND SAMPLE DATA RELIABILITY

When, as was the case with this study, data is obtained from a diverse group of respondents, it negatively impacts the consistency of the detailed answers provided by respondents, affecting the Cronbach Alpha and also the perceived data reliability of the study.

11.5.3 QUALITATIVE NATURE OF THE STUDY

In the research study, the “experiment” conducted is not one in which a model’s ability to represent similarities pertaining to physical aspects in the real world is being considered but rather where a model of the model, the system on which we base our understanding and decisions about the real world, is reflected upon. As such, representation cannot be established by an isomorphic relationship between the model and the world but has to be defined by a looser relation of similarity, a degree of accuracy, a relative relationship that essentially involves value judgements that cannot be reduced to facts. Therefore all the responses received from the respondents are subjective and rely heavily on the text and discourses of the participants under study.

Considering the enigmatic subject matter as well as the exploratory nature of this study and the fact that in many instances it asks as many questions as it answers, it is doubtful whether a clear and concise answer as to exactly how and precisely in what sequence the value process will unfold within each individual decision-maker can be obtained. To a large extent this is so because much of the process is by nature contextual and individualistic. This leaves the outcome of this study inconclusive with regard to how a general theory of value capable of conclusively quantifying value can be established.

11.5.4 THE RESEARCHER

Moreover, the researcher’s limited context, perception and inherent limitations may be the most significant limitation of the study in the sense that the research only reflects what the researcher is able to “see” at the time.

11.5.5 FACTOR ANALYSIS AND THE DETERMINATION OF THE SHAPE STRUCTURE OF THE QUESTIONNAIRE

The study is not able to meet the minimum requirements of 10 times as many subjects as variables set by Nunnally (1978:421) in order for it to be able to use factor analysis to assist in determining the shape structure of the questionnaire. Even on the minimum requirements outlined by Tabachnick & Fidell (183:379) of five times as many subjects as variables, it is still not able to meet the set minimum requirements.

11.5.6 RESEARCH TIME

One of the most fundamental limitations of the research study was the time the researcher had in order to conduct the sturdy. Had more time been available, the study could have been extended to include additional disciplines that might have contributed further to a better understanding of the construct of value and the role it plays in the financial decision-making process.

11.5.7 LACK OF STANDARDISATION OF SPECIALISED TERMS

The general lack of standardisation of the meaning of specialised terms within different disciplines also posed a significant problem for the respondents, with each respondent bringing his or her own context to the interpretation of the terminology. This problem was exacerbated by the number of disciplines involved and the complexity of the terminology required to describe the principles and their specific conditions used.

11.6 RECOMMENDATIONS FOR FURTHER RESEARCH

The development of the financial value decision-making model depicts a financial decision-making process far more intricate and complicated than previously imagined, with value not being a passive allocation but rather an active participant. As such, it highlights many aspects that influence the decision-making process on both a conscious and unconscious level; illuminating many critical aspects that were previously left unaccounted for or misrepresented. Considering this, many new avenues are available for exploration.

As a point of departure there is a need for a more detailed longitudinal study based on the eight general principles outlined by the financial value decision-making model. In contrast to the present study, which merely established the significance of the relationships between the specific conditions and general principles of the model and between the general principles among themselves, this will establish the cause and effect.

In addition, this study only focused on those disciplines that made a significant contribution towards the researcher's understanding of value and its role as part of the financial decision-making process. This, combined with the relatively small sample size, severely limits any claim the study may have with regard to the larger population. As such, the research findings will have to be qualified when extended to the larger population, something that can be circumvented if the sample size and the number of disciplines used as part of the study were increased to something more representative of the entire population.

In conclusion, it is clear that the financial value decision-making model not only changes the way the financial decision-making process is perceived, but also what value is and what role it plays as part of the larger ongoing process towards the continuous re-establishment of the decision-maker's dynamic balance. This has significant implications not only for economics, which is probably the most value-dependent of all the financial social sciences, but also for financial management and in particular for accounting, with its continued drive towards the integration of fair value into its existing framework. As such, a great deal of future research is required in order to assess the impact of the model on the abovementioned disciplines.

REFERENCES

American Accounting Association, 1966, *A Statement of Basic Accounting Theory*, AAA.

American Institute of Certified Public Accountants, 1953, *Review and Resume*, Accounting Terminology Bulletin No. 1., AICPA, New York.

American Institute of Certified Public Accountants, 2011, International Financial Reporting Standards (IFRS), An AICPA Backgrounder, viewed 2 December 2013, from www.ifrs.com/pdf/IFRSUpdate_V8.pdf

Accounting Principles Board, 1970, Statement No. 4., *Basic Concepts and Accounting Principles Underlying Financial Statements of Business Enterprises.*

Babbie, E. & Mouton, J., 2007, *The practice of social research*, Oxford University Press Southern Africa, Cape Town.

Ball, P., 2004, Critical mass: *How one thing leads to another*, Arrow Books, London.

Ball, P., 2011, *Flow: nature's patterns – a tapestry in three parts*, Oxford University Press, New York.

Barnhart, R.K. & Steinmetz, S., 2012, *Chambers Dictionary of Etymology,* Chambers Harrap Publishers Ltd., London.

Bateson, B., 1979, *Mind and nature: a necessary unity*, Dutton, New York.

Batra, R., Homer, P.M. & Kahle, L.R., 2001, 'Values, susceptibility to normative influence and attribute importance weights: a nomological analysis'*, Journal of consumer psychology* 11(2):115-128, 107, 2001.

Beinhocker, E.D., 2006, *The origin of wealth: evolution, complexity, and the radical remaking of economics*, Harvard Business School, USA.

Belkaoui, A.R., 2004, *Accounting theory*, University of Illinois, Chicago.

Bergson, H., 1911, *Creative evolution*, Macmillan & Co., London.

Bergson, H., 2002, *Henri Bergson: key writings,* Continuum, New York.

Bernstein, P.L., 1996, *Against the gods*, John Wiley and Sons, Inc., Canada.

Blanshard, B., 2014, *Rationalism*, viewed 11 March 2014 from: http://www.britannica.com/EBchecked/topic/492034/rationalism

Bodie, Z., Kane, A. & Marcus, A.J., 1998, *Essentials of Investment*, Irwin/McGraw-Hill, USA

Bohm, D., 1988, *Wholeness and the implicate order*, Routledge, USA

Bohm, D., 1994, *Thought as a system*, Routledge Publishers, Oxon.

Bohm, D. & Krishnamurti. J., 1999, *The limits of thought*, Routledge, USA.

Bryman, A. $ Bell, E., 2007, *Business research methods*, Oxford University Press, New York.

Burchell, S., Clubb, C., Hopwood, A., Hughes, J. & Nahapiet, J.,1980, 'The roles of accounting in organizations and society'*, Accounting Organizations and Society* 5(1): 5-27.

Buys, P., 2009, 'Reflections on the value concept in accounting', *Koers* 74(3): 495-517.

Canning, J.B., 1929, 'Some divergences of accounting theory from economic theory', *The Accounting Review* 4(1):1-8.

Capra, F., 1983, *The tao of physics*, Flamingo Publishers, London.

Capra, F., 1983a, *The turning point,* Flamingo Publishers, London.

Capra, F., 2003, *The hidden connections,* Flamingo Publishers, London.

Cartwright, N., 1983, *How the laws of physics lie*, Clarendon Press, Oxford.

Chambers, R.J., 1965, 'Measurement in accounting', *Journal of Accounting Research* 3(1):32-62.

Cioffi, J., 1997, 'Heuristics, servants to intuition, in clinical decision-making', *Journal of Advanced Nursing* Vol. 26: 203-208.

Cohen, J. & Stewart, I., 2000, *The collapse of chaos,* Penguin Books, London.

Coleman, M.A., 2000, 'The technology of metaphor', *The Southern Journal of Philosophy* XXXVIII: 379-392.

Cooper, D.R. & Emory, C.W., 1995, *Business research methods* 5th ed. Irwin, Chicago.

Cooper, D.R. & Schindler, P.S., 2006, *Research business methods*, McGraw-Hill, Singapore.

Crozier, J., Gilmour, L. & Hucker, H., 2008, Collins English Thesaurus, Harper Collins Publishers, Great Britain:

Cyert, R.M., Simon, H.A. & Trow, D.B., 1956, 'Observation of a business decision', *The Journal of Business* 29(4): 237-248.

Damasio, A.R., 1996, *Descartes' error*, Macmillan, Papermac edition, London.

Davies, J.B., Sandstrom, S., Shorrocks, A. & Wolff, E.N., 2008, Discussion Paper No. 2008/03, *The world distribution of household wealth,* viewed 15 March 2012, from http://www.wider.unu.edu/publications/working.../dp2008-03.pdf

Dawkins, R., 2006, *The selfish gene*, Oxford University Press, Oxford.

Debreu, G., 1959, *Theory of value – an axiomatic analysis of economic equilibrium,* John Wiley and Sons, Inc., New York.

Decoene. S., Onghena, P. & Janssen, R., 1995, 'Representationalism under attack', *Journal of Mathematical Psychology* 39: 234-242.

De Chardin, P., 2008, *The phenomenon of man*, First Harper Perennial Modern Thought, New York.

Deloitte, 2014, IFRS 13: fair value measurement, viewed 19 March 2014 from http://www.iasplus.com/em/standards/ifrs/ifrs13

De Spinoza, B., 1996, *Ethics*, Penguin Books, London.

De Vos, A.S., Strydom, H., Fouché, C.B. & Delport, C.S.L., 2005, *Research at grass roots for the social sciences and human service professions*, Van Schaik, Pretoria.

Dewey, J., 1910, *How we think, in middle works*: vol. 6, D.C. Heath, Boston.

Dewey, J., 1915, *The logic of judgements of practice in middle works*: vol 8, The Bedknap Press of Harvard University Press, Cambridge.

Dewey, J., 1922, *Human nature and conduct: an introduction to social psychology*, Holt, New York.

Dewey, J., 1939, *Theory of valuation:* vol 13, University of Chicago Press, Chicago.

Dewey, J., 2008, *The later work of John Dewey*, volume 8: 1925-1953:1933, essays and how we think, revisited edition. Ed. Boydston, J., Southern Illinois University, USA.

Dillman, D.A., 2000, *Mail and international surveys: the tailored design method*, Wiley, New York.

Duff & Phelps, 2011. IFRS 13, *Fair value measurement. What does this mean for valuation?* Viewed on 2 December 2012 from http://www.duffandphelps.com/expertise/publications/pages/ArticleDetail.aspx?itemid=251&list=Articles

Ellsberg, D., 1961, 'Risk, ambiguity, and the savage axioms', *Quarterly Journal of Economics* 75(4): 643-669.

Field, A., 2009, *Discovering statistics using SPSS,* Sage, London.

Financial Accounting Standards Board (FASB), 1975, *Accounting for Contingencies, Statement of Financial Accounting Standards.* No. 5. Norwalk, CT: FASB.

Financial Accounting Standards Board (FASB),1991, *Disclosure about Fair Value of Financial Instruments, Statement of Financial Accounting Standards.* No. 115. Norwalk, CT: FASB

Frankl, V.E., 1985, *Man's search for meaning,* Simon & Schuster, Inc., New York.

Friedlander, M. & Stockman, S., 1983, 'Anchoring and publicity effects in clinical judgement', *Journal of Clinical Psychology* 39: 637-644.

Gehring, W. & Wiloughby, J., 2002, 'The medial frontal cortex and the rapid processing of monetary gains and losses', *Science* 295:2279-2282.

Georgescu-Roegen, N., 1960, 'Economic theory and agrarian economics', *Oxford economic papers: new series* 12(1):1-40.

Georgescu-Roegen, N., 1971, *The entropy law and the economic process,* MA: Harvard University Press, Cambridge.

Giere, R.N., 1996, 'Visual models and scientific judgment', Baigrie, B.S., Ed. *Picturing knowledge: historical and philosophical problems covering the use of art in science*, Toronto University Press.

Giere, R.N., 2004, 'How models are used to represent reality', *Philosophy of Science* 71(5), 742-752.

Gigerenzer, G., 2010, 'Moral satisficing: rethinking moral behaviour as bounded rationality', *Topics in Cognative Science* 2: 528-554.

Gigerenzer, G. & Gaissmaier, W., 2011, *Heuristic decision-making, viewed 24 January 2014 from* http://www.annualreviews.org.innopac.up.ac.za/doi/pdf/10.1146/annurev-psych120709-145346.html.

Gouws, D.G. & Lucouw, P., 2000, 'A dynamic balance model for analysts and managers', *Meditari Accountancy Research* 8: 25-45.

Guthrie, W.K.C., 1977, *The sophists*, Cambridge University Press, New York.

Haines, S.G., 1998, *The manager's pocket guide to systems thinking and learning,* HRD Press, Amherst.

Hanson, N.R., 1958, *Patterns of discovery,* Cambridge University Press, London.

Harper, F. A., 2006, 'An introduction to value theory from the writings of F.A. Harper', *Short Essays, Missed Daily Volume 2*, viewed 9 April 2012, from http://www.misses.org/daily/2422

Harrison, E.F., 1996, *A process perspective on strategic decision-making*, MCB University Press, San Francisco.

Harvard Reference Guide, 2009, Open Journals Publishing (OMICS group), viewed 13 May 2014 from www.OMICS online.org

Hawkins, S., 1998, *A brief history of time*, Bantam Press, Great Britain.

Hemingway, E.M., 2004, *For Whom the Bell Tolls*, Arrow Books, London.

Henning, E., 2004, *Finding your way in qualitative research*, Van Schaik, Pretoria.

Hertz, H., 1958, *The principles of mechanics*, Jones, D.E. & Walley, J.T., *Trans*. Dover Books, New York.

Hofstee, E., 2006, *Constructing a good dissertation: a practical guide to finishing a master's MBA, or PHD on schedule,* EPE, Johannesburg.

Holland, J.H., 2000, *Emergence from chaos to order*, Oxford University Press, New York.

Howell, W.C. & Burnett, S.A., 1978, 'Uncertainty measurement: a cognitive taxonomy', *Organizational Behaviour and Human Performance* 22: 45-68

Howson, L., 2000, *Hume's problem: induction and the justification of belief*, Oxford University Press, New York.

Hume, D., 2003, *A treatise of human nature*, Clays Ltd, St Ives plc, Great Britain.

International Accounting Standards Board (IASB) 2009, International Financial Reporting Standards (IFRS) (2009): Including International Accounting Standards (IAS) and interpretations as at 1 July 2009. Vol. 1A, 1B & 1C, IASB, London.

International Monetary Fund (IMF) 2008, *Containing systemic risks and restoring financial soundness*, April.

International Valuation Standards Council 2007, International valuations standards 1, 2 & 3. Viewed 10 December 2013 from http://www.propertystandards.propertyinstitutewa.com/documents/International ValuationStandards-4_000.pdf

Iverson, G. & Luce, R.D., 1998, 'The representational measurement approach to psychophysical and judgemental problems', in *Measurement, Judgement, and Decision-making*, M.H. Birnbaum, Ed. Academic Press, San Diego, CA, pp. 1-79.

Jaworski, J., 1998, *Synchronicity: the inner path of leadership*, Berret-Koehler Publishers Inc., San Francisco.

Jevons, W.S., 2006, *The theory of political economy*, Macmillan and Co, London.

Jung, C. G., 1958, *The undiscovered self*, Routledge & Kegan Paul, Oxon.

Jung, C. G., 1978, *Psychological reflections: a new anthology of his writings*, Jacobi, J. & Hull, R.F.C., Eds, Princeton University Press, New York.

Kahneman, D., 2002, 'Maps of bounded rationality: a perspective on intuitive judgement and choice', Prize lecture, December 2008, Princeton University, New York.

Kahneman, D., 2003, 'Maps of bounded rationality: psychology for behavioural economics', *American Economic Association* 93(5): 1449-1475.

Kahneman, D., 2012, 'The human side of decision-making', *Journal of Investment Consultancy* 13(1): 5-14.

Kahneman, D. & Frederick, S., 2001. 'Representativeness revisited: attribute substitution in intuitive judgement', Eds. Gilovich, T., Griffin, D. & Kahneman, D., *Heuristics of intuitive judgement: extensions and applications*, Cambridge University Press, New York.

Kahneman, D. &Tversky, A., 1981, 'Variants of Uncertainty', report prepared with support by the Engineering Psychological Programs, Office of Naval Research.

Kahneman, D. & Tversky, A., 1984, 'Choices, values and frames', *American Psychologist* 39 (4): 341-350.

Kahneman, D. & Varey, C.A., 1990, 'Propensities and counterfactuals: the loser that almost won', *Journal of Personality and Social Psychology* 59(6): 1101-1110.

Kahneman, D., Slovic, P. & Tversky, A., 1974, *A judgement under uncertainty: heuristics and biases,* Cambridge University Press, New York.

Kaiser, H.F., 1970, 'A second generation little jiffy', *Psychometrika*, 35(4), 401-414.

Kant, I., 1949, *Fundamental principles of the metaphysics of morals* (1785); transl. Thomas K. Abbott, Prentice Hall Inc., New Jersey.

Kapur, J.N. &Kesavan, H.K., 1992, *Entropy optimization principles with applications*, Academic Press, Inc., London.

Kauffman, S., 1996, *At home in the universe*, 1996. Oxford University Press, New York.

Khomba, J.K., 2011, 'Redesigning the balanced scorecard model: an African perspective', Doctorate of Philosophy thesis, Financial Management Sciences, University of Pretoria.

Koornhof, C., 2001, 'A systems approach to research inquiry in accounting: a research note', *SAJEMS* 4(2): 254-262.

Kuhnen, L. & Knutson, B., 2005, 'The neural basis of financial risk-taking', *Neuron* 47: 763-770.

Lacey, A.R., 1996, *A dictionary of philosophy*, 3rd Ed. Taylor and Francis, London.

Lao, T., 2006, Tao Te Ching, D. Lin, Ed. SkyLight Paths Publishing, Woodstock.

Laszlo, E., 1972, *The systems view of the world*, George Braziller, Inc., New York.

Laszlo, E., 2006, *The chaos point: the world at the crossroads*, Piatkus Books, London.

Llinas, R. & Ribary, U., 1993, 'Coherent 40-hz oscillation characterizes dream state in humans', proceedings from the National Academy of Science, USA 90: 2078-2081

Littlejohn, S.W., 1989, *Theories of human communication*, Wadsworth Publishing Company, California.

Littleton, A.C.,1929, 'Value and price in accounting', *The Accounting Review* 4(3): 147-154.

Lopes, L.L., 1987, 'Between hope and fear: the psychology of risk', Berkowitz, I., Ed. *Advancement in Experimental Social Psychology* 20: 255-295.

Lunenburg, F.C. & Irby, B.J., 2008, *Writing a successful thesis or dissertation: tips and strategies for students in the social and behavioural sciences*, Sage, London.

Mandel, E., 1968, *Marxist economic theory*, Monthly Review Press, New York.

Marais, D.D., & Gouws, D., 2013, 'The unfolding of value in a decision-making context', Proceedings from the World Finance Conference held in Cyprus, 1-3 July 2013.

March, J.G., 1987, 'Ambiguity and accounting: the elusive link between information and decision-making', *Accounting Organizations and Society* 12(2): 153-168.

March, J.G. & Shapira, Z., 1987, 'Managerial perspective on risk and risk taking', *Managerial Science* 33(11): 1404-1418.

Margulis, L., 1998, *Symbiotic planet,* Basic Books, New York.

Marshall, C. & Rossman, G., 1989, *Designing Qualitative Research*, Sage, CA.

Maslow, A.H., 1954, *Motivation and personality*, Harper & Row Publishers, Inc., New York.

Matheson, C.A. & Kline, A.D., 1988, *Is there a significant observational-theoretical distinction? Introductory readings in the philosophy of science,* Prometheus Books, New York.

Matlin, M.W., 1971, 'Response competition, recognition and affect', *Journal of Personality and Social Psychology* 19: 295-300.

Maturana, H.R. & Varela, F.J., 1998, *The tree of knowledge*, Shambala, Boston and London.

Mautz, P.K. & Sharaf, H.A., 1961, *The philosophy of auditing*, Banta Company Inc., Wisconsin.

Meek, R.L., 1956, *Studies in the labor theory of value,* 2nd Edn. Monthly Review Press, New York.

Menger, C., 2007, *Principles of economics*, Ludwig von Mises Institute, USA.

Mitroff, I.I., Betz, F., Pondy, L.R. & Sagast, F., 1974, 'On managing science in the systems age: two schemes for the study of science as a whole systems phenomenon', *Interfaces* 4(3): 46-58.

Morrison, M., 1999, *Models as autonomous agents*, Eds. Morgan, M.S. & Morrison, M., *Models as mediators: perspectives on natural and social science*, Cambridge University Press, Cambridge.

Mouton, J., 2001, *How to succeed in your master's and doctoral studies*, Van Schaik, Pretoria.

Mouton, J. & Marais, H.C., 1990, *Basic concepts in the methodology of the social sciences,* HSRC, Pretoria.

Musvoto, S.W. & Gouws, D.G., 2011, 'Rethinking the going concern assumption as a pre-condition for accounting measurement', *International Business and Economic Research Journal* 10(4): 31-44.

Narens, L., 2002, 'A meaningful justification for the representational: theory of measurement', *Journal of Mathematical Psychology* 46: 746-768.

Nicolescu, B., 2005, 'Towards transdisciplinary education', *The journal for transdisciplinary research in South Africa*, 1(1):5-15.

Nietzsche, F., 1976, *The portable Nietzsche.* Kaufmann, W. Ed. Penguin Books, USA.

Nietzsche, F., 1989, Beyond good and evil, Random House, New York.

Nunnally, J.C., 1978, *Psychometric theory*, 2nd Edn., McGraw-Hill, New York.

Pallant, J., 2007, *SPSS Survival Manual*, 3rd Edn., Open University Press, Berkshire.

Patton, M.Q., 1990, *Qualitative evaluation and research methods,* Sage, London.

Payzan-Le Nestour, E., 2014, *What is neuro finance?* Viewed 20 March 2014 from http://www.elisepayzan.com/neurofinance.definition

Pearson, R.H. & Mundform, D.J., 2010, 'Recommended sample size for conducting exploratory factor analysis on dichotomous data', *Journal of Modern Applied Statistical Methods,* 9(2):359-368.

Pirsig, R.M., 1999, *Zen and the art of motorcycle maintenance,* Bookmarque Ltd., Surrey.

Popper, K.R., 1968, *The logic of scientific discovery,* Harper Torchbooks, New York.

Prigogine, I., 1996, *The end of certainty*, The Free Press, New York.

Quattrone, P., 2000, 'Constructivism and accounting research: towards a trans-disciplinary perspective', *Accounting, Auditing and Accountability Journal*, 13(2): 130-155.

Ramaprasad, A., 1983, 'On the definition of feedback', *Behavioural Science* Volume 28(1).

Rhoads, B.L. & Thorn, C.E., 1994, 'Contemporary philosophical perspectives on physical geography with emphasis on geomorphology', *Geographical review* 84 (1):90-101.

Ricciardi, V. & Simon, H.K., 2002, 'What is behavioural finance', *The Business Educational and Technology Journal* 2(2): 27-34.

Rieskamp, J. & Otto, P., 2006, 'SSL: a theory of how people learn to select strategies', *Journal of Experimental Psychology* 135(2): 207-236.

Rivett, Z.P., 1972, Principles of model building, John Wiley, London.

Rocha, A.F., Vieito, J.P. & Rocha, F.T. 2013. *Neorofinance: how do we make financial decisions*? Viewed 12 February 2014 from http://ssrn.com/abstract=2352820

Ruby, L., 1950, *Logic*, J.B. Lippincott Company, New York.

Russell, B., 1945, *The history of western philosophy*, Simon and Schuster, Inc., New York.

Ryan, S.G., 2008, *Fair value accounting: understanding the issues raised by the credit crunch*, Stern School of Business, New York.

Ryan, B., Scapens, R. W. & Theobald, M., 2002, *Research method and methodology in finance and accounting*, TJ International, Great Britain.

Saunders, M., Lewis, P. &Thornhill, A., 2003, *Research methods for business students,* Prentice Hall, Edinburgh.

Sayre, K.M., 1976, *Cybernetics and the philosophy of mind*, Routledge & Kegan Paul, London.

Schroeder, M., *Value-theory*, Viewed 22 May 2014 from http://plato.stanford.edu/emtries/value-theory/

Schopenhauer, A., 2004, *Essays and aphorism,* Penguin Books, London.

Schwartz, J.M & Begley, S., 2002, *The mind and the brain: neuroplasticity and the power of mental force*, Harper Collins, New York.

Schwartz, S.H. & Bilskey, W., 1987, 'Towards a universal psychological structure of human values', *Journal of Personality and Social Psychology* 53:550-562.

Seeley, T.D., 2001, 'Decision making in superorganisms: how collective wisdom arises from the poorly informed masses', In *Bounded rationality: The adaptive toolbox,* Eds. Gigerenzer, G. & Selten, R., MIT Press, Cambridge, MA.

Sen, A., 2009, *Inequality re-examined,* Clarendon Press, Oxford.

Sewell, M., 2001, *The use of qualitative interviews in evaluation*, viewed 3 November 2013 from http://www.ag.arizona.edu/sfcs/cyfernet/cyfar/Intervu5.htm

Shuttleworth, C.C., 2009, *Towards A financial literacy model as a coordinating interface between financial information and decision makers*. University of Pretoria: thesis for Doctorate of Commerce – Financial Management.

Simmel, G., 1900, 'A chapter in the philosophy of value', *The American Journal of Sociology* 5(5): 577-603.

Simon, H.A., 1957, *Models of man: social and rational,* Wiley, Oxford England.

Simon, H.A., 1959, 'Theories of decision-making in economic behavioural science', *The American Economic Review*. 49(3): 253-283.

Simon, H.A., 1960, *The new science of management decision,* Harper and Row, New York.

Simon, H.A., 1978, *On how to decide what to do* 9(20): 494-507.

Simon, H.A., 1996, *The science of the artificial*, MIT Press, Cambridge, Massachusetts.

Simon, H.A. & Bonini, C.P., 1958, 'The size distribution of business firms', *The American Economic Review* 48(4): 607-617

Smith, P., 1998, 'Approximate truth and dynamical theories', *British Journal for the Philosophy of Science* 49: 253-277.

Smith, A., 2000, *The wealth of nations*, Random House, New York.

Snook, V.L., Taylor, P.J. & Bennell, C., 2004, 'Geographic profiling: the fast, frugal and accurate way', *Applied Cognitive Psychology* 18: 105-121.

Soanes, C. & Stevenson, A., 2008, Eds. Concise Oxford English Dictionary, Oxford University Press, New York.

Speerstra, K., 2005, *Collected wisdom of the heart*, Morning Light Press, Canada.

Stanford Encyclopaedia of Philosophy, Mark Schroeder viewed 22 May 2014 from http://plato.stanford.edu/entries/value-theory/

Stanford Encyclopaedia of Philosophy, 2013, viewed 11 March 2014 from http://www.plato.standford.edu/entries/rationalism.empiricism/

Statistics South Africa, 2013, *Gender*, viewed 22 November 2013 from http://www.mobi.statssa.gov.za/census 2011/Gender.html

Stembler, S., 2001, *An overview of content analysis. Practical Assessment, Research & Evaluation,* 7(17), viewed May 31, 2014 from http://PAREonline.net/getvn.asp?v=7&n=17.

Sterling, R.R., 1968, 'The going concern: an examination', *The Accounting Review* 43(3): 481-502.

Stevens, J.,1996, *Applied multivariate statistics for the social sciences*. 3rd Edn., Lawrence Erlbaum, N.J.

Stevens, S.S., 1966, 'On the operation known as judgement', *The Scientific Research Society* 54(4):385-401.

Suarez, M., 2003, 'Scientific representation: against similarity and isomorphism', *International studies in the Philosophy of Science* 17(3): 225-244.

Sudarshan, E.C.G. & Misra, B., 1977, 'The zeno's paradox in quantum theory', *Journal of Mathematical Physics* 18(4):756-763.

Suppe, F., 1977, *The search for philosophic understanding of scientific theories: the structure of scientific theories*, University of Illinois Press, Urbana.

Tabachnick, B.G. & Fidel, L.S., 1983, *Using multivariate statistics*, HarperCollins, New York.

Taylor, C., 1991, *The ethics of authenticity,* Harvard University Press, Massachusetts.

Teller, P., 2001, 'Twilight of the perfect model', *Erkenntnis* 55(3): 393-415.

Terre Blanche, M. & Durrheim, K., 1999, *Research in practice: applied methods for the social sciences*, University of Cape Town Press, Cape Town.

Tinker, T., 1985, *Paper prophets: a social critique of accounting*, Holt, Rinehart and Winston Ltd., Great Britain.

Tobias, D., 2005, *Numbers: the language of science,* Pearson Education, New York.

Trevarthen, C.B., 1968, 'Two mechanisms for vision in primates', *Psychologische Forschung* 31: 299-337

Tukey, J.W., 1962, 'The future of data analysis', *Annals of Mathematical Statistics* 33:1-67.

Turnbull, J., Lea, D., Parkinson, D., Phillips, P., Francis, B., Webb, S., Bull, V. & Ashby, M., 2010, Eds, *Oxford Advanced Learner's Dictionary*, Oxford University Press, UK.

Tversky, A. & Kahneman, D., 1973, 'Availability: A heuristic for Judging Frequency and Probability', *Cognitive Psychology* 5: 207-232.

Tversky, A. & Kahneman, D., 1983, 'Extensional vs. intuitive reasoning: the conjunction fallacy in probability judgement', *Psychological Review* 90(4): 293-315.

Tversky, A. & Kahneman, D., 1986, 'Rational Choice and the Framing of Decisions', *Journal of Business* October 59(4): S251-S278.

Tversky, A. & Kahneman, D., 1991, 'Loss aversion in riskless choice: a reference dependent model', *The Quarterly Journal of Economics* 106(4): 1039-1061.

Tversky, A. & Kahneman, D., 1992, 'Advances in prospect theory: cumulative representation of uncertainty', *Journal of Risk and Uncertainty* 5: 297-323.

Uzgalis, W., '*John Locke'*, *The Stanford Encyclopedia of Philosophy* (Fall 2012 Edition), Edward N. Zalta Ed., viewed 15 January 2014, URL = http://plato.stanford.edu/archives/fall2012/entries/locke/

Van der Post, L., 1976, *Jung and the story of our time*, Cox and Wyman Ltd., Great Brittan.

Vickery, D.W., 1970, 'Is accounting a measurement discipline?' *The Accounting Review* (American Accounting Association) 45(4): 731-742.

Von Bertalanffy, L., 1972, 'The history and status of general systems theory', *The Academy of Management Journal* 15(4): 407-426.

Waldrop, M.M., 1992, *Complexity, the emerging science at the edge of order and chaos,* Simon & Schuster Paperbacks, New York.

Walras, L., 2003, *Elements of pure economics*, Routledge, New York.

Welman, C., Kruger, F. & Mitchell, B., 2005, *Research methodology*, Oxford University Press Southern Africa, Cape Town.

Wheatley, M.J., 1994, *Leadership and the new science: learning about organization from an orderly universe*, Berrett-Koehler Publishers, San Francisco.

Wilber, K., 2001, *No Boundary*, Shambhala Publications, Inc., Boston, MA.

Wolk, H.I., Tearney, M.G. & Dodd.J.L., 2001, *Accounting theory – a conceptual and institutional approach,* South-Western College Publishing, a division of Thomson Learning, USA.

Zajonc, R.B., 1980, 'Feeling and thinking: preferences need no inferences', *American Psychologist* 35(2):151-175.

Zohar, D. &Marshall, I., 2001, *Spiritual intelligence: the ultimate intelligence*, Bloomsbury Publishing Plc, London.

Zukav, G., 1979, The dancing Wu Li masters. Rider and Company, United Kingdom.

ANNEXURE 1A

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Economic and Management Sciences

Department of Financial Management

BEHOLDING VALUE FOR FINANCIAL DECISION-MAKING

Research conducted by:
Mr D D Marais
Student Number: 96071592
Cell: 082 463 9006

Dear Participant

You are hereby cordially invited to partake in an academic research study conducted by Desmond Dawid Marais, a doctoral student under the supervision of Professor Daan Gouws of the Department of Financial Management Sciences at the University of Pretoria.

An extensive trans- and multi-disciplinary review of literature which has been conducted over the past several years seems to suggest that social sciences occupying themselves with financial decision-making have neglected to integrate a trans-disciplinary concept of value into their frameworks thereby, in many instances, depicting value as a fait acompli. As such, the proposition is put forward for consideration that this type of value depiction undermines the importance of not only what value is but also the decision-making process from which it emanates. This consequentially leaves a large part of the financial decision-making process unaccounted for, or worse, misrepresented by an ambiguous and often limited concept of value.

The study puts forward for consideration that this current state of affairs not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

As such, in an effort to address these serious issues, an attempt is made to create a conceptual trans-disciplinary model for value within the financial social sciences by identifying the key criteria necessary for value emergence and subsequent wealth reflection; inevitably leading to a mapping of the value process itself. This is done in the hope of improving the quality of the financial decisions being made at all levels everywhere.

The response obtained from your interview will greatly assist us to create a context from within which the questionnaires that have been put forward for consideration to selected target groups will be analysed and interpreted. As such any assistance you provide is considered to be of cardinal importance, not only with regard to the validity, but also the possible impact that this research study may have.

Please note the following:

- The study and its survey are conducted under the premise of anonymity and as such your name will not appear nor be linked to any of the answers you provide. The answers you give will be treated as strictly confidential.
- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the interview as completely and honestly as possible. This should not take more than 25 to 30 minutes of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.
- Please contact my study leader, Professor Daan Gouws on (012) 4203411 or e-mail him on daan.gouws@up.ac.za if you have any questions or comments regarding the study.

Please sign the form to indicate that:

- You have read and understand the information provided above.
- You give your consent to participate in the study on a voluntary basis.

_____ _____

Participant's signature **Date**

ANNEXURE 1B

INTERVIEW QUESTIONS

A. The composition of value

1. What is your understanding of the construct of value?
2. Is value created or discovered? Please clarify.
3. Can value be measured? If yes, please elaborate how.

B. Reflationary aspects of value

1. What is your understanding of wealth?
2. Do you believe that a relationship exists between value and wealth? If so, please clarify what your understanding of the relationship is.
3. Do you believe that a relationship exists between value and values? If so please clarify what your understanding of the relationship is.

C. Value and the financial decision-making process

1. Does the accountant merely reflect value, or does he play an active role in the value determination process on behalf of the users of accounting information? Please elaborate.
2. Do you believe that from a decision usefulness perspective the existing structures of the financial social sciences of economics, finance and accounting appropriately reflect value?

ANNEXURE 1C

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Faculty of Economic and Management Sciences

Department of Financial Management

BEHOLDING VALUE FOR FINANCIAL DECISION-MAKING

Research conducted by:
Mr D D Marais
Student Number: 96071592
Cell: 082 463 9006

Dear Participant

You are hereby cordially invited to partake in an academic research study conducted by Desmond Dawid Marais, a doctoral student under the supervision of Professor Daan Gouws of the Department of Financial Management Sciences at the University of Pretoria.

An extensive trans- and multi-disciplinary review of literature which has been conducted over the past several years seems to suggest that social sciences occupying themselves with financial decision-making have neglected to integrate a trans-disciplinary concept of value into their frameworks thereby, in many instances, depicting value as a fait accompli. As such, the proposition is put forward for consideration that this type of value depiction undermines the importance of not only what value is but also the decision-making process from which it emanates. This consequentially leaves a large part of the financial decision-making process unaccounted for, or worse, misrepresented by an ambiguous and often limited concept of value. The study puts forward for consideration that this current state of affairs not only distorts in its portrayal of wealth but also deeply affects the financial social sciences' ability to assist in the financial decision-making process.

As such, in an effort to address these serious issues, an attempt is made to create a conceptual trans-disciplinary model for value within the financial social sciences by identifying the key criteria necessary for value emergence and subsequent wealth reflection; inevitably leading to a mapping of the value process itself. This is done in the hope of improving the quality of the financial decisions being made at all levels everywhere.

The response obtained from your questionnaire will greatly assist us to gain a deeper understanding of the elusive construct of value and the deeper underlying value process from which it emerges, thereby allowing us to illuminate it and to place it into an appropriate context within the financial decision-making process. As such any assistance you provide is considered to be of cardinal importance, not only with regard to the validity, but also the possible impact that this research study may have.

Please note the following:

- The study and its survey are conducted under the premise of anonymity and as such your name will not appear nor be linked to any of the answers you provide. The answers you give will be treated as strictly confidential.
- Your participation in this study is very important to us. You may, however, choose not to participate and you may also stop participating at any time without any negative consequences.
- Please answer the questions in the attached questionnaire as completely and honestly as possible. This should not take more than 20 minutes of your time.
- The results of the study will be used for academic purposes only and may be published in an academic journal. We will provide you with a summary of our findings on request.
- Please contact my study leader, Professor Daan Gouws on (012) 4203411 or e-mail daan.gouws@up.ac.za if you have any questions or comments regarding the study.

Please sign the form to indicate that:

- You have read and understand the information provided above.
- You give your consent to participate in the study on a voluntary basis.

_____ _____

Participant's signature **Date**

ANNEXURE 1D

Respondent number

Please indicate with an "X" your:

Gender	Male	Female
Ethnicity	African	
	European	
	Indian	
	Coloured	
	Other	
Age	Under 25	
	25-45	
	Over 45	
Please indicate the field in which your primary expertise lies.	Physics	
	Biology	
	Philosophy	
	Psychology	
	Economics	
	Accounting	
	Financial Management	
	Other	
If other, please specify:		
Number of years' experience	Less than 5 years	
	5-10 years	
	More than 10 years	

Please indicate with an "X" your:

Economic sector in which you participate	√ Please tick one
Primary sector (e.g. agriculture; mining)	
Secondary sector (e.g. manufacturing; electricity, gas and water; construction)	
Tertiary sector (e.g. retail and wholesale; catering and accommodation; transport, storage and communication; financial intermediation; insurance; community; social and personal service)	
Government sector (e.g. national; provincial and municipal)	
Parastatals (e.g. Eskom; Transnet)	
Academic (e.g. primary, secondary, tertiary education)	
If other, please specify:	

Decision-making category	√ Please tick one
Executive	
Senior management	
Middle management	
Junior management	
Employee (not part of management)	

Please use the following scale to rate the statements in the categories listed below. Mark your preference with an "X".	
1	Strongly disagree
2	Disagree
3	Disagree slightly
4	Neutral
5	Agree slightly
6	Agree
7	Strongly agree
8	Not sure

A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM

Nr.		1 Strongly disagree	2 Disagree	3 Disagree slightly	4 Neutral	5 Agree slightly	6 Agree	7 Strongly agree	8 Not sure
1	The flow or motion of value forms the correlation to its position with time.								
2	Necessity arises from movement.								
3	An open-ended system in dynamic balance is always unfolding and in transition, exploring its way through an immense space of possibilities with no realistic hope of ever finding the single best place to be.								
4	Information organises the flow of energy through matter into form.								
5	Time is an abstract representation which is set up by thought to represent succession.								
6	A complex adaptive system is always unfolding, always in transition.								
7	Our thoughts, in their purely logical form, are incapable of presenting the true meaning of evolutionary movement.								

8	Each discontinuous thought is born by the fluid mass of our whole physical existence and continues after each other in an endless flow.								
9	Duration is the continuous progress of the past which gnaws into the future and which swells as it advances.								

B. CHANGE – AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN

Nr.		1 Strongly disagree	2 Disagree	3 Disagree slightly	4 Neutral	5 Agree slightly	6 Agree	7 Strongly agree	8 Not sure
1	Change is anything but predictable.								
2	Life is only possible in the presence of change.								
3	The deep structure of change emanates from the decay of the quality and not the quantity of energy.								
4	Information thus signifies the positive difference between two uncertainty levels.								
5	Nothing is created, nothing is lost, everything is transformed.								
6	In the purest sense, the analysis of feelings attends primarily to energy transformation; while in contrast, the analysis of thoughts focuses principally on information transformation.								
7	Probability judgements are not attached to events but to descriptions of events and as such depend upon the explicitness of their descriptions and not the events themselves.								

8	Risk reflects variation in the distribution of possible outcomes, their likelihoods, and their subjective values.								
9	Risk can be defined as situations in which decisions are made whose consequences depend on the outcome of future events having known probabilities.								

C. BIFURCATION – A BREAKTHROUGH OR A BREAKDOWN

Nr.		1 Strongly disagree	2 Disagree	3 Disagree slightly	4 Neutral	5 Agree slightly	6 Agree	7 Strongly agree	8 Not sure
1	Bifurcation can be considered the source of diversification and innovation.								
2	The edge of chaos is where the familiar and the unpredictable meet.								
3	A crucial tipping point in the evolution of a system will either lead to a breakdown or a breakthrough.								
4	A critical point is like a needle balanced on its tip.								
5	The physical universe is a whole which seeks balance within itself.								
6	A chaos point is a decision window that builds towards a critical threshold of no return.								
7	Complexity reaches a threshold from which structure emerges.								

D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE

Nr.		1 Strongly disagree	2 Disagree	3 Disagree slightly	4 Neutral	5 Agree slightly	6 Agree	7 Strongly agree	8 Not sure
1	Irreversibility leads to coherence.								
2	Far-from-equilibrium situations lead to new forms of coherence.								
3	Once we have dissipative structures, we can speak of self-organisation.								
4	Structures emerge, but only as temporary solutions that facilitate rather than interfere.								
5	Open systems have a continuous exchange of energy and matter with their environment as part of autopoiesis (self-creation).								
6	Dissipative structures maintain and develop structure by breaking down other structures in the process of metabolism.								

7	Dynamic balance exists between rates of external change and rates of internal adaptation to change.								
8	It is a characteristic of living systems to continuously renew themselves and to regulate this process in such a way that the integrity of their structure is maintained.								
9	Structure and function are not imposed by the environment but established by the system itself.								

E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT

Nr.		1 Strongly disagree	2 Disagree	3 Disagree slightly	4 Neutral	5 Agree slightly	6 Agree	7 Strongly agree	8 Not sure
1	Reality is always the moment of vision before intellect-ualisation takes place.								
2	The whole is seen all at once and then unfolded.								
3	We create an artificial world as a frame of reference.								
4	Without context words and actions have no meaning.								
5	Meaning and language stem from the shared interpretations of the minds of the sender and receiver.								
6	The observer and the observed are all one thought process.								
7	The intellect combines and separates; it arranges and disarranges and co-ordinates; it does not create.								

8	We do not see what we do not see and what we do not see does not exist.								
9	The world everyone sees is not the world but a world which we bring forth with others.								
10	We carry within us the wonders we seek without us.								

F. VALUE – A PERSONAL EXPRESSION OF MEASURE

Nr.		1 Strongly disagree	2 Disagree	3 Disagree slightly	4 Neutral	5 Agree slightly	6 Agree	7 Strongly agree	8 Not sure
1	Value imposes constraints on the feasibility of probability distributions in order to reduce entropy.								
2	All value-creating economic transformations and trans-actions are thermodynamically irreversible.								
3	The expression of ourselves and the revelation it reveals is what we describe as value.								
4	Scales must be reflected upon as foreground estimates or provisional perspectives.								
5	Value is at the very base of every economic consideration.								
6	Value is something each individual person weighs on a purely private, not a public, set of scales.								

7	Value is a relative concept within the appraisal of each individual.								
8	Value has no predetermined fixed quantities.								
9	Value is a barometer in the present which is used to facilitate the currency of uncertainty in the moment, blended with the burden of ignorance.								
10	Each of us has an original way of being human; each person has his or her own “measure”.								
11	Man is the measure of all things.								
12	The psyche seeks an expression that will embrace its total nature.								

G. CHOICE – THE CARING DIRECTION-GIVER OF CHANGE

Nr.		1 Strongly disagree	2 Disagree	3 Disagree slightly	4 Neutral	5 Agree slightly	6 Agree	7 Strongly agree	8 Not sure
1	Knowing is disrupting.								
2	Choice is an attempt to freeze or stop the flow of a moving or changing process world.								
3	Precise knowledge is not possible.								
4	Prediction is something human beings do consciously based on some explicit model of the world.								
5	The basic laws of quantum physics express possibilities.								
6	We have the choice to upset the design of our genes.								
7	The individual is not a passive reactor but an active planner.								
8	Our brains evolved an impressive ability to detect features.								
9	All complex adaptive systems build models that allow them to anticipate the world.								

10	Risk is situations where decisions are made whose consequences depend on the outcome of future events having known probabilities.								
11	Cognitive interpretation is the creative act of ascertaining meaning possibilities.								
12	Minding involves hesitating (post-poning overt action) while one consciously assigns meaning to the stimuli (the exertion of will).								
13	Numbers are not the name of this game but rather representational structures that permit functional reasoning.								
14	We learn how to behave, and we anticipate the future, using models to guide us in activities both common and uncommon.								
15	All exchange is ultimately an exchange of social activities.								
16	Future events do not represent reality and as a result their attributes are not measurable.								
17	Quality best harmonises what we are with what we are becoming.								
18	Social truth only embraces those theories that are in tune with the prevailing social ideology.								

DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING

Nr.		1 Strongly disagree	2 Disagree	3 Disagree slightly	4 Neutral	5 Agree slightly	6 Agree	7 Strongly agree	8 Not sure
1	To make a decision means to make a judgement regarding what one ought to do in a certain situation.								
2	A decision is a creational act born of creative necessity in the now.								
3	A decision is a limiting position in an infinite process applied to a segment of the whole.								
4	Decision-making is a mechanism used by an organism to evolve and adapt to outside pressures.								
5	The real economic actor is in fact a satisficer, a person who accepts “good enough” alternatives, not because less is preferred to more but because there is no choice.								
6	Meanings arise from interactions within social groups.								
7	Economic decisions cannot be delegated by one person to another, they can only be abdicated to the other person.								

8	There is no evidence of a prior cognitive process when a decision is made.								

Pg. 10 The end – Thank you

ANNEXURE 1E

CRONBACH'S ALPHA TEST FOR DATA RELIABILITY – SECTIONAL SCORE ANALYSIS

QUESTIONNAIRE SECTIONS	Cronbach's Alpha
A. FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM	0.826
. CHANGE - AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN	0.667
C. BIFURCATION - A BREAKTHROUGH OR A BREAKDOWN	0.841
D. DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE	0.650
E. CONSCIOUSNESS, ARTIFICAL REALITY AND THE UNFOLDING OF A MUTUAL CONTEXT	0.684
F. VALUE - A PERSONAL EXPRESSION OF MEASURE	0.824
G. CHOICE - THE CARING DIRECTION-GIVER OF CHANGE	0.892
H. DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING	0.712

Note: Cronbach's Alpha for each section of the questionnaire with the exclusion of question B3

ANNEXURE 2A

DETAILED FINDINGS OF THE UNIVARIATE ANALYSIS NOT INCLUDED AS PART OF CHAPTER 9

SECTION A FLOW, CREATION AND THE MOVEMENT OF PATTERNS AND FORM

In Section A, the questionnaire reflects on the general principle of flow and its involvement in the creation and movement of patterns and form. It presents statements with regard to the interrelationship that exists between flow and the complex adaptive system which is man and asks participants if value, thought and decision-making are causal effects that occur as a result of this process. It further presents statements with regard to the origin and nature of value, thought and financial decision-making.

In Statement A1, the participant's perspective with regard to the relative nature of the beholding of value process is tested. First noted by Maslow (1954:237), a psychologist, this statement links the flow or motion of the beholding of value process to its correlation with its position in time. Given that the statement obtained a 69.9% agreement among respondents there appears to be a strongly belief among them about the relative nature of the beholding of value process. In addition, it also appears as though respondents believe the beholding of value process to be position and time bound.

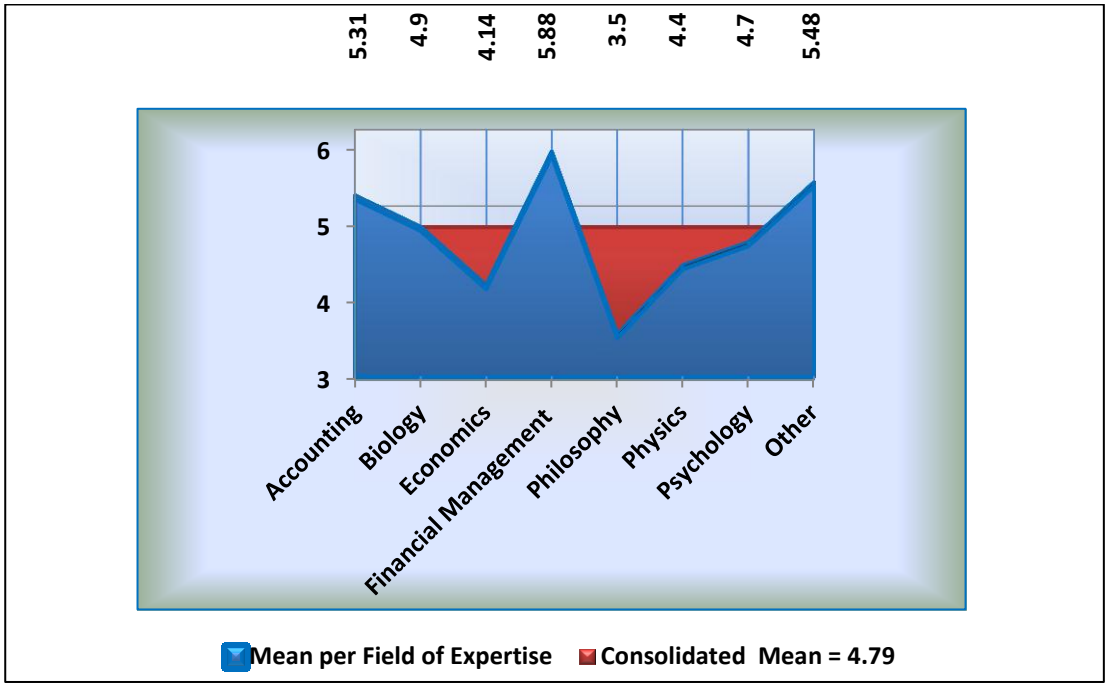
Statement A1

The flow or motion of value forms the correlation to its position with time.

Table 1 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.15%	6.45%	5.38%	16.13%	13.98%	44.09%	11.83%	100.00%

Figure 1 **Means of the converted response ratings for each field of expertise as well as for the consolidated group**



This position is however not shared by all the disciplines tested, with philosophy ranking the statement the lowest of all the disciplines with a mean of 3.5; which is substantially lower than the consolidated group mean of 4.79. This indicates an ontological difference of opinion with regard to how these participants perceive and reflect on value.

Statement A2

Necessity arises from movement.

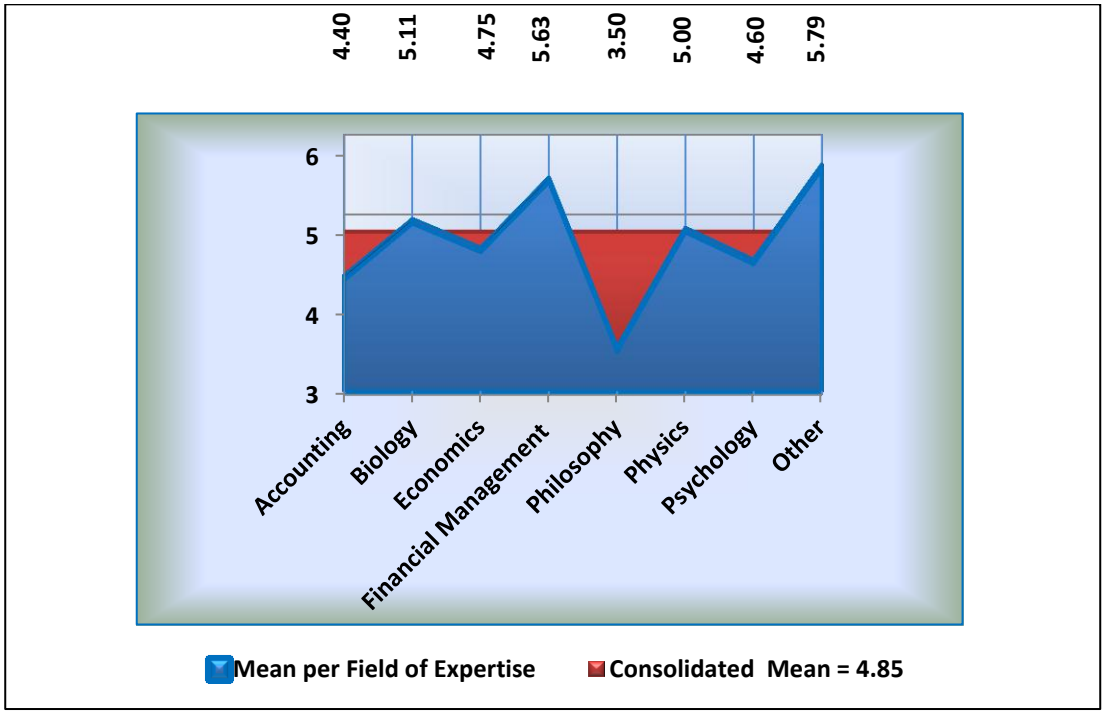
Noted by Bohm (1994:222), a physicist, Statement A2 tests the participant's perception with regard to the origin of necessity; an aspect providing a vital clue towards our understanding of not only why but how we come to value.

Table 2 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.30%	5.38%	6.45%	17.20%	11.83%	37.63%	17.20%	100.00%

Reflecting on the rating scale, it appears that with a 66.66% agreement rating, there is strong support among the respondents for the statement, with, as was the case in the previous statement, only the discipline of philosophy, with a mean rating of 3.5, giving a rating significantly lower than the general consolidated group mean of 4.85; affirming the ontological difference of opinion mentioned above.

Figure 2 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement A4

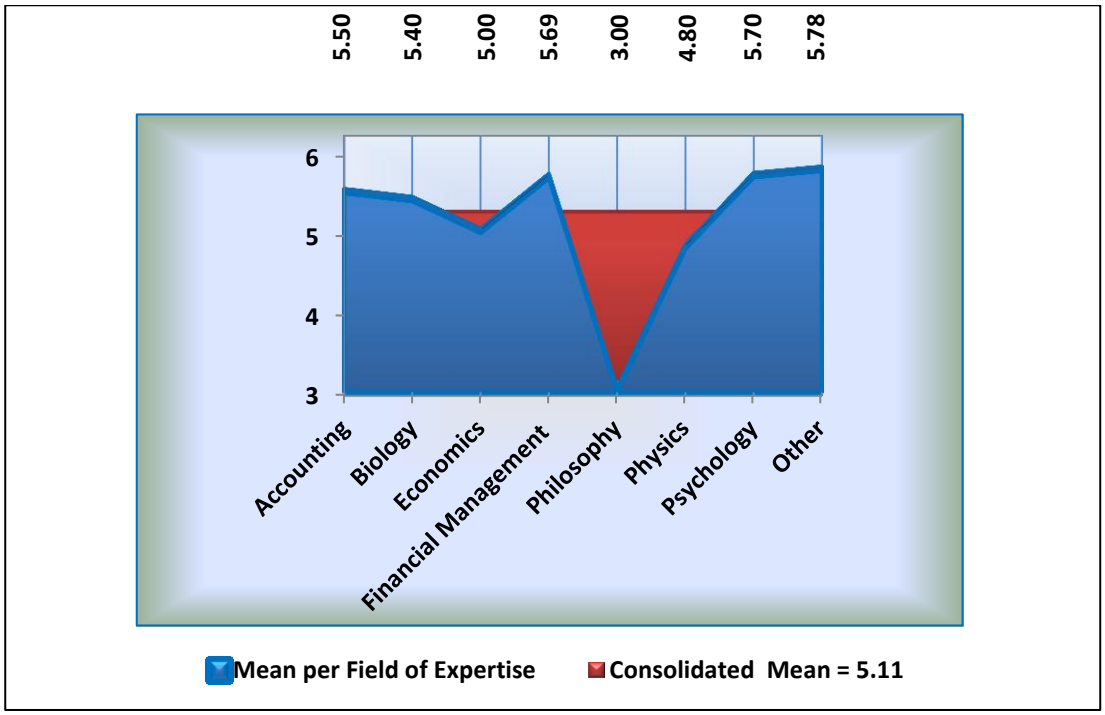
Information organises the flow of energy through matter into form.

Statement A4 tests the relationship that Wheatley (1994:104), a behavioural theorist, believes exists between flow and information, assessing if respondents perceive information to be a consequence of flow. This proposition appears to be strongly supported by 73.48% of the respondents, with only the field of philosophy providing strong opposition with a mean of 3 when compared to the consolidated group mean of 5.11.

Table 3 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.06%	6.12%	3.06%	14.29%	14.29%	38.78%	20.41%	100.00%

Figure 3 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement A5

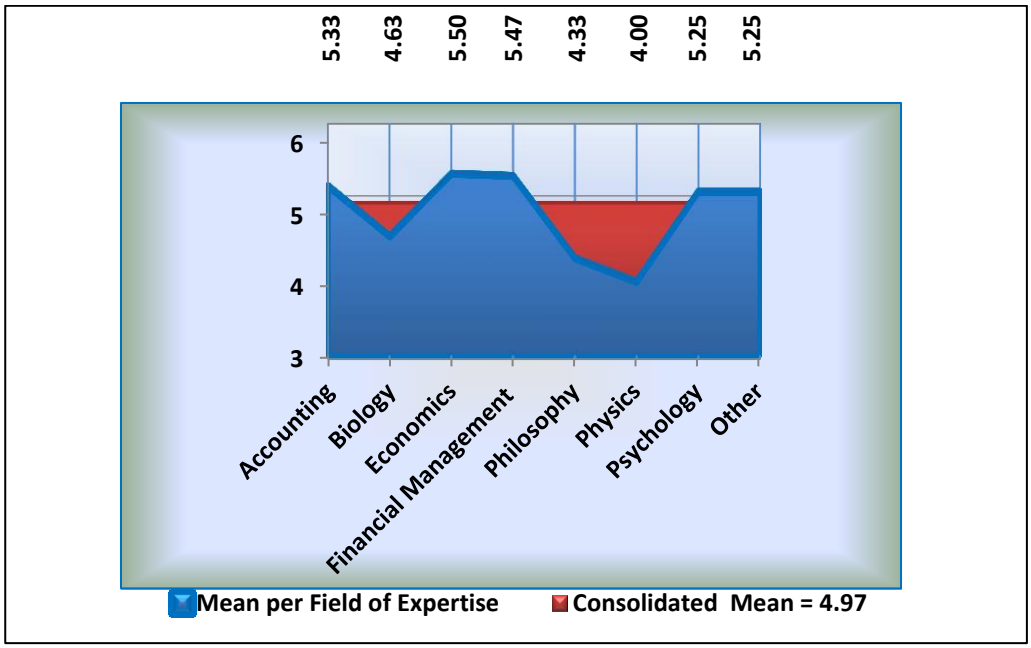
Time is an abstract representation which is set up by thought to represent succession.

With statement A5, Bohm (1994:227) links time, abstract representation, thought and succession, thereby providing a relativism that one would assume respondents from the fields of accounting, economics and finance to be uncomfortable with; especially so considering that all these fields at their core are based on empiricism in general and positivism in particular. Yet the research tends to suggest that, to the contrary, this is not the case with respondents in those particular fields providing the highest mean response ratings of 5.33, 5.5 and 5.47 respectively; mean responses significantly higher than the consolidated group mean of 4.97 for the statement.

Table 4 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.15%	5.38%	11.83%	13.98%	13.98%	34.41%	18.28%	100.00%

Figure 4 Means of the converted response ratings for each field of expertise as well as for the consolidated group



This point of view is seemingly supported by the majority of the respondents who provided an agreement rating of 66.67%.

Statement A6

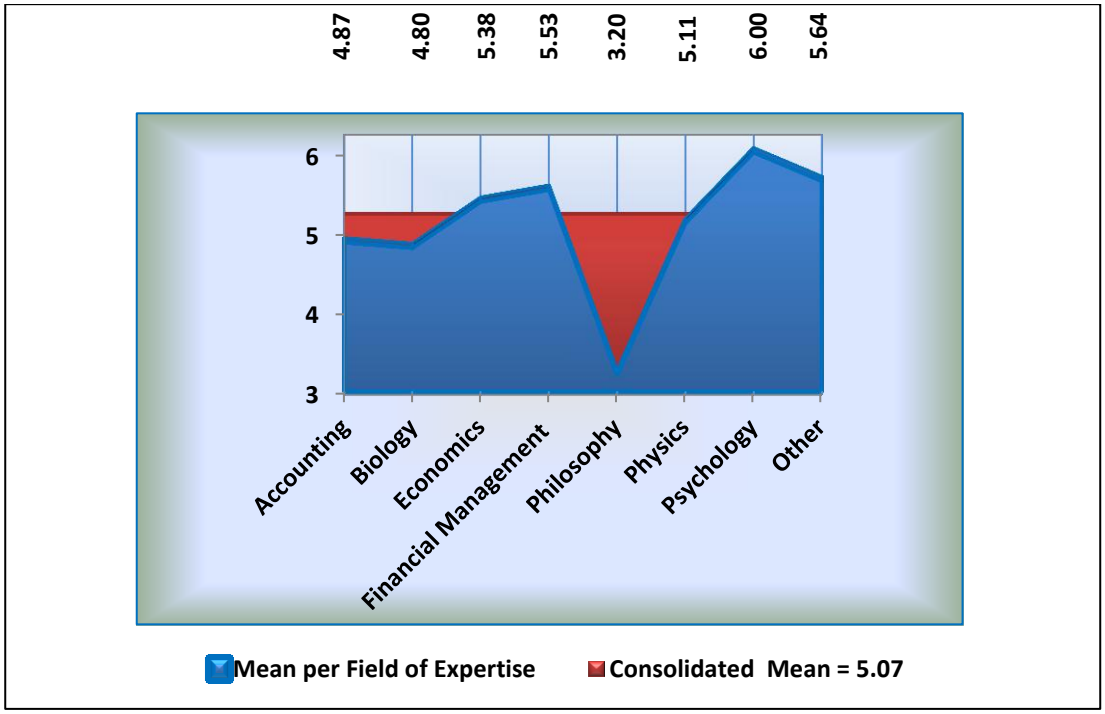
A complex adaptive system is always unfolding, always in transition.

With statement A6 Prigogine (1996:147), a chemist, reflects on the transitive nature of complex adaptive systems.

Table 5 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.08%	6.12%	4.08%	15.31%	15.31%	30.61%	24.49%	100.00%

Figure 5 Means of the converted response ratings for each field of expertise as well as for the consolidated group



As part of the questionnaire, the statement tests the respondent's perspective with regard to the continuity in the movement of complex adaptive system, providing clarification on a key specific condition associated with the general principle of flow. Reflecting on the fact that all human beings are considered to be complex adaptive systems, the statement, if accepted, creates, with statement A3, a binary correlation between transition, flow or movement and the process of being human. This is a proposition which, given the considerably high agreement level of 70.41%, appears to be the general sentiment among the tested respondents, with only the field of philosophy, with a mean of 3.2 when compared to the consolidated mean of 5.07, displaying serious reservations.

Statement A7

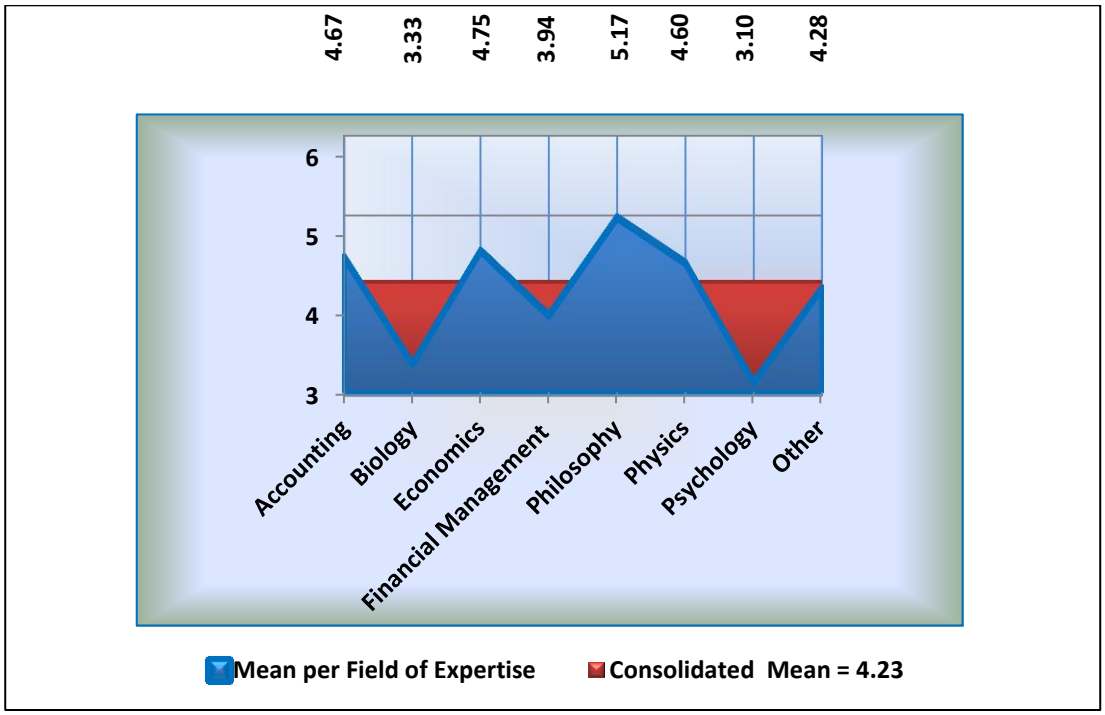
Our thoughts, in their purely logical form, are incapable of presenting the true meaning of evolutionary movement.

With Statement A7, Bergson (1911:x), a philosopher, touches on the idea that logic is not capable of presenting the true meaning of evolutionary movement, thereby implying that there is a facet to this movement that exists beyond the scope of logic ie emotion, irrationality. Research seems to indicate that, of the respondents tested, 37.75% disagreed with this statement with the strongest rejection of the proposition coming from the fields of psychology, biology and financial management, who respectively gave mean response ratings of 3.1, 3.33 and 3.94. In contrast, 44.89% agreed with the statement, resulting in a consolidated group mean of 4.23, with 17.35% of the respondents claiming that they are neutral on the issue.

Table 6 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.12%	12.24%	19.39%	17.35%	12.24%	23.47%	9.18%	100.00%

Figure 6 **Means of the converted response ratings for each field of expertise as well as for the consolidated group**



Statement A8

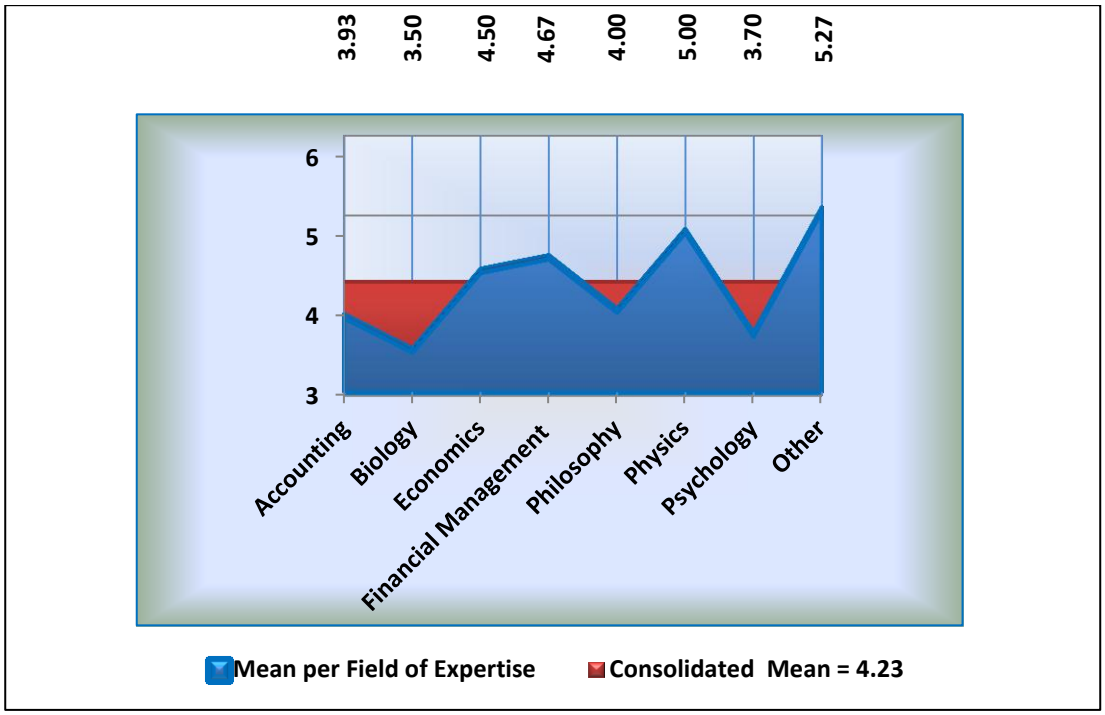
Each discontinuous thought is born by the fluid mass of our whole physical existence and continue after each other in an endless flow.

In Statement A8 the proposition is made that thought is discontinuous. In addition, it is put forward for consideration that, in accordance with Bergson (1911:3), the representational quality of thought stems from our whole physical existence and as such does not emanate from logic alone; introducing both a biological and structural component to the process. Reflecting on this proposition, the study's research indicates that the majority of the respondents, approximately 52.13% of the 80.85% of the respondents not neutral on the matter, agreed with the statement. What is surprising however, is the strong opposition from the field that probably has the most to gain by the statement, biology, which gave the statement the lowest mean response rate, 3.5 of all the fields tested; a mean substantially lower than the consolidated mean of the various fields which amounted to 4.23.

Table 7 **Statistical summary of the converted consolidated univariate analysis**

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.26%	12.77%	11.70%	19.15%	17.02%	22.34%	12.77%	100.00%

Figure 7 **Means of the converted response ratings for each field of expertise as well as for the consolidated group**



Statement A9

Duration is the continuous progress of the past which gnaws into the future and which swells as it advances.

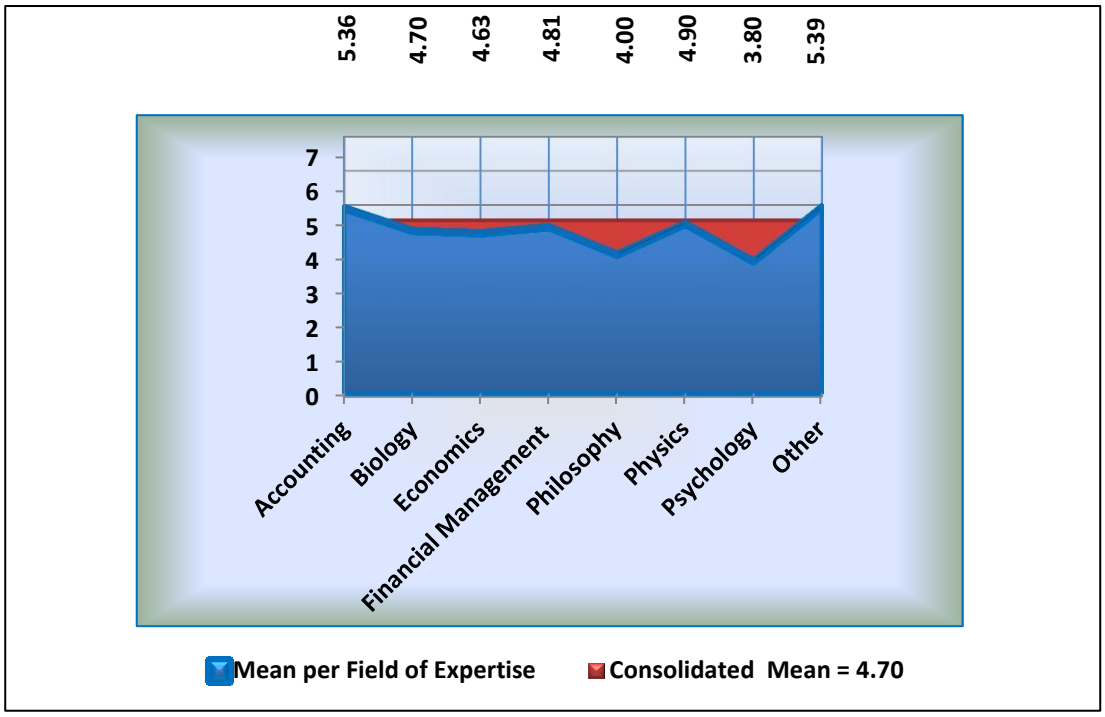
With Statement A9, Bergson (1911:5) defines duration as the progressive swelling of the past as it advances into the future, portraying a context within which human beings become accumulating vessels of past experience as they progress into the future; representing a specific condition of the model that needs to be confirmed as part of the broader decision-making process.

Reflecting on the research, it appears that 62.37% of the respondents agreed to a more or lesser extent with this statement with psychology being the field with the most severe reservations, giving the statement a mean of 3.8 when compared to the consolidated mean of 4.7.

Table 8 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.30%	5.38%	9.68%	18.28%	20.43%	23.66%	18.28%	100.00%

Figure 8 Means of the converted response ratings for each field of expertise as well as for the consolidated group



SECTION B CHANGE: AN ENDLESS TRANSFORMATION INTO THE GREAT UNKNOWN

In Section B the questionnaire reflects on the general principle of change. It tests various concepts and constructs associated with the principle, defining, giving meaning and creating a context for them as it progresses.

Statement B2

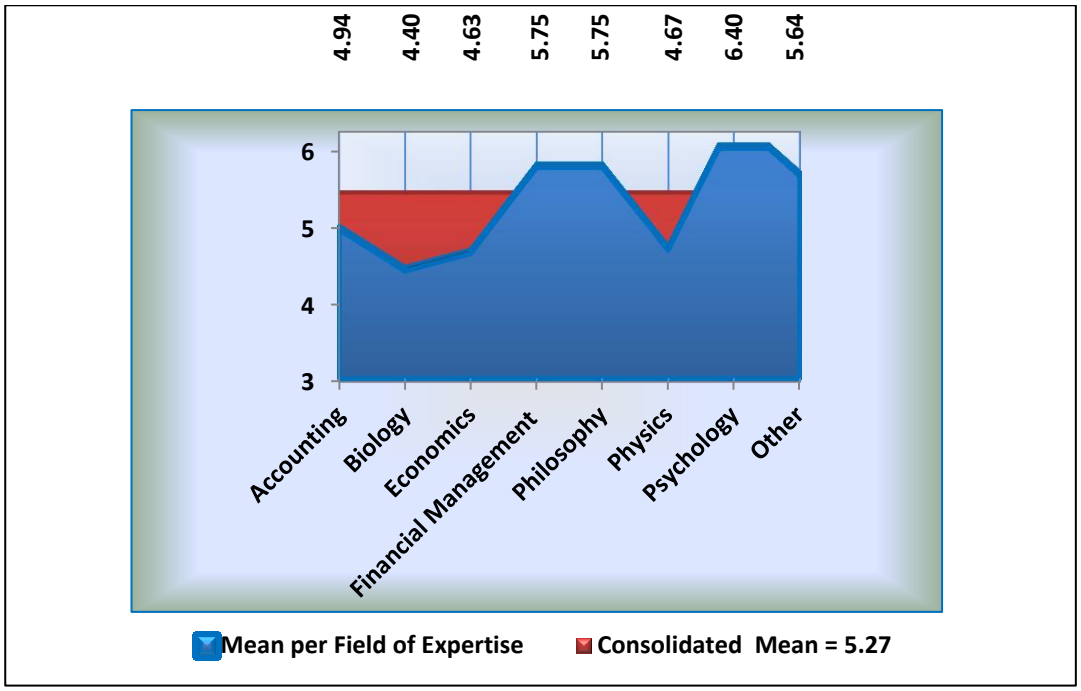
Life is only possible in the presence of change.

With Statement B2 the questionnaire tests the respondent's perspective about the type of correlation that exists between life and change, presenting, as envisaged by Prigogine (1996:27), the respondent with the proposition that no life is possible without change. Considering that according to the rating scale, 71.14% of the respondents to some extent agreed with the statement, the high consolidated group mean of 5.27 comes as no surprise.

Table 9 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.09%	3.09%	9.28%	13.40%	17.53%	23.71%	29.90%	100.00%

Figure 9 **Means of the converted response ratings for each field of expertise as well as for the consolidated group**



Statement B3

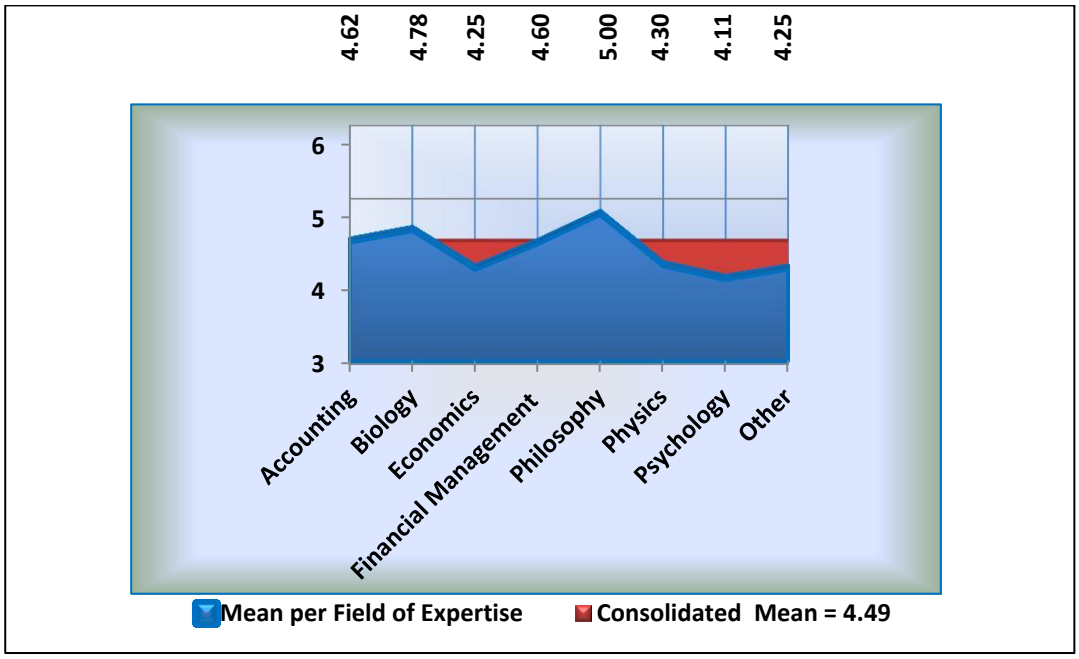
The deep structure of change emanates from the decay of the quality and not the quantity of energy.

Statement B3 causally associates change with a decay in the quality of energy, a proposition which 48.35% of the respondents agreed with to a more or lesser extent with 24.18% being in disagreement and 27.47% choosing to remain neutral on the matter; thereby indicating that, when interpreted with the consolidated mean of 4.49, the majority of the respondents support Dawkins' (2006:12) proposition. This not only provides clarification with regard to the respondent's perception about the origin of change but also highlights the important role that quality plays during the process.

Table 10 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.30%	9.89%	10.99%	27.47%	17.58%	24.18%	6.59%	100.00%

Figure 10 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement B4

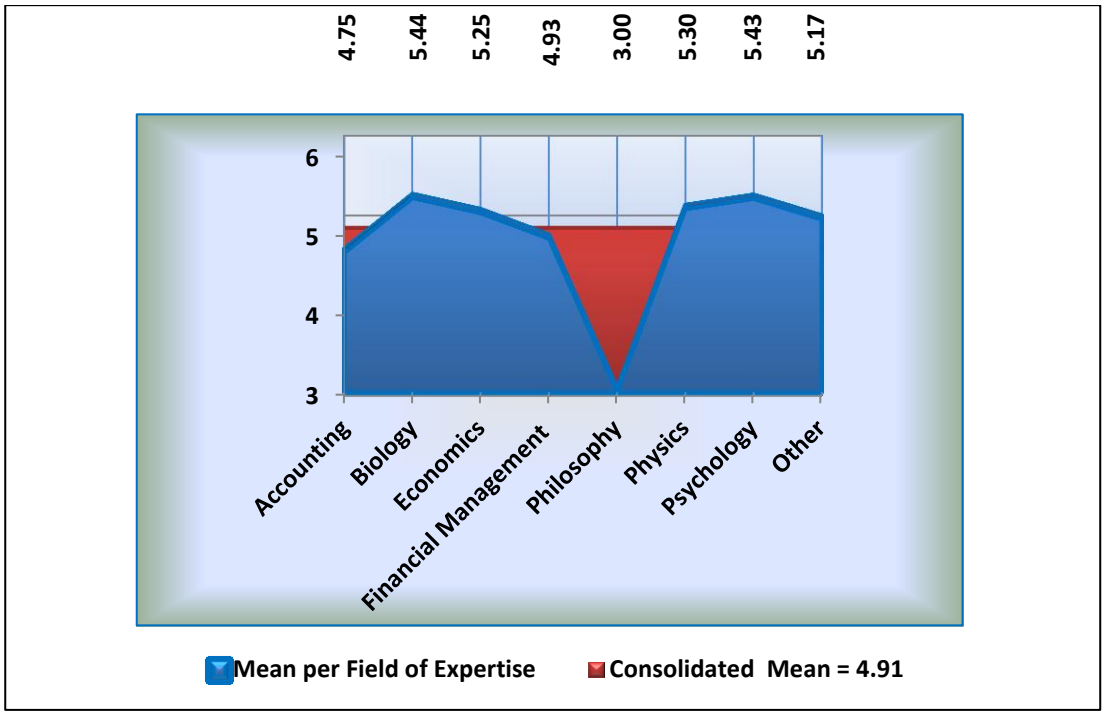
Information signifies the positive difference between two uncertainty levels.

With Statement B4 the respondent's perception about information is tested, portraying it as Sayre (1976:23) did, as the positive difference between two uncertainty levels. Considering that 25.81% of the respondents were neutral on the issue, it is significant that of the remaining 74.19%, 60.21% agreed with the statement to some extent. This aspect is reiterated by the relatively high consolidated group mean of 4.91, with only the field of philosophy with a mean of 3, appearing to show some reservation about the statement.

Table 11 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.23%	3.23%	7.53%	25.81%	20.43%	21.51%	18.28%	100.00%

Figure 11 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement B6

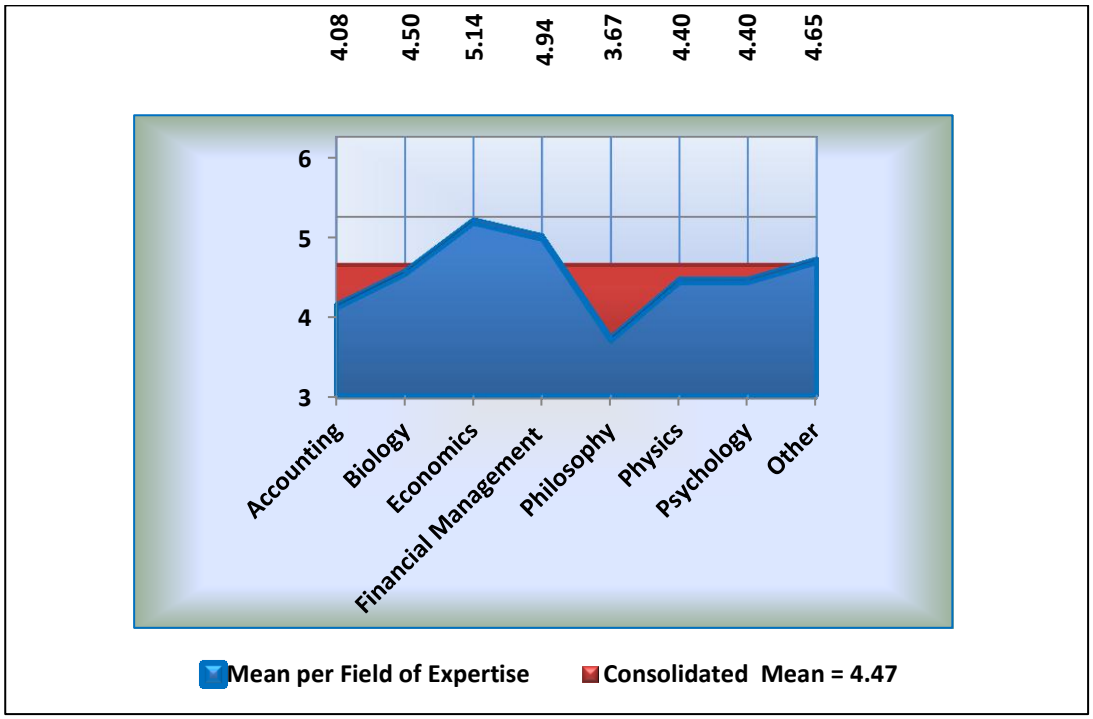
In the purest sense, the analysis of feelings attends primarily to energy transformation; while in contrast, the analysis of thoughts focuses principally on information transformation.

Statement B6 attempts to define how feelings and thoughts are perceived by utilising their relationships with change to highlight their differences, thereby validating several specific conditions of the model in relation to the general principle of change.

Table 12 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
5.49%	6.59%	12.09%	18.68%	21.98%	29.67%	5.49%	100.00%

Figure 12 Means of the converted response ratings for each field of expertise as well as for the consolidated group



In general, 57.14% of the respondents to a more or lesser extent agreed with the statement with 18.86% being neutral and 24.98% disagreeing with it. Given the consolidated mean of 4.47 it can with a fair amount of certainty be stated that in general the majority of the respondents agreed with the statement made by Zajonc (1980:154), a psychologist, with only the field of philosophy, with a mean of 3.67, reflecting a significant below average mean.

Statement B7

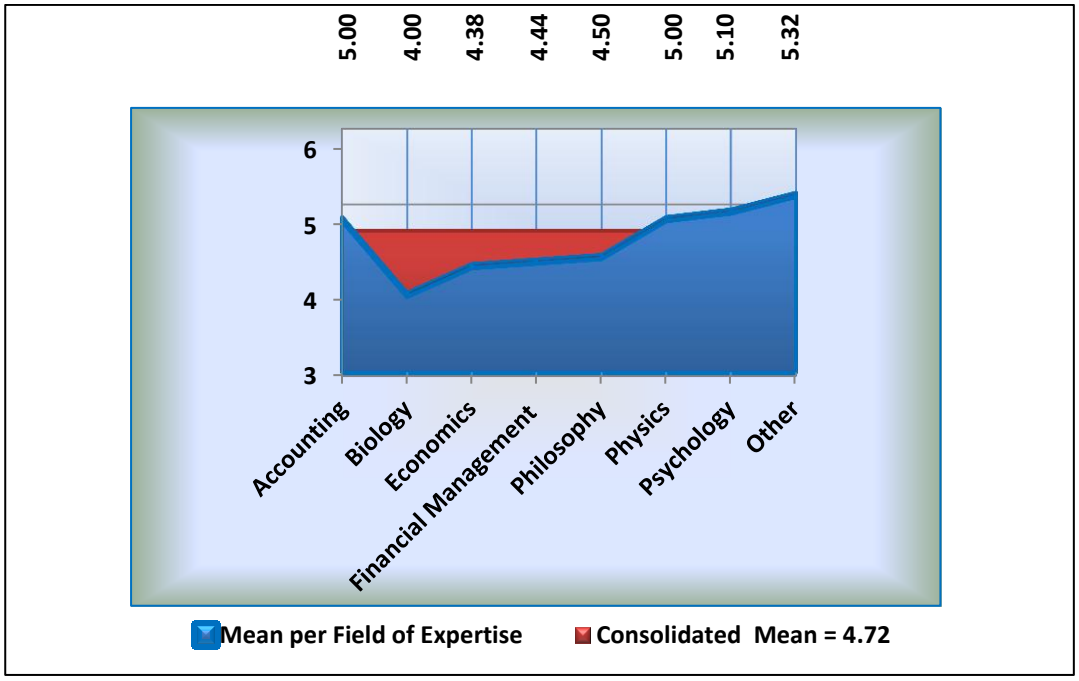
Probability judgments are not attached to events but to descriptions of events and as such depend upon the explicitness of their descriptions and not the events themselves.

With Statement B7 the questionnaire tests if respondents perceive probability judgements to be dependent on events or on a context and if so if this context is dependent on the explicitness of its description. Research findings indicate that 65.26% of the respondents agreed with the statement made by Bernstein (1996:279) with only 19.9% of the respondents disagreeing with it, with a further 18.95% being neural on the matter.

Table 13 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.05%	6.32%	10.53%	18.95%	29.47%	27.37%	6.32%	100.00%

Figure 13 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Considering that the consolidated mean among the various disciplines amounts to 4.72 and that the lowest mean as reflected by the field of biology is 4, it appears that a general, consensus among the various fields exists in favour of the statement at the time that the research study was conducted.

Statement B8

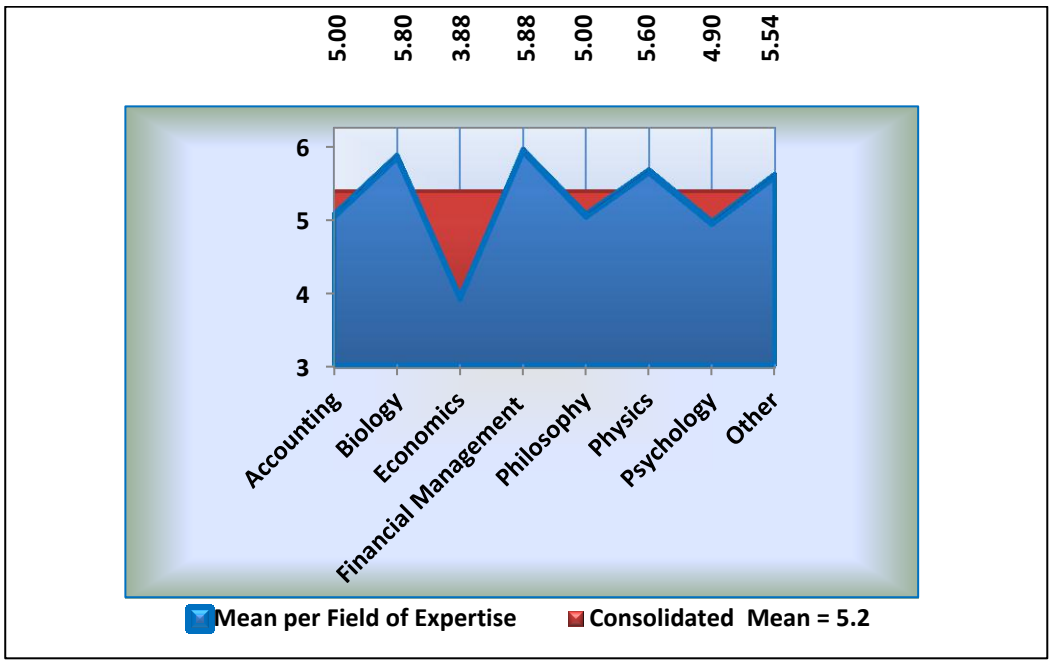
Risk reflects variation in the distribution of possible outcomes, their likelihoods, and their subjective values.

Statement B8 presents a possible definition for risk; testing how the respondents perceive risk. It further depicts risk as an associative aspect of change by defining it as a variation of possibility distributions.

Table 14 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.04%	2.04%	7.14%	17.35%	14.29%	39.80%	17.35%	100.00%

Figure 14 Means of the converted response ratings for each field of expertise as well as for the consolidated group



With 71.44% of the respondents agreeing with the statement to a more or lesser extent, there appears to be strong support for the statement made by March & Shapira (1987:1404). who specialise in the field of managerial science. This is also reflected by the relatively high consolidated group mean of 5.2 with only the field of economics showing reservations with a mean of 3.88

Statement B9

Risk can be defined as situations in which decisions are made whose consequences depend on the outcome of future events having known probabilities.

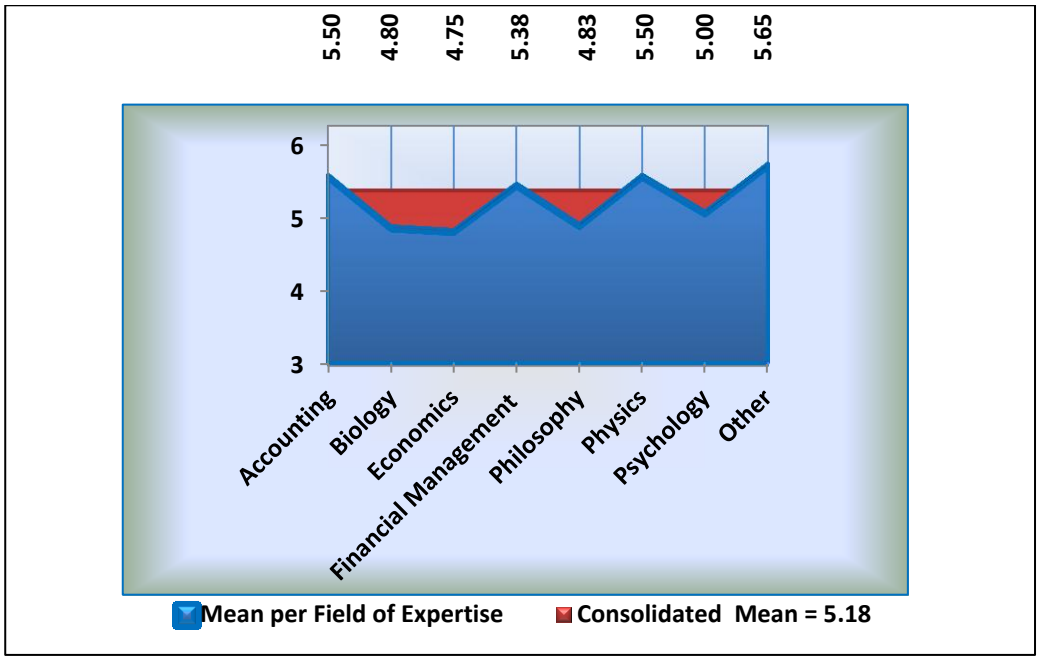
Statement B9 presents another possible definition for risk; testing from an alternative perspective how risk is perceived by respondents, by linking it to the uncertainty associated with the future, thereby as Lopes (1987:255), a psychologist, envisaged, tying risk to the change associated with the transition from the present into the future.

This is a proposition 76.29% of the respondents agreed with. Considering the high rating while taking the consolidated group mean of 5.18 into account, and the fact that the lowest mean per field obtained from the statement was 4.8, it appears that a strong consensus among the respondents in support of the statement existed at the time that the research was conducted.

Table 15 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.06%	3.09%	7.22%	11.34%	23.71%	32.99%	19.59%	100.00%

Figure 15 **Means of the converted response ratings for each field of expertise as well as for the consolidated group**



SECTION C BIFURCATION – A BREAKTHROUGHT OR A BREAKDOWN

In order to gain insight into the context that gives rise to a decision, Section C of the questionnaire reflects on and tests several aspects of the general principle of bifurcation.

Statement C1

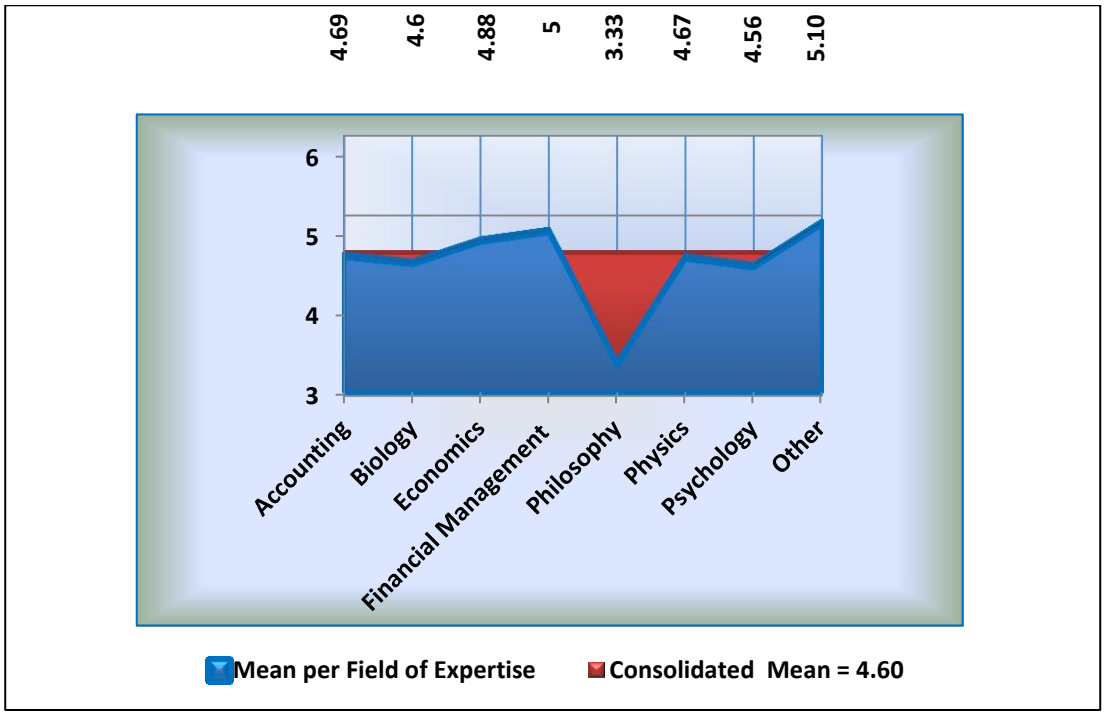
Bifurcation can be considered the source of diversification and innovation.

Statement C1 presents the respondents with a possible definition of bifurcation, presenting it in accordance with Prigogine's (1996:70) vision as a source of diversification and innovation.

Table 16 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
7.87%	1.12%	3.37%	25.84%	22.47%	32.58%	6.74%	100.00%

Figure 16 Means of the converted response ratings for each field of expertise as well as for the consolidated group



This is a proposition 61.79% of the respondents agreed with, with 25.84% being neutral on the matter and a further 12.36% disagreeing with the statement. Given the consolidated group mean of 4.6 and the fact that of all the fields only philosophy with a mean of 3.33% showed serious reservations it can with a reasonable amount of certainty be stated that a general consensus among the respective fields in favour of the statement existed at the time the research was conducted.

Statement C2

The edge of chaos is where the familiar and the unpredictable meet.

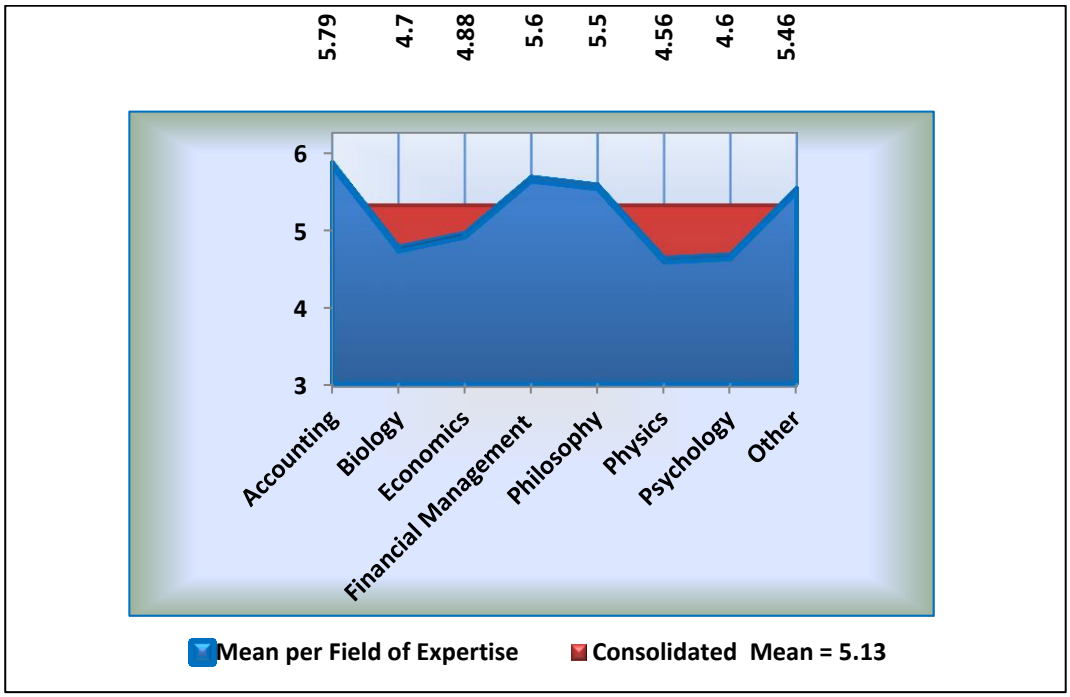
Statement C2 attempts to establish from the respondents where they believe bifurcation to occur, depicting it as an event at the edge of chaos where the familiar and the unpredictable meet. Research results from the study indicate that 72.63% of the respondents agreed with the statement made by Spangler as cited by Speerstra (2005:61), a philosopher, with 15.79% being in disagreement with it, and a further 11.58% choosing to remain neutral on the matter.

Reflecting upon this while taking the consolidated group mean of 5.13 into account, as well as the generally high individual means across all the respective fields tested, it is clear that a general consensus in favour of the statement existed among the respondents at the time of the study.

Table 17 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
0.00%	5.26%	10.53%	11.58%	17.89%	32.63%	22.11%	100.00%

Figure 17 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement C3

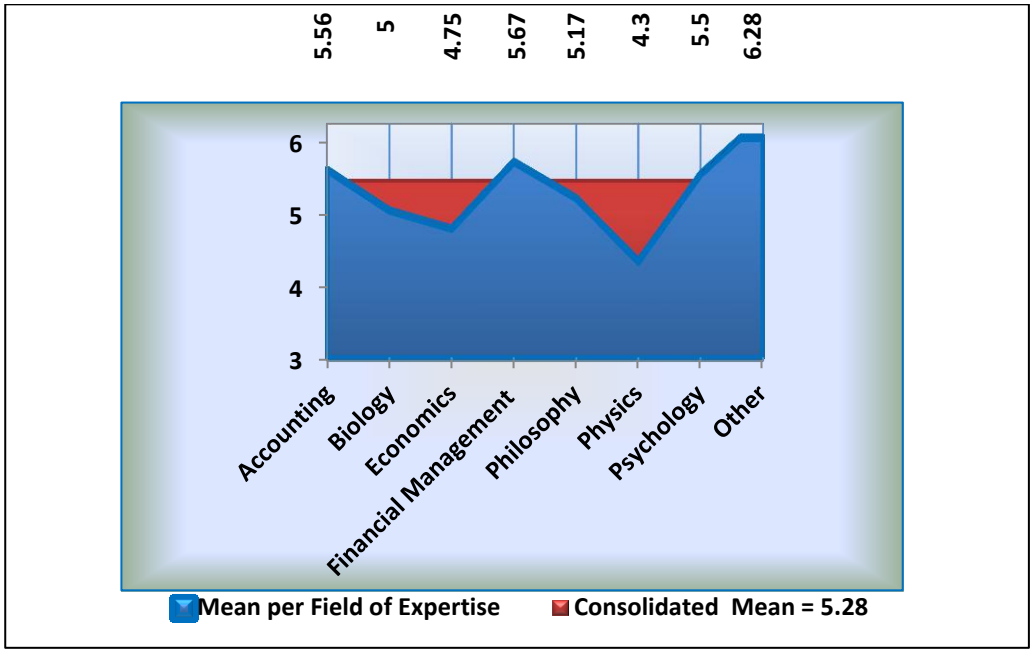
A crucial tipping point in the evolution of a system will either lead to a breakdown or breakthrough.

Noted by Laszlo (2006: foreword), Statement C3 presents a proposed definition for bifurcation, representing it as a crucial tipping point that either leads to a breakthrough or a breakdown. Given the high consolidated group mean of 5.28 and the fact that 79% of the respondents agreed with the statement, it is clear that strong support for the statement existed among the respondents at the time that the research study was conducted.

Table 18 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.00%	3.00%	5.00%	10.00%	17.00%	35.00%	27.00%	100.00%

Figure 18 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement C4

A critical point is like a needle balanced on its tip.

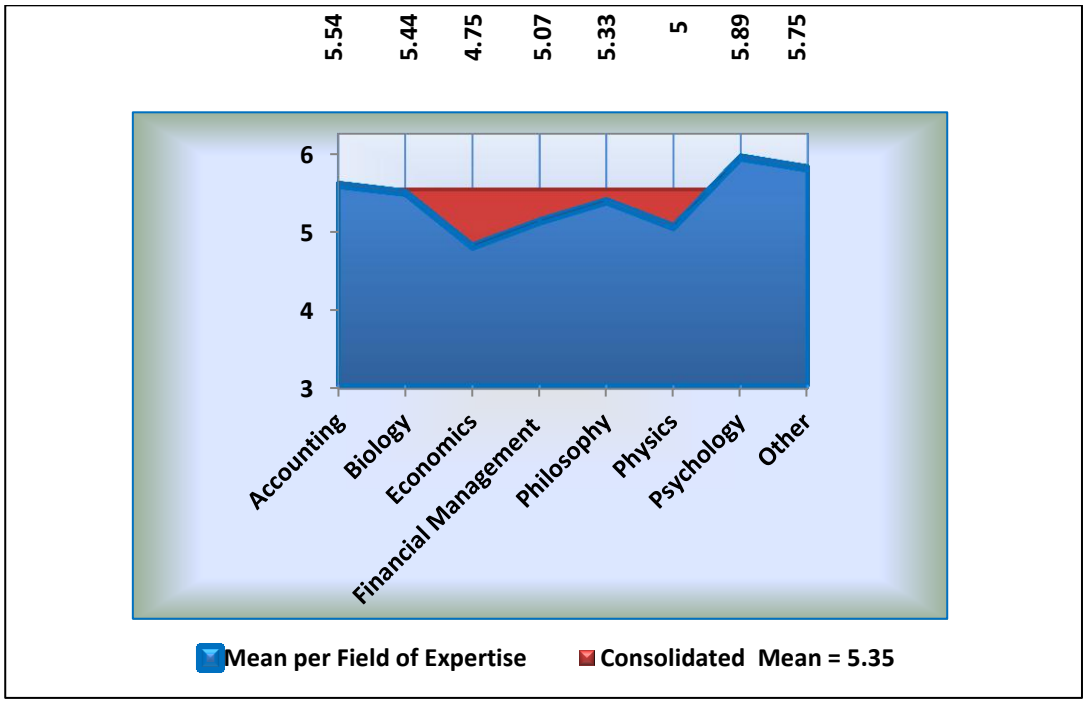
Statement C4 obtains further clarification from the respondent about what the respondent's perception about a critical point is, representing it as a needle balancing on its tip.

From the research it was established that 77.42% of the respondents agreed with the statement made by Ball (2011:107), a science writer, to a more or lesser extent, with 15.06% being in disagreement with it, and a further 7.53% choosing to remain neutral on the matter. Reflecting upon this while taking the high consolidated group mean of 5.35 into account, it is clear that strong support existed for the statement at the time that the research was conducted, indicating a strong dynamic aspect associated with the balance.

Table 19 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.08%	7.53%	6.45%	7.53%	18.28%	33.33%	25.81%	100.00%

Figure 19 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement C5

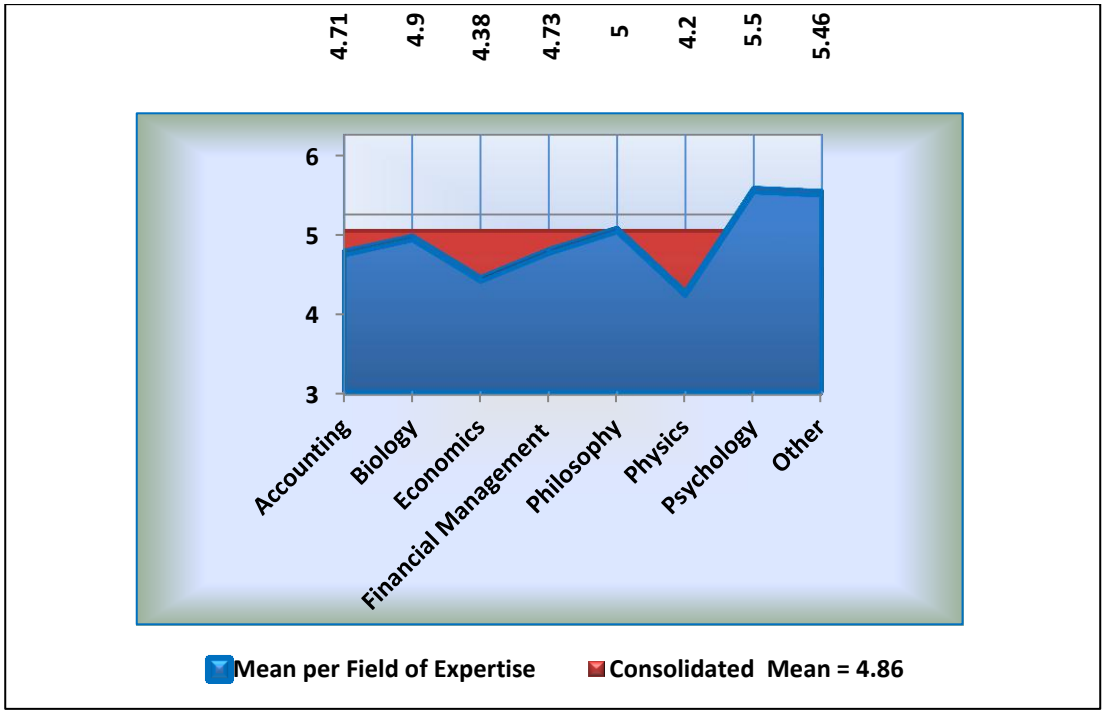
The physical universe is a whole which seeks balance within itself.

With Statement C5, the questionnaire tests the respondent's perception about the importance and role that balance plays within the physical universe, portraying it as a fundamental requirement thereof and as such of anything in it. Research results from the study indicate that 63.92% of the respondents agreed with the statement made by Kauffman (1996:179) a theoretical biologist, with 19.59% being in disagreement with it, and a further 16.49% choosing to remain neutral on the matter.

Table 20 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.19%	5.15%	8.25%	16.49%	16.49%	27.84%	19.59%	100.00%

Figure 20 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Taking this into account, while reflecting upon the consolidated group mean of 4.86, as well as the generally high individual means across all the respective fields tested, it can with a fair amount of certainty be stated that a general consensus in favour of the statement existed among the respondents at the time that the study was conducted.

Statement C6

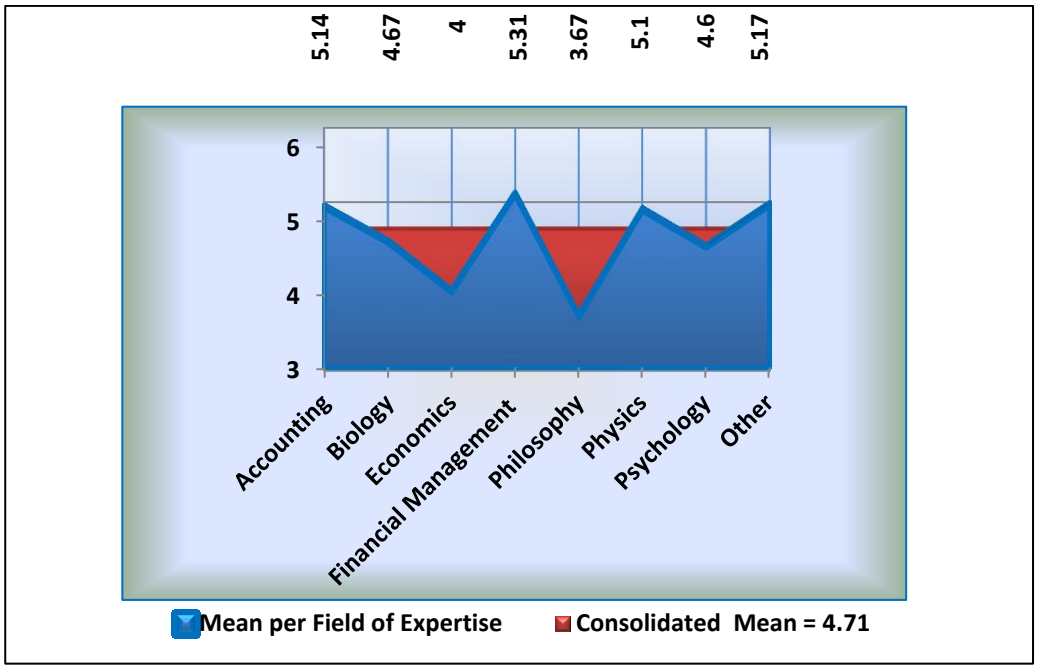
A chaos point is a decision window that builds towards a critical threshold of no return.

Statement C6 tests if the balance as referred to in Statement C5 is perceived by the respondents as being dynamic by linking it to a decision-window that builds into a critical threshold. Research findings indicate that 65.21% of the respondents agreed with the statement made by Laszlo (2006:14), a philosopher, with 17.39% of the respondent disagreeing with it, and a further 18.95% chose to remain neutral on the matter.

Table 21 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.17%	6.52%	8.70%	17.39%	23.91%	27.17%	14.13%	100.00%

Figure 21 **Means of the converted response ratings for each field of expertise as well as for the consolidated group**



Apart from the relatively low mean obtained from the field of philosophy, all the other fields provided means in excess of 4, resulting in a consolidated group mean of 4.71; thereby indicating a general consensus among respondents at the time that the research was conducted in favour of the statement.

SECTION D DISSIPATION, SELF-ORGANISATION AND THE YEARNING FOR DYNAMIC BALANCE

In Section D the questionnaire introduces the systemic biological structural requirements that are necessary in order for value and financial decision-making to occur. It tests for characteristics associated with the particular type of structure and attempt to determine if these characteristics influence the financial decision-making process and how human beings value.

Statement D2

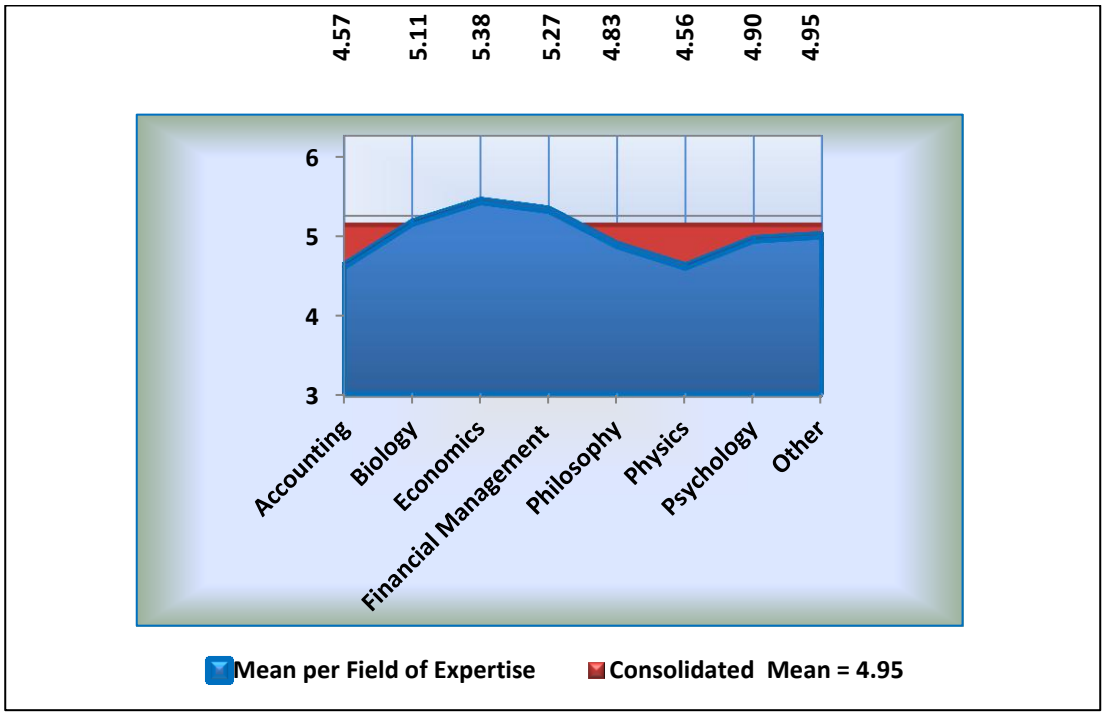
Far-from-equilibrium situations lead to new forms of coherence.

Statement D2 tests if respondents perceive far-from-equilibrium situations to lead to new forms of coherence. If accepted, this statement directly contradicts the stable equilibrium theory embedded within the discipline of economics, thereby confirming a vital aspect of the financial value decision-making model. This is a proposition that research findings seem to concur with, with 67.4% of the respondents agreeing with the statement made by Prigogine (1996:26), 12.95% disagreeing with it, and a further 19.57% choosing to remain neutral on the matter.

Table 22 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
0.00%	4.35%	8.70%	19.57%	29.35%	26.09%	11.96%	100.00%

Figure 22 Means of the converted response ratings for each field of expertise as well as for the consolidated group



In general, relatively strong means were obtained across all the fields tested by the study, resulting in a consolidated group mean of 4.95, indicating a general consensus among respondents in favour of the statement at the time that the research was conducted.

Statement D3

Once we have dissipative structures, we can speak of self-organisation.

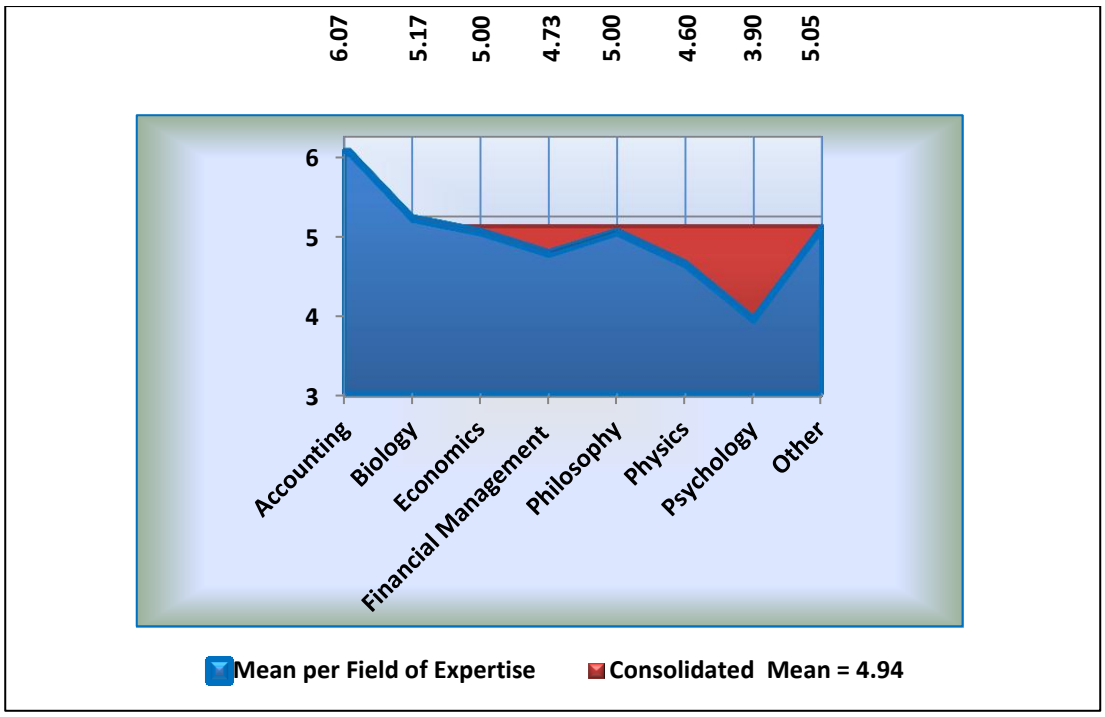
Statement D3 tests the respondent's perspective with regard to the relationship that exists between dissipative structures and self-organisation, portraying dissipative structures as a prerequisite for self-organisation. In this regard research findings indicate that 64.78% of the respondents agreed with the statement made by Prigogine (1996:70) with 15.91% of the respondents disagreeing with it, and a further 19.32% choosing to remain neutral on the matter.

Apart from the relatively low mean obtained from the field of psychology, all the other fields provided means in excess of 4.6, resulting in a consolidated group mean of 4.94, indicating a general consensus among respondents in favour of the statement at the time that the research was conducted.

Table 23 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.14%	3.41%	11.36%	19.32%	22.73%	26.14%	15.91%	100.00%

Figure 23 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement D4

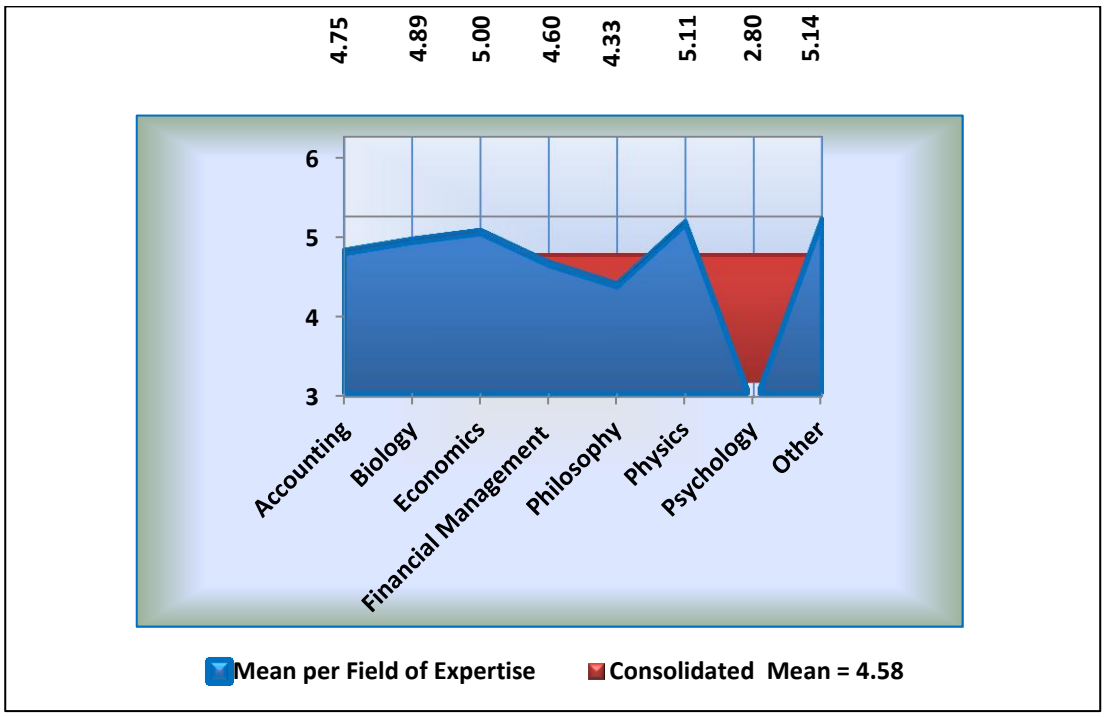
Structures emerge, but only as temporary solutions that facilitate rather than interfere.

Statement D4 tests how the research participants perceive structure formation, reflecting upon it as temporary solutions used to facilitate change.

Table 24 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.38%	5.32%	11.70%	14.89%	27.66%	18.09%	15.96%	100.00%

Figure 24 Means of the converted response ratings for each field of expertise as well as for the consolidated group



From the findings it was established that 61.71% of the respondents agreed with the statement made by Wheatley (1994:16) with 23.4% disagreeing with it and a further 14.89% choosing to remain neutral on the matter. A review of the means indicate that with the exception of the low mean obtained from the field of psychology, all the other fields provided means in excess of 4.33, resulting in a consolidated group mean of 4.58; thereby reflecting clear support for the statement by the majority of the respondents at the time.

Statement D5

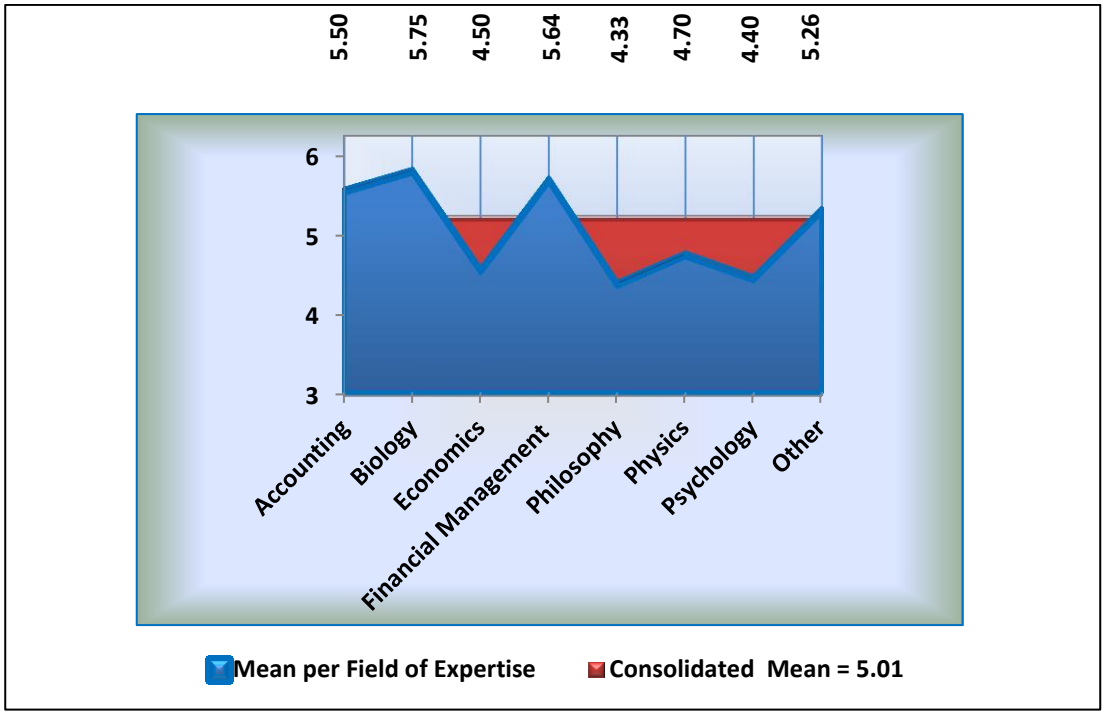
Open systems have a continuous exchange of energy and matter with their environment as part of autopoiesis (self-creation).

Statement D5 tests a respondent's perspective with regard to whether or not, as part of autopoiesis, open systems have a continuous exchange of energy and matter with their environment. Depicting the exchange as a condition precedent for future survival, the statement, if accepted, implies the exchange to be a condition precedent for any decision being made, thereby making it a fundamental special condition of the financial value decision model.

Table 25 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.06%	2.13%	5.32%	19.15%	29.79%	26.60%	15.96%	100.00%

Figure 25 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Research findings indicate that 72.35% of the respondents agreed with the statement made by Capra (1983:291), a theoretical physicist, with 8.51% disagreeing with it, and a further 19.15% choosing to remain neutral on the matter. Reflecting on the means obtained from the respective fields tested by the study, relatively strong means were obtained, resulting in a consolidated group mean of 5.01; indicating a relatively strong consensus among respondents in favour of the statement at the time the research was conducted.

Statement D6

Dissipative structures maintain and develop structure by breaking down other structures in the process of metabolism.

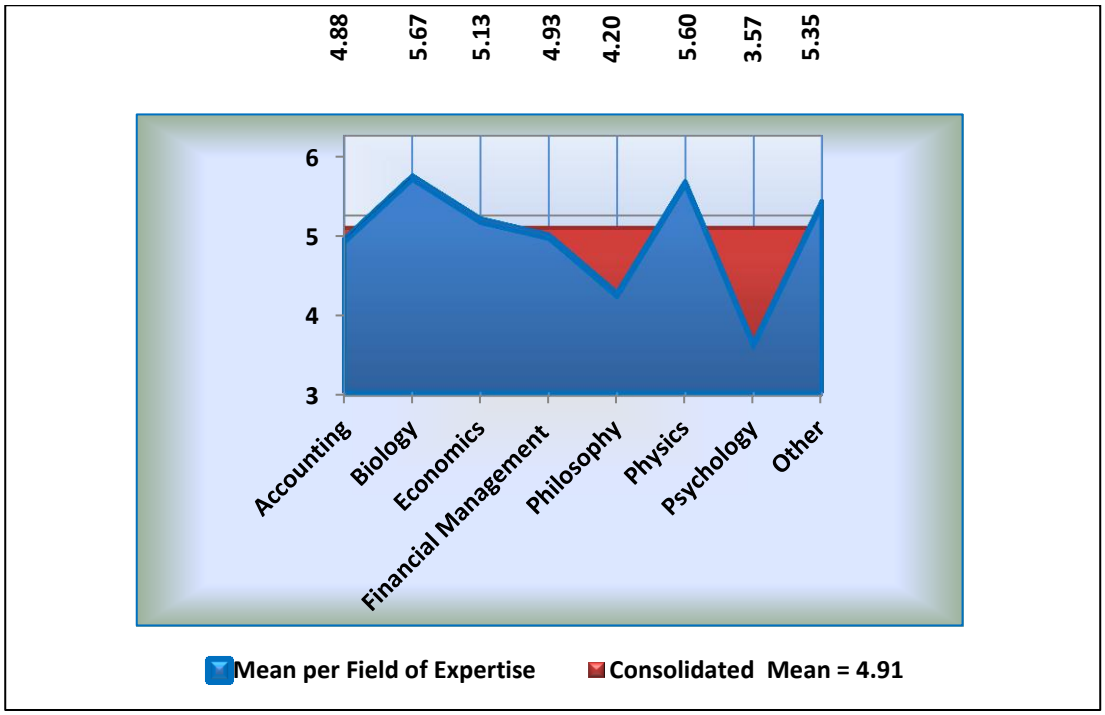
Statement D6 attempts to establish how respondents envisage the maintenance and development of dissipative structures, depicting the process as the breaking down of some structures towards the maintenance and development of others through the process of metabolism. From the findings it was established that 66.17% of the respondents agreed with the statement made by (Capra 1983:292) with 11.24% of the respondents disagreeing, and a further 23.6% choosing to remain neutral on the matter.

A review of the means indicate that with the exception of the low mean obtained from the field of psychology, all the other fields provided means in excess of 4.20, resulting in a consolidated group mean of 4.91; indicating a general consensus among respondents in favour of the statement at the time the research was conducted.

Table 26 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.37%	2.25%	5.62%	23.60%	19.10%	33.71%	12.36%	100.00%

Figure 26 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement D7

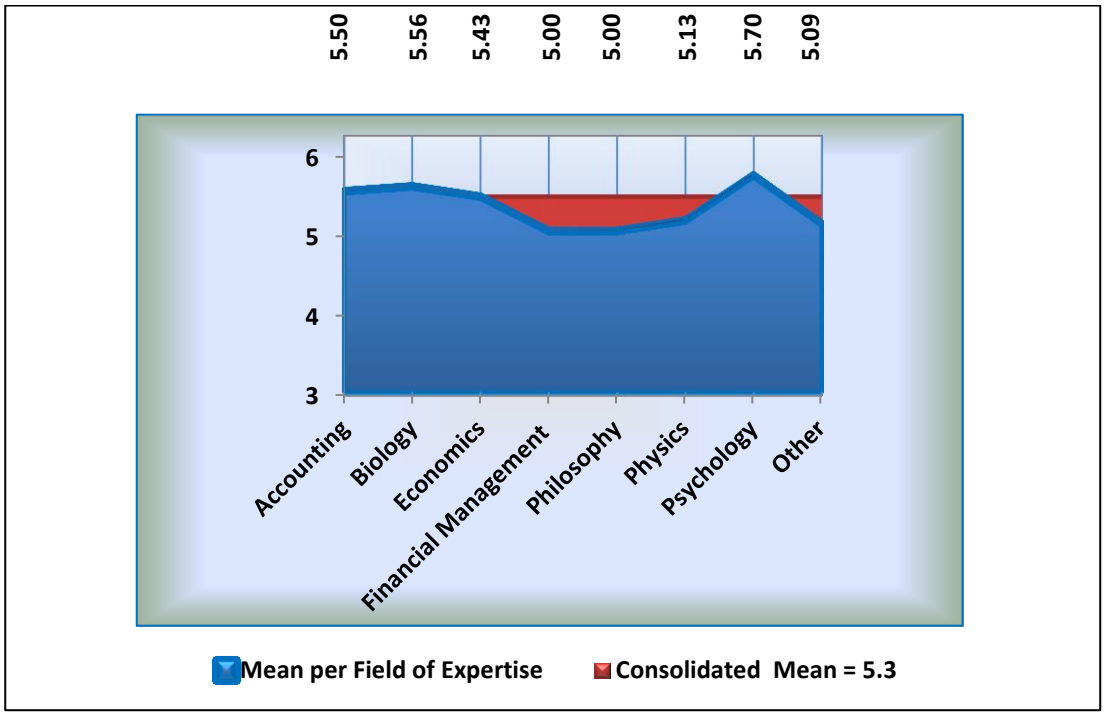
Dynamic balance exists between rates of external change and rates of internal adaptation to change.

Statement D7 tests a respondent's perspective about dynamic balance, portraying it as the balance that exists between rates of external change and rates of internal adaptation to change; both if accepted forming special conditions of not only the value process but also the motives behind the decision-making process as portrayed by Garratt as cited in Gouws and Lucouw (2000:31). Research findings tend to suggest that of the respondents tested 78.4% agreed with the statement, with 14.77% choosing to remain neutral and a further 6.83% disagreeing with it. In general, high individual means were obtained from all the fields tested in the study, amounting to a consolidated group mean of 5.3; thereby tending to suggest that external change and rates of internal adaptation to change must form part of the specific conditions associated with the general principle of dissipation.

Table 27 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.14%	4.55%	1.14%	14.77%	23.86%	39.77%	14.77%	100.00%

Figure 27 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement D8

It is a characteristic of living systems to continuously renew themselves and to regulate this process in such a way that the integrity of their structure is maintained.

Statement D8 presents regulation and renewal as prerequisites for living systems towards the maintenance of their structural integrity, a proposition which, if accepted by the respondents, require both these aspects to be part of the special conditions of the general principle of dissipation.

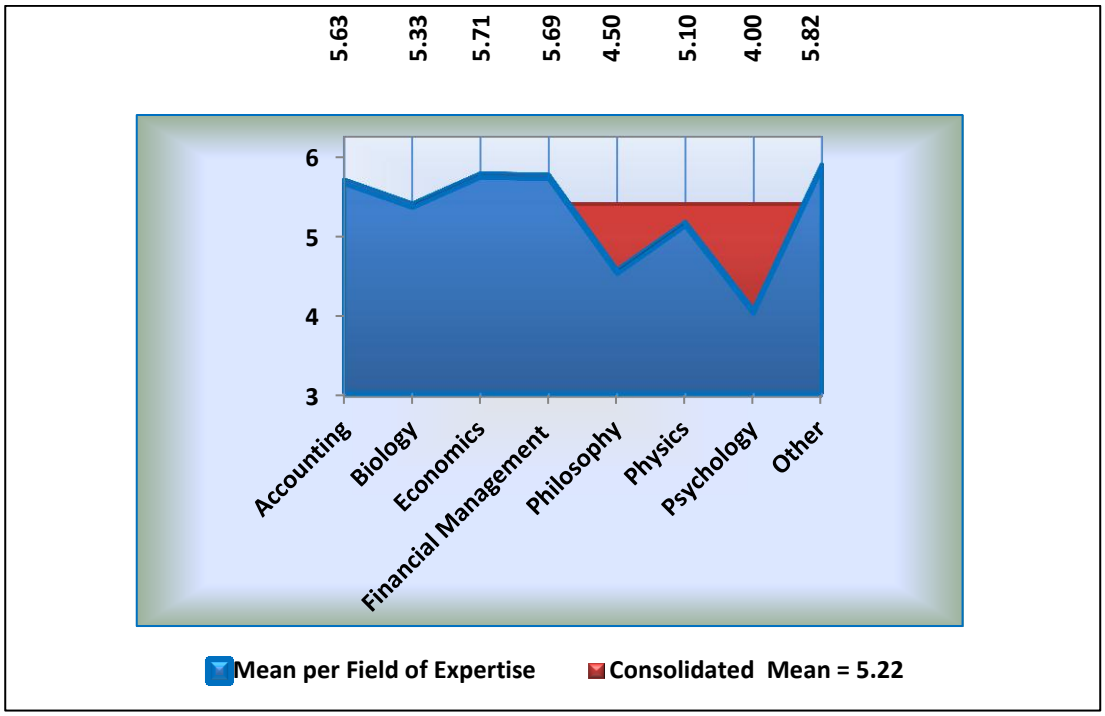
This is a proposition research findings seem to concur with, as 76.84% of the respondents agreed with the statement made by Jantsch as cited in Wheatley (1994:18), an astrophysicist, 13.69% of the respondents disagreeing with it, and a further 9.47% choosing to remain neutral on the matter.

Strong means were also obtained across all the respective fields tested by the study, resulting in a consolidated group mean of 5.22, indicating strong support among respondents in favour of the statement at the time that the research was conducted.

Table 28 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.21%	3.16%	6.32%	9.47%	20.00%	31.58%	25.26%	100.00%

Figure 28 Means of the converted response ratings for each field of expertise as well as for the consolidated group



SECTION E CONSCIOUSNESS, ARTIFICIAL REALITY AND THE ENFOLDING OF A MUTUAL CONTEXT

Statement E2

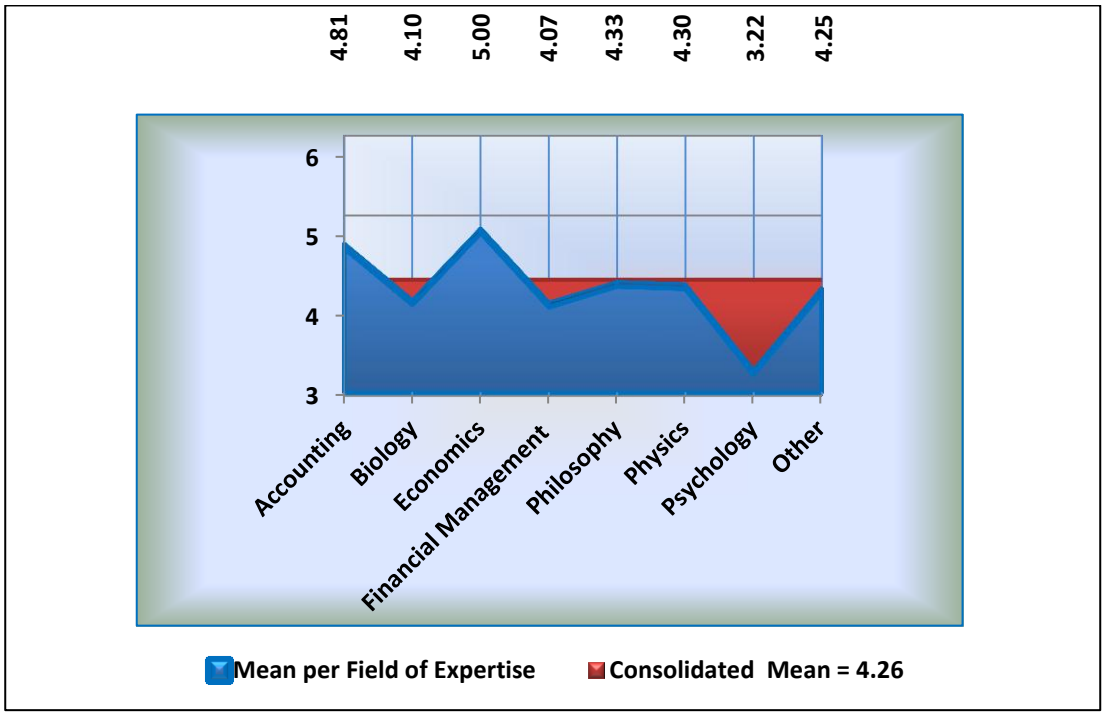
The whole is seen all at once and then unfolded.

Statement E2 tests if during the initial "becoming aware" phase participants see the external world in well-defined segments or reflect upon it as a whole all at once and then unfold it. Here the findings indicate that 47.96% of the respondents agreed with the statement made by Bohm (1994:221) with 39.8% disagreeing with it, and a further 12.24% choosing to remain neutral on the matter.

Table 29 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
0.00%	19.39%	20.41%	12.24%	15.31%	26.53%	6.12%	100.00%

Figure 29 Means of the converted response ratings for each field of expertise as well as for the consolidated group



A review of the means however, indicate that only the field of psychology, with a mean of 3.22, displayed reservations about the statement with the consolidated group mean amounting to 4.26 indicating strong conflicting opinions among the respondents with regard to the statement.

Statement E3

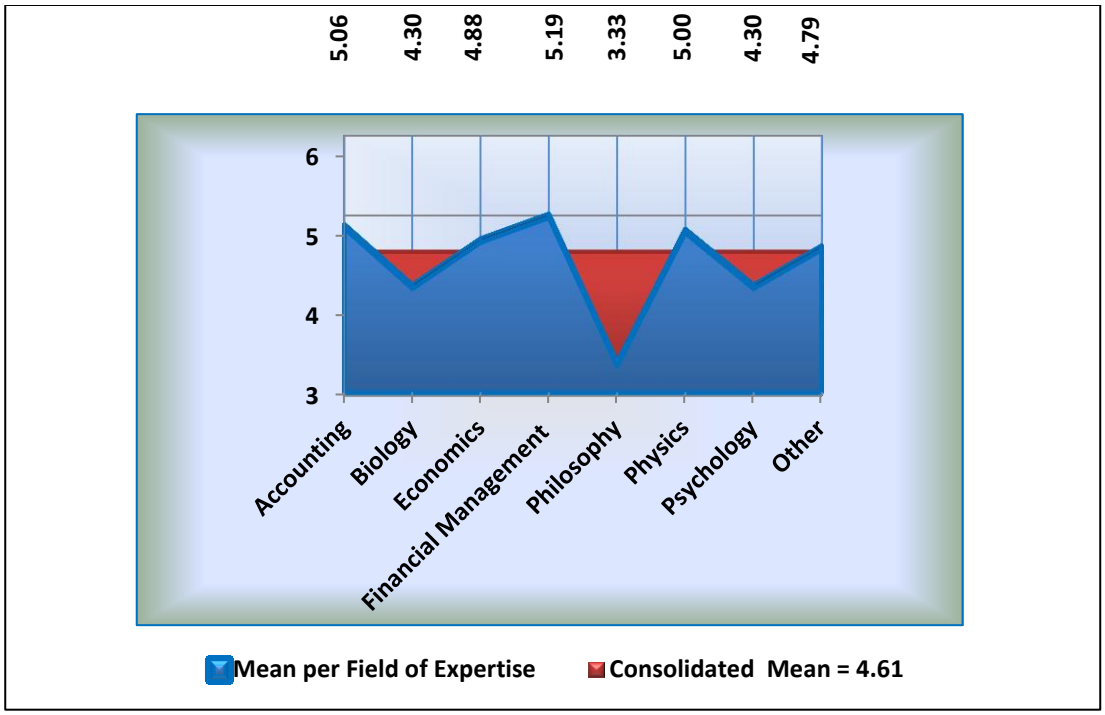
We create an artificial world as a frame of reference.

Statement E3 tests the respondent's perception with regard to the role of the artificially created world, representing it as Maslow (1954:176). a psychologist, envisaged as a frame of reference.

Table 30 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
5.05%	8.08%	9.09%	13.13%	21.21%	32.32%	11.11%	100.00%

Figure 30 Means of the converted response ratings for each field of expertise as well as for the consolidated group



This is a proposition with which research findings seem to concur, with 64.64% of the respondents agreeing with the statement made, 22.22% disagreeing with it, and a further 13.13% choosing to remain neutral on the matter. Apart from the relatively low mean obtained from the field of philosophy, all the other fields provided means in excess of 4.3, resulting in a consolidated group mean of 4.61, indicating a general consensus among respondents in favour of the statement at the time that the research was conducted.

Statement E4

Without context words and actions have no meaning.

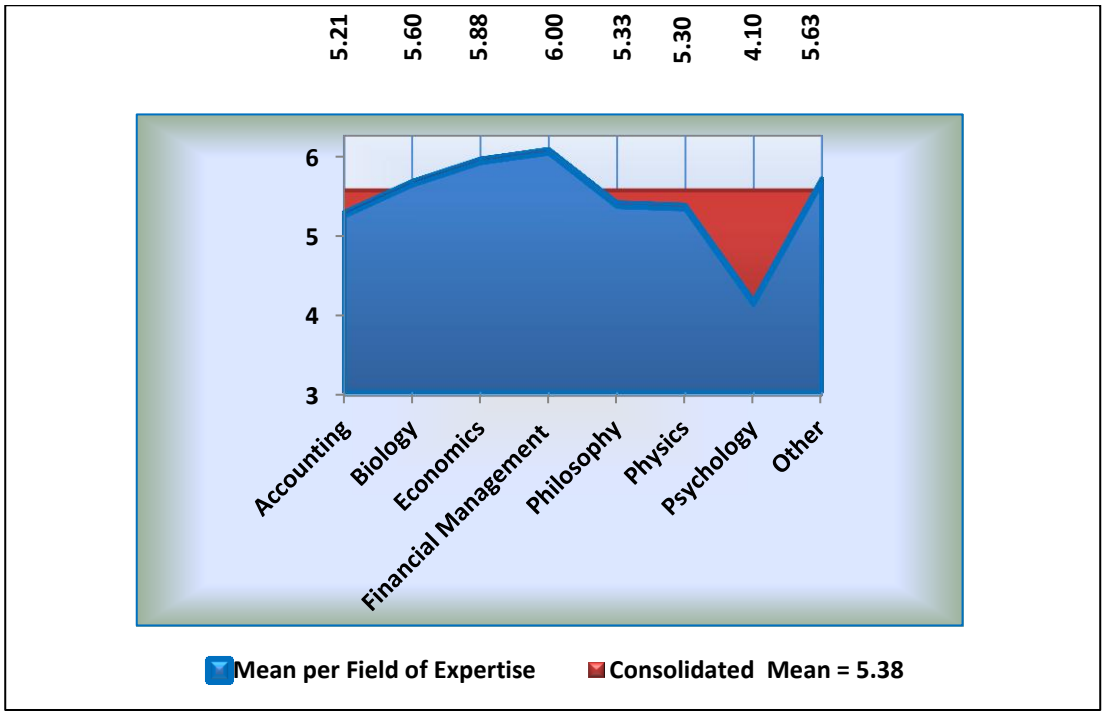
Statement E4, tests what value respondents place on the context surrounding words and actions, putting forward for consideration that without context, words and actions have no meaning, a proposition that illuminates the interconnectivity that exists among constructs and concepts, impressing its importance towards the attainment of meaning. This is something which, if accepted, necessitates the incorporation of the concept of a context as a specific condition of the general principle of consciousness.

Research findings pertaining to this statement indicate that 77.31% of the respondents agreed with the statement made by Bateson (1979:15), an anthropologist, with only 11.33% disagreeing with it, and a further 11.34% choosing to remain neutral on the matter. Strong means were also obtained across all the respective fields tested by the study, resulting in a consolidated group mean of 5.38, indicating strong support among respondents in favour of the statement at the time that the research was conducted.

Table 31 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.09%	3.09%	5.15%	11.34%	15.46%	37.11%	24.74%	100.00%

Figure 31 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement E5

Meaning and language stem from the shared interpretations of the minds of the sender and receiver.

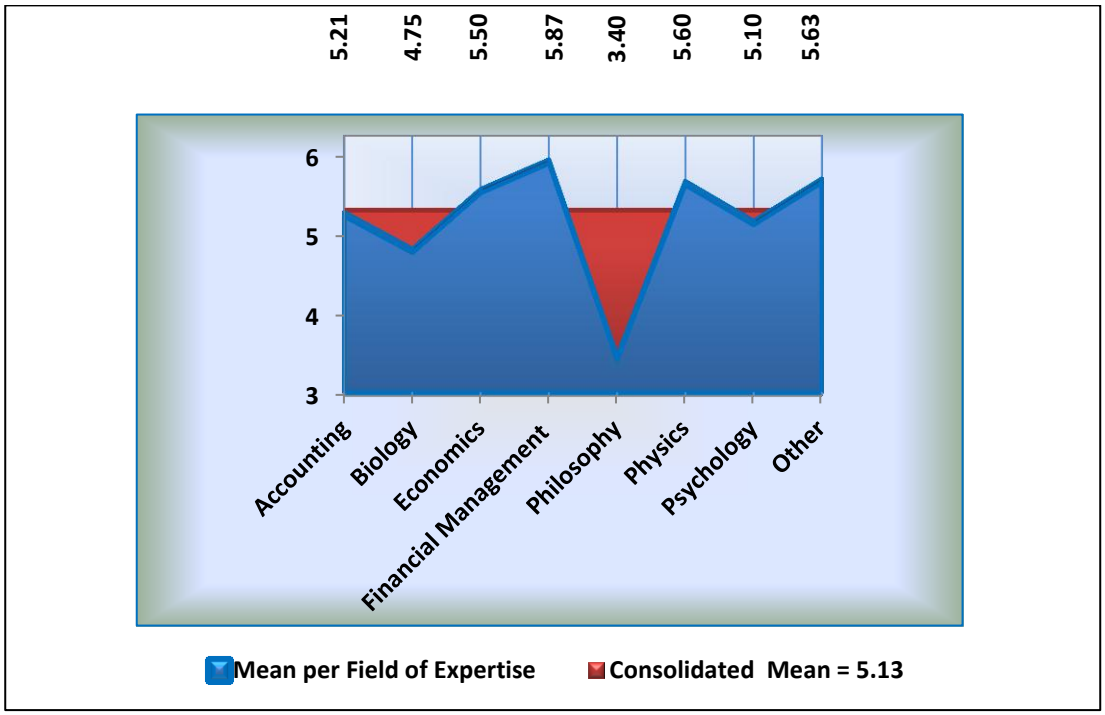
Statement E5 tests if respondents believe meaning and language to stem from shared interpretations. If accepted, this proposition implies a uniformity in how individuals interpret symbols and words, making the shared interpretation a pre-requisite for a shared context, which as such must also form a specific condition of the financial value decision model.

Research findings pertaining to this statement indicate that 77.66% of the respondents agreed with the statement made by Cohne & Stewart (2000:354), a scientist and mathematician respectively, with only 13.84% of the respondents disagreeing with it, and a further 8.51% choosing to remain neutral on the matter.

Table 32 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.13%	4.26%	7.45%	8.51%	24.47%	27.66%	25.53%	100.00%

Figure 32 Means of the converted response ratings for each field of expertise as well as for the consolidated group



With the exception of philosophy all the other fields tested portrayed relatively strong means resulting in a consolidated group mean of 5.13, indicating a general consensus among the majority of respondents in favour of the statement at the time that the research was conducted.

Statement E9

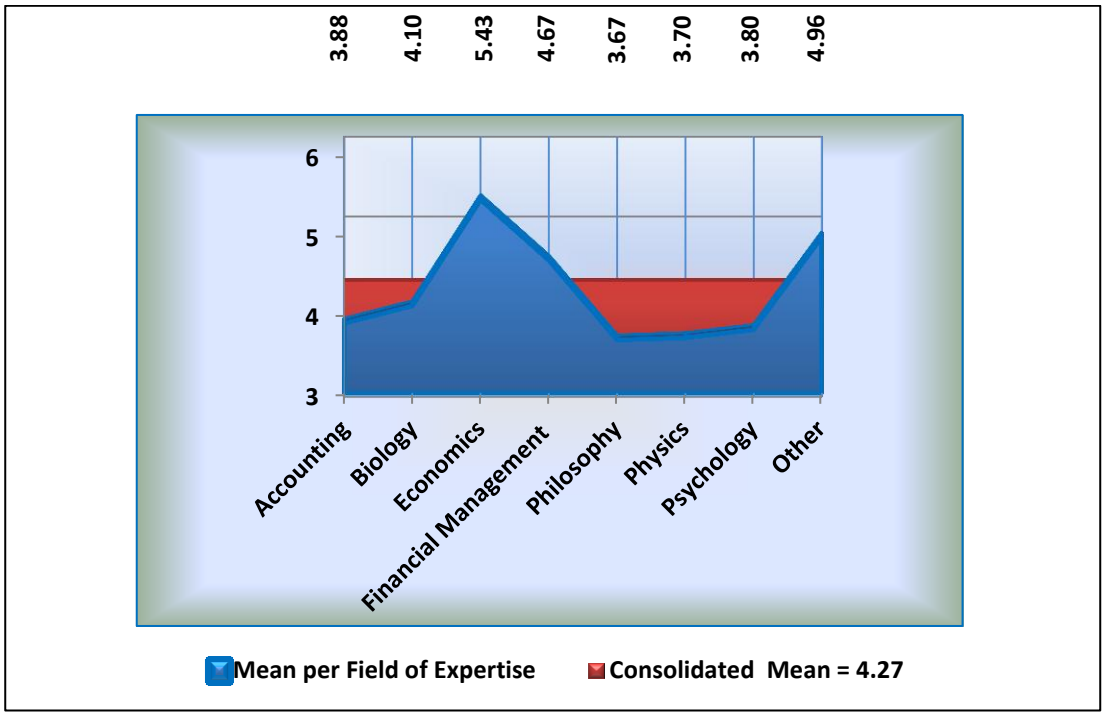
The world everyone sees is not the world that exists independently but a world which we bring forth with others.

Statement E9 tests another ontological position of the respondents by reflecting on the world as a construction that is being brought forth with others and not as something external which exists independently from the observer (Maturana & Varela 1998:245). This is a proposition with which 55.67% of the respondents agreed, with 30.93% disagreeing and a further 13.4% choosing to remain neutral on the matter. Reflecting on the means obtained from the various disciplines, it appears that several fields, including accounting, philosophy, physics and psychology, displayed reservations about the statement, resulting in a consolidated group mean of 4.27.

Table 33 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
8.25%	11.34%	11.34%	13.40%	20.62%	26.80%	8.25%	100.00%

Figure 33 Means of the converted response ratings for each field of expertise as well as for the consolidated group



SECTION F VALUE-A PERSONAL EXPRESSION OF MEASURE

In section F the questionnaire reflects on the construct of value and attempt to establish what its relationship is with the general principle of measurement.

Statement F1

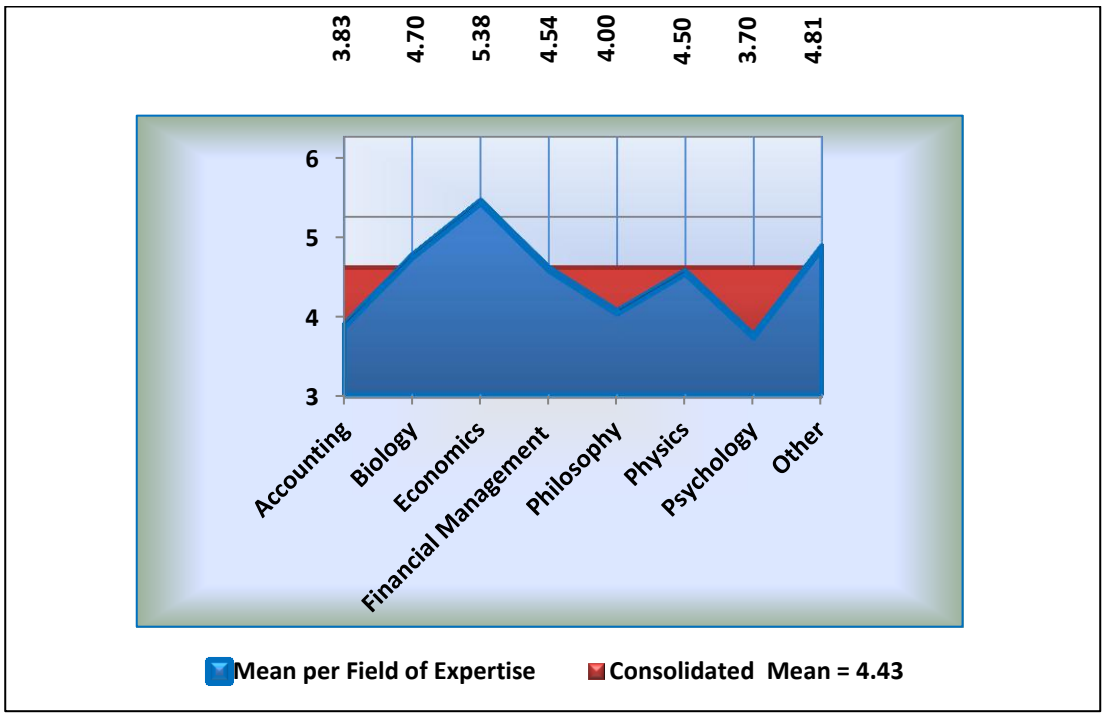
Value imposes constraints on the feasibility of probability distributions in order to reduce entropy.

Statement F1 tests the participant's perception with regard to the proposition that value imposes constraints on the feasibility of probability distributions, thereby resulting in a reduction in entropy.

Table 34 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
9.09%	2.27%	6.82%	36.36%	11.36%	27.27%	6.82%	100.00%

Figure 34 Means of the converted response ratings for each field of expertise as well as for the consolidated group



This is a proposition made by both Beinhocker (2007:105-7, 303), an economic thinker and writer, as well as Kapur & Kesavan (1992:6), both mathematicians, which 45.45% of the respondents appeared to concur with, with 18.18% of the respondents disagreeing with the statement and a further 36.36% choosing to remain neutral on the matter. Reflecting upon this while taking the consolidated group mean of 4.43 into account, it appears that despite reservations being displayed by the fields of accounting and psychology a general consensus among the respondents in favour of the statement existed at the time that the research was conducted.

Statement F2

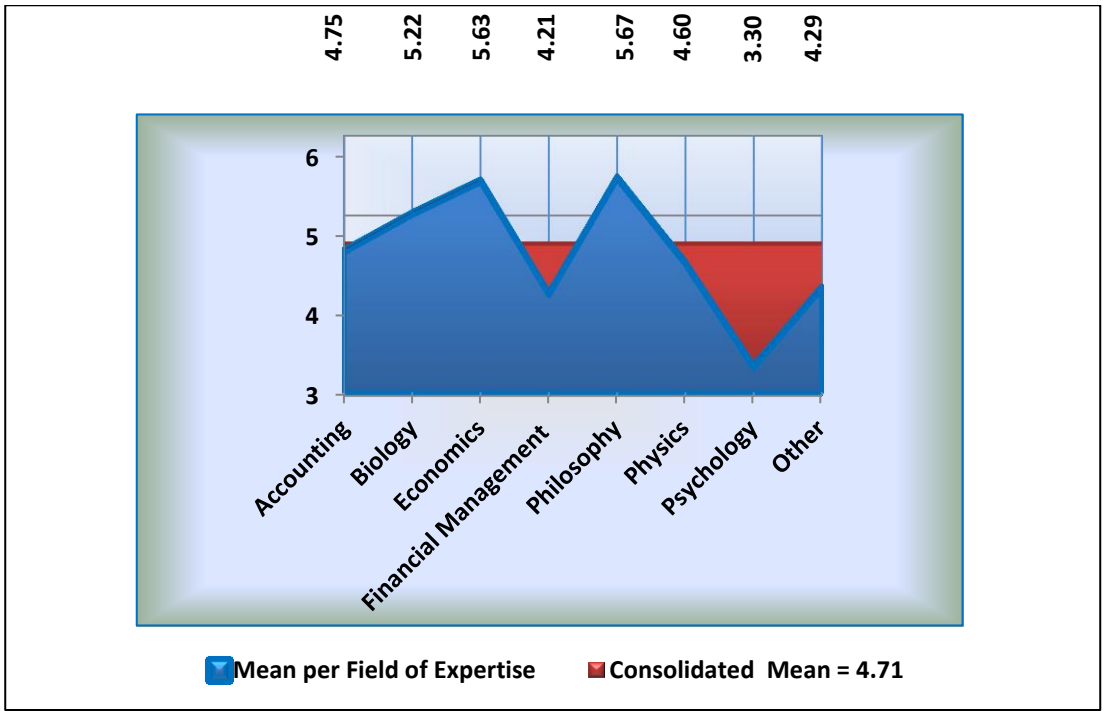
All value-creating economic transformations and transactions are thermodynamically irreversible.

Statement F2 tests the respondent's belief with regard to whether or not value-creating economic transformations and transactions are, as Bernstein (2006:303) a financial historian noted, thermodynamically irreversible. Research results pertaining to this statement indicate that 52.82% of all the respondents tested agreed with the statement with 23.6% of the respondents disagreeing with it and 23.06% choosing to remain neutral on the subject.

Table 35 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.25%	8.99%	12.36%	23.60%	14.61%	30.34%	7.87%	100.00%

Figure 35 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Reflecting on the means of the various fields, it becomes apparent that apart from psychology none of the other fields showed any serious reservations about the statement, resulting in a consolidated group mean of 4.71; indicating a general consensus in favour of the statement.

Statement F3

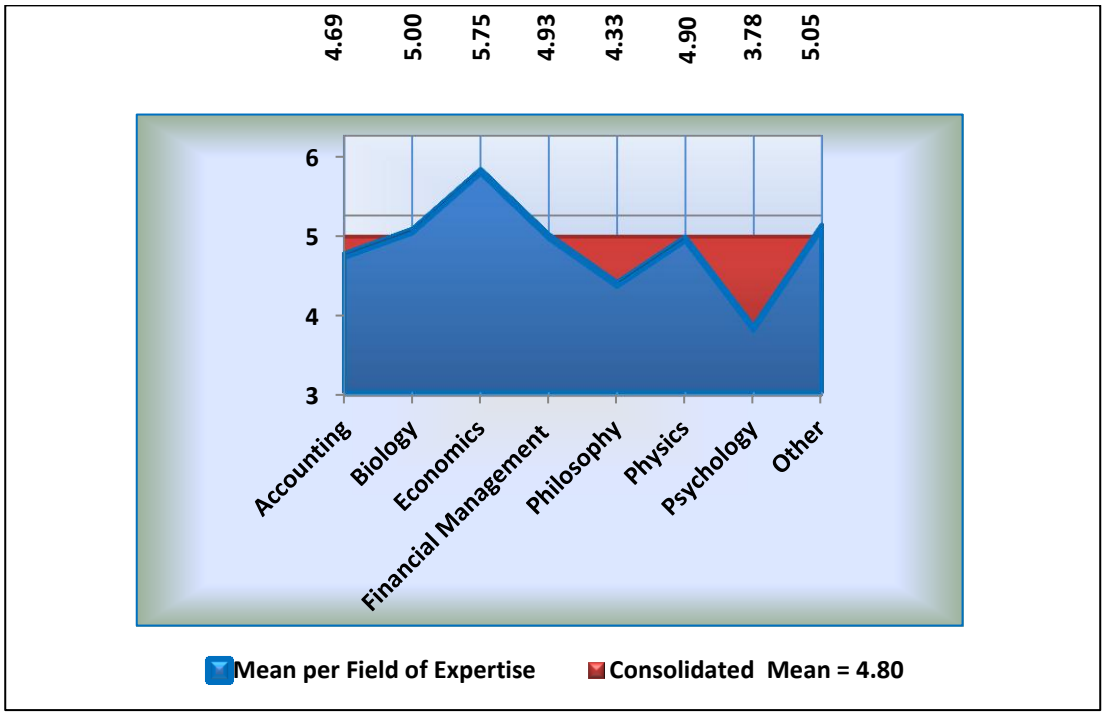
The expression of ourselves and the revelation it reveals is what we describe as value.

Statement F3 personalises value by testing if participants perceive value to be an expression of themselves, a personal measure of sorts that embrace their total nature.

Table 36 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.38%	5.32%	6.38%	12.77%	24.47%	32.98%	11.70%	100.00%

Figure 36 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Research findings with regard to the statement indicate that 69.15% of the respondents agreed with the statement made by Taylor (1991: 62), a philosopher, with only 18.08% of the respondents disagreeing with it, and a further 12.77% of the respondents choosing to remain neutral on the matter. An analysis of the means indicate that with the exception of the field of psychology all the other fields tested, displayed means in excess of 4.3 and above indicating a general support among the respondents in favour of the statement as is reflected by the consolidated group mean of 4.8.

Statement F4

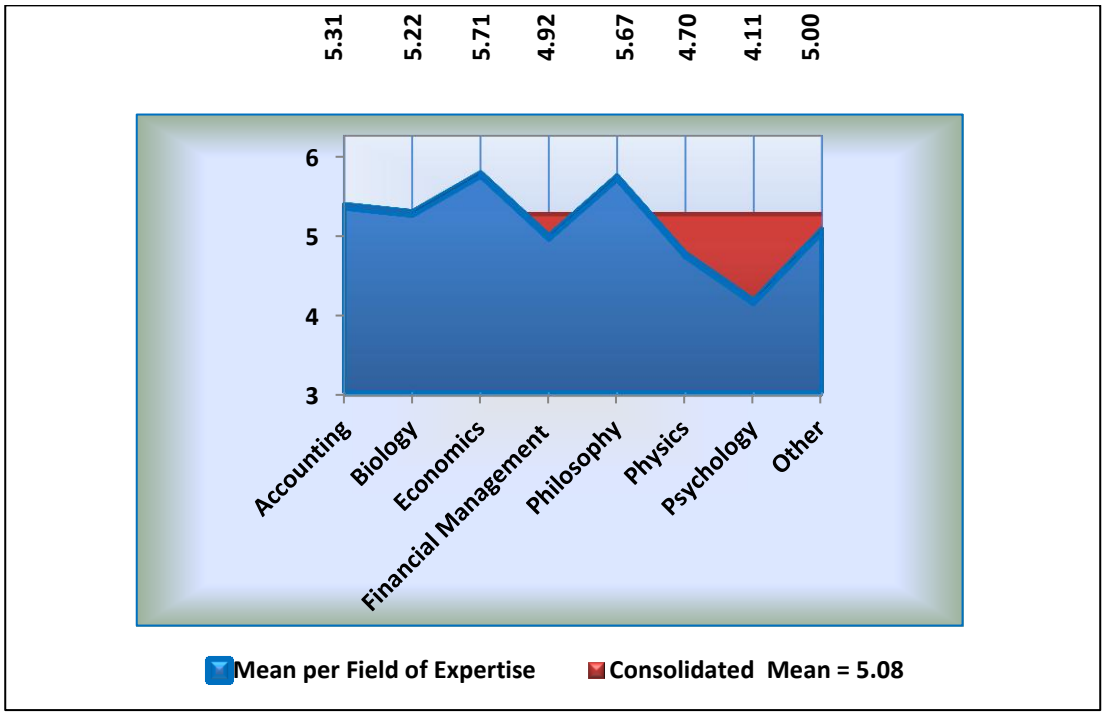
Scales must be reflected upon as foreground estimates or provisional perspectives.

With Statement F4 the questionnaire puts forward for consideration a proposed definition for scales, presenting them as foreground estimates or provisional perspectives used to create a context among variables, If accepted this proposition provides not only clarification about what a scale is but also ensures that as a specific condition it is correctly portrayed and incorporated as part of the financial value decision-making model.

Table 37 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.12%	2.25%	3.37%	26.97%	24.72%	31.46%	10.11%	100.00%

Figure 37 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Research findings with regard to the statement indicate that 66.29% of the respondents agreed with the statement made by Nietzsche (1989:10), a philosopher, with only 6.71% of the respondents disagreeing with it, and a further 26.97% choosing to remain neutral on the matter. An analysis of the means indicate relatively high means across all the respective fields tested by the study, resulting in a consolidated group mean of 5.08, indicating strong support among respondents in favour of the statement.

Statement F6

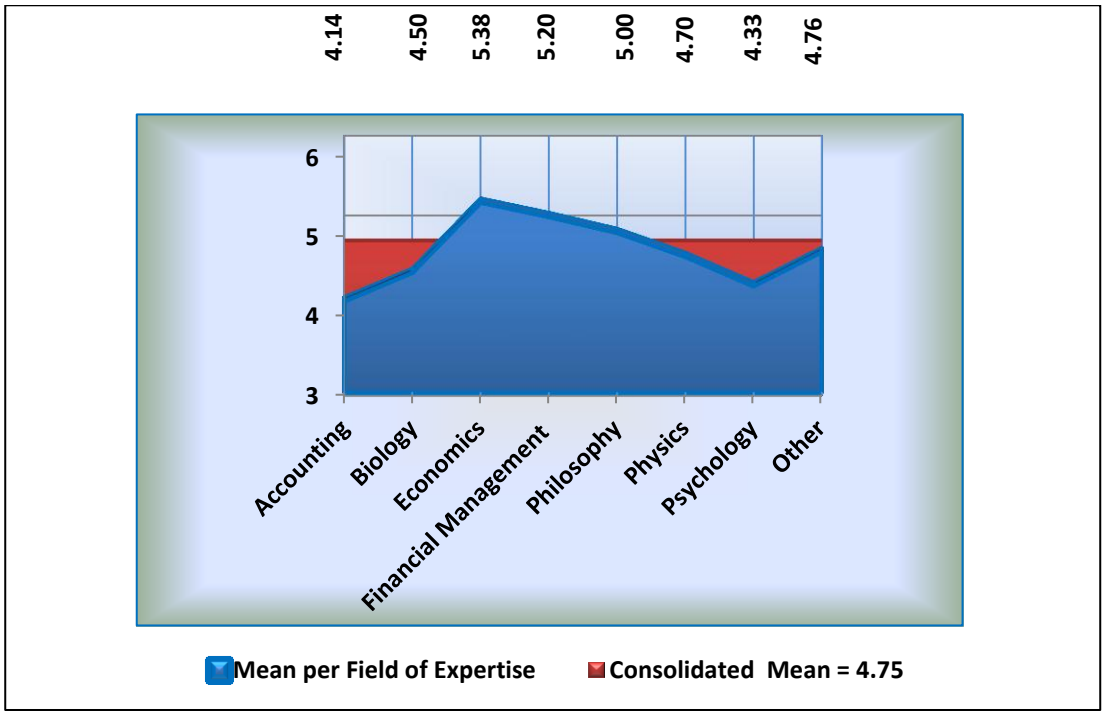
Value is something that each individual person weighs on a purely private, not a public, set of scales.

With Statement F6 the questionnaire tests the participant's perspective with regard to the nature of value, reflecting on it as something that each individual person weighs on a purely private, and not a public set of scales; attributing to it an undeniable subjectivism that forms a key specific condition of the general principle of value in the model. Research findings with regard to this statement indicate that 62.1% of the respondents agreed with the statement made by (Harper 2006:2), an economist, with 26.32% of the respondents disagreeing with it, and a further 11.58% choosing to remain neutral on the matter. Reflecting on the means obtained from the respective fields, none are below 4, which, when combined with the consolidated group mean of 4.75, indicates a general consensus among the various respondents in favour of the statement.

Table 38 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.21%	14.74%	7.37%	11.58%	16.84%	29.47%	15.79%	100.00%

Figure 38 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement F7

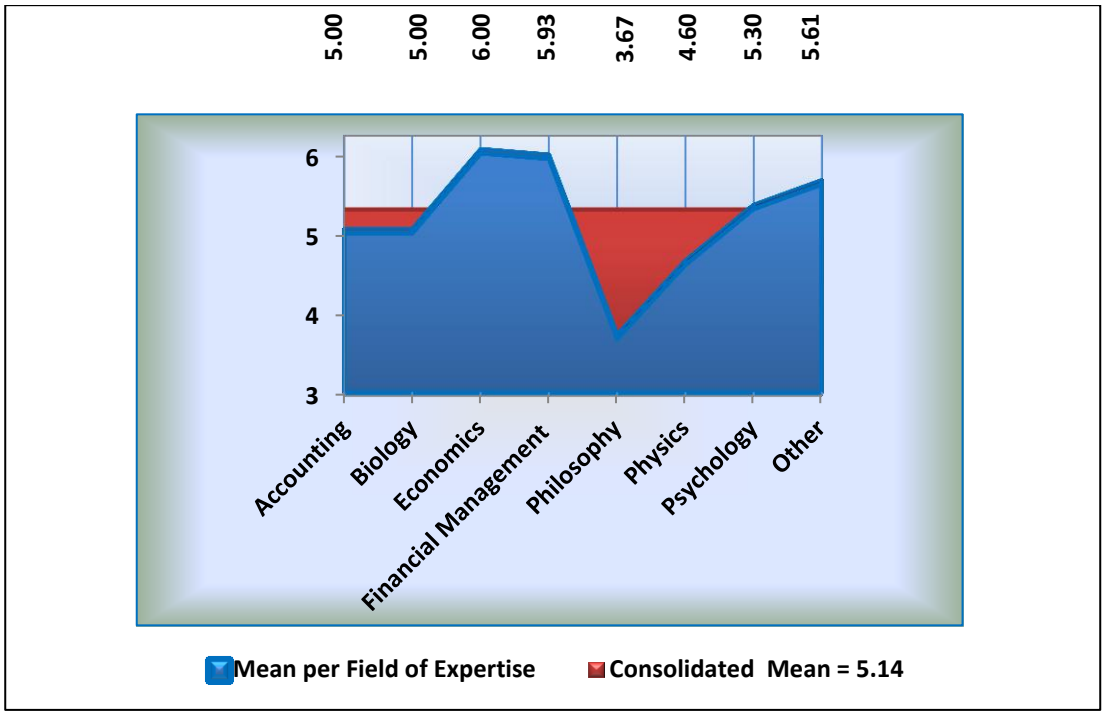
Value is a relative concept within the appraisal of each individual.

Statement F7 continues to explore the nature of value by testing its perceived relativity in relation to the appraisal of each individual. Research findings indicate that 72.92% of the respondents agreed with the statement made by Harper (2006:3), an economist, with 15.63% disagreeing with it, and a further 11.46% choosing to remain neutral on the matter. Reflecting on the means of the respective fields, it appears that with the exception of the field of philosophy, with a mean of 3.67, all the other means were in excess of 4.6, resulting in a consolidated group mean of 5.14 which indicates a general consensus among the respondents tested in favour of the statement.

Table 39 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
5.21%	3.13%	7.29%	11.46%	16.67%	29.17%	27.08%	100.00%

Figure 39 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement F8

Value has no predetermined fixed quantities.

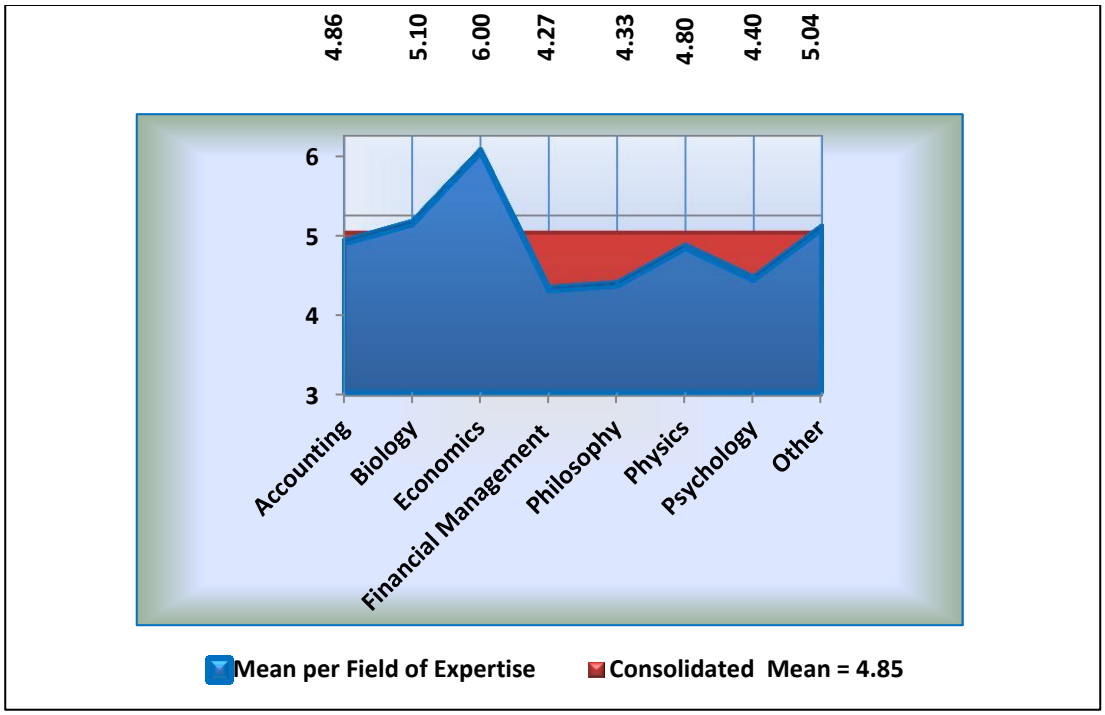
Statement F8 tests if respondents believe value to have any predetermined fixed quantities. Here, with 63.55% of the respondents agreeing with the statement, 23.96% disagreeing with the statement and a further 12.5% choosing to remain neutral on the matter it appears that a general consensus in favour of the statement existed among the respondents at the time that the research was conducted.

This point of view is also supported by the consolidated group mean of 4.85 as well as the fact that none of the individual fields displayed a mean below 4.

Table 40 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.25%	11.46%	6.25%	12.50%	15.63%	22.92%	25.00%	100.00%

Figure 40 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement F10

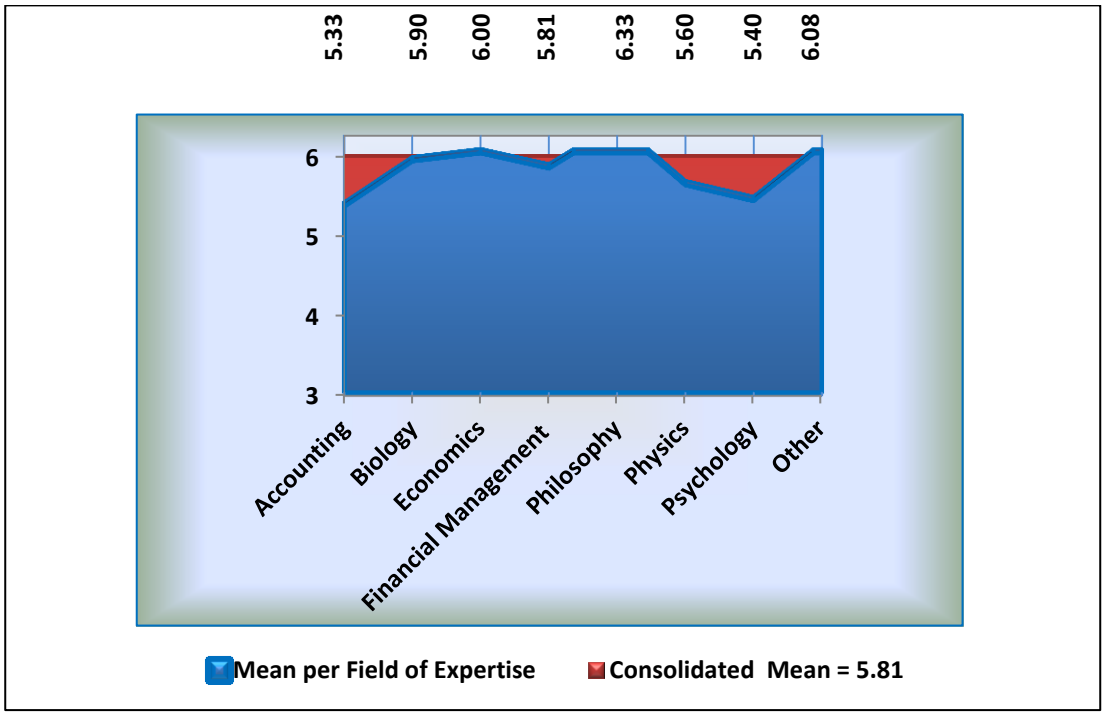
Each of us has an original way of being human; each person has his or her own "measure".

Statement F10 personalises value by testing if participants perceive value to be an expression of themselves, a personal measure of sorts that embraces their total nature.

Table 41 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.02%	1.01%	5.05%	2.02%	18.18%	34.34%	37.37%	100.00%

Figure 41 Means of the converted response ratings for each field of expertise as well as for the consolidated group



This is a proposition made by Herder as cited in Taylor (1991: 28), a philosopher, which research findings indicate 89.89% of the respondents agreed with. Only 8.08% of the respondents disagreed with the statement, and a further 2.02% chose to remain neutral on the matter, resulting in a consolidated group mean of 5.81; indicating strong support among the respondents in favour of the statement.

Statement F12

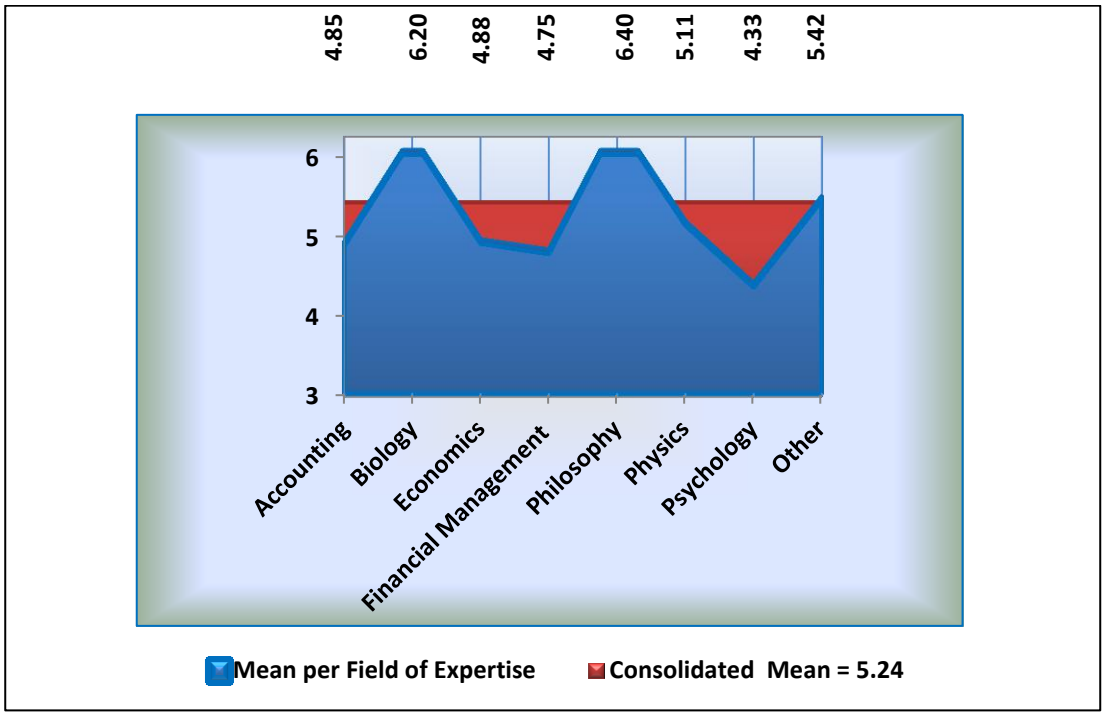
The psyche seeks an expression that will embrace its total nature.

Statement F12 tests if the respondent believes value to be an expression, a personal measure of sorts that embraces the respondent's total nature. With 65.6% of the respondents indicating that they agreed with the statement made by Jung (1978:276), a philosopher, 11.84% indicating that they disagree with it, and a further 22.58% choosing to remain neutral on the matter, it appears that, if interpreted in conjunction with the consolidated group mean of 5.24, a general consensus among the tested respondents existed in favour of the statement at the time that the research was conducted.

Table 42 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.08%	3.23%	7.53%	22.58%	16.13%	23.66%	25.81%	100.00%

Figure 42 Means of the converted response ratings for each field of expertise as well as for the consolidated group



SECTION G: CHOICE – THE CARING DIRECTION-GIVER OF CHANGE

In Section G, the questionnaire tests the general principle of choice as a direction-giver for change by, as was the case with Section B, testing various concepts and constructs associated with the principle, defining them, giving meaning to them, and creating a context from them.

Statement G3

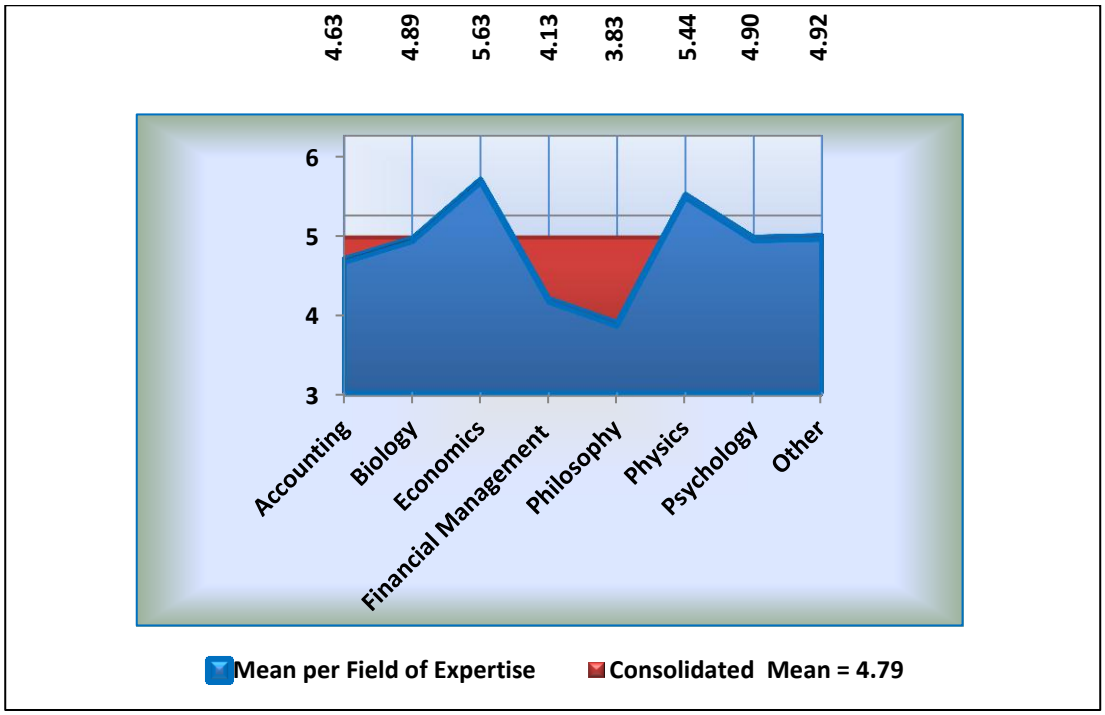
Precise knowledge is not possible.

With Statement G3 the questionnaire introduces uncertainty as a specific condition of change and tests the participant's perception with regard to the relationship that exists between them. Research findings indicate that 60.82% of the respondents agreed with the statement made by Martin Heidegger as cited in Littlejohn (1989:135), a philosopher, with 26.81% of the respondents disagreeing with it, and a further 12.37% choosing to remain neutral on the matter. Reflecting upon this, while taking the consolidated group mean of 4.79 into account, as well as the fact that of all the fields tested only the field of philosophy reflected a mean below 4, then it becomes clear that in general, the majority of the respondents are in favour of the statement.

Table 43 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
7.22%	10.31%	9.28%	12.37%	11.34%	25.77%	23.71%	100.00%

Figure 43 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G4

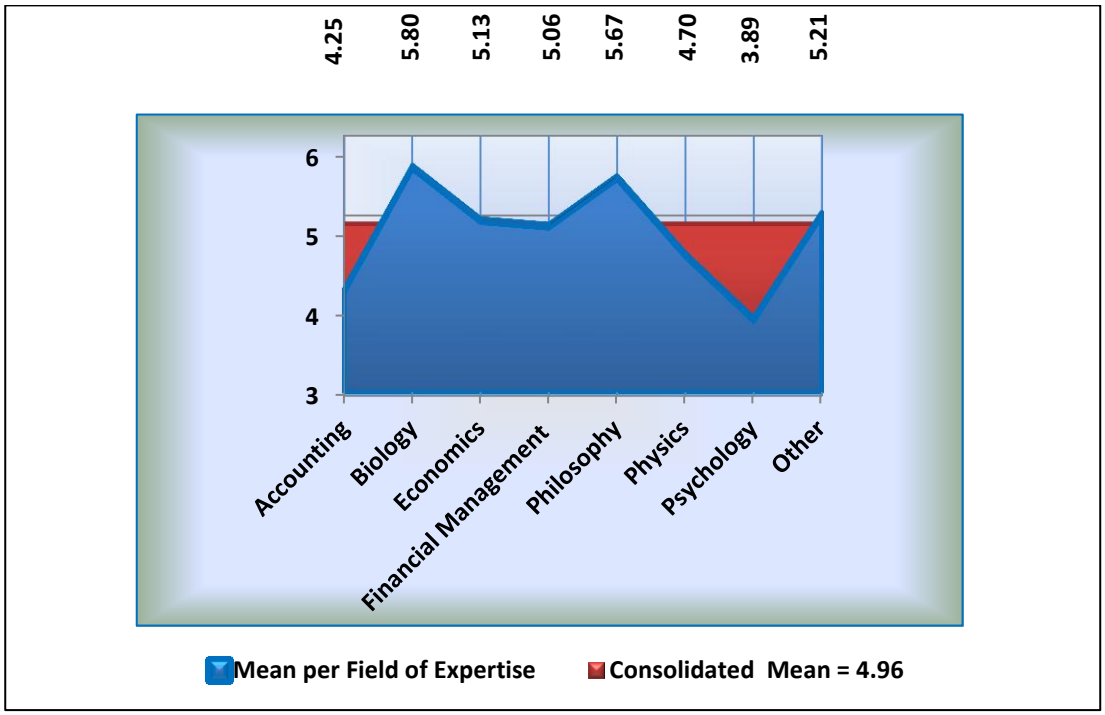
Prediction is something human beings do consciously based on some explicit model of the world.

Statement G4 expands on the general principle of choice by portraying it as something that is based on predictions made of an explicit model of the world. Research findings indicate that 67.34% of the respondents agreed with the statement made by Waldrop (1992:177) a particle physicist, with 17.34% disagreeing with it, and a further 15.31% choosing to remain neutral on the matter. An analysis of the means indicated that of all the respective fields only the field of psychology had significant reservation about the statement, resulting in a consolidated group mean of 4.96; reflecting a general consensus among the respondents in favour of the statement.

Table 44 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.04%	3.06%	12.24%	15.31%	22.45%	33.67%	11.22%	100.00%

Figure 44 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G5

The basic laws of classical quantum physics express possibilities.

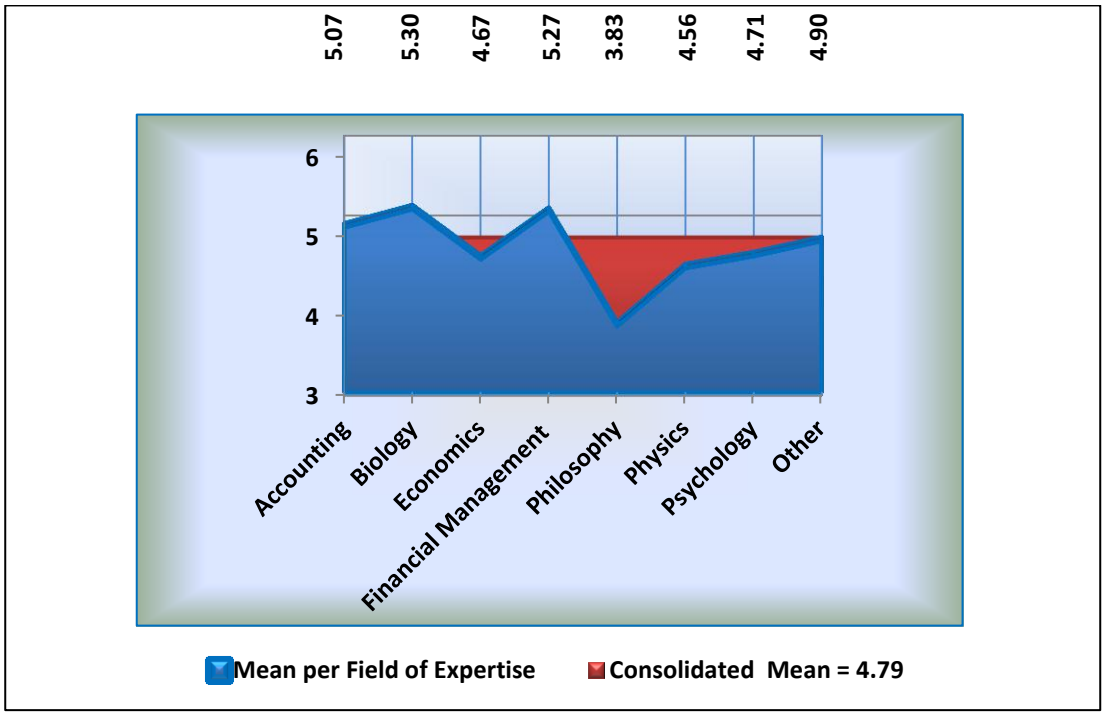
Statement G5 further expands on the general principle of choice by proposing the introduction of possibilities as one of the specific conditions associated with it. This is a proposition which 69.76% of the respondents agreed with, with 18.61% disagreeing with the statement made by Prigogine (1996:5) and a further 11.63% choosing to remain neutral on the matter.

An analysis of the means indicated that of all the respective fields only the field of philosophy indicated a significant reservation about the statement, resulting in a consolidated group mean of 4.79; indicating a general consensus among the respondents in favour of the statement.

Table 45 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
3.49%	2.33%	12.79%	11.63%	22.09%	39.53%	8.14%	100.00%

Figure 45 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G6

We have the choice to upset the design of our genes.

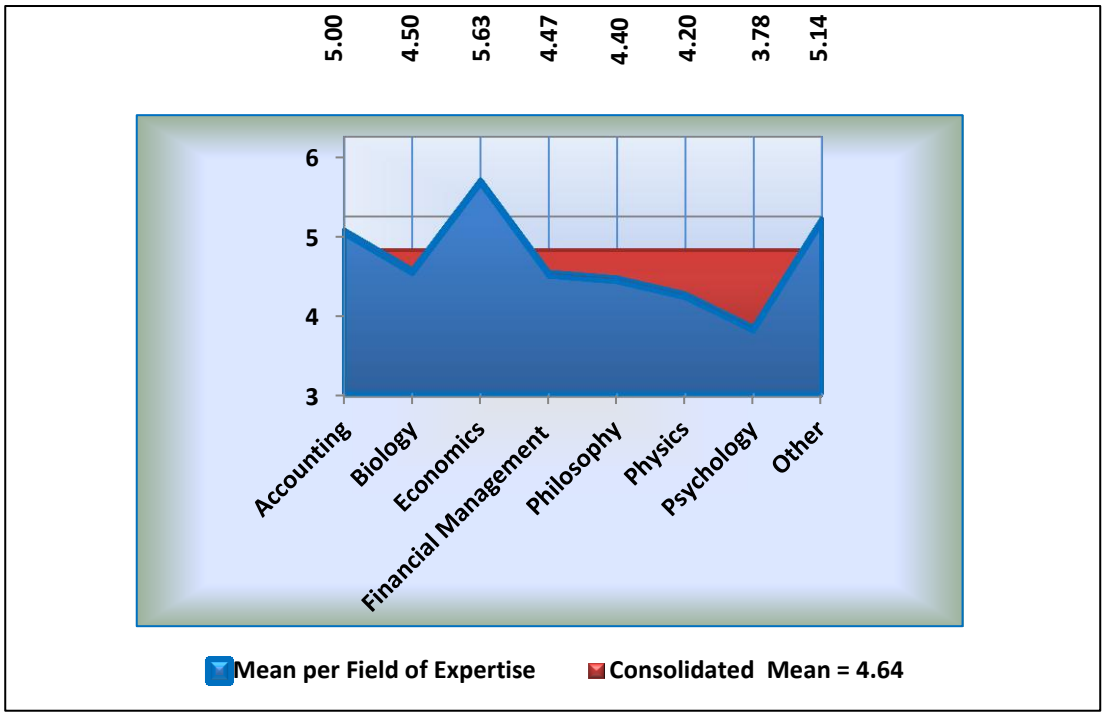
Statement G6 tests if respondents believe they have the choice to upset the design of their genes. This is a statement the majority, 62.36% of the respondents agreed with, while 23.65% disagreed with the statement made by Dawkins (2006:3), a biologist, a further

11.63% choosing to remain neutral on the matter. An analysis of the means indicated that with the exception of the field of psychology all the other fields obtained means in excess of 4.2 indicating a general consensus in favour of the statement. This is an assessment further supported by the consolidated group mean of 4.64.

Table 46 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.15%	12.90%	8.60%	13.98%	20.43%	29.03%	12.90%	100.00%

Figure 46 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G7

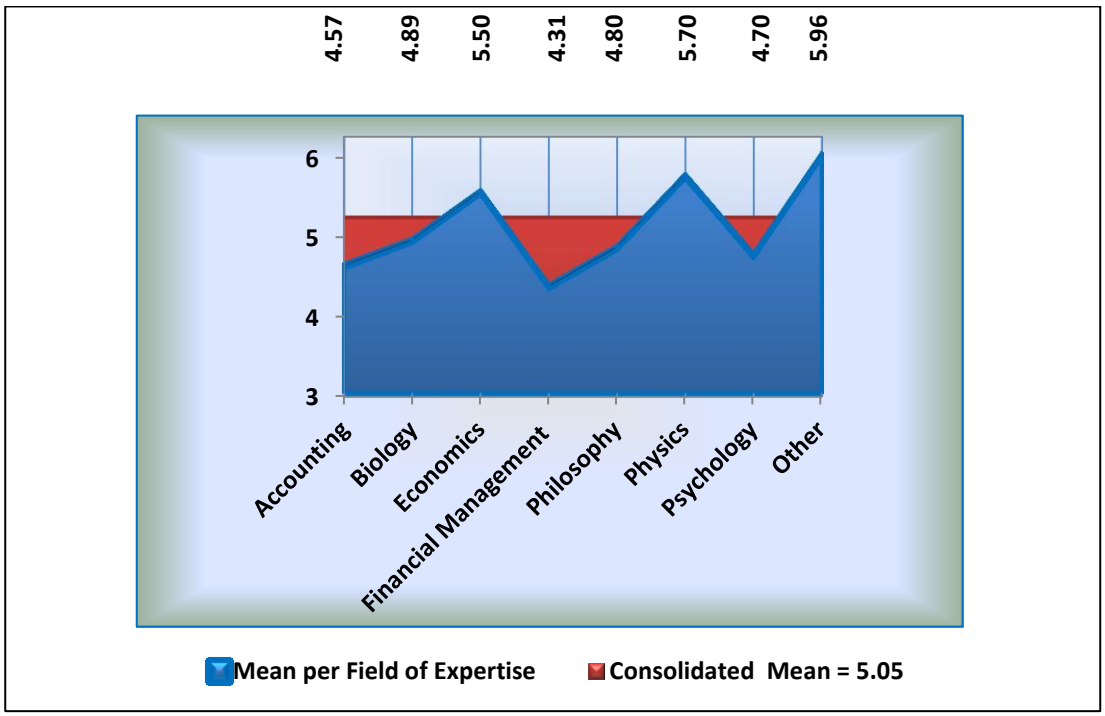
The individual is not a passive reactor but an active planner.

With Statement G7 the proposition is tested among participants that an individual should be perceived as an active planner and not a passive reactor.

Table 47 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.04%	7.29%	8.33%	15.63%	18.75%	27.08%	21.88%	100.00%

Figure 47 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Noted by Kuhn, as cited in Littlejohn (1989:100), 67.71% of the respondents agreed with the statement, with 16.66% disagreeing with it and a further 15.63% choosing to remain neutral on the subject.

Reflecting on the mean analysis, a general consensus in favour of the statement appears to exist among the respondents, resulting in a consolidated group mean of 5.05.

Statement G8

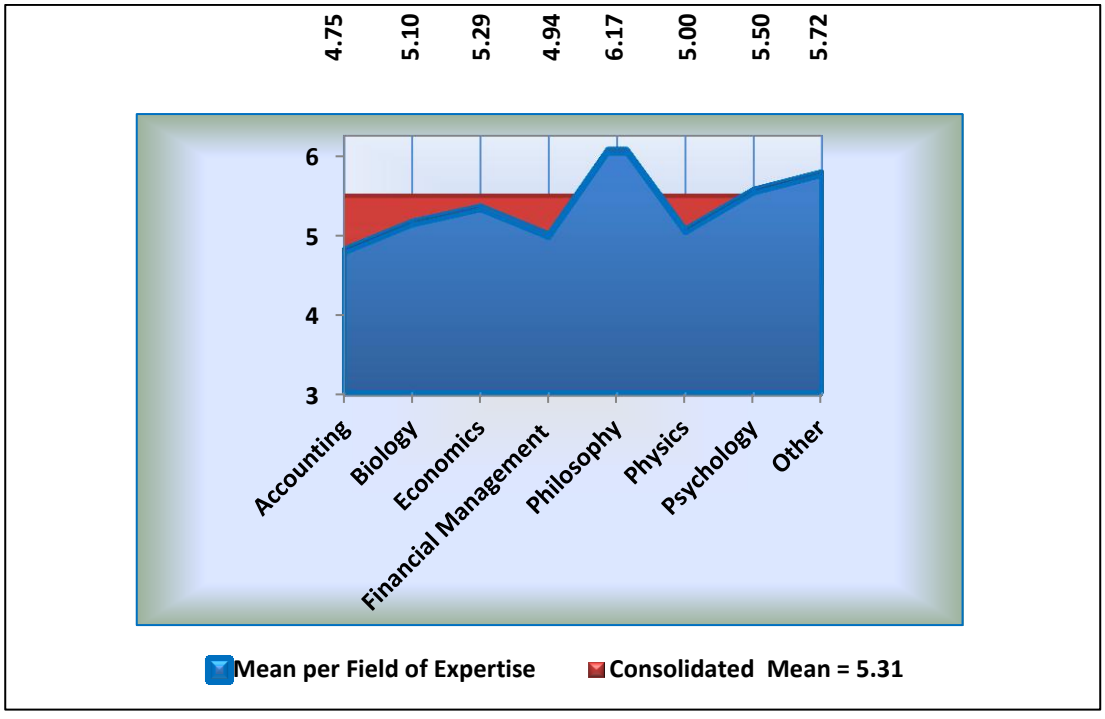
Our brains evolved an impressive ability to detect features.

Statement G8 tests the participant's perspective about the brain's ability to detect features, suggesting as Cohen & Stewart (2000:425), both scientists, did, that this feature detection ability be incorporated into the financial value decision-making model as a specific condition of the general principle of choice.

Table 48 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.12%	2.06%	5.15%	13.40%	23.71%	31.96%	19.59%	100.00%

Figure 48 Means of the converted response ratings for each field of expertise as well as for the consolidated group



This is a proposition which the research findings indicate 75.26% of the respondents agreed with, 11.33% disagreed with and a further 13.40% chose to remain neutral on the subject. Reflecting upon the mean analysis, it appears that generally strong means were obtained across all the respective fields, as is also reflected by the consolidated group mean of 5.31, indicating a general consensus in favour of the statement among the respondents.

Statement G10

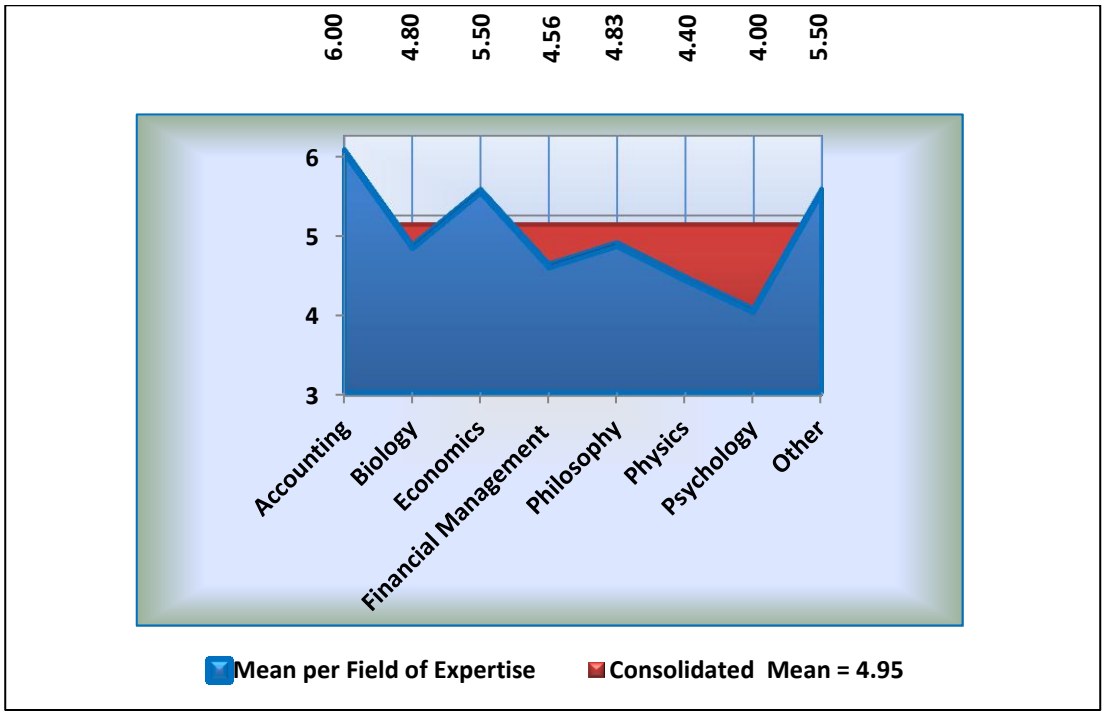
The word risk refers to situations in which decisions are made whose consequences depend on the outcome of future events having known probabilities.

In Statement G10 a proposed definition of risk is presented for the participant's consideration. Research findings pertaining to this statement indicate that 72.92% of the respondents agreed with the statement made by Lopes (1987:255), with 14.59% disagreeing and 12.5% choosing to remain neutral on the matter. A review of the mean analysis indicates a general consensus among the respective fields amounting to a consolidated group mean of 4.95.

Table 49 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
7.29%	4.17%	3.13%	12.50%	22.92%	31.25%	18.75%	100.00%

Figure 49 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G11

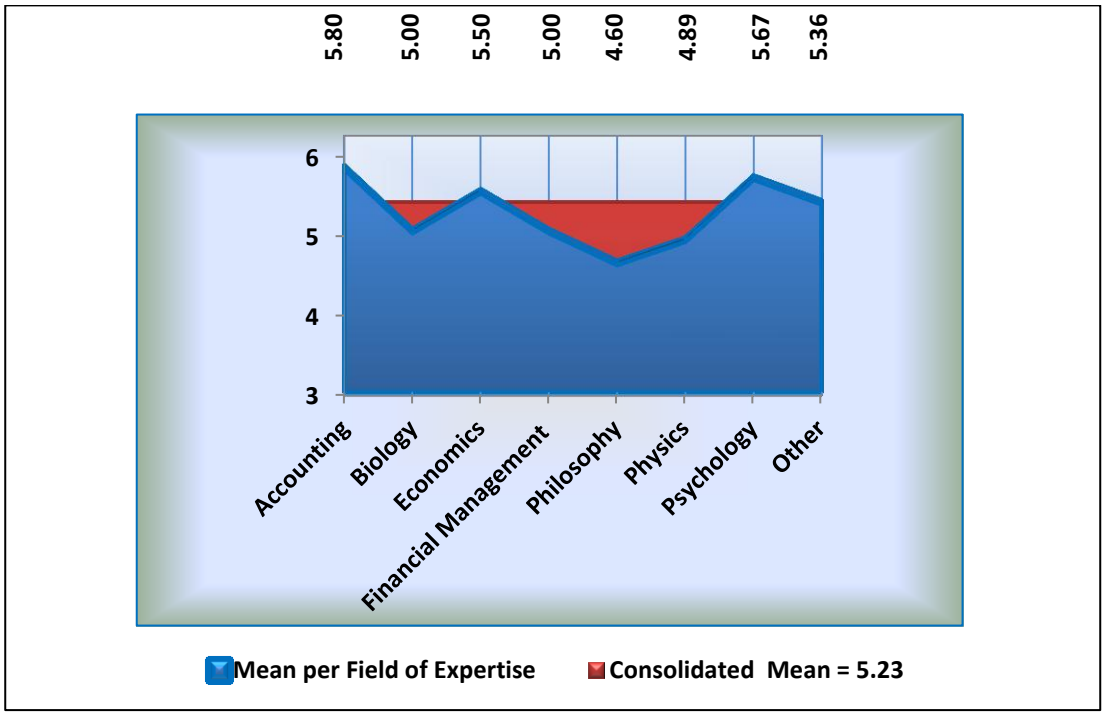
Cognitive interpretation is the creative act of ascertaining meaning possibilities.

Introducing cognitive interpretation as a special condition of choice, Statement G11 asks respondents if, from their perspective, cognitive interpretation can be viewed as Littlejohn (1989:140) did, as the creational act of ascertaining meaning possibilities. Research findings pertaining to this statement indicate that 71.75% of the respondents agreed with the statement, with 6.53% disagreeing and 21.74% choosing to remain neutral on the matter. A review of the mean analysis indicates a general consensus among the respective fields; amounting to a consolidated group mean of 5.23.

Table 50 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.09%	1.09%	4.35%	21.74%	18.48%	33.70%	19.57%	100.00%

Figure 50 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G12

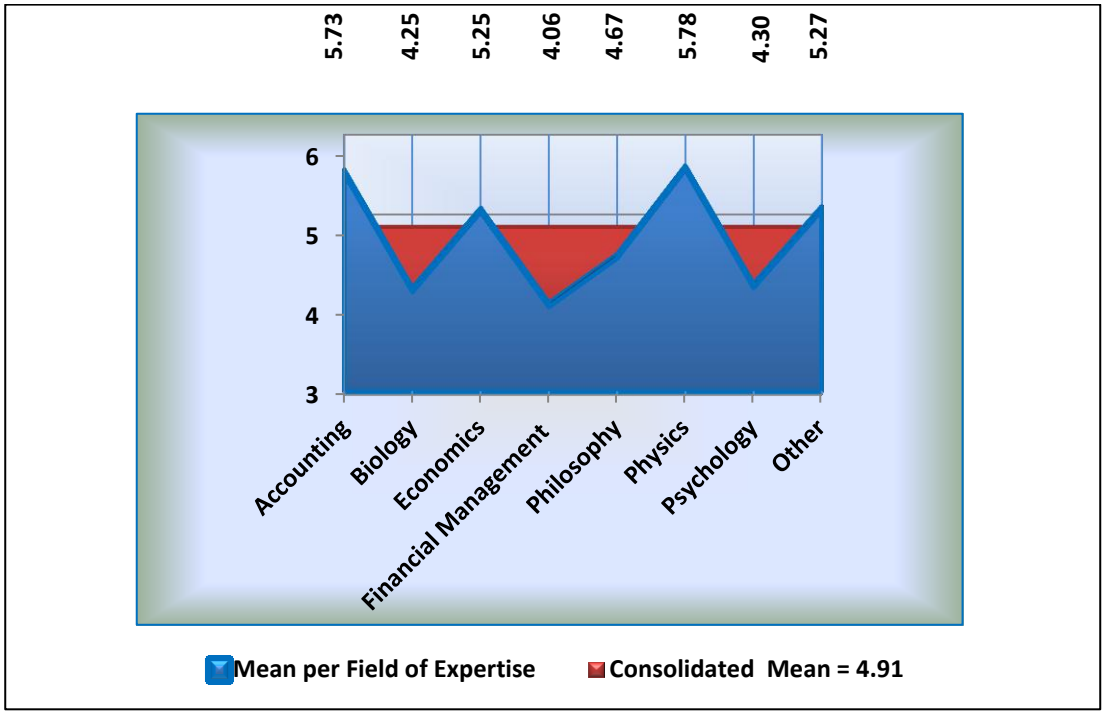
Minding involves hesitating (postponing overt action) while one consciously assigns meaning to the stimuli (the exertion of will).

With the introduction of the concept of minding, Statement G12 attempts to ascertain from respondents what they believe this process entails.

Table 51 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.40%	3.30%	7.69%	18.68%	16.48%	34.07%	15.38%	100.00%

Figure 51 Means of the converted response ratings for each field of expertise as well as for the consolidated group



From the research findings it was established that 65.93% of the respondents agreed with the statement made by Littlejohn (1989:99), with 15.39% disagreeing and 18.68% choosing to remain neutral on the matter. A review of the mean analysis indicates a general consensus among the respective fields in favour of the statement, a point also depicted by the consolidated group mean of 4.91.

Statement G13

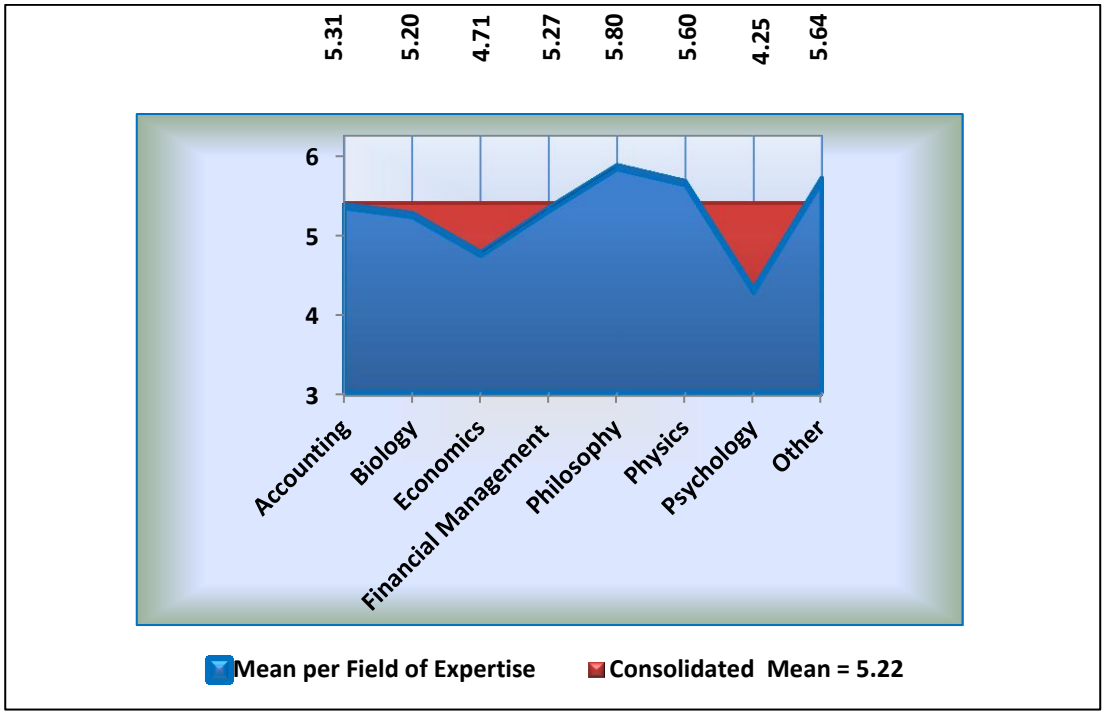
Numbers are not the name of this game but rather representational structures that permit functional reasoning.

Statement G13 tests how participants reflect on numbers, defining them as Simon (1996:146) did, as representational structures that permit functional reasoning.

Table 52 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.09%	4.35%	3.26%	17.39%	19.57%	32.61%	21.74%	100.00%

Figure 52 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Research findings indicate that 73.92% of the respondents agreed with the statement with 8.7% disagreeing and 17.39% choosing to remain neutral on the matter. A review of the mean analysis indicates a general consensus among the respective fields in favour of the statement, resulting in a consolidated group mean of 5.22.

Statement G14

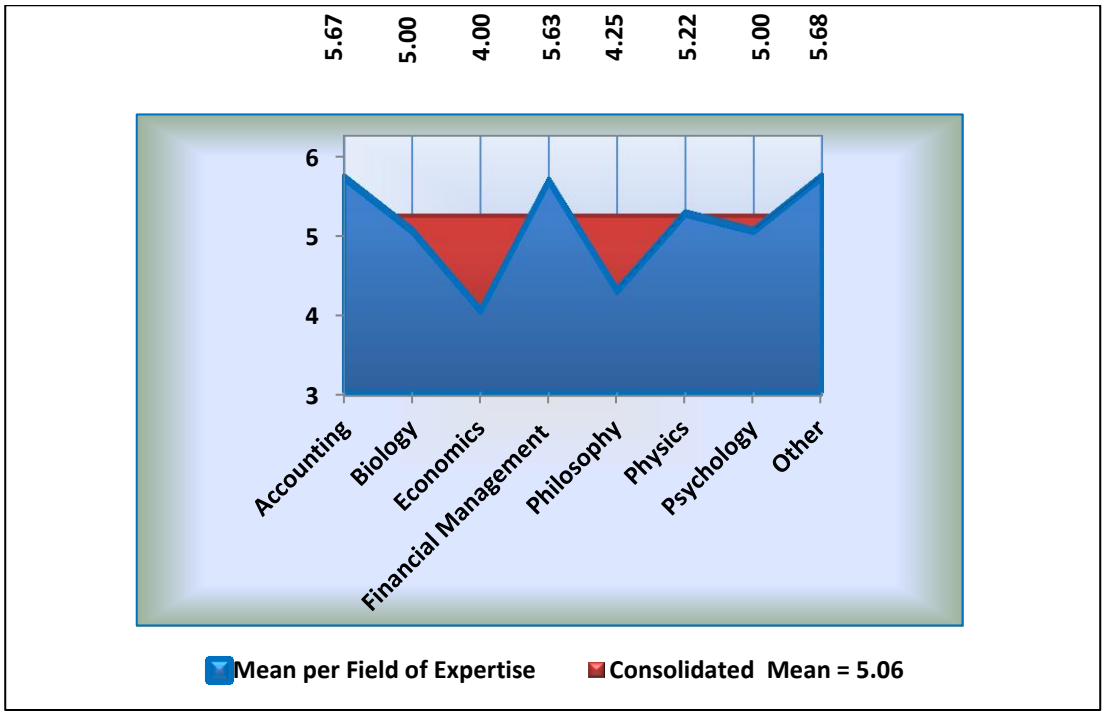
We learn how to behave, and we anticipate the future, using models to guide us in activities both common and uncommon.

Statement G14 tests the participant's perspective with regard to the relationship that exists between learning, anticipation and the use of models as activity guides. Reflecting upon the statement and taking cognisance of the research findings, it appears that 76.08% of the respondents agreed with the statement made by Holland (2000:53), a psychologist and an electrical engineer, with 16.3% disagreeing and a further 7.61% choosing to remain neutral on the subject. A review of the mean analysis indicates a general consensus among the respective fields in favour of the statement, resulting in a consolidated group mean of 5.06.

Table 53 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
6.52%	2.17%	7.61%	7.61%	16.30%	39.13%	20.65%	100.00%

Figure 53 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G15

All exchange is ultimately an exchange of social activities.

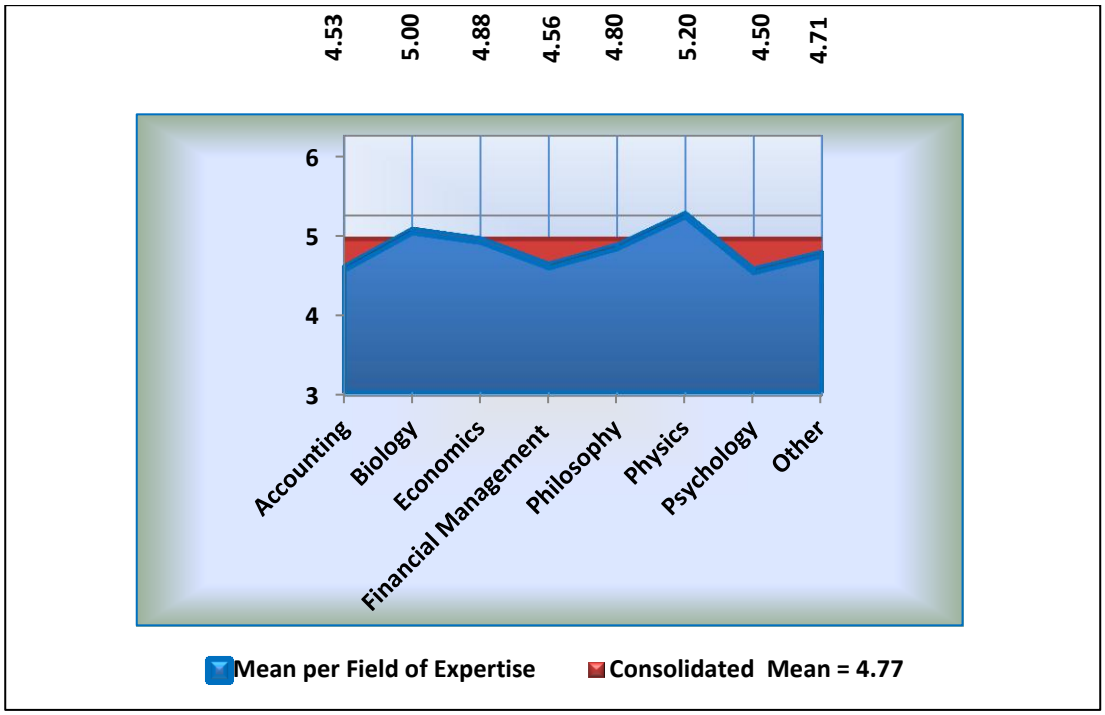
With Statement G15 the questionnaire tests the participant's perspective about exchange, representing it as Tinker (1985:122) did as a social activity that if accepted, according to literature, must form part of the specific conditions of the general principle of choice. This is a proposition which the research results indicate 67.02% of the respondents agreed with, with 24.47 disagreeing and 8.51% choosing to remain neutral about the matter.

A review of the mean analysis indicates that there appears to be a general consensus among the respective fields tested in favour of the statement; something also reflected in the consolidated group mean of 4.77.

Table 54 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
2.13%	12.77%	9.57%	8.51%	26.60%	23.40%	17.02%	100.00%

Figure 54 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement G16

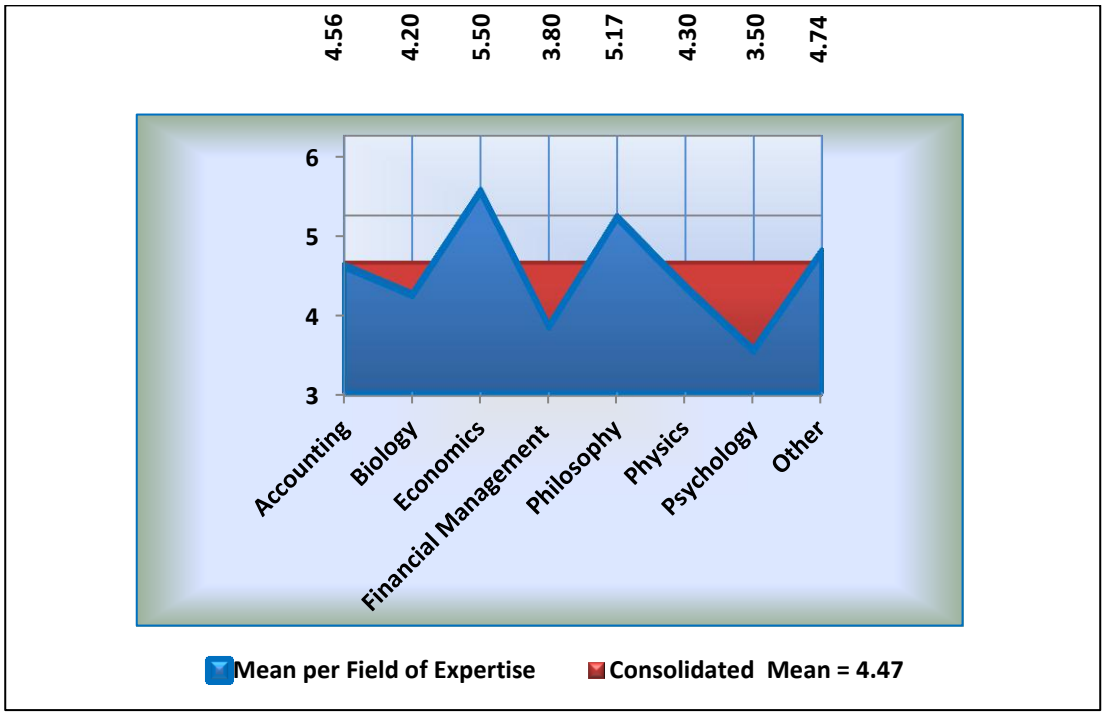
Future events do not represent reality and as a result their attributes are not measurable.

Statement G16 tests the respondent's perception about the measurability of the attributes of future events, ascertaining if respondents are aware of the fact that future attributes are not measureable in the present (Sterling as cited in Musvoto & Gouws 2011:377).

Table 55 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
8.25%	14.43%	11.34%	13.40%	16.49%	20.62%	15.46%	100.00%

Figure 55 Means of the converted response ratings for each field of expertise as well as for the consolidated group



In this regard research results indicate that 52.57% of the respondents are aware of this fact, with 34.02% indicating they are not aware of it, believing future events to be measurable in the present, with a further 13.4% of the respondents not disclosing what they are aware of with regard to this matter. The means analysis indicates that it appears to be the fields of financial management and psychology that are most opposed to this statement, both with means below 4, while the consolidated group mean was 4.47.

Statement G17

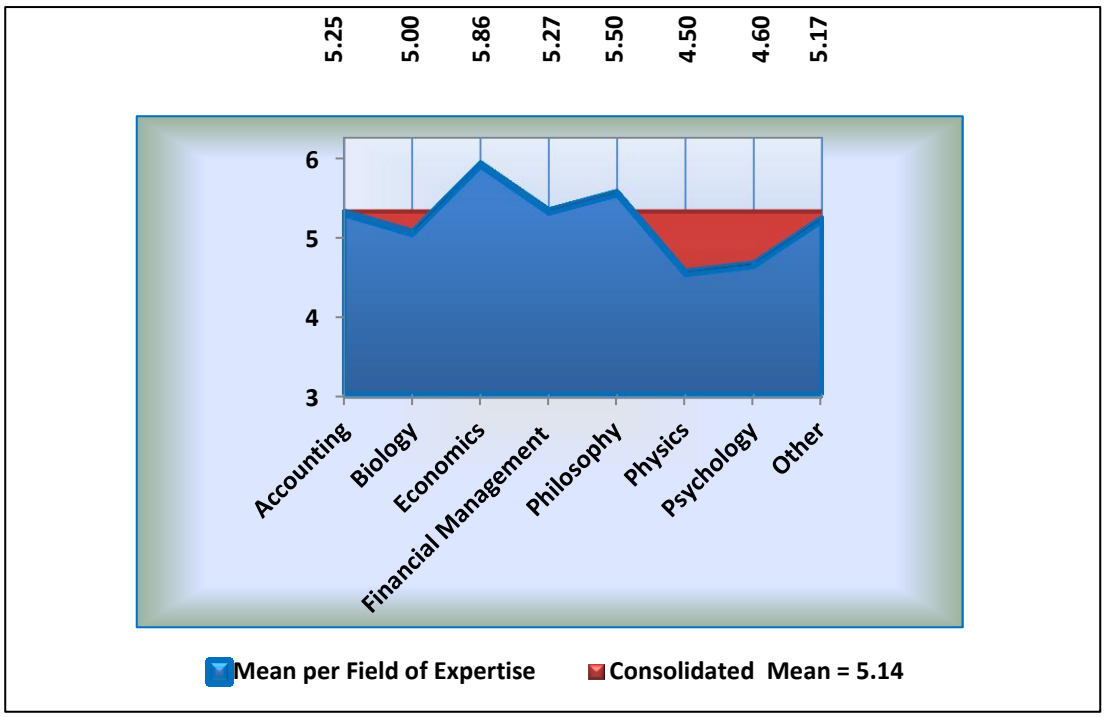
Quality best harmonises what we are with what we are becoming.

With Statement G17, the questionnaire introduces the construct of quality and tests the participant's perception about its ability to harmonise what we are with what we are becoming.

Table 56 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.10%	4.40%	8.79%	13.19%	26.37%	26.37%	19.78%	100.00%

Figure 56 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Research findings with regard to this statement made by Pirsig (1999:311) indicate that 72.52% of the respondents agreed with the statement, with 14.29% being opposed to the statement and 13.19% choosing to remain neutral about the matter. A review of the mean analysis further indicates that there appears to be a general consensus among the respective fields tested in favour of the statement; something also reflected in the consolidated group mean of 5.14.

Statement G18

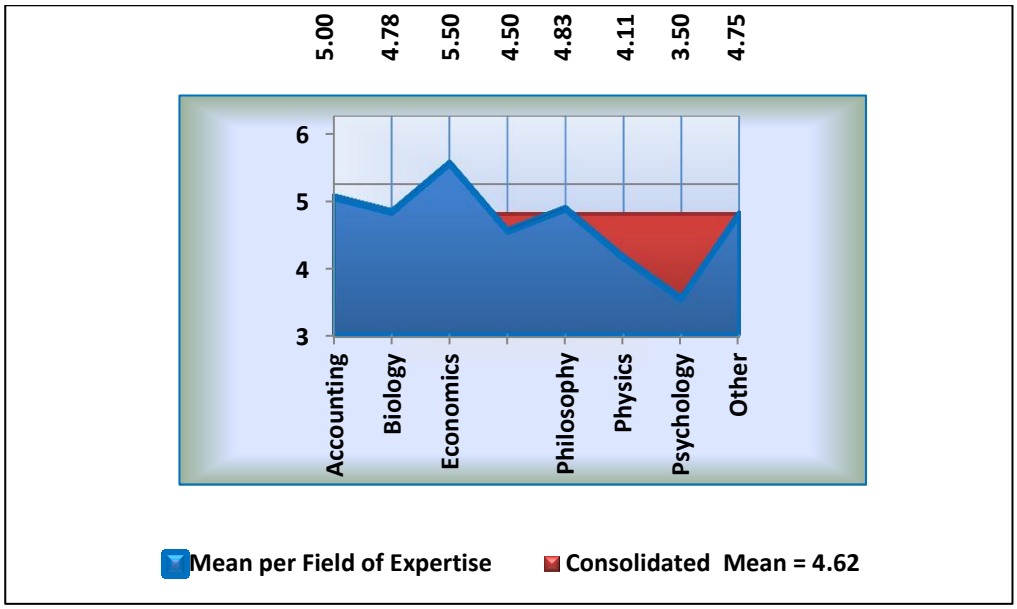
Social truth only embraces those theories that are in tune with the prevailing social ideology.

Statement G18 tests if there is a causality for the respondent between social truth and social ideology. Research findings with regard to Tinker's (1985:164) statement indicate that 56.74% of the respondents agreed with the statement, with 25.26% being opposed to it and 20% choosing to remain neutral about the matter. A review of the mean analysis indicate that with the exception of the field of psychology there appears to be, in general, consensus among the respective fields tested in favour of the statement; something also reflected by the consolidated group mean of 4.62.

Table 57 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.21%	11.58%	9.47%	20.00%	15.79%	20.00%	18.95%	100.00%

Figure 57 **Means of the converted response ratings for each field of expertise as well as for the consolidated group**



Section H DECISION-MAKING, JUDGEMENT AND THE SEARCH FOR MEANING

In section H, the questionnaire reflects on the general principle of decision-making.

Statement H1

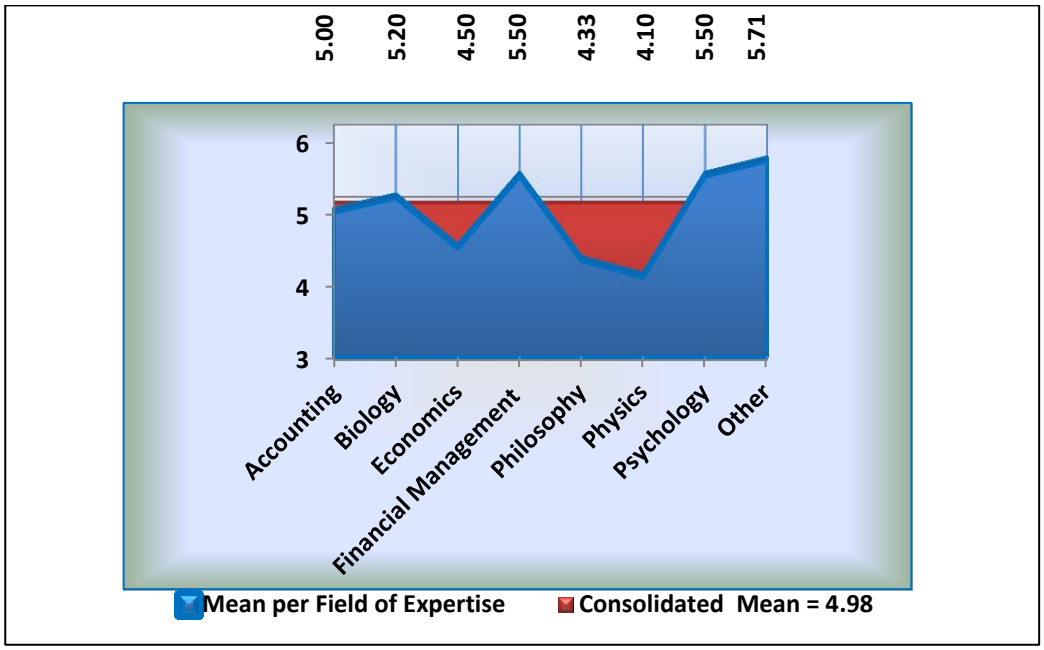
To make a decision means to make a judgment regarding what one ought to do in a certain situation.

With Statement H1 the questionnaire tests the participant's perception with regard to the relationship that exists between judgement and decision-making, presenting it as something that one ought to do; thereby introducing ethics as a specific condition of the general principle of decision-making (Harrision 1996:46).

Table 58 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
8.08%	3.03%	9.09%	8.08%	13.13%	34.34%	24.24%	100.00%

Figure 58 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Research findings pertaining to this indicate that 71.71% of all the respondents tested agreed with the statement, with 20.20% being opposed to it and 8.08% choosing to remain neutral about the matter. A review of the mean analysis indicates that there appears in general, to be consensus among the respective fields tested in favour of the statement; with the consolidated group mean amounting to 4.98.

Statement H2

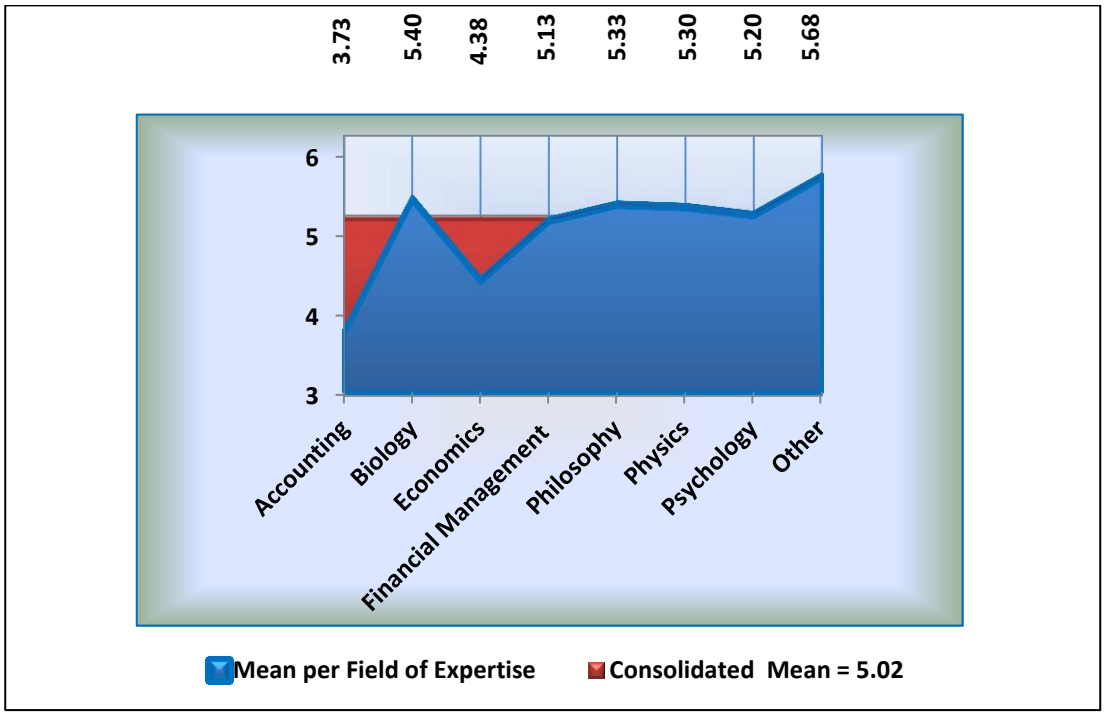
A decision is a creational act born out of creative necessity in the now.

Statement H2 presents the respondents with a possible definition for decision-making, depicting it as a creational act born out of creative necessity in the now.

Table 59 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
4.04%	1.01%	6.06%	19.19%	22.22%	38.38%	9.09%	100.00%

Figure 59 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Testing the respondent's perception in this regard, the research findings indicate that 69.69% agreed with the statement by Bohm (1994:236) with 11.11% disagreeing with it and a further 19.19% being neutral about the matter. An analysis of the respective means show that with the exception of the field of accounting all the other fields produced means in excess of 4, indicating a general consensus in favour of the statement; also reflected by the consolidated group mean of 5.02.

Statement H3

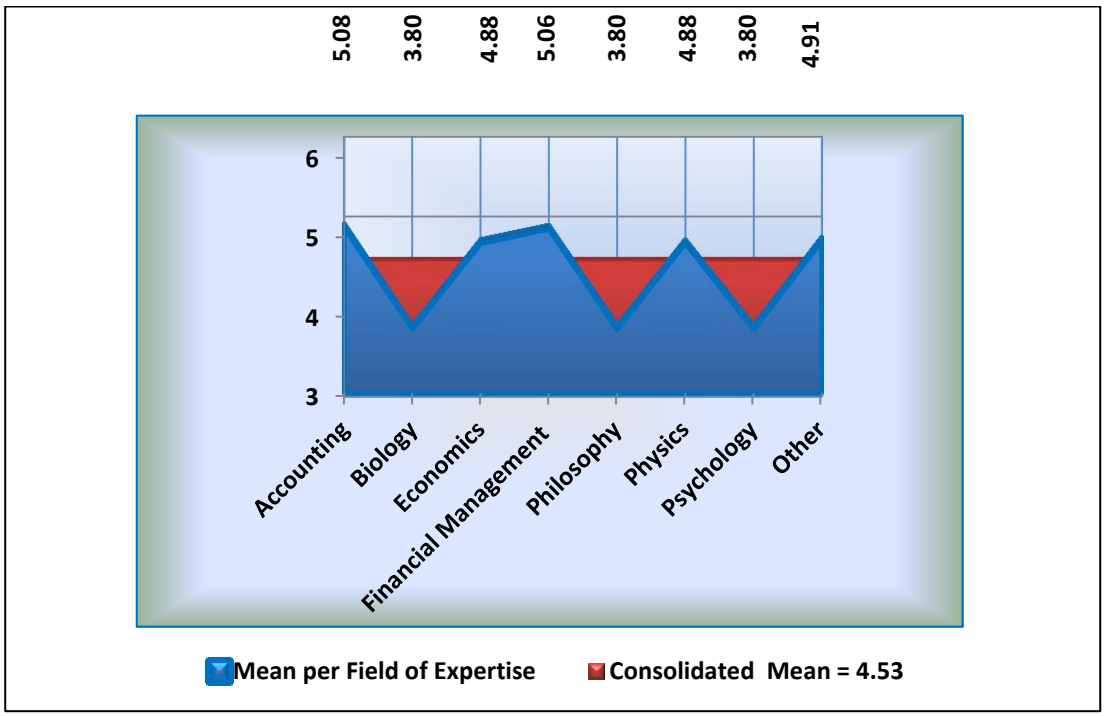
A decision is a limiting position in an infinite process applied to a segment of the whole.

Statement H3 presents the respondents with an alternative definition of decision-making, depicting it as a limiting position in an infinite process applied to a segment of the whole. Reflecting upon this statement made by Tobias (2005:147), the research findings indicate that 57.61% of the respondents are in favour of the statement, with 27.17% disagreeing and a further 15.22% choosing to remain neutral on the matter.

Table 60 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
5.43%	8.70%	13.04%	15.22%	18.48%	23.91%	15.22%	100.00%

Figure 60 Means of the converted response ratings for each field of expertise as well as for the consolidated group



An analysis of the means indicate that reservations about the statement are displayed by the fields of biology, philosophy and psychology; all with means of 3.8. Amid the reservations of the above mentioned fields, the group consolidated mean amounts to 4.53 indicating a general trend in favour of the statement.

Statement H4

Decision-making is a mechanism used by an organism to evolve and adapt to pressures from the outside.

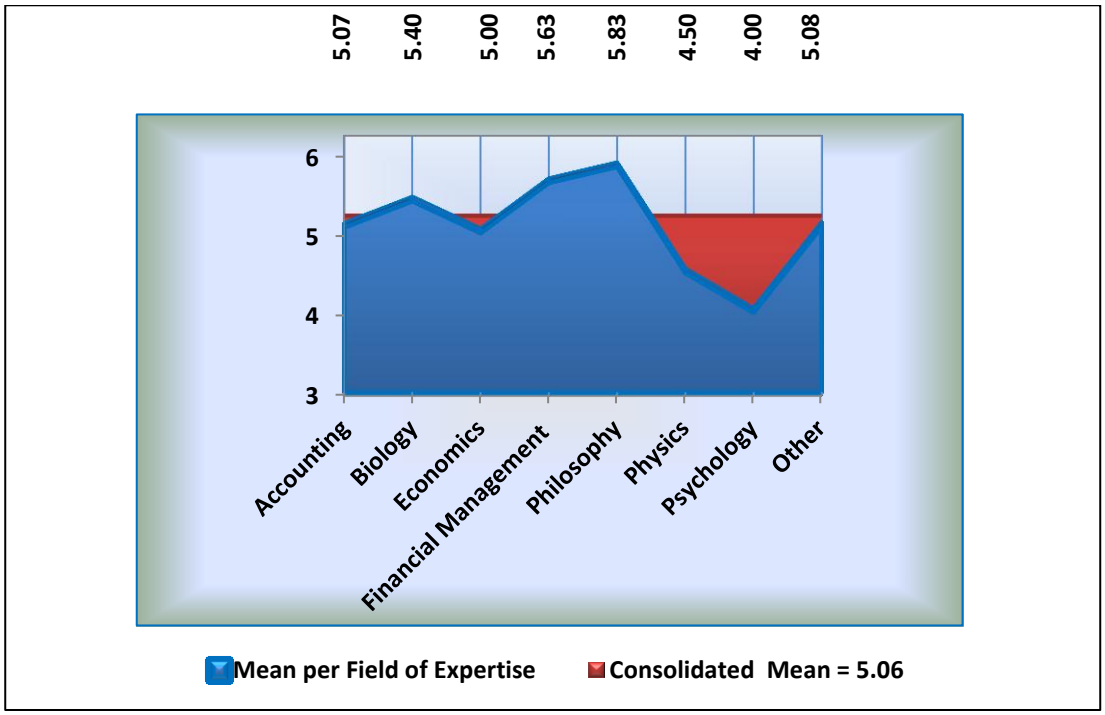
Statement H4 presents the respondents with a further alternative definition for decision-making, depicting it as a mechanism used by an organism to evolve and adapt to pressures from the outside; each definition illuminating a different aspect of the same process, each time introducing new specific conditions as part of the general principle of decision-making.

Taking cognisance of this approach, the research findings indicate that 69% of the respondents agreed with the statement made, with 17% disagreeing and a further 14% choosing to remain neutral on the matter. A further analysis of the means obtained from the respective fields in relation to Darwin in Littlejohn's (1989:35) statement indicate that there appears in general to be consensus among the fields in favour of the statement; a point of view supported by the consolidated group mean of 5.06.

Table 61 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.00%	8.00%	8.00%	14.00%	18.00%	37.00%	14.00%	100.00%

Figure 61 Means of the converted response ratings for each field of expertise as well as for the consolidated group



Statement H6

Meanings arise from interactions within social groups.

Statement H6 tests if participants believe meaning to arise from interactions within social groups. This is a proposition which the research findings indicate 71.43% of the respondents concur with, with 19.39% disagreeing and a further 9.18% choosing to remain neutral about it. An analysis of the means obtained from the respective fields in relation to Littlejohn's (1989:110) statement indicate that there appears in general, to be consensus among the fields in favour of the statement; a point of view supported by the consolidated group mean of 5.05.

Table 62 Statistical summary of the converted consolidated univariate analysis

Rating scale (%)							
Strongly Disagree	Disagree	Disagree Slightly	Neutral	Agree Slightly	Agree	Strongly Agree	Total
1.02%	5.10%	13.27%	9.18%	22.45%	37.76%	11.22%	100.00%

Figure 62 **Means of the converted response ratings for each field of expertise as well as for the consolidated group**