Measuring Information Systems value against organisational performance: A case study of a South African retailer

by

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Research report submitted in accordance with the requirements for the degree of

MASTER OF COMMERCE

In the subject

INFORMATION MANAGEMENT
In the

Department of Information Systems

ECONOMIC AND MANAGEMENT SCIENCES

UNIVERSITY OF THE WESTERN CAPE

Supervisor: Prof. Joel Chigada

2021

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DECLARATION

I declare that "***Measuring Information Systems value against organisational performance: A case study of a South African retailer*****",** is my own work and that it has not been submitted for any degree or examination at any other academic institution, and that all the sources that I have used or have quoted, have been indicated and acknowledged by references.

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Signed: …… Date: December 2021

ABSTRACT

Organisations' increased dependency on technology in general and retailers in particular, is changing how businesses and people operate and communicate. This has amplified the need to make better choices to increase the benefits from information and communication technology investments. As such, the economic evaluation of the business value of information systems (BVIS) against organisational performance has become a business imperative but to do this effectively, organisations must be presented with an appropriate framework. Research shows that organisations have historically struggled to measure the BVIS because of the multiple challenges that hinder effective measurement. These hindrances include the unavailability of a framework that is suitable for the disruptive challenges faced by organisations as well as several difficulties that exist to use existing frameworks/metrics effectively.

This study investigated and analysed existing frameworks/metrics in use within organisations to measure the BVIS against organisational performance. An interpretivist epistemological stance was adopted thus, a qualitative research method was adopted for the study. Data was collected using Microsoft-Teams based interviews where thirty-eight individuals across the Finance, Supply Chain (SC) and Information Systems (IS) departments of a South African (SA) based retailer participated in the study. The results of these interviews were decoded using NVivo analysis for coding, identification, and analysis, resulting in the researcher performing thematic data analysis. Results from the emerging themes are expressed in text (words) and in most instances, the statements from participants are cited verbatim.

The findings in this study led to the development of a new proposed BVIS framework that includes a comprehensive set of metrics for measuring the BVIS against organisational performance. The study also analysed components of the "Control Objectives for Information and related Technology" (COBIT) framework, to identify other potential areas of substantial business value not encapsulated in existing BVIS frameworks. These identified areas were incorporated into the new framework that can be used by organisations as a tool for improved measurement, reporting and decision-making around their IS function. A significant contribution of this study is the development of a Maturity Assessment Framework to assist organisations to measure their BVIS measurement efforts. Lastly, the study also makes several recommendations for future research and management practice into the BVIS phenomena.

KEYWORDS

Business alignment, Benefits realisation management, Business value of information systems, Framework, Metrics, Organisational performance

ACKNOWLEDGEMENTS

Completing a master's degree has been an arduous journey, especially after a huge gap in between my formal academic studies. Throughout this process, I have been fortunate to enjoy immense support from a large number of people whose contribution is fully acknowledged.

I would like to acknowledge my indebtedness and render my warmest thanks to my supervisor, Professor Joel Chigada, who made this work possible. Without his fierce and professional, but yet friendly guidance and expert advice, this work would not have been possible. His insights have been invaluable throughout all the stages of this work. From the bottom of my heart, thank you, Professor Joel Chigada for your critical and insightful thoughts and suggestions that have kept me focused throughout this process. You challenged me intellectually and pointed me in the correct directions when I struggled. Maybe most importantly, you have reminded me of the importance of enjoying formal studies. Your comments and reviews were invaluable during this process.

I was also fortunate to be surrounded by the staff of the Department of Information Systems in the Faculty of Economic and Management Sciences at the University of the Western Cape, especially Ms Justine Voigt who guided me through the formal processes around the completion of this thesis. Your professionalism has not gone unnoticed. Thank you, Justine, for making my administrative nightmares relatively easy.

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I gratefully acknowledge the opportunity afforded to me by my company, for their financial support, especially to Ms Jillian Brikkels for ensuring that the application and allocation of the funds happened seamlessly. I am especially grateful to the Head of Supply Chain, Mr Bradley Nitsckie, and to the Chief Information Officer, Mr Christie Koorts, for their support in allowing me to do this research within the company. I would also like to extend a word of gratitude to the colleagues who participated in the research study without whom it would have been impossible to complete this thesis.

Lastly, the thesis also benefited from my wife, Ms Rochelle Julius, and my son, Mr Kerwyn Julius who read through the different drafts, several times, commenting and inspiring me with positive suggestions and motivation throughout this journey. From the bottom of my heart, I take this opportunity to thank them.

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AIE	Applied Information Economics
AHP	Analytic Hierarchy Process
BPR	Business Process Reengineering
BMAM	Business Value of Information System Maturity Assessment Model
BRM	Benefits Realisation Management
BSC	Balanced Scorecard
BVC	Business Value Case
BVIS	Business Value of Information Systems
BVIT	Business Value of Information Technology
BVSC	Business Value of Supply Chain
CSF	Critical Success Factor
EVPI	Expected Value of Perfect Information
IRR	Internal Rate of Return
KPI	Key Performance Indicator
NPV	Net present value
PIR	Post Implementation Review
ROE	Return on Equity
ROIC	Return on Invested Capital
ROT	Return on Talent
SCM	Supply Chain Management
TCO	Total cost of Ownership

CHAPTER 1 : INTRODUCTION AND BACKGROUND

1.1 Introduction

Nearly eighty percent (80%) of global organisations have undergone significant transformation over the past number of years because of a whirlwind of disruptive technological changes that permeates every aspect of our lives (Accenture, 2018; Lewis, 2019). In addition to these technological changes taking place in the environment in which organisations operate, globalisation, uncertain economies, wary investors, unprecedented regulation, several competitive and macroeconomic threats including cost pressures, and the sheer spend required to stay abreast of these changes have all added to the pressure on the profitability of organisations. Even though global Information System (IS) spending has contracted in 2020 by 3.2%, it is projected to grow to US$3.9 trillion in 2021, up 6.2% from 2020 (Torres, 2021). In the South African (SA) context, IS spending was expected to grow to R306bn (Egham, 2019) in 2020 with companies having spent a total of R292bn in 2018 on IS (Solanki, 2018).

A myriad of challenges including the emergence of the Corona Virus Disease of 2019 (COVID-19), are fundamentally altering the way organisations and people operate and behave, with technology creating new revenue streams, increasing existing revenue streams and reducing costs. Technology itself has emerged as a critical business capability (Dhasarathy et al., 2020). The reality is that most companies need to be technology-based because Information Systems is now their core business, and for many others, digital convergence is integrating traditional and electronic information sharing platforms between businesses (Florentine, 2017; Vader & Martin, 2020; Dhasarathy et al., 2020; Torres, 2021).

The level of company investments in IS, which is globally at 3.25% (Retail 2.04%) of their turnover (Kark, 2018), creates access to funds that presents IS leaders with an opportunity to make headway in dealing with the disruptive technologies that are required during the digital transformation efforts of their organisations. This indicates that IS leaders must present their organisations with the right investment choices. Skepticism about whether the IS function can do this effectively is though persistent. Tallon et al. (2020) cited Lee Iacocca, President, CEO, and Chairman of Chrysler from 1978 to 1992, who famously claimed that he had approved so many Information Technology (IT) projects involving employee layoffs that there should be nobody working at Chrysler! Similarly, scholars, researchers, economists, business leaders and consultants find themselves asking the most fundamental of questions: Does IS really add value or to put it another way – is there a link between IS initiatives and business value (Van der Zee, 2002; Ward & Daniel, 2007; Aranyossy, 2014; Rubin et al., 2016b, Fitzpatrick & Strovink, 2021), if so how, and lastly, why are IS leaders

unable to measure and effectively articulate the true business value of Information System (BVIS) to their organisations (Solanki et al., 2018)?

The failure to demonstrate the BVIS reached a climax in 2003, with Nicholas Carr's aggressive article "IT Doesn't Matter" (Carr, 2003). This has led to reduced IS budgets and the lack of IS involvement in strategic decision-making that impacts business outcomes (Solanki, 2018). As such, answering the questions posed has ensured that the issue of obtaining value from IS-related investments has remained one of the major research topics for IS researchers (Schryen, 2013; Lynn & Mooney, 2020).

1.2 Background to the Study

The issue of the measurement of the economic impact of the BVIS against organisational performance is not new and has been at the centre of IS business value research for decades (Lynn & Mooney, 2020). In many organisations though, not all the activities of IS departments support and are aligned to their visions, missions and strategies with many of the "shiny objects" in which IS functions have invested time adding limited business value (Balafif and Haryanti, 2019). This is primarily due to limited partnering between IS and business, an often-unclear sense of the business value at stake and the inability of IS to effectively measure, manage and articulate the BVIS (Dhasarathy et al., 2020). This is vividly shown in a Gartner Group (Solanki, 2018) study that shows that 45% of the 169 participating organisations had no formal way of measuring BVIS, only 6% of participating organisations have metrics linked to contributions towards business objectives and even though companies attempt to measure the BVIS, only 7% were consistently successful in demonstrating BVIS. This needs to be changed around urgently because benefits from IS investments will only be realised if IS is effectively measured and managed (Tallon et al., 2020).

According to Sabherwal and Jeyaraj (2015), several studies have sought to explain BVIS by examining the relationship between IS factors such as IS-investment, IS adoption, IS capability, and IS alignment and their organisational impacts. This has however been difficult with organisations struggling to collaborate effectively and to maximize value for themselves and all stakeholders within the broader business ecosystems (Schryen, 2013; Borges, 2015). This is also partly due to the existing value management principles being remnants of an economy dominated by capital-intensive companies for which value creation was largely based on squeezing out incremental returns on physical capital and having strong balance sheets (Hansell et al., 2018). However, the advent of third platform technologies such as cloud services, IS resource sharing and software-as-a-service (SaaS) business models have substantially changed these traditional capital-intensive IS funding models that required large upfront Capital Expenditure (CapEx) layouts for expensive dedicated hardware

(Tallon et al., 2020). The new “discovery” IS businesses are more aligned with value creation through top-line growth and generating returns from investments that are Operational Expenditure (OpEx) based that flow through the income statement (Hansell et al., 2018). This removed the hurdle to get some IS projects started, significantly influencing ex-ante *(*i.e., based on the forecast or before the event) BVIS evaluations (Hansell et al., 2018).

An understanding of what is meant by the concept of the BVIS is needed before the questions posed around how IS creates value and how this value can be measured can be answered. According to Schryen (2013), the Alliance for Telecommunications Industry Solutions (ATIS) defines IS as the entire organisation, personnel, infrastructure, and components for the collection, processing, storage, transmission, dissemination, display, and disposition of information. IT on the other hand is defined by Anomah and Agyabeng (2013) as the hardware and network and software such as Supply chain management (SCM) systems. Even though many confuse the IS and IT disciplines and tend to think that the distinction is not relevant (Chen et al., 2010), this study is clear in recognising the distinction between the two and agrees with Zeng et al. (2020) that IS comprises the combination of IT, the function that supports it, and how people interact with these technologies in support of business processes. The term BVIS in this context thus includes but is not limited to the business value of IT (BVIT) and refers to the value that a business can derive from IS and its effect on organisational performance.

Why there is such a renewed focus on the BVIS is not difficult to answer if one looks at the business environment in which this question is being asked. Across the economy as a whole, “creative destruction” as coined by Joseph Schumpeter, has remained a constant since at least 1942, according to Bucy et al. (2016), and will result in about half of today’s S&P 500 companies being replaced over the next ten years as business turbulence and transformation increase (Anthony et. al., 2016). Within this environment where technological shifts are unabated, every drop of cash is being squeezed and the margin between winning and losing is becoming razor-thin, as creating value is accelerating the success of those that get it right and the decline of those that don’t (Borges, 2015). These realities have injected a renewed importance, focus and sense of urgency around the IS function and especially the business value that it can generate (Dhasarathy et al., 2020).

Even though retailers and their SC organisations remain early adopters of technology (Sardar & Sardar, 2016), the COVID-19 realities, growing customer expectations, cash flow, cost and margin pressures permeate this sector. In the United Kingdom (UK) for instance profits and margins have declined from 4% in 2013 to 2.5% in 2019 (Vader & Martin, 2019) and measured in real terms (constant 2015 prices), the retailer landscape in SA has seen a decrease of 4.0% year-on-year in November 2020 (Stats SA, 2021). Even though these numbers were exacerbated by COVID-19, the

sector has always had some structural issues that were laid bare by the pandemic. The SA government recognises a formal and informal retail sector, with the latter being viewed as a viable and important form of employment and enabler of economic mobility for the country's poor (Laframboise, 2019). Even though IS, and more specifically automation through IS, allows retailers and their SCs to replace labour-intensive manual processes with algorithms (Rubin et al., 2016b), according to McArthur et al. (2020), modern SCs are fundamentally still a human endeavour because although the smart algorithms deployed within organizations generate faster and more accurate demand forecasts, executing against those forecasts still requires the efforts of hundreds of individuals across the chain.

The supply-side (transactional) of the IS function has also traditionally been an area where IS leaders could make a strong business case and where they have seen budgetary increases even in today's world (Kishore et al., 2006; Eide, 2020). The demand-side (transformational) of the IS function is however becoming increasingly important, pushing organisations to upgrade their technology layer towards service-based models (Eide, 2020; Tallon et. al., 2020). As such, new frameworks/metrics are required that reflects activities across the demand and supply-side of the IS spectrum (Chen et al., 2010; Onik, 2019), with traditional demand-side measurements such as systems availability or software functionality required to transform as they lack a business context as few venture beyond the confines of the SLA (Murphy, 2002a).

Several attempts have been made to address some of these failures but these attempts have mostly focused on frameworks/metrics from other disciplines such as the financial discipline with metrics such as Economic Value Added (EVA), Internal Rate of Return (IRR), Net Present Value (NPV), Payback Period, Return on Assets (ROA), Return on Equity (ROE), Return on Investment (ROI), Return on Invested Capital (ROIC), Total Cost of Ownership (TCO) and Weighted Average Cost of Capital (WACC) being utilised extensively (Hajela, 2009a; Lynn & Mooney, 2020). Financial approaches on their own have however proven to be problematic in that they are not comprehensive enough to fully measure BVIS (Maçada et al., 2012) and they use up valuable resources as they are tedious to use and time-consuming (Hajela, 2009a). In addition to this, financial approaches are also expensive in that it requires investment in interfaces across the organisation to keep it updated, are not necessarily designed for internal investments nor factor in the unique nature of the IS function because they either do not quantify results correctly or are focused on tangible value (Hajela, 2009a). Importantly, these financial metrics fail to assist organisations to make better IS decisions which is why several organisations gave up mid-stream and others never got the intended benefits from IS-related investments (Hajela, 2009a). Nonetheless, these accounting techniques provide a useful benchmark for measuring the contribution of IS to economic growth (Brynjolfsson & Hitt, 2000).

Financial metrics also tend to ignore intangible benefits, which is particularly problematic because intangibles have come to predominate value in today's service-oriented economies (Aranyossy, 2014, Hubbard, 2014; Solanki et al., 2018; Ross, 2020). In addition, financial metrics have evolved over a 43-year period, from a supporting asset into a major consideration for investors – growing from making up 17% of the value of the S&P 500 in 1975 to 84% in 2018 (Ross, 2020). According to Lynn and Mooney (2020), this is further exacerbated by the flexible and interdependent nature of some third platform technologies such as cloud computing that introduces new intangible benefits. Even though the measurement of intangibles remains one of the biggest challenges in the monetary valuation of the BVIS (Aranyossy, 2014) some scholars argue that it is a misconception that certain elements of the contribution of the IS function cannot be measured and argue that the value of intangible assets such as information is measurable and must be measured (Hubbard, 2014; Hubbard & Seiersen, 2016; Solanki et al., 2018).

1.3 Statement of the Research Problem

It is well understood that the traditional approach of using only financial measures to calculate BVIS, is not always comprehensive enough with the key challenge in this sense, being to find ways to determine the value of intangibles in monetary terms (Brynjolfsson & Hitt, 2000; Aranyossy, 2014; De Haes et al., 2020). These assets cannot be excluded from BVIS frameworks. There is also a misconception that certain intangibles, such as the business value of information and skilled IS people, cannot be measured (Hubbard, 2014; Hubbard & Seiersen, 2016; Solanki et al., 2018). However, even though these intangible items may not consistently be accounted for on balance sheets, they have been shown to add substantial value to organisations as shown in the late 1990s (Brynjolfsson & Hitt, 2000) and also recently by the Columbia Threadneedle Investment (CTI) group (2019). Intangibles and their contribution are thus not sufficiently reflected in BVIS frameworks.

Additionally, several studies highlight some other key challenges that exist around measuring the BVIS namely, clarity around what needs to be measured (Solanki, 2018), ineffectiveness in articulating the BVIS (Solanki, 2018; Tallon et al., 2020), the difficulty around measuring the BVIS (Solanki, 2018), the unavailability of a single metrics/benchmark, frameworks/metrics that do exist that differ for each organisation (Solanki, 2008). Some frameworks exist that have real deficiencies (Van Der Zee, 2002) and the general ineffectiveness of existing frameworks/metrics (Tallon et al., 2020). There is also a lack of concepts for choosing the appropriate evaluation approach in each case and for integrating the results into a holistic picture (Lanzinner et al., 2008).

Even though numerous frameworks exist to measure the BVIS in academic and business literature, none is comprehensive enough to both fully describe all the most important metrics (the what) that is needed to measure BVIS for both *ex-ante* as well as *post-facto* evaluations in a single

comprehensive framework (the how) that is relevant to the complex and changing nature of today's business environments (Aranyossy, 2014; Onik, 2019). According to Zeng et al. (2020), these challenges inhibit the creation and appropriation of economic value, with this having a major impact on IS departments and within the broader organisation. These challenges thus frame the problem statement that this thesis addresses and can be summarised as an answer to the question raised earlier of "*why IS leaders are unable to measure, manage and effectively articulate the true BVIS to their organisations"* - due to ineffective measurement frameworks/metrics.

1.4 Research Questions

The primary research question that this thesis address is:

i) What frameworks measure the economic impact of the IS function against organisational performance?

The research study also addresses the following secondary research questions:

ii) What weaknesses are posed by existing frameworks that measure the impact of IS against organisational performance?

iii) What factors hinder organisations from using the existing frameworks?

iv) What interventions can be put in place to address the hindrances?

v) Which other potential areas within IS not covered within existing frameworks add substantial business value?

vi) Is there an effective framework that addresses the identified hindrances, weaknesses and other potential areas of business value of IS?

1.5 Research Objectives

The primary objective of this research is:

i) To identify frameworks that measure the economic impact of the IS function against organisational performance.

This research also had some secondary objectives, namely:

ii) to identify the weaknesses that are posed by existing frameworks,

iii) to evaluate factors hindering organisations from using existing frameworks, to measure BVIS effectively,

iv) to assess interventions that can be put in place to address these hindrances,

v) to establish what other potential areas exist that add substantial business value from IS,

vi) and to propose a new framework that addresses the identified gaps.

1.6 Contribution of the Study

The major contribution of this study is the development of a proposed conceptual framework to measure the impact of IS on organisational performance. The proposed conceptual model might be used by organisations to assess their maturity in measuring the BVIS. The study also provides a synthesis and analysis of the literature around existing frameworks that measures the BVIS against organisational performance. This generates new ideas and knowledge for the information systems discipline. In addition to this, the study also makes a significant contribution by analysing COBIT2019 components to identify other potential areas for substantial business value from IS. The weaknesses identified within the existing BVIS frameworks analysed as well as the analysis of COBIT2019 contributed to the development of the proposed framework and development of new theory. Practitioners might also benefit from the study if they adopt the recommendations from the study. Lastly, the study also creates an opportunity for further research and interrogations.

1.7 Thesis Outline

This paper is divided into 6 chapters, which are organised as follows:

Chapter 1 introduces the objectives for this research, the research problems, and the contribution of the study. The motivation for conducting the study and structure of this dissertation are outlined in this introductory chapter.

Chapter 2 is a detailed *literature review* on the measurement of the impact of the BVIS against organisational performance. Related studies and other scholarship are consulted to obtain ideas and information regarding how others have looked at the issue closely aligned to the problem under investigation. Literature review is an important step in research because the researcher draws some lessons from past studies to mitigate potential mistakes in the current study.

Chapter 3 presents a critical analysis of the existing *theoretical frameworks* that exist to measure the impact of the BVIS against organisational performance and identifies the gaps that exist with these frameworks/metrics. Additionally, Chapter 3 also proposes a new framework for BVIS measurement. Theoretical works situate the study into a specific scholarly discourse, thus, providing the researcher with a better understanding and explanation of the research problem.

Chapter 4: The *research methodology* that was deployed during this research study is discussed in this chapter. It is important to discuss the research steps, procedures and methods that were adopted from inception to the conclusion of the research study.

Chapter 5: The NVivo *results of the data collected during the study* are analysed and summarised in this fifth chapter of the study. When data is collected, it has to be processed to produce information/meaning which can be used for informed decision.

Chapter 6: The last chapter of the study presents the conclusions, *recommendations and limitations* of this study is presented.

1.8 Chapter Summary

This chapter presented an introduction and background to the study of the measurement of the economic impact of the BVIS against organisational performance. The severity of the impact of large-scale economical and digital shifts that have accelerated within the operating environments of most organisations, including retailers and their SC functions were also presented. The chapter also presented the rationale for the importance of BVIS research and why this has seen such a prominent rise over the past number of years. Arguments were advanced for the importance of the economic evaluation of the BVIS and that it has become a business imperative that requires a comprehensive framework that articulates both the value that is generated from the business as usual (BAU) activities of IS as well as from key IS investment initiatives and projects. However, as presented in this chapter, it is an arduous task given the hindrances that exist to do this effectively. The chapter also presented the primary research problem and primary objective as well as the five secondary research questions and primary objectives. Lastly, the contribution of this study was presented. This next chapter presents a detailed look at the relevant literature that exists around the measurement of the economic impact of the BVIS against organisational performance.

CHAPTER 2 : LITERATURE REVIEW

2.1 Introduction

This chapter reviews literature on the BVIS construct and specifically its significance for retailers and its SC organisations. It presents an overview of the literature around the retailer and SC landscapes, gives an overview of BVIS, its history in research and the different approaches that have been followed to measure BVIS within organisations. It also presents the literature on the challenges faced by organisations, including retailers and their SC organisations, to effectively measure the BVIS. It lastly presents the gaps that exist within the literature around the BVIS construct and sets a benchmark for comparing the literature with the findings of this study as suggested by Creswell and Creswell (2018).

A vast array of sources was consulted to get a full understanding of some of the theories and frameworks/metrics that exist around the measurement of the economic impact of the BVIS against organisational performance. These sources include books, scholarly articles, various articles published by consulting groups, company financial statements, specifically that of retailers in the South African (SA) sector as well as other resources found on the internet and in libraries.

2.2 An overview of the Retail and Supply Chain landscapes

Retailers are facing severe pressures within their operating environments. While some of these pressures are not new, most retailers are taking new approaches to cut costs and to drive profitable growth (Vader & Martin, 2020) as they have realised that conventional cost-reduction levers are no longer enough to strengthen profits and margins (Begley et al., 2019). Retailers are placing SC and IS capabilities at the centre of these efforts. According to Burnette and Dittmann (2018) SC is defined as

> *"the end-to-end, integrated system of processes and activities required to deliver product or service from the supplier's supplier to the consumer's shelf and the SC organisation as the holistic resources and teams required to deliver valued products and services to the consumer with excellence which includes, but is not limited to, procurement, manufacturing, engineering, process control, quality, safety/environmental, innovation program management, warehousing, transportation/distribution, and logistics".*

The historical focus of SCs of making or buying products has, according to Burnette and Dittmann (2018), changed significantly due to increasing SC complexity because of globalisation, expanded consumer channels and increased government regulations with organisations shifting to next-generation SC models (Kuntze et al., 2019) as they increasingly compete and use their SCs as a

distinct area for strategic and competitive advantage (Chen et al., 2013; Lynn & Mooney, 2020; McArthur et al., 2020).

The challenges faced by retailers are also forcing retailers to rethink the complexity as well as the role that IS can play in transforming their value chains (Vader & Martin, 2020) as studies on the association between IS, SC integration, and organisational performance have grown with the belief that there is a positive link of value through IS and its impact on organisational performance (Srimarut & Mekhum, 2020). In addition to this, the imperative for retailers to build a strong commercial case for technology and to amplify value creation, measurement, and the articulation of the BVIS has become critical to ensure the survival and transformation of their organisations and to keep abreast in these challenging times (Borges, 2015; Vader & Martin, 2020).

The significant transformational impact of IS within retail is beyond doubt (Ramesh Babu et al., 2012; Begley et al., 2019) and it is widely recognised that the rapid move from the traditional physical retail experience, which has been the cornerstone of retail for millennia, to digital platforms has had a radical impact in evolving the face of the retail landscape (Begley et al., 2019; Achille & Zipser, 2020; Vader & Martin, 2020). IS innovation, being the ultimate survival strategy for retailers (Begley et al., 2019), are providing retailers with the opportunity to transform the shopping experience of their customers, strengthen their competitive positions, and has also made the traditional online/physical dichotomy obsolete according to Sardar and Sardar (2016). The digital and sharing economies, driven by non-physical outputs (e.g., service delivery and software) are increasingly at the centre of competitive advantage in this environment (Henry-Nickie et al., 2019), as products become more durable, are less expensive and can repair themselves, and in the process reducing or eliminating jobs in retail and SC (Lewis, 2019).

Despite the emergence of COVID-19 accelerating the adoption of digitisation, the global and SA realities are that physical stores still predominate within this sector as retailers struggle to seamlessly unite digital capabilities, transformational projects and traditional IS work (Torres, 2021b). The SA retailer on which this study is based, has an online penetration of only 3%, according to their financial results of 2019/2020. However, even physical stores are transforming into stores of the future with the most prominent disruptor, Amazon Go, being deployed at scale and projected to grow from just ten concept stores in 2020 to 3000 stores by the end of 2021 (Begley et al., 2019). In addition, this boosts revenue by 5% to 15% (Bijlsma, 2020), and gives consumers an experience that they cannot get through digital channels. Retailers recognise the potential of a strong online presence with global retail e-commerce sales projected to grow to US$6.54 trillion in 2022 from US$5.3 trillion in 2019 (Sabanoglu, 2020) and as such are increasingly pursuing digital at the centre of their operating model

to give consumers flexibility across online and offline channels (Begley et al., 2019; Achille & Zipser, 2020; Vader & Martin, 2020).

The SC function of retailers operates within the same turbulent business environment and as such researchers frequently study the role of SC integration and its capability to promote organisational performance especially through the use of technology (Srimarut & Mekhum, 2020). The adoption of Artificial Intelligence (AI) and process automation and more specifically robotic process automation (RPA) are being accelerated at an unprecedented scale to enhance both the employee and customer experience (Begley et al., 2019), which makes the case for BVIS obvious with automation initiatives across stores, SC, and head-office functions potentially generating between 300 to 500 basis points of margin increase (Begley et al., 2019), which can be reinvested.

Ayers and Odegaard (2018) posit that when developing SC strategies to create BVIS and BVIS metrics, SC organisations within retail must follow a "top-down" approach and ensure alignment to the performance and strategic objectives of the retailer. This will ensure that key processes such as global order promising, integrated business planning and capacity planning that enables global available-to-promise (Global ATP) and sales & operations planning (S & OP) are standardised (Cattell et al., 2014). IS plays an important role in improving the sustainability, performance, and efficiency of the operations of retailers and their SCs (Zeng et al., 2020) by improving the integration of these processes and activities across the whole SC (Srimarut & Mekhum, 2020). IS minimizes the number of integration points required to create control and generate end-to-end benefits in a mixed-vendor SC landscape (Cattell et al., 2014).

To fully realise the potential value of IS and to enable the SC transformation that is required, Cattell et al. (2014) state that it is important to identify value upfront, design solutions that drives value creation and then to capture value from the start to lessen the organisational resistance to change, which speeds up both organisational learning (Gammelgard et al., 2010) and the adoption of new ways of working. The retailer in this study has, for instance, created a control tower to accelerate the journey from value identification to value realisation, focusing on continuous improvements to ensure that the barriers to efficiencies and value creation are removed from within their operational areas.

2.3 An overview of BVIS

The BVIS concept cannot be discussed without an understanding of the concept of *value* and the creation thereof. The guiding principle of business value creation, articulated by Alfred Marshall in 1890, states that value is created when companies grow and earn a return on capital that exceeds their cost of capital (Koller et al., 2015). This should be no different for value in all business areas, especially one such as IS. Hansell et al. (2018) state that ensuring that value management principles

are embedded into organisational systems and processes such as planning, target setting, and the allocation of capital are just as important as getting the metrics right. Whereas there is clarity around value and value creation, according to Lanzinner et al. (2008), there is generally an inconsistent understanding of the definition of the BVIS. De Haes et al. (2020), define the concept of BVIS as: "[…] the organisational performance impacts of IS *at both the intermediate, process level and the organisation-wide level, and comprising both efficiency impacts and competitive impacts".* The definition of the BVIS, used by this thesis is "*the measurement of related business performance gains in financial and non-financial consequences (Lanzinner et al., 2008), and the direct and sustainable impact that the IS in an organisation has on these consequences"*

A summary of several dependent variables highlighted throughout the research history is shown in Table D.1 in Appendix D and includes "value", "worth", "benefit" and "outcome" (Schryen, 2013) as well as "organisational performance" (Van Der Zee, 2002; Apfel, 2003; Schryen, 2013; Aranyossy, 2014; Sabherwal & Jeyaraj, 2015). From a historical perspective, BVIS research in the 1980s focused on productivity, which was seen as the fundamental economic measure to be used (Van der Zee, 2002). However, the majority of these studies found that even with accelerated IS investments, there was a failure to produce evidence of a positive productivity impact of IS investments in the United States (US) at organisational, industry or economic level (Schryen, 2013; Sabherwal & Jeyaraj, 2015) which led to the controversial "productivity paradox" raised in the early 1980s by the Morgan Stanley economist Stephen Roach (Brynjolfsson, 1993).

These early productivity-based studies continued into the early 2000s (Murphy, 2002a), but were severely criticised, no more so than in a comprehensive study by Sabherwal and Jeyaraj (2015) that indicated that there was clear evidence of major positive value from IS on national productivity and economic growth and resolving the productivity paradox at specifically the organisational level. Several other studies throughout the BVIS research timeline also shows that companies with higher technology spending have much higher gross margins (Brynjolfsson & Hitt, 2000; Sabherwal & Jeyaraj, 2015; Rubin et al., 2016a). In addition to this, Vieira (2016) states that the IS function has continued to provide business value to companies in both the developing and developed regions of the world with the growth rate in business value from developing regions exceeding that of developed regions.

The positive impact of IS on the economy and within organisations is thus confirmed by several research studies. However, several other empirical, theoretical, and analytical approaches having examined BVIS under different conditions, using diverse methods and for a variety of IS types have produced inconsistent results, necessitating periodic retrospection in the literature, according to Sabherwal and Jeyaraj (2015). One of the key challenges that remained as an important research

topic has been the organisational frameworks to measure and demonstrate this BVIS (Sabherwal & Jeyaraj, 2015; Onik, 2019), especially within the digital world (Onik, 2019), with current research primarily focused on the causal link between IS use and organisational performance (De Haes et al., 2020). Due to the multi-disciplinary nature of the BVIS domain, the extant literature is also characterised by a proliferation of complex qualitative and quantitative metrics (Ayers & Odegaard, 2018; Brahm et al., 2018) that entails business objectives, costs, risks (Colkin, 2002), and other output-oriented metrics operationalized through Key Performance Indicators (KPI) and Critical Success Factors (CSF).

Most of the investments made in the IS function of today remains predetermined, i.e., organisations cannot be in business without it (Kaufmann & Kriebel, 1988; Florentine, 2017; Dhasarathy et al., 2020). These investments fall into three broad investment classes namely mandatory IS, IS infrastructure spending and IS research (Van de Zee, 2002) with the majority of budgetary spend and increases being directed towards updating infrastructure, enabling employee growth, and on prioritizing security projects (Eide, 2020). As organisations are increasingly dependent on using IS as a strategic advantage (Chen et al., 2013; Lynn & Mooney, 2020; McArthur et al., 2020), they are confronted by key questions such as “what benefits will the investment bring?”, or “what is the return on investment or direct payback?” and as such are required to be shrewd about their investment choices and measuring the BVIS around these choices (Borges, 2015; Solanki, 2018).

Van der Zee (2002) states that for an organisation to launch an effective, systematic, and consistent measurement of IS, it must use an overall management framework *(how)* that forms part of an effective broader organisational measurement program that links planned activities with the valuation results, select key metrics *(what)* to assess the BVIS and use tools such as benchmarking to develop norms for supply and demand-side measurement. According to Van der Zee (2002), a framework is necessary to help navigate difficult terrain and for simplifying and ordering metrics, rather than an end in itself. However, the Gartner Group study (Solanki, 2018) quoted earlier in this thesis, shows that organisations are not doing this effectively and according to Lanzinner et al. (2008) many investment decisions are justified as “acts of faith”, “gut instinct”, “got to do”, or simply “strategic” and not against identified metrics that are appropriate to capture the economic impacts of the IS artefact that they are evaluating (Kaufman and Kriebel, 1988). The failure to measure and articulate BVIS effectively has resulted in pushbacks on IS budgets, an increase in shadow IS, and a lack of IS involvement in strategic decision making (Solanki, 2018).

2.3.1 Measuring BVIS

The IS function does not operate within a vacuum but operates within the organisation who in turn operates within a broader economy. Ordinarily a business would try and measure performance at various levels using different IS artefacts across varying units of analysis from a business process, unit, organisational, inter-organisational, and value chain levels perspective (Lynn & Mooney, 2020). Not all companies measure performance across all the levels in which they operate. As such, another key question that has to be answered is at what level one should measure the BVIS because it can be generated at the individual, organisational, industry, economy (DeLone & McLean, 1992; Mellville et al., 2004; Schryen, 2013; Sandkuhl & Stirna, 2018), societal levels (Mellville et al., 2004; Sandkuhl & Stirna, 2018) as well as at the functional and non-functional levels of IS (Gammelgard et al., 2010).

Tallon et al. (2020), argues that organisations should measure BVIS but also manage the IS function in a way that maximizes its value creation potential as the BVIS will not arise automatically because not IS activities are value-generating. This view that not all IS activities are value-generating is aligned to views shared by several authors. For instance, Kauffman and Kriebel (1988), argues that BVIS should not be confused with criteria intended to track the performance of the IS organisation as this is a different management consideration that is not necessarily synonymous with business value. Van der Zee (2002) states that BVIS is concerned with the extent to which the IS function contributes to business objectives and strategy and not necessarily with the *effectiveness of IS,* the *effectiveness of IS supply* or the *efficiency of IS*. Van der Zee (2002), states that the effectiveness of IS supply relates to how the services supplied by IS aligns with business requirements. Van der Zee (2002) also states that the efficiency of IS relates to whether IS is supplied at minimum cost.

However, several authors argue that the BVIS is a multi-dimensional construct that should contain a set of metrics that articulates both the value that is generated from all BAU activities as well as from key investment initiatives and projects that are undertaken by the IS function (Koller et al., 2015; Sabherwal & Jeyaraj, 2015; Peppard & Ward, 2016). Harris et al. (2008), also argues that the BVIS can be measured based on value delivery (“Does IS provide value that has a bottom-line impact on the business?”) but argues that BVIS can be delivered through development efficiency (“Has the software been developed cost-effectively?” –or *the efficiency of IS*), with both aspects being measurable.

Historically the focus of measurement systems has been on effectiveness and the metrics around the supply side of the value chain such as the deployment of systems and system maintenance (Chen et al., 2010; Solanki et al., 2018). Harris et al. (2008) define 13 characteristics and 40 sub-characteristics defined for software quality (ISO/IEC 25010:2011) within four quadrants namely *cost*

(accounting for all IS expenditure within the IS budget), *quality* (the number defects found in a product or application during the testing phase), *duration* (measuring how long a project team takes from initiation to the deployment of a software solution) and *customer satisfaction* (measuring the perspective of the customer through for instance, a customer satisfaction survey).

Some other development operational metrics used by organisations include deployment frequency, lead time and automated test failure rate which deal directly with the effectiveness of the software development cycle. These traditional metrics are evolving while new ones are emerging such as the metrics associated with third platform technologies (cloud computing) which measure *resilience* that is a risk-based measure that speaks to system reliability and availability (Tallon et al., 2020). The *speed of deployment* that assesses the ability of IS to respond to changes in the demand for IS since deployment tends to lag any decision to deploy IS resources (Tallon et al., 2020). The *scalability* that describes how seamlessly additional IS resources can be added to (or removed from) the resources available to distributed users (Tallon et al., 2020). The *organisational agility* that describes how easily and quickly organisations can respond to business environment changes and, more importantly, at what cost (Tallon et al., 2020).

IS-centred metrics lack a business context and focus on business contribution because they fail to express performance in terms of value-creation, as few of these metrics have ventured beyond the confines of the SLA (Murphy, 2002a). It also reflects the reality that IS departments have mostly been reflecting on reactive measures, responding to outages, or solving help desk issues after they arise and as such and not traditionally strategically (Kidd, 2019) as these measures sometimes show a strong performance in the IS department which may not necessarily translate to equally strong organisational performance (Kidd, 2019). The last category of metrics used by IS to measure its effectiveness is financial, with budgeted cost compared to the actual cost, and the positive and negative budget variances tightly controlled within this category. Harris et al. (2008), shares two metrics that can be used by the IS team as measures of its BAU performance as IS cost as a per cent of Total OpEx where OpEx are the total expenses for the whole organisation and IS cost as a per cent of revenue.

Past studies have considered different antecedents and contextual factors, such as core organisational competencies, organisational structure and culture, governance including strategic IS/business alignment, management practices such as strategic planning and the competitive environment that influence the BVIS (Schryen, 2013; Onik, 2019). Measuring and managing IS benefits at the industry and macroeconomic level have been challenging (Schryen, 2013) with many economists arguing that the digital revolution has not generated the anticipated increases in traditional macroeconomic metrics such as gross domestic product (GDP), according to Rubin et al.

(2016b). However, Rubin et al. (2016b) argue that this failure is more because of how GDP is measured and that economists need to re-think macroeconomic growth in new ways considering the impact of technology generated benefits on the broader economy such as greater convenience, the improved customer experience provided by digital services and the benefit of the vast amount of information being provided by, for instance, search engines.

The challenge of measuring IS value at the macroeconomic level is not addressed by this thesis because of its focus is on organisational level BVIS. However, the competitive position and organisational context is critical to the measurement of BVIS and is supported by various academic scholars and is well established within the literature (Mooney et al., 1995, Sandkuhl, 2013). Focusing only on the firm-level output variables provides only a limited understanding of how BVIS is created (Mooney et al., 1995). It is reflected in the proposed framework of this study as the interplay between the organisation and the environment in which it operates is critical to the successful measurement of BVIS. This interplay is illustrated by Ward and Daniels (2007) in Figure 2.1 that shows how the macro-environment, including the competitive landscape and other industry factors, play a key role in the generation of BVIS using IS and complementary organisational resources that improve business processes that ultimately result in improved organisational performance.

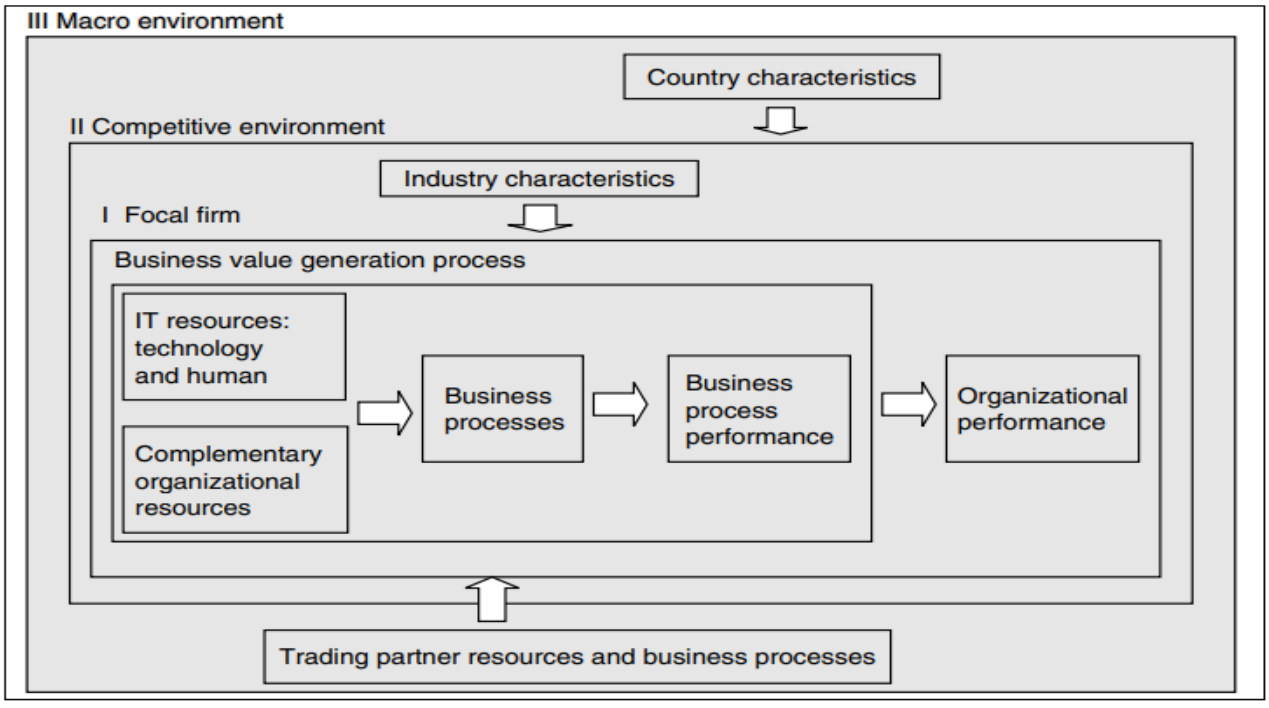


Figure 2.1 Impact of macro environment on business value (Source: Ward and Daniels (2007)

Even though several hindrances exist with measuring BVIS at the organisational level (see Section 2.5), some scholars agree that BVIS derives largely from organisation-centric activities such as internal business processes, organisational capabilities, organisational practices (Brynjolfsson & Hitt, 2000; Ward & Daniel, 2007; Onik, 2019). BVIS is also derived from a strategic, informational,

transactional, transformational (Sandkuhl & Stirna, 2018) and across management, operational and functional perspectives (Ward & Daniel, 2007). Some researchers consider different antecedents and contextual factors, such as organisational structure and culture, governance including strategic alignment between IS and business, management practices and competitive environment that influence the BVIS (Schryen, 2013; Onik, 2019). The organisational level perspective has been adopted by this study for these reasons.

Another key aspect that is reflected in the academic literature is the question of *when* to measure the organisational impact of the BVIS (Lanzinner et al., 2008). Some scholars stress the importance of doing both *ex-ante (*that is, based on the forecast or before the event) and ex *post facto (*that is, after the fact or based on actual results) evaluations as this provide a more complete evaluation of whether the IS function has created value and whether future investments and strategic actions will create value for the organisation (Chen et al., 2010; Aranyossy, 2014). Most early academic writers focused on *ex-ante* rather than *ex post facto* evaluations (Schryen, 2013; Aranyossy, 2014). According to Aranyossy (2014) the principal function of *ex-ante* evaluations lies not so much in determining an exact value as in identifying the key factors of value creation. However, with a more pointed focus being placed on benefits from IS investments, more scholars amplify Benefits Realisation Management (BRM) and *ex post facto* evaluations (Serra and Kunc, 2015; Murray, 2016). The new BVIS framework proposed by this study considers the evaluations of benefits/costs both ex-ante and ex post facto.

DeLone and McLean (1992) developed the concept of a dependent variable within IS research while developing the IS Success Model framework for the measurement of BVIS. “Organisational performance” was established as the dependent variable in their study, but several other dependent variables have been highlighted in subsequent studies around BVIS. The dependent variables are important because it demonstrates what impact BVIS can have on organisation performance. Kauffman and Kriebel (1988) posit that using some of these variables in isolation (such as productivity) to measure the impact of the BVIS is not very meaningful and that the measures acquire significance only when they are juxtaposed against benchmarks for other businesses, business units/facilities or prior periods. Table D.1 in Appendix D lists dependent variables identified through a detailed review of the BVIS literature by the researcher.

2.3.2 Approaches to measuring BVIS

Another key question is the question of *how* to measure the BVIS. Cronk and Fitzgerald (2002) argue that even though it is difficult to identify the lens of a researcher because they rarely state their applied paradigm, four distinct paradigms exist to evaluate BVIS is, namely the positivist paradigm

that reflects quantitative economic/financial perspectives on value, critical theory that reflects context-specific measures of value, realism that reflects a combination of multiple perspectives on value and hence measurement type, and constructivism/realistic relativism that reflects perceptual perspectives of value. Lanzinner et al. (2008), states that IS evaluation approaches can be systemised according to their purpose with assessments that evaluate investment impacts post facto (*effect-assessing)* or approaches that aim at locating BVIS impacts (*effect-locating)*.

Four types of approaches are identified within the literature and even though scholars agree that there are differences between the different approaches concerning their suitability that needs to be considered (Sandkuhl et al., 2008; Sankuhl & Stirna, 2018; Sandkuhl & Siegerroth, 2018). This study chose a combination of the project-focused, scorecard and perceived value approaches in the proposed framework presented in Section 6.5. In making this decision, the researcher has also considered the argument of Lanzinner et al. (2008) that not all approaches are compatible with each other and the whole evaluation process can become very expensive. The four approach types are summarised below:

2.3.2.1 Scorecard based approach

This approach encapsulates different metrics within a scorecard that contains the strategic organisational goals and objectives (Van der Zee, 2002), establish long-term targets for these metrics, align long-term and short-term resources to these initiatives and aim to continuously improve and communicate performance and results against these metrics (Sandkuhl & Siegerroth, 2018). According to Haes et al. (2020), one should decide which measurement approach to use based on whether one can quantify the monetary value of the attributes (see Figure 2.2) with a scorecard being more appropriate when measuring intangible attributes with tangible attributes to be used using traditional financial metrics such as ROI, IRR, NPV and the payback period.

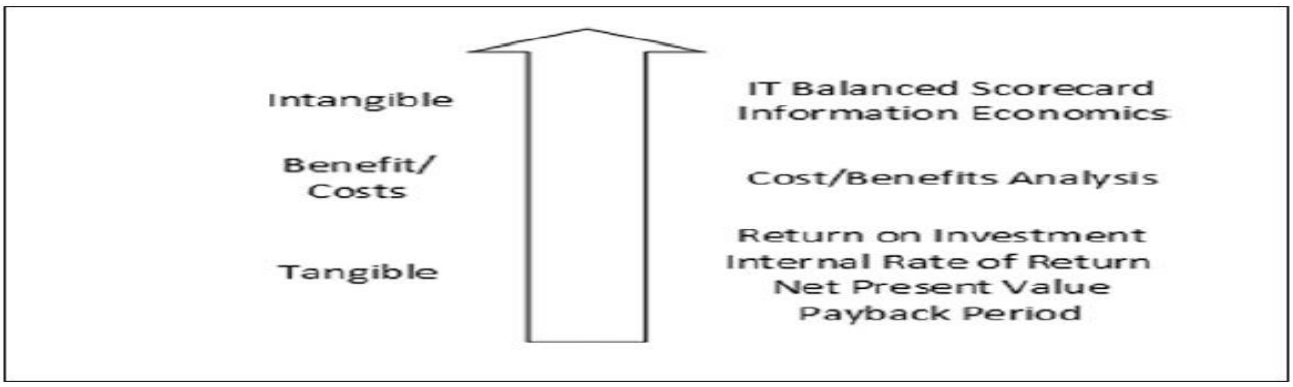


Figure 2.2. Business Value Hierarchy (Source: Sandkuhl & Siegerroth, 2018)

2.3.2.2 Process-oriented approaches

Even though process-level perspectives are important to illustrate the BVIS they are by nature organisation specific which requires a detailed understanding of the organisation specific process

and the IS impacts there upon before starting a BVIS analysis, which makes this approach quite expensive in terms of effort (Sankuhl & Stirna, 2018; Sandkuhl & Siegerroth, 2018). Awareness of the importance of process improvements is not new with several mature initiatives such as business process reengineering (BPR), Total Quality Management (TQM), Lean and Six Sigma aimed at process level improvement (Ayers & Odegaard, 2018). Process-oriented approaches focus on these theories to provide causal explanations of *how* the BVIS can be demonstrated through process improvements under the necessary conditions, particular events, and sequences (Tallon & Kraemer, 1999; Sandkuhl & Stirna, 2018; Onik, 2019). The process-oriented approach is supported by researchers (Tallon & Kraemer, 1999; Hajela, 2009a; Ayers & Odegaard, 2018; Tallon et al., 2020. Organisations also err on the side of inclusion when selecting metrics for processes, a fault that results in overly complex analysis (Ayers & Odegaard, 2018).

2.3.2.3 Perceived value approaches

There is little consensus among scholars concerning the definition, conceptualization, and measurement of "perceived value" because of its somehow ambiguous nature, which has been described as "complex", "multifaceted", "dynamic" and "subjective". Borges (2015) defines the perceived value "*as the consumer's overall assessment of the utility of a product based on perceptions of what is received and what is given*". BVIS with this approach is evaluated ex post facto (Borges, 2013), based on the perception of the user of the overall value of the IS service that they received rather than on financial indicators (Chung, 2003; Borges, 2015; Sandkuhl & Stirna, 2018).

Several problems exist with this approach, such as the scale of subjectivity (Chung, 2003), the failure to attach importance to the impact that IS may have on decision-making (Chung, 2003), it may lead to inconsistent and incommensurable empirical measures (Borges, 2015) and do not cover measurable business objectives sufficiently (Sankuhl & Stirna, 2018; Sandkuhl & Siegerroth, 2018). However, even with all these problems, several scholars agree that perceptual measures are a valid proxy to use when clear financial measures of BVIS are hard to find or non-existent (Tallon & Kraemer, 2007, Tallon et al., 2020).

2.3.2.4 Project-focused approaches

The project-focus approach tries to support decision-making on whether an IS project should be started by calculating a score for different project alternatives, including the "do nothing" alternative (Remez & White, 1999; Colkin, 2002; Karmperis et al., 2013; Sankuhl & Stirna, 2018; Sandkuhl & Siegerroth, 2018). Project-focused approaches are typically favoured by organisations that have a strong Project Portfolio Management (PPM) culture where projects are seen as part of a bigger value proposition (Torres, 2021b). PPM is defined as the selection and management of all projects, programmes, and related BAU activities taking into account resource constraints, financial cost,

financial return or benefit (Peppard & Ward, 2016) as most projects require some sort of benefit (Murphy, 2002a; Koller et al., 2015). Serra and Kunc (2015) define two approaches to evaluate project success namely Project Management (PM), also called efficiency, that evaluates the "triple constraint" of cost, schedule and scope and project success that measures how well projects deliver the strategic benefits required to create value.

Several problems exist with measuring project success such as the difficulty in measuring project costs and benefits using a capital budgeting framework as it requires the need to model them in positive or negative cash flows, and restating these using the time value of money (Tallon et al., 2020). BVIS and relevant performance indicators should be measured during the whole project which is difficult to meet with the primary aim of project-centric approaches being the evaluation of business value to get them started (Sandkuhl et al., 2008). Other problems include tension around ownership of projects or initiatives (Torres, 2021b), the difficulty of accurate forecasting of benefits especially with breakthrough projects or projects whose aim is cost avoidance and that require significant changes in operating methods (Murphy, 2002a), and that many of the "benefits" attributed to support investment decisions do not represent actual business benefits but rather the "potential" to provide benefits (Murphy, 2009).

2.4 Effects of BVIS to Retailers and their SC organisations

The changing retailers and SC landscapes had a significant impact on the metrics and measures that are used within organisations to measure BVIS and as such one of the most important topics in the evaluation of the BVIS is the question of ***what to measure*** to see whether the IS function adds any measurable business value (Schryen, 2013) as there is no consensus on the metrics to be used (DeLone & McLean, 1992; Bloch & Hoyos-Gomez, 2009). As such this section presents the literature to the questions of "what metrics do organisations use to measure its performance" and "what metrics links IS performance with organisational performance" to answer the question of what to measure.

Ayers and Odegaard (2018) argue that metric proliferation is present within many retail and SCs which creates confusion, is costly to maintain and in many instances results in inaction, metrics debates resulting from those being measured debating the calculation of the metrics, who should be measured and the value of the metrics, *changing metrics* (new metrics that are introduced to replace old ones but creates confusion), *old data* (lags that exist in gathering and acting n metrics) and *gaming* ("you get what you measure" with those being measured manipulating the system to improve the metrics). As such retailers and their SC organisations should trim the number of metrics tracked (Ayers & Odegaard, 2018) move from transaction-level economic assessments and seek "high-

fidelity" (Brahm et al., 2018) or "vital" metrics (Ayers & Odegaard, 2018) such as assessing the lifetime value of a customer relationship (Brahm et al., 2018).

Brahm et al. (2018) also warn that metrics are often imperfect and are only approximations of desired behaviour and output and sometimes even dangerous especially when a single metric is overemphasized at the expense of others or when it does not align with BVIS such as with the measurement of the number of lines of code written without worrying about the quality of the code written.

2.4.1 Measuring organisational performance

Organisations typically use a variety of quantitative and qualitative metrics to measure organisational performance as well as the causal link between the BVIS and organisational performance, with a typical bias for quantitative metrics in existence in most organisations (Bryan, 2007).The identification of this quantitative bias is not hard to find in the literature or practice. The annual financial statements of most organisations reflect the reality that performance is still gauged using systems that measure internal financial results and the usage of capital (Bryan, 2007; Crotty, 2020). The financial results of SA retailers are no different – the key focus of their annual financial results can be grouped into five key areas: Turnover, Operating Performance (Profit and Margin), Headline Earnings, ROE, and ROIC. However, although accounting metrics remain fundamental to market analysts across the world, it is recognised that they represent lagging indicators of performance and as such is insufficient for capturing all the critical elements of business worth (Apfel, 2002; Proctor & Smith, 2017).

Hansell et al. (2018), advocate the use of Total shareholder return (TSR) as the only measure that represents the bottom line for shareholders. TSR, factors in margin expansion, revenue growth, dividends and capital gains when measuring the total return generated from a share and is the only multi-period metric mandated by the US Securities and Exchange Commission as well as the principal performance metric evaluated by Institutional Shareholder Services, according to Hansell et al. (2018). TSR is the IRR of all cash flows during the holding period of an investment (Ayers & Odegaard, 2018; Hansell et al., 2018) with investors seeking out dividends to validate the believe of management that their future earnings are strong (Rubin et al., 2016a). However, even from a TSR perspective, early studies have shown no positive correlation between IS investments and TSR (Brynjolfsson & Hitt, 1996).

The discussions thus far in this section have focused on measures that apply to the broader set of organisations as a whole – but what about technology-focused companies – are there different

measures that define the success of these IS-focused organisations? Even within the technology sector, financial measures predominate with investors looking at the gross margin as a proxy for business resistance to commoditisation (Rubin et al., 2016a; Hansell et al., 2018). The top 10 technology industry performance dimensions identified through a survey by PWC (2004) for value creation were (i) Strategic Direction, (ii) Cash Flow, (iii). Market Growth. (iv) Gross Margins, (v) Quality/Experience of Management Team, (vi) Market Size, (vii) Competitive Landscape, (viii) Earnings, (ix) Speed to Market/First to Market, and (x) Market Share. These metrics support a bias for financial indicators.

Vieira (2016) states that the measurement of BVIS shows an increasing trend through the decades despite variations in metrics and that the variables used to measure BVIS have continued to evolve from profitability measures such as ROA and ROE to other performance measures and also from pure tangible-based measures to applied measures such as technology use and capability.

2.4.2 Measuring BVIS within the Retail and SC landscape

BVIS metrics should be derived from the strategic goals and objectives of the organisation (Kauffman and Kriebel, 1988; Bloch & Hoyos-Gomez, 2009), which will vary based on the business context and priorities (Kauffman and Kriebel, 1988) and should correlate IS and overall organisational performance in terms of value creation and preservation (Solanki, 2018). However, as Hansell (2018) points out, “metrics” alone are not enough to achieve organisational performance because value creation and preservation within modern organisations come from the evaluation of positive net present-value investments as well as from subjective measures such as the evaluation of the underlying business and the attractiveness of the available reinvestment opportunities. According to Kark (2018), leaders of the IS function are starting to realise the importance of value creation and preservation, the link thereof to organisational performance and the effective measurement thereof.

Cost optimisation has always been a key focus area of BVIS within retailers and their SCs. According to Keenan (2017), the result of a survey of retailers on the measurement of the success of IS investments, increased revenue (62.87%) and cost savings (50.30%) were identified as the top two metrics identified by respondents. Burnette and Dittmann (2018) also state that SC organisations reduce cost through efficient operations, overall supply chain time, material cycle time, production cycle time, new initiative launch time, the value of inventory and overall quality of customer service as well as SC collaboration. Another area of focus of the second group of measures focuses on collaboration and responsiveness across the entire SC (Ayers & Odegaard, 2018; Srimarut & Mekhum, 2020), as well as the effectiveness of end-to-end business outcomes (Burnette & Dittmann, 2018). Burnette and Dittmann (2018) define SC collaboration as the process of identifying and

working issues and opportunities with specific business objectives between two or more parties in a way that increases overall SC value.

Keenan (2017) argues that in addition to increased revenues and cost savings that were set as the benchmark for the measurement of BVIS by retailers. They should also establish the monetary quantification of anticipated revenue, productivity gain, staffing reduction or increase in clients served at the start of a project and have clarity on how the planned initiative will impact their day-to-day operations such as the potential impact on staff (positive or negative). Retailers should ensure that the initiative has high-level support and end-users are sufficiently trained to use the system because the BVIS would be contingent on the strategic use and adoption of the system.

Consumers are central to the success of retailers and as such customer-centricity and the measurement thereof is widely recognised within the literature as a critical measure of the impact of the BVIS on organisation performance (Apfel, 2002; Onik, 2019; Zeng et al., 2020). Improved customer service also received the highest “relative importance” rating (100%) of all the variables mentioned in the study (see Table D.1) by Gammelgard et al. (2010). However, increased customer engagement (26.5%), increased customer retention/loyalty (27.54%) were low on the study results quoted by Keenan (2017), which is against the current customer-centricity trend within retailers (Vader & Martin, 2020) and misaligned with the view of Tsan-Ming (2014) who states that satisfying consumer needs is critically important in retail and retail SC.

Traditionally, the customer-centred retail service quality scale (RSQS) model has been widely adopted within retailers to measure the customer expectation and perception of service quality and contains four dimensions. Tsan-Ming (2014) states these dimensions as *physical aspects* (store layouts, visual merchandising, convenience, etc.), *reliability* (stick to promises), *personal interaction* (how staff respond to queries, provide advice, etc.) and *problem-solving* (technical problems, returns, products exchanges and other complaints).

The processes and metrics within SC are all impacted by the introduction of IS which can increase the BVIS (Burnette & Dittmann, 2018). Within the context of this study, BVIS creates an interesting dilemma in that these metrics, creates an opportunity for SC to measure the Business Value of SC (BVSC) which can conflict with the BVIS! SC research has explored the key function of SCM in refining organisational performance, and more explicitly, the role of SC integration and capability in promoting organisational performance (Srimarut & Mekhum, 2020). Formerly the studies on the association between IS, SC integration, and organisational performance have been growing with the belief that there is a positive link between the BVIS and its impact on organisational performance (Srimarut & Mekhum, 2020).

To simplify metrics within SC, Ayers and Odegaard (2018) list three categories across which SC performance are measured namely service, operational and financial. The first category, *service metrics,* measure the effectiveness of the service of the SC organisation, the second category namely *operational* level measures operational effectiveness and the final category, *financial metrics*, has traditionally ruled decision making within SC organisations, according to Ayers and Odegaard (2018). Tsan-Ming (2014) identifies four metrics that can be used in retail and SCM to measure customer service levels namely inventory service levels, on-time deliveries, percentage of defective products and number of consumer complaints. The on-time delivery and percentage of defective products have recently been combined into a measure of on-time and in-full (OTIF), according to Burnette & Dittmann (2018) or Perfect Order (Ayers & Odegaard, 2018). Burnette and Dittmann (2018) differ on the categorisation of Ayers and Odegaard (2018) and define measuring On-Time and In-Full (OTIF) deliveries to customers as a typical *operational* outcome when measuring world-class SC organisation.

Slone et al. (2010), focus on the shareholder value that effective SC organisations create within organisations by driving organisational cross-functional integration to produce the highest availability levels with the minimum cost and capital investment, reduce capital requirements with lower inventory, lower overall working capital, streamline physical networks (Burnette & Dittmann, 2018) and increases in economic profit. These overall organisational performance categories would also include metrics such market share and TCO, which Ayers and Odegaard (2018) have included in their *service* category. Srimarut & Mekhum (2020), lists several other financial metrics important for all SC organisations and their organisations to understand such as net profit margin which is the net operating profit after tax (NOPAT), Capital turnover (CT/O) which is revenue divided by total capital, WACC, ROIC and Economic profit (EP) which NOPAT less WACC.

Measuring these extensive set of metrics are common in virtually all SC organisations based on the understanding that organisations achieve what is measured with several frameworks in existence to measure the effectiveness of SC organisations. According to Ayers and Odegaard (2018), the SC operations reference (SCOR) model, as a best practice framework is used in SCM, and enable the process of aligning the SC plan and its execution with the financial plan and consists of four high-level generic “executing” processes namely *source*, *make*, *deliver*, and *return* with process descriptions employed to evaluate the completeness of SC processes within organisations. Together, all the SCOR process descriptions contain hundreds of metrics that measure the health of individual processes and even though SCOR does not advocate using them all, their existence is emblematic of the multitude of choices (Ayers & Odegaard, 2018). Another approach favoured by

SC organisations is the use of a Balanced Scorecard (BSC) that is also in use in the SC organisation of the Retailer on which this study is based.

2.5 Factors hindering Organisations from Measuring BVIS

This section discusses the hindrances that impede the effective measurement of the economic impact of the BVIS against organisation performance. These hindrances are discussed in detail below.

2.5.1 The ambiguity and fuzziness of the BVIS construct

Hajela (2009) states that several scholars have given different perspectives of the inherent problem with value and valuations with the view of purists being that all bias should be removed from valuations before it can be considered which is difficult in itself as the following example illustrates – it is virtually impossible to remove all bias from the decision by an employee to determine whether you should buy the share of your company or that of the competitor. Valuations also change over time as more information becomes available and as such leads to a degree of variation and lastly most companies view the IS department as a cost centre and by doing this, they focus on the cost metrics of IS, i.e., whether they meet performance against budget and other cost targets (Kishore et al., 2006; Solanki et al., 2018). Schryen (2013), gives several other reasons for the existence of this hindrance such as that the discussion around BVIS frays into many thought lines and loses track of the BVIS construct, that market-oriented and internal capabilities are out of the scope of BVIS, that the understanding of value lacks the consideration of the environment and that subjective preferences of stakeholders are ignored.

2.5.2 Neglected disaggregation of IS investments

According to Schryen (2013), little is known about the relative performance contributions of different types of IS investments and whether these investment types impact different areas of organisational performance. Schryen (2013) also states that the results of different empirical studies are hard to compare and that the impact of specific IS assets on strategic organisational objectives are hardly understood and synergies within IS assets are not identified.

2.5.3 BVIS as a “grey box”

According to Schryen (2013), time-variant relationships between IS assets and complementary capabilities are unclear, time issues in creating competitive advantages are not sufficiently addressed, value generation processes need to be uncovered, explanations of unintended consequences are still required and no theory of IS business value exists. Lee (2001), states that modelling problems have been at the centre in the difficulty in valuing IS and believes that this is

because “IS” as a general term includes so many different functions and features that have been designed for purposes other than increasing short-term profitability. Schryen (2013) also suggests that the mismeasurement of impact of IS investments may also be rooted in the ignorance of effects delayed by years, which can result in a lag effect.

2.5.4 The multifaceted nature of BVIS

BVIS is a multifaceted construct as it can be measured using intangible and tangible values, measured at various levels within the organisation and across the broader economy as well as through different paradigms and approaches. The BVIS is also a multi-disciplinary, multi-dimensional construct that is characterised by a proliferation of complex qualitative and quantitative metrics (Ayers & Odegaard, 2018; Brahm et al., 2018) that entails business objectives, costs and risks (Colkin, 2002), and other output-oriented metrics that articulates both the value that is generated from all BAU activities as well as from key investment initiatives and projects that are undertaken by the IS function (Koller et al., 2015; Sabherwal & Jeyaraj, 2015; Peppard & Ward, 2016).

2.5.5 IS/Business misalignment

Tallon and Kraemer (1999) define strategic alignment as the extent to which the IS strategy supports and is supported by the Business strategy and state that misalignment results from either an IS or Strategy shortfall. According to Balafif and Haryanti (2019), many studies have shown strategic IS/Business misalignment is the main reason for the failure to realise the full potential of IS investments. According to Chen et al. (2010), opportunities created through initiatives such as BPR cannot succeed unless business and IS leadership are aligned. Scholars have argued that IS/business alignment has a direct impact on the BVIS and that the BVIS must form part of an overall “value ecosystem” within the company (Tallon & Kraemer, 1999, De Haes et al., 2020, Ottervig, 2020) and that the measurement and the demonstration of BVIS should be a joint effort (Gliedman, 2003; Tucker, 2003; Solanki et al., 2018; Ottervig, 2020). This view is also supported by a recent study by the Gartner Group (Solanki et al., 2018) who established that where BVIS is measured formally in organisations, there is joint accountability but that where there is no formal measure, 60% of companies say that it is the responsibility of the CIO. However, Tucker (2003) argues that the IS function can help the business estimate “potential value” but the business leadership is responsible for “value realisation”. It is however important to understand that all the problems around achieving the BVIS cannot be resolved by IS/Business alignment alone (De Haes et al., 2020).

2.5.6 Lack of effective communication of BVIS

The 2004 survey by PWC (2004), referenced earlier in this Chapter, were also used to test some of the gaps between measurement and value creation and the survey found five communication gaps

namely, information, reporting, quality, understanding and perception gaps. These gaps are identified by PWC (2004) are summarised in Table 2.1 below.

Table 2.1. The Five Communication Gaps and their Impact on the Value Gap

Information Gap	Reporting Gap	Quality Gap	Understanding Gap	Perception Gap
The difference between the relative importance the investment community place on a measure and how satisfied they are that business executives provided them with sufficient information on that measure.	The difference between the relative importance executives attaches to a measure and how actively they work to report on it.	The difference between the relative importance executives attaches to a measure and the reliability of the information their internal systems provide on it.	The difference between the relative importance executives attach to a measure and the importance investment community attach to it.	The difference between how actively executives think they work to report on a measure and how the investment community perceive the quality of the information they get on it.

Source: PWC (2004)

Even though these gaps are primarily directed at the relationship between organisations and external stakeholder valuations, the gaps in themselves were used within this study, to test the level of success at which BVIS is articulated within the SA Retailer of this study.

2.5.7 Complexity created by the pervasiveness of IS

The pervasiveness of IS has at its core that very few IS initiatives can succeed on their own and while computers have improved the ability of organisations to collect and analyse data on most aspects of their company and the economy, according to Brynjolfsson & Hitt (2000), the computer-enabled economy has become increasingly difficult to measure using conventional methods. BVIS frameworks/metrics also struggle to measure the true cost of IS because there has been a huge shift in the decentralisation of some of the components of the IS function. Even though this task of allocating cost correctly for the IS organisation, is fairly straightforward for tangible end-user assets such as laptops, allocating costs related to intangible assets such as applications drawing on CPUs, and the cost of servers as well as is determining what to charge for different tiers of service quality, such as 24/7 availability as opposed to off-peak usage only is more complex (Appel et al., 2005).

In addition to the pervasiveness of the IS capability within organisations, the performance is also simultaneously influenced by a multitude of other external and internal factors that, according to Schryen (2013), make it difficult to isolate the influence of IS on its own and to develop a causal relationship between the value of IS and business performance. The pervasiveness of IS thus means that BVIS measurement of a particular initiative or project must be measured in terms of a portfolio of projects and not in isolation, for BVIS measurement to be successful. Some IS functions is deeply

embedded into multiple spheres of the organisation through decentralization, and the advent of some third platform technologies such as cloud computing and SaaS platforms that introduce new key capabilities that are outsourced (Lynn & Mooney, 2020). This dispersed nature of IS makes it more complex and difficult to assess and allocate IS costs for instance, across organisations (DeLone & McLean, 1992) which complicates the effective measurement of the BVIS against organisational performance.

2.5.8 Lack of intangible benefits in demonstrating BVIS

Scholars agree that the determination of BVIS is part art and part science (Brynjolfsson & Hitt, 2000) and that any approach must account for both intangibles and tangible measures (De Haes et al., 2020; Tallon et al., 2020) with Lanzinner et.al (2008), arguing that an IS function management approach that is only monetary-oriented is not feasible or at least questionable. Financial metrics have traditionally been favoured for decision making within organisations (Strassman, 1996; De Haes et al., 2020) because the achievement of quarterly and yearly revenue and profitability targets are favoured by market analysts and tied directly to business executives' bonuses (Proctor & Smith, 2017; De Haes et al., 2020). The accounting measures in use today that ascribes most of the value for most enterprises to physical assets (Proctor & Smith, 2020), were created during the industrial age and is not keeping pace as the global economy shifts to a services-oriented model (Free, 2003; Proctor & Smith, 2020). For the organisations operating within the services-oriented model, value from intangible benefits have come to predominate (Murphy, 2002a; Aranyossy, 2014, Hubbard, 2014; Solanki et al., 2018; Ross, 2020).

Most intangible assets are not treated as investments (Saunders & Brynjolfsson, 2016) because accounting for these intangibles is difficult, complex, and costly (Bryan, 2007; Hubbard, 2014). It may also result in the risk of mismeasurement (Tallon et al., 2020). The specific contribution of each intangible is also hard to assess (Bryan, 2007) because intangibles are interwoven into the value of several processes which makes its value difficult to link directly to improved organisational profitability or the lack thereof (Saunders and Brynjolfsson, 2016). In an increasingly competitive and digital economy, knowledge, advertising and branding, intellectual property and unique business processes and R&D are placed under the spotlight (Ross, 2020; Proctor & Smith, 2020). Several of them illustrating value (Saunders & Brynjolfsson, 2016). This value is wide and varied and includes substantial potential for driving share prices higher, according to the Columbia Threadneedle Investment (CTI) group (2019) who states that over five years, ending September 30, 2019, the significant outperformance of the broader market by the stock of Facebook, Amazon, Apple, Netflix, and Google (FAANG) can be linked to intangibles directly. As such, BVIS frameworks **must** include

intangibles to be considered relevant in today's digital world (The CTI Group, 2019; Ross, 2020; Proctor & Smith, 2020).

2.6 Gaps in Literature

A large body of literature, including some empirical studies, has been presented in Chapter 2 on the economic impact of the BVIS at a societal, macro economical, industry, organisational, process level (Sabherwal & Jeyaraj, 2015; Rubin et al., 2016a; Rubin et al. 2016b; Vieira, 2016) as well as within retailers and SC organisations (Ramesh Babu et al., 2012; Chen et al., 2013; Srimarut & Mekhum, 2020; McArthur et al., 2020). Even though some dissenting opinions have been expressed (Hitt & Brynjolfsson, 1996; Carr, 2003), these views have been disproven in later studies (Sabherwal & Jeyaraj, 2015) with an overwhelming of recent studies expressing a favourable outcome or net positive benefit of the BVIS. The answer to the question asked in Chapter 1 of "*does IS really add value or to put it another way – is there a link between IS initiatives and business value?"* can be answered in the positive (Sabherwal & Jeyaraj, 2015).

An overwhelming body of literature presented in Chapter 2 that focused on the framework **(how)** this value has been measured, managed and articulated especially within organisations (Van Der Zee, 2002; Hajela, 2009a, Hajela, 2009b, Chen et al., 2010; Aranyossy, 2014; Solanki, 2018; Onik, 2019; Lynn & Mooney, 2020; Tallon et al., 2020; Zeng et al., 2020), as well as with the metrics (**what**) used within organisations to measure the BVIS (Koller et al., 2015; Sabherwal & Jeyaraj, 2015; Peppard & Ward, 2016). As such IS researchers have struggled to identify and explain the economic impact of the BVIS against organisation performance.

According to Schryen (2013) the literature reveals inconclusive and conflicting results in many areas, such as with the "productivity paradox" and with market and accounting performance. Schryen (2013) also states that after many years of research, the contribution and importance of IS regarding the creation of various forms of business value is still a "grey box". This is largely rooted in the fact that past research on the economic impact of the BVIS against organisational performance has underemphasized increasingly important research areas and questions such as (i) how to get a consistent and comprehensive understanding of the complex 'IS business value construct', (ii) how to disaggregate overall IS investments to distinguish value-adding IS activities from non-value-adding activities, and (iii) how, why and when IS assets create capabilities with which they jointly create and preserve business value. These items are further exacerbated by the hindrances highlighted in Section 2.5 namely (i) The multifaceted nature of BVIS, (ii) lack of intangible value benefits in demonstrating the BVIS, (iii) complexity created by the pervasiveness of IS, (iv) Lack of effective communication on the BVIS and (v) IS/business misalignment.

These gaps in the literature make it clear that the problem statement that was framed earlier in the thesis is accurate in that literature agrees with the answer that *IS leaders are unable to measure, manage and effectively articulate the true BVIS to their organisations due to* ineffective measurement frameworks/metrics (Van Der Zee, 2002; Hajela, 2009a, Hajela, 2009b, Chen et al., 2010; Aranyossy, 2014; Solanki, 2018; Onik, 2019; Lynn & Mooney, 2020; Tallon et al., 2020; Zeng et al., 2020).

2.7 Chapter Summary

This chapter reviewed the existing literature on the measurement of the BVIS against organisational performance. The sections in this chapter were aligned with some of the key research objectives identified in Chapter 1 namely, identifying the existing frameworks/metrics that exist, evaluating factors hindering organisations from using these existing frameworks, and assessing interventions that can be put in place to address the hindrances. It lastly, identified the gaps within the existing BVIS measurement literature. The next chapter analyzes existing frameworks in further detail, analyzes the COBIT2019 component for other areas of substantial business value and develops the new proposed BVIS framework.

CHAPTER 3: THEORETICAL FRAMEWORK

3.1 Introduction

Debates about the appropriate frameworks that measure the economic impact of the IS function against organisational performance is the primary objective of this study. Therefore, in order to provide answers about the appropriate frameworks, this chapter presents a detailed evaluation and a critical analysis of frameworks that have shaped the BVIS landscape over the past number of decades. A key outcome of this exercise is the identification of gaps within these frameworks/metrics. This chapter also presents arguments to address one of the secondary objectives of this thesis, by exploring other potential areas where the IS function can add substantial business value. Different components of COBIT2019 will be analysed to ascertain if the value is inherent in any of these components. These evaluations and analyses lay the foundation for the new framework/metrics presented at the end of the chapter. The next section provides an overview of existing BVIS frameworks.

3.2 Overview of existing BVIS frameworks

The ten frameworks presented in this section are analysed chronologically based on the year during which it was first published. These are the critical frameworks discovered within the literature in current usage to measure the BVIS against organisational performance. In addition to these frameworks/metrics, additional quantitative evaluation metrics such as ROI, IRR, NPV and others have been found in the literature and have been defined in detail in Appendix A of this paper.

3.2.1 Cost/Benefit Analysis (CBA)

According to Karmperis et al. (2013), the basic concept of setting project costs in direct opposition to the projected monetary benefits was first proposed in the USA and developed into a CBA framework in the early 1900s, which has evolved rapidly since the 1950s. CBA provides a comprehensive, structured, and systematic collection of costs, schedules, and performance-related goals needed to manage the investment or project (Remez & White, 1999). CBA is used for many purposes such as a planning tool, a decision-making criterion, and the evaluation of investments alternatives (Remez & White, 1999).

CBA is normally performed in a six steps process (Remez & White, 1999; Karmperis et al., 2013) that involves understanding the socio-economic context and defining project objectives, describing the project and its life cycle phases, the feasibility analysis of all the different project alternatives (including “do-nothing”) regardless of size, complexity or cost, identifying physical and financial constraints, the financial analysis of all investment alternatives using multiple non-quantitative and

quantitative decision criteria, an economic analysis that includes the economic NPV, the economic ROR and the benefit-cost (B/C) ratio and a risk and uncertainty assessment

There are several strengths identified within the literature around the use of CBA. The primary one is that it is expressed through financial metrics such as NPV and ROI that is understood by decision-makers which supports decision-making and gives it widespread adoption (Hubbard Decision Research, 2004). It considers all alternatives on an equal footing resulting in standardisation and objectivity (Remez & White, 1999). It also satisfies the axion of rational behaviour, considers long and short-term direct negative or positive impacts, and includes a risk assessment to factor in the risk associated with projects (Karmperis et al., 2013). Lastly, it examines project performance on behalf of both the project operator and the business unit, respectively (Karmperis et al., 2013). According to Hubbard Decision Research (2004), some of the weaknesses of this approach, listed in Table 3.2, results in numbers that make it difficult to meaningfully compare alternatives

3.2.2 The Process-based Framework

The primary objective of this framework is to provide a structure within which to consider the BVIS on organisational performance by improvements in business processes (Mooney et al., 1995). The first step in this framework is the identification of key business processes within each core organisational area and then to identify the linkages and contributions of IS to those processes (Mooney et al., 1995). This is then followed by the identification of operational processes referring to the execution of value chain activities such as marketing, design and development processes and management processes referring to activities associated with the allocation, administration, and control of resources (Mooney et al., 1995). According to Mooney et al. (1995), the intention of this framework is not to propose a causal model of the BVIS but to simply provide a new lens that offers a new perspective on the BVIS (Mooney et al., 1995).

Mooney et al. (1995), identifies the importance of organisational context and competitive positioning in studies of the BVIS as an imperative and as such this is included in this framework. In addition to this, Mooney et al. (1995) identify three separate but complementary business process improvement dimensions along which the effect of BVIS can be defined; i) productivity gains, cost improvements, and savings on labour through the automation of business processes, ii) the informational effect that emerges because of better quality and better decision making primarily from the capacity of the IS function to collect, store, process, and disseminate information and lastly, iii) the transformational effects that refers to the value deriving from the ability of IS to facilitate and support process innovation and transformation. The typology of business processes can be combined with the dimensions of business value, to derive the BVIS framework shown in Figure 3.1.

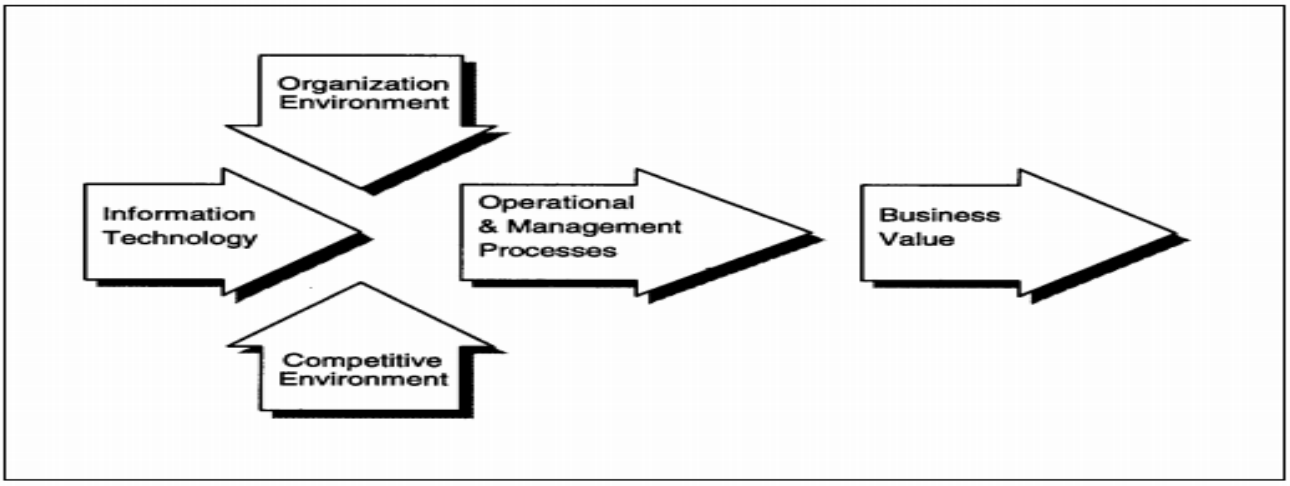


Figure 3.1. A process-oriented model of IT Business value (Source: Mooney et al., 1995)

The strengths associated with this process-based assessment framework include its focus on processes that can lead to cost and expense optimisation, an increase in revenue, lower capital expenditure or a better working-capital position (Tallon & Kraemer, 1999; Kohli & Devaraj, 2003; Hajela, 2009a; Onik, 2019), which can all lead to improved financial performance. A process-level approach can lead to new business models (Mooney et al., 1995; Tallon & Kraemer, 1999; Kohli & Devaraj, 2003; Hajela, 2009a; Onik, 2019) and can result in higher levels of turnover and an improvement in quality throughout the process (Hajela, 2009a). It can also reduce rework by driving process efficiencies (Hajela, 2009a). The framework will also likely yield greater insights into where the organisation is misaligned, helping to isolate bottlenecks (Hajela, 2009a) which leads to process optimisation, process integration, process redundancy, process automation, and process consolidation (Hajela, 2009a). According to Bloch and Hoyos-Gomez (2009), organisations can also dovetail IS processes into some core business processes, such as managing the business project portfolio and the allocation of resources to investment opportunities, to create BVIS. It also supports better decision making through the collection and analysis of data along with these processes (Hajela, 2009a). Several weaknesses, associated with the process-based framework, are listed in Table 3.2.

3.2.3 The Balanced Scorecard (BSC)

The BSC was developed two Harvard professors, Kaplan and Norton (1992) in response to the fact that the vast majority of organisations managed their business based on backwards-looking financial metrics and in so doing fail to get a forward view of performance (Kidd, 2019). The BSC has been widely used as a management approach continuously improve performance and results (Sandkuhl & Siegerroth, 2018). It is also used to uncover and communicate strategies, establish long-term strategic targets, aligns initiatives, allocate long- and short-term resources, and provide feedback about these strategies (Van der Zee, 2002). The BSC is widely adopted within organisations (Kidd,

2019) and its multi-criteria technique can be applied to business and IS projects, investments, and even the entire IS department (Kaplan & Norton, 1996; Van der Zee, 2002; Kidd, 2019).

The BSC, illustrated by Van der Zee (2002) in Figure 3.2, contains several performance KPIs across four dimensions namely a financial dimension that measures budgeted profit targets against actual performance and shows perceived value to shareholders in the form of the result of actions already taken (Kaplan and Norton, 1996; Van der Zee, 2002; Harris et al., 2008), a customer dimension that defines whether the organisation is providing services/products that satisfy the need of the customer and indicates how the organisation is viewed by customers (Kaplan & Norton, 1996; Van der Zee, 2002; Harris et al., 2008), an internal perspective dimension that answers the questions of whether all processes are optimised to provide services efficiently (Kaplan & Norton, 1996; Van der Zee, 2002; Harris et al., 2008) and lastly, the learning and growth or innovation and improvement dimension that defines whether the organisation improves and adds value on a continuous basis (Kaplan & Norton, 1996; Van der Zee, 2002; Harris et al., 2008). The BSC evaluates actual performance against budgeted targets facilitated through cause-and-effect relationships which enables the linking of actions to outcomes.

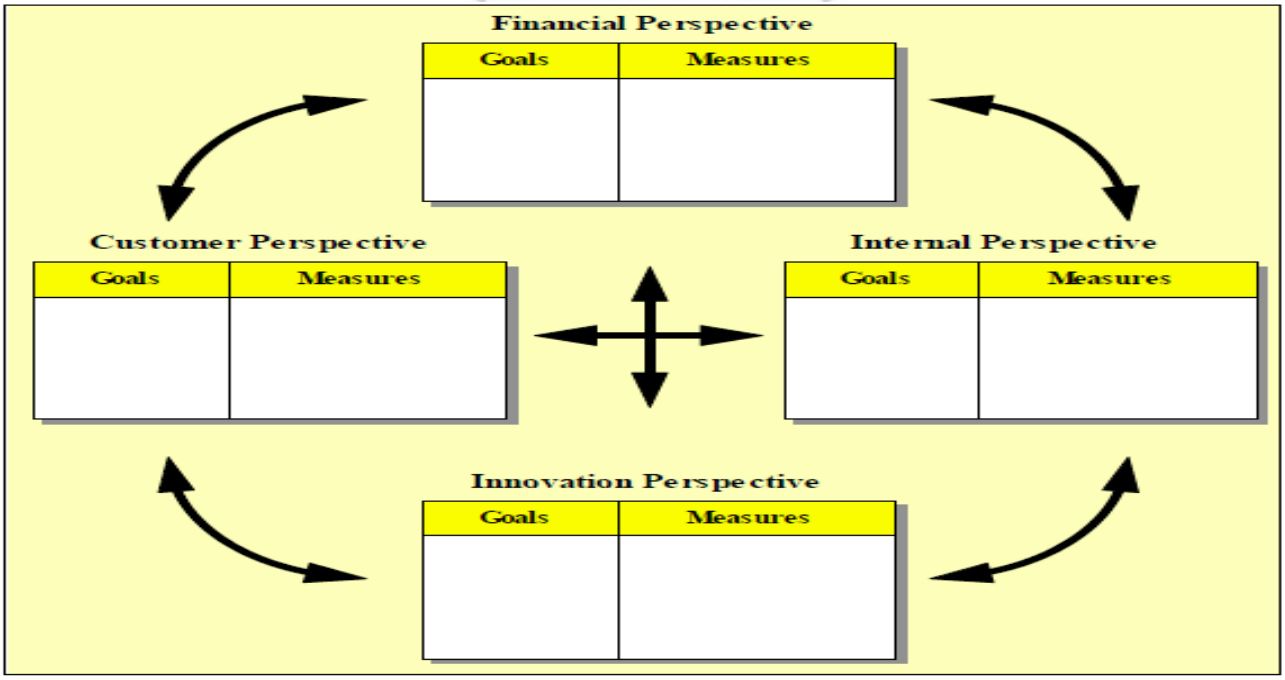


Figure 3.2. The Balanced Scorecard (Source: Kaplan & Norton, 1992)

Van Grembergen and Van Bruggen (1997) modified the BSC for use within IS organisations to align IS with the broader business so that its metrics can be tracked alongside enterprise-wide metrics (Kidd, 2019), by focusing them on the corporate contribution which measures IS alignment to strategic corporate objectives (Balafif & Haryanti, 2019), the user or customer orientation, operational excellence which could contain KPIs that measure helpdesk efficiency, time-to-respond and efficient

software development, and future orientation (Sandkuhl & Siegerroth, 2018; Kidd, 2019) and the ability of IS to reduce complexity and drive maturity within their processes (Balafif & Haryanti, 2019). Balafif and Haryanti, (2019) refer to the IT-specific BSC as ITBSC, and as such this thesis will refer to the BSC specific to IS as ISBSC. The ISBSC is illustrated in Table 3.1 by Balafif and Haryanti, (2019) below:

Table 3.1. **Measures within the IS BSC**

Perspectives	Objective	KPI Measurements	Weight	Total
Corporate Contribution	Strategic Business-IT alignment	Tangible and intangible benefits in CBA	0154	0.247
	IT Service Management	Service Level Management	0093	
Customer Orientation	Satisfaction Service Performance	User satisfaction and loyalty index	0124	0.248
	Interactive Support Service	Support Availability	0124	
Operational Excellence	Reduce Complexity	Process Velocity	0062	0.255
	Technology capability	IT capability and business performance	0062	
	process maturity	Process Complexity	0124	
Future Orientation	Effective Cost Management	Traceability cost in IT investment	0166	0.250
	Job Satisfaction Employees	Total factor productivity (TFP)	0166	

Source: Balafif and Haryanti (2019)

Several strengths regarding the use of a BSC are that it brings together many seemingly disparate elements of the possible competitive initiatives, such as becoming customer-oriented, shortening response time, etc. (Van der Zee, 2002), it guards against sub-optimisation by forcing managers to consider all the operational measures together by checking whether improvement in one area is achieved at the expense of another (Van der Zee, 2002), and it links IS costs directly with organisational performance indicators which makes the articulation of BVIS easier (Van der Zee, 2002). The BSC ensures alignment and introduces measurement structures ensuring that different departments that may have different performance metrics can measure what they consider to be important but ensure that it all falls within a set of broader organisational metrics understood by all (Dannert, 2020) and it connects the company and connects the individual worker to the greater purpose behind the organisational goals and objectives (Dannert, 2020). However, the BSC also has some inherent weaknesses which are listed in Table 3.2.

3.2.4 Total Economic Impact (TEI)

The Giga Information Group that was bought by the Forrester Research group in 2003, developed TEI in 1997, as a driver of IS decisions to help shift the perception of IS as a cost centre to that of a value centre (Gliedman, 2003). TEI (see Figure 3.3) is an ROI-based valuation approach (Gliedman, 2003; Harris et al., 2008) that allow organisations to evaluate the project or investment decisions in

light of organisational goals and strategies (Gliedman, 2003). TEI contains four elements namely *future options* (flexibility) that considers the future potential value of different options through the lifecycle of an investment by using techniques such as Real Options Valuation (ROV) described in Appendix A, *impact on business* (benefits*)*, *impact on IT* (costs) and lastly, the overarching element of *risk* that adjusts the probability or uncertainty of benefit and cost estimates based on risk factors (Gliedman, 2003, Harris et al., 2008). TEI has several associated tools and methodologies for the quantification of these elements (Gliedman, 2003; Owens, 2020).

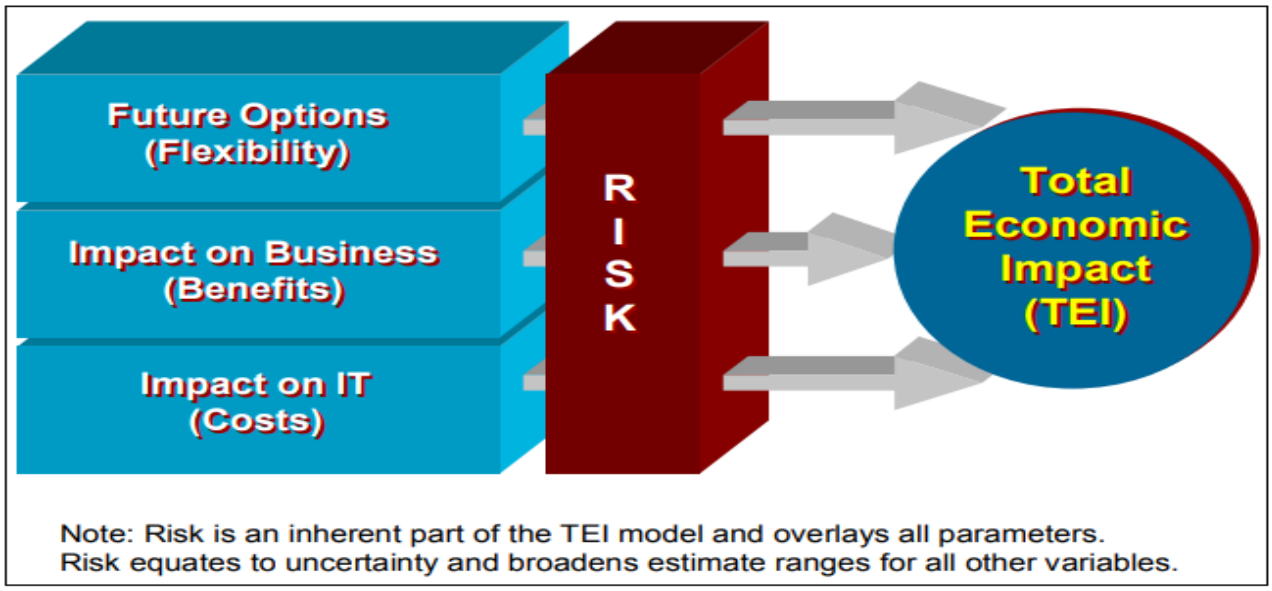


Figure 3.3. TEI Framework (Source: Gliedman, 2003; Owens, 2020)

The primary cost concern of TEI is the changes to IS spending involved with a project/investment under consideration. Cost estimates such as the *capital costs* of acquiring the hardware and software as well as their upgrades, the *ongoing maintenance and operations costs*, and *the administrative costs* for the acquisition and tracking of the technology assets (Gliedman, 2003), are all considered under TEI. Using TEI also has several strengths such as that TEI places equal weight on the measure of costs and benefits, allowing for a full examination of its effect on the organisation (Glieldman, 2003), that it has widespread acceptance with Forrester conducting several TEI evaluations globally in companies such as Google, Amazon, Apple, IBM, SAS, etc. as per the Forrester company website. The weaknesses of TEI are listed in Table 3.2.

3.2.5 "B-Triple-E" Framework

According to Van der Zee (2002), the "B-Triple-E" framework, provides a context in which organisations in search of the BVIS can evaluate the extent to which IS contributes to organisational strategies and objectives. The framework has four distinct variables namely, the **B**VIS (the extent to which the IS function contributes to business objectives and strategy), the **E**ffectiveness of IS (IS

effectively supports business processes, activities, and employees), the **E**ffectiveness of IS supply (IS supply aligns with business requirements) and the **E**fficiency of IS (IS supplied at minimum cost).

The “B-triple-E” framework and the interplay between the elements that measure whether BVIS was realised by measuring IS supply effectiveness, IS supply efficiency, IS effectiveness, and whether IS is used to its full potential in terms of its possible contribution to business objectives and the services and products delivered by IS at minimal cost (Business value) is shown in Figure 3.4 (Van der Zee, 2010). According to Van der Zee (2020), “B-triple-E” uses three dimensions to measure the **E**ffectiveness of IS namely support and enabling of business processes and activities, and their availability to employees, the effectiveness as perceived by the users, and the technical aspects that stem from architectural and infrastructural requirements expressed by IS supplying functions. In the framework, **E**ffectiveness of IS supply measures how effective IS supply aligns with business requirements while IS supply **E**fficiency measures the efficiency-orientation and the technical issues and optimisation of production capability.

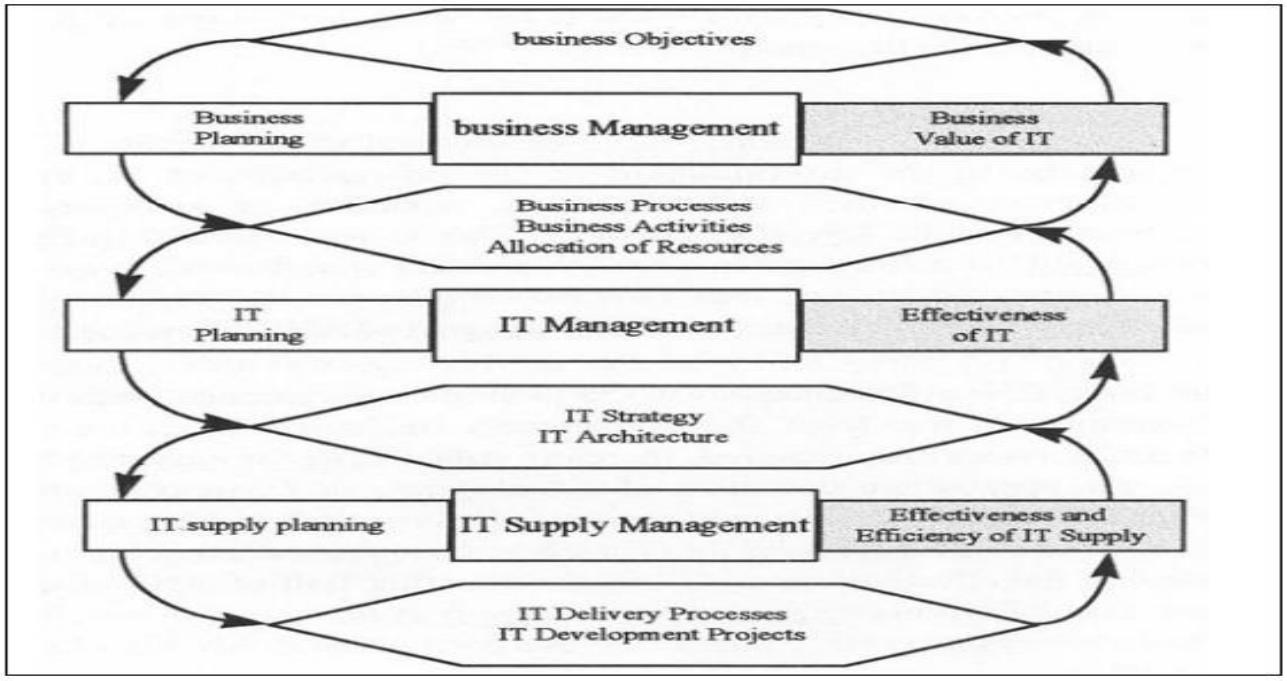


Figure 3.4. B-triple-E Framework (Source: Van der Zee, 2002)

From an IS investment perspective, “B-triple-E” measures the BVIS through metrics such as the IS budget as a % of revenue, Value of IT equipment as a % of revenue, % of IS budget spent on IS staff, % of IS budget spent on training of IS staff and number of PCs and laptops as a % of total employees (Van der Zee, 2002). From a strategic and organisational performance perspective “B-triple-E” measures the BVIS through metrics such as Return on investments (ROI), Return on sales (ROS), Revenue growth, Sales by total assets and Sales by employee (Van der Zee, 2002).

The strength of the “B-triple-E” framework is that it considers business as usual (BAU) elements such IS Effectiveness. However, using “B-triple-E” also has weaknesses identified by the literature that are summarised in Table 3.2.

3.2.6 Total Value of Opportunity (TVO)

Apfel and Smith (2003), state that TVO is a quantitative and qualitative value methodology for determining the overall business value expected to be created by an IS-enabled business initiative. The TVO is based on the Gartner Business Performance Framework that considers Market responsiveness across factors such as Sales, Product development, Customer, Supplier and Operational efficiencies as well as HR, IT and Finance and regulatory responsiveness. The TVO framework is a comprehensive investment analysis of any IS-enabled initiatives. TVO applies a standard set of metrics and is based on the hypothesis that, despite an infinite number of features and functions available from technology today, there is a finite list of understandable, explainable, relevant capabilities that such products bring to the organisation (Apfel & Smith, 2003; Harris et al., 2008). TVO assigns a weighting to these components that determine the overall business value of each project and the priority that it should have within the Project Portfolio of the organisation (Apfel, 2002).

The key components of TVO are identified through a standard set of concepts and models to answer seven key value questions (Apfel & Smith, 2003b), about a potential IS investment are:

- *What is the initiative?* - includes a succinct description that helps the organisation decide the scope and the type of value expected.

- *How will we measure the Business value?* - TVO provides two key elements to the discussion, a framework to measure organisational performance, and a way to use these measurements to communicate the BVIS in business language.

- *What does the technology do?* –A TVO user will select several IS capabilities that shows the major reasons the organisation is interested in the potential technology investment which is not necessarily everything the solution could do.
- *How much benefit will we receive?* - Benefits must be modelled against a holistic framework of business metrics with this information being used to compare the change to the baseline value of the selected metrics.

- *How much will the initiative cost?* - Costs are derived using a TCO approach to ensure that visible, hidden, one-time and recurring costs are all included (Harris et al., 2008) and consider whether an initiative will result in lower IS or/and Business costs.

- *How do we take Future Uncertainty into account?* A complete value analysis must enable some quantification of the value that a successful initiative would deliver to the business at a future time and must include an analysis of risk.

- *Is the organisation positioned to exploit these capabilities?* – IS initiatives need to be measured against the need of the organisation across strategic alignment, risk, direct payback, architecture and business process impact The more closely a project meets the needs of the areas deemed important by the organisation, the more likely it is to be an appropriate investment.

TVO is based on the Five Pillars of benefits realisation illustrated by Murphy (2002) in Figure 3.5, which define the link between business context and benefits realisation and consist of *strategic alignment* (alignment of the IS investment strategy and organisational goals and objectives), *business process impact* (impact on the requirement to redesign business processes), *architecture* (integration, scalability and resilience of IS which the company has or plans to implement), *direct payback* (conventional benefits that a project can deliver) and *risk* (exposure of the proposed investment to failure or underachievement).

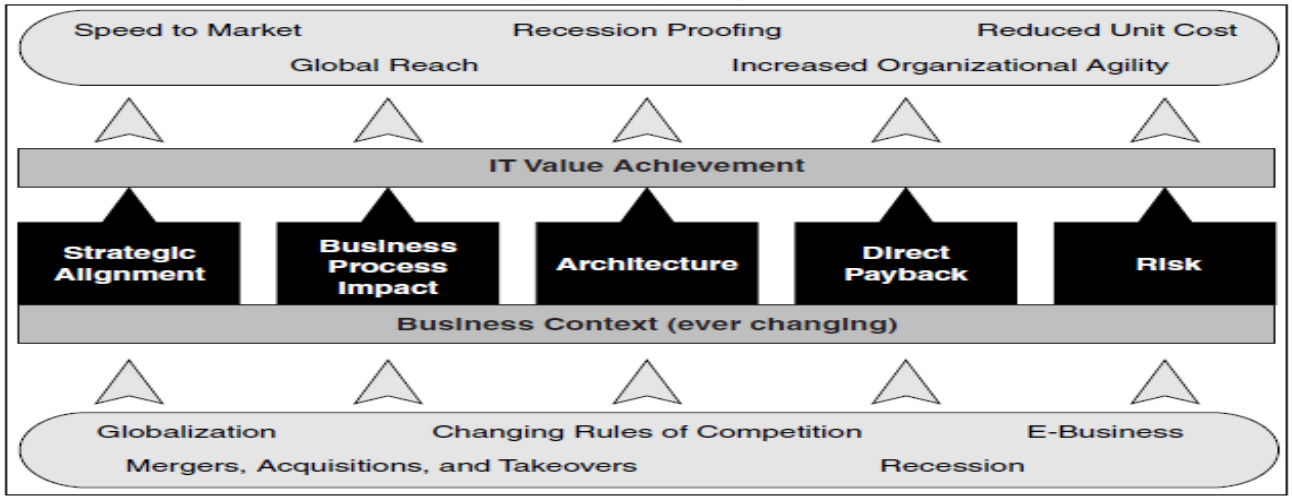


Figure 3.5. Five pillars of benefits realisation (Source: Murphy, 2002)

The strengths of TVO are that it follows a metrics-based approach to measuring organisational performance (Apfel & Smith, 2003) and that it includes the important factors of risk, time and conversion effectiveness as well as an assessment of the ability of the organisation to actualise the projected benefit values. However similar to some other frameworks reviewed, using TVO has some weaknesses that are listed in Table 3.2.

3.2.7 New Information Economics (NIE)

Information Economics (IE), which formed the basis of consulting work for decades, was developed by Marilyn Parker and Robert Benson and published in 1988 (Benson et al., 2004). The NIE, developed based on IE and CBA, establishes the view that IS effectiveness and value lie in its ability to fundamentally improve organisational performance, and to do this, business management must be directly involved in IS decision-making (Benson et al., 2004). NIE is a complete management and planning framework that sets out a way for business and IS leadership to understand and use IS, the ability to align overall IS spending, to support the value chain strategy to achieve the bottom-line, prioritize IS investments, and help maximize the bottom-line impact of new investments for the organisation (Benson et al., 2004; Mulyaman et al., 2018).

NIE contains five collaborative management practices, illustrated in Figure 3.6, that effectively translate a company's business activities and strategies into implementable IS strategies, programs, initiatives and management processes (Benson et al., 2004; Mulyaman et al., 2018).

- **Practice 1: Strategic Demand/Supply Planning** refers to the alignment of business strategic intentions to the role IS plays to achieve these strategies by translating this into a strategic agenda for IS that can be translated into IS plans and action.
- **Practice 2: Innovation** refers to the business opportunities that IS makes possible resulting in robust and competitive business strategies and tactical plans
- **Practice 3: Prioritisation** assesses the business impact and prioritizes proposed IS initiatives and assigns resources to the highest value projects that support the strategic intentions, ranking them by future business impact
- **Practice 4: Alignment** assesses the business impact of existing IS activities and allows business and IS leaders to decide on which IS initiatives should get resources, rather than assuming that everything currently operating is critical and should be supported at existing levels.
- **Practice 5: Performance Management** blends metrics IS performance in operational and tactical terms, that is easy to measure, with the measurement of the BVIS, which is much harder to measure according to Benson et al. (2004). This allows IS to determine the measurement, management of IS based on those metrics, and the articulation of BVIS.

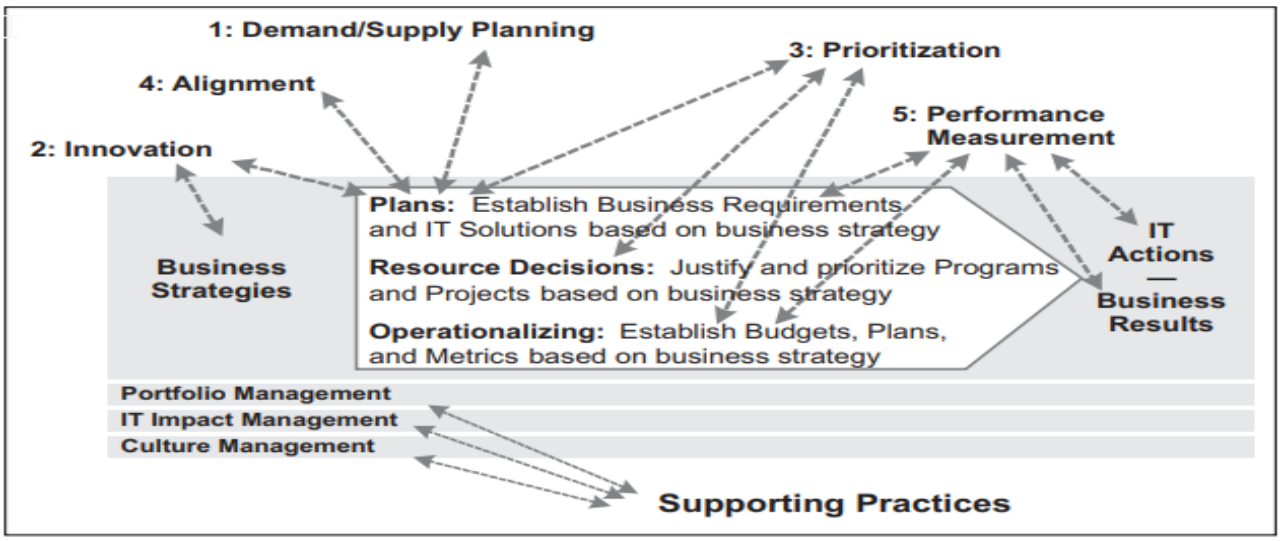


Figure 3.6. NIE Practices (Source: Benson et al. 2004)

The strength of the NIE is that it links business strategies and business activities with IS management processes and strategies. However, NIE has a very limited link to economic evaluations.

3.2.8 Updated IS success model

The original IS success model, illustrated in Figure 3.7 (DeLone and McLean, 2004), synthesized research between the 1970s and 1980s involving IS success, consists of six dimensions namely, systems quality (measures technical success), information quality (measures semantic success), use, user satisfaction, and individual impacts and organisational impacts that were proposed to be interrelated rather than independent.

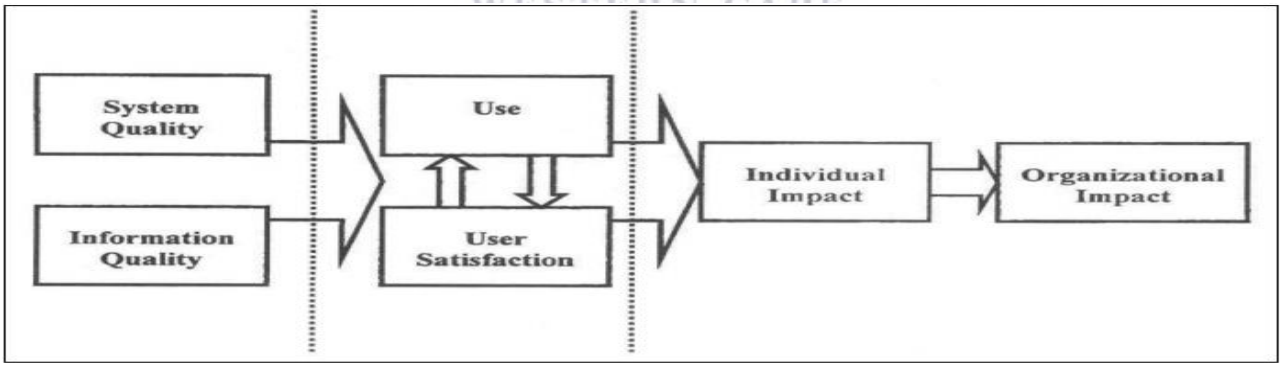


Figure 3.7. Original IS Success Model (Source: DeLone and McLean, 2004)

The original IS success model was updated in 2004 to establish the Updated IS Success model, illustrated in Figure 3.8, because of the changing role of the IS function in delivering both the system and support for the system services by adding the service quality (SERVQUAL) dimension to "system quality" and "information quality" as components of IS success (DeLone and McLean, 2004). According to DeLone and McLean (2004), SERVQUAL must include items such as that IS has up-to-date hardware and software (tangibles), that IS is dependable (reliability), that IS

employees give prompt service to users (responsiveness), that IS employees have the knowledge to do their job well (assurance) and that IS has the best interests of the users at heart (empathy).

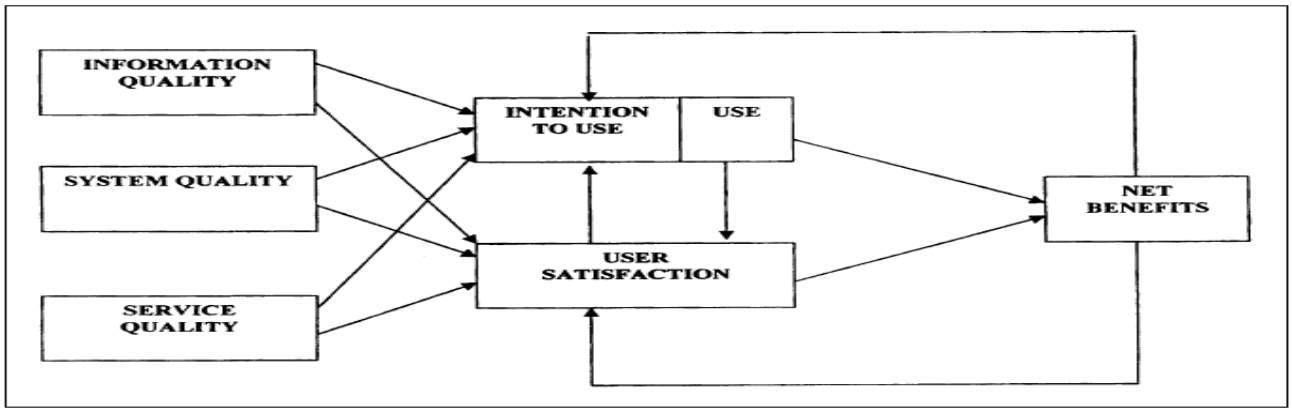


Figure 3.8. Updated IS Success Model (Source: DeLone and McLean, 2004)

The strength of the updated IS success framework is that has a strong focus on intangibles (in the form of perceived values) and even though DeLone and McLean (2004), proposed interrelationships among the dimensions in their model, they did not test them empirically. However, perceived value approaches, such as this one, also contains some weaknesses which are listed in Table 3.2.

3.2.9 Applied Information Economics (AIE) framework

AIE synthesizes several quantitative methods from economics, financial theory, actuarial science, decision theory (the formulation of decisions into a mathematical framework), information theory (the mathematical modelling of transmitting and receiving information) and statistics were developed to assess investment decisions that are large, risky, and difficult to measure (Harris, 2008; Hubbard Decision Support, 2014). AIE also uses Monte Carlo analysis that is typically used to provide input for better decision-making under uncertainty Hubbard (2014), to generate thousands of random scenarios on a computer to develop a graph of the likelihood of each possible net benefit (Hubbard Decision Research, 2004).

Within AIE, the impact of all risks is quantified, along with intangible benefits resulting in a probability distribution for ROI (Harris et al., 2008), with the economic value of intangibles such as strategic alignment, customer satisfaction and information quantified by using an economic formula for this purpose. According to Harris et al. (2008), AIE reduces each variable to a range of ROI outcomes with assigned probabilities and quantifies uncertainties with ranges of values and probabilities by determining the range of possible values for a given variable and ascribing probabilities to them in the form of a probability distribution (Hubbard Decision Research, 2004).The framework components of AIE is illustrated in Figure 3.9..

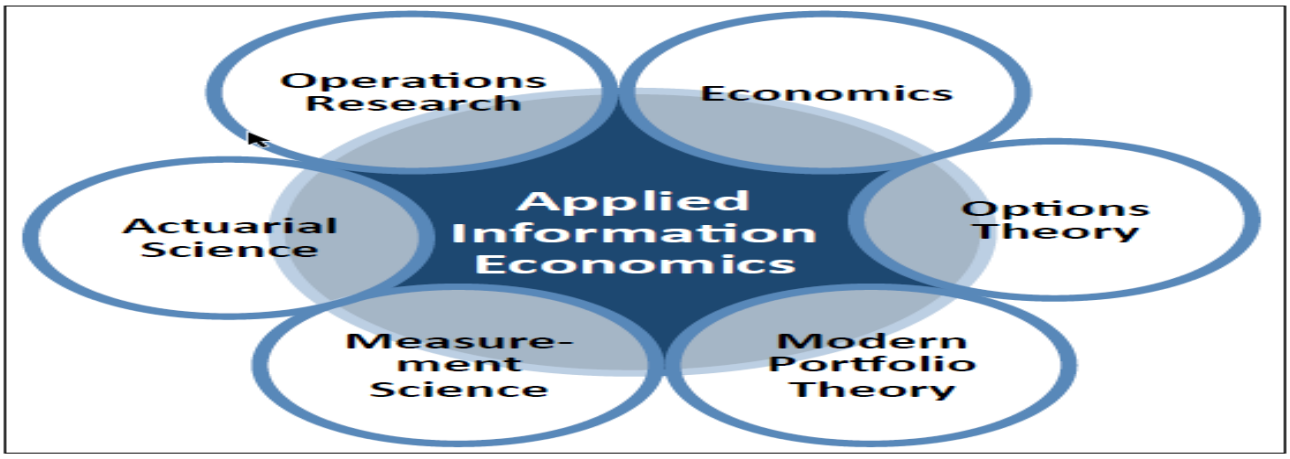


Figure 3.9. AIE Framework components (Source: Hubbard Decision Research, 2004)

In so doing removing any assumptions not known factually. According to Hubbard Decision Research (2004), AIE can be applied across the organisation to solve some of its most complex business problems through mathematical models to improve the cost and benefits equations for better IS decisions at all levels. AIE also ensure that the organisation develops financially based quality assurance metrics to support IS strategy formulation and the implementation of effective IS decisions to identify the best opportunities for BVIS.

In Figure 3.10 below, Hubbard (2014) illustrates the five phases of AIE namely definition of the decision(s) and the variables that matter to the decision, model what is known including the state of uncertainty about the defined variables, compute the value of additional measurements, measure high-value uncertainties in a way that is economically justified, and improve decision making by using a risk/return decision after the economically justified amount of uncertainty is reduced (Hubbard Decision Research, 2014; Hubbard, 2014).

According to Hubbard Decision Support (2004), AIE quantifies “unmeasurable” benefits, costs, and risks and their presentation in a probabilistic model based on a range of estimates instead of single-point estimates. Thus, it structures investment decisions in economic terms with defined levels of risk/return (Hubbard Decision Support, 2004). AIE represents a rigorous, quantitative approach to improving IS investment decision-making (Hubbard Decision Support, 2004). The weaknesses of using this approach as identified within the literature are listed in Table 3.2 below.

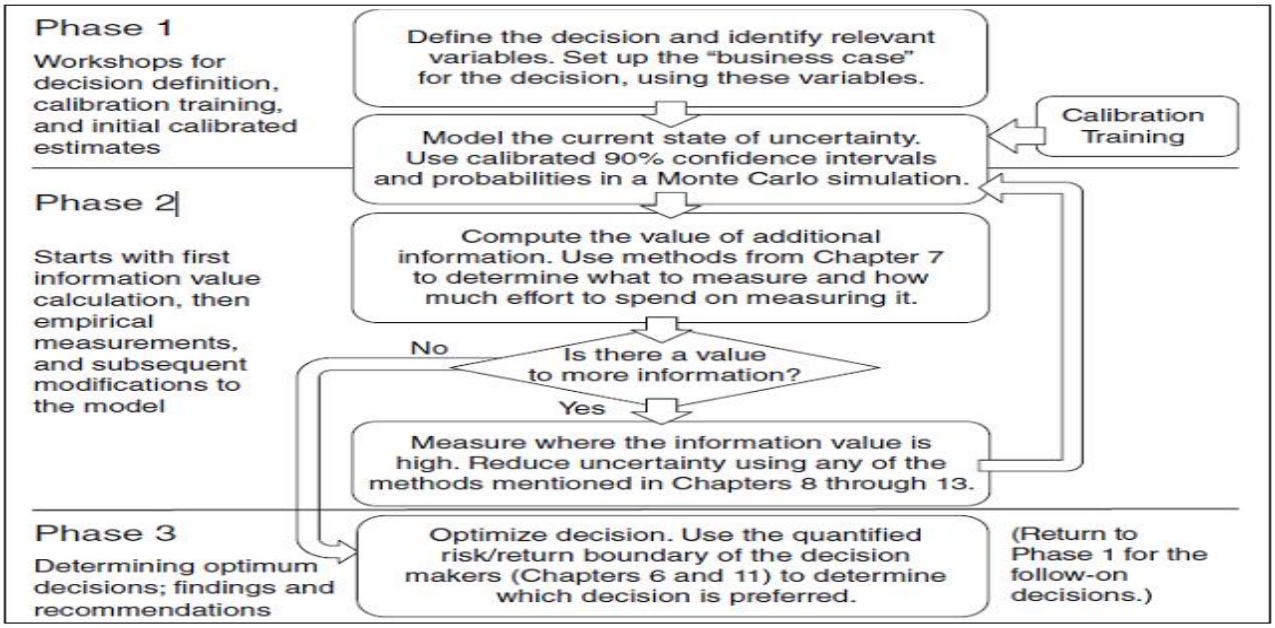


Figure 3.10. AIE 5 step process (Source: Hubbard Decision Support, 2004)

3.2.10 Benefits Realisation Management (BRM) Framework

BRM is an approach that tries to address the issue of project success and involves identifying, planning, measuring, and tracking benefits from the start of a programme or project, until the realisation of the last projected benefit (Murray, 2016). The BRM framework, according to Murray (2016), is important because it makes the economic value and the strategic relevance of each project clear, enabling increased effectiveness of project governance and providing organisations with a framework to work towards the delivery of planned benefits.

An organisation is a system of related activities and the changes that the IS department implement does not appear in a vacuum which is why benefits do not appear instantly with both of these approaches (Remenyi and Brown, 2002) which means a deliberate action is needed to measure the BVIS. BRM uses ROI which is also well-suited to problem-based implementations, which makes the management of benefits easier as the benefits that should result from the removal of known problems means improved ways of executing business processes and activities that can be identified and quantified (Peppard et al., 2007). The benefits of BRM are difficult to quantify with innovation-based implementations (Peppard et al., 2007). This is attributable to the uncertainties about whether the new IS functionality and business changes can successfully be implemented or whether the changes will deliver projected benefits.

During the early stages of building new IS systems, *progress measures* are needed to measure whether projects are on track, *deployment measures* are needed to track whether the original business case is still valid and *realisation metrics* are needed to track whether the project has

delivered the intended benefits (Rubin et al., 2016b). Murray (2016) identifies different stages in benefits lifecycle management namely, benefits modelling, benefit profiling, defining a benefits management strategy, baselining measurements, target-setting and the business review. The business case for a project is outlined during the first three steps. Business strategies set targets of future value, which are met by achieving measurable strategic objectives with the difference between the current situation and the target future situation creating a value gap, which is fulfilled by a portfolio of initiatives defined by the organisation in their strategic plan (Serra and Kunc, 2015). The strategic initiatives/projects then fill these value gaps as illustrated by Serra and Kunc (2015) in Figure 3.11.

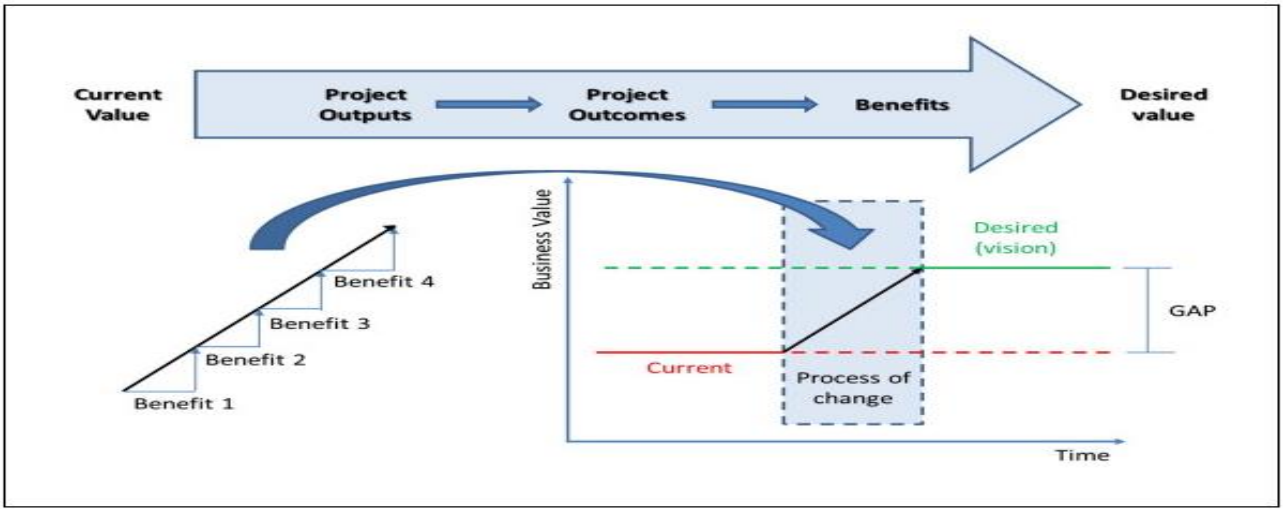


Figure 3.11. Filling the Value gap (Source: Serra & Kunc, 2015)

The strength of BRM is its focus on realising IS projects specific benefits by using a comprehensive list of project-related metrics. However, this by implication means that it does not include benefits from BAU activities. In addition to this, despite the clear role projects have in implementing business strategies, BRM, in general, is not always easy, with several factors contributing to benefits realisation failure. Some organisations have no BRM plan (Murray, 2016). Some organisations are still evaluating projects only by their efficiency and not by the benefits delivered (BCG, 2020). According to Wattrus, (2009) business problems are often poorly defined resulting in a flawed business case that is poorly developed and sets an incorrect expectation, that the project execution is poor, that the technical solution is fundamentally flawed, that the delivered solution is not effectively adopted by the business, that significant business change took place between project inception and completion and that the benefit is effectively realised but not properly recognised or reported. Some of the weaknesses established within the literature of using BRM are summarised in Table 3.2.

3.3 Other potential sources of business value from IS function

This section aligns with one of the research objectives and tries to establish whether there are any other areas of the IS capability within the organisation that can in itself result in business value that

directly impacts organisational performance. The components of COBIT2019, which was chosen because it is a comprehensive governance and control framework (Harris et al., 2008). The COBIT2019 focuses on the full IS capability and helps organisations to develop, organise and implement strategies around IS (ICASA, 2019) and as such provides a comprehensive basis for looking at all IS capabilities. The primary governance objective of COBIT2019 is also “value creation” through benefits realization, risk optimization, and resource optimisation (ICASA, 2019), which aligns with this study on BVIS. The governance system of COBIT2019 consists of seven components namely Processes, Organisational Structure, Principles, procedures and policies, Information, Culture, Ethics and Behaviour, People, skills and competencies and Services, Infrastructure and Application and these components are analysed in the next few sections to determine whether the BVIS can be established at any level of these components.

3.3.1 Process

Process, the first COBIT2019 component, describes an organised set of practices and activities to achieve objectives (ICASA, 2019). This paper has already discussed the importance of process-level BVIS and it has categorically established that value is generated at a process level in Chapter 2 and Chapter 3, and as such a more detailed discussion is not needed at this point. Even though measuring the BVIS around process optimisation is important this paper is more focused on BVIS frameworks that address organisational level performance and as such this has not been considered explicitly in the new proposed framework.

3.3.2 Organisational Structure

The second component of the COBIT2019 framework, namely organisational structures, ensures that key decision-making entities exist in the organisation and that they are aware of their roles, responsibilities, and their expected involvement (ICASA, 2019). In many organisations, the journey of IS governance maturity has been an arduous one, and even today the IS function is trying to define and communicate the BVIS without involvement from the business. This, however, is ineffective as it is important to understand that BVIS cannot be realised by IS but will always be created at the business level (De Haes et al., 2020) with several scholars arguing for the existence of a definite link between strategic alignment and the BVIS (Tallon & Kraemer, 1999, Ottervig, 2020, De Haes et al., 2020). In Figure 3.12 below, Tallon and Kraemer (1999) show the importance of IS/business alignment to allow IS to support the business strategy that capitalizes on the technology and how the lack of alignment can lead to an IS or strategy shortfall.

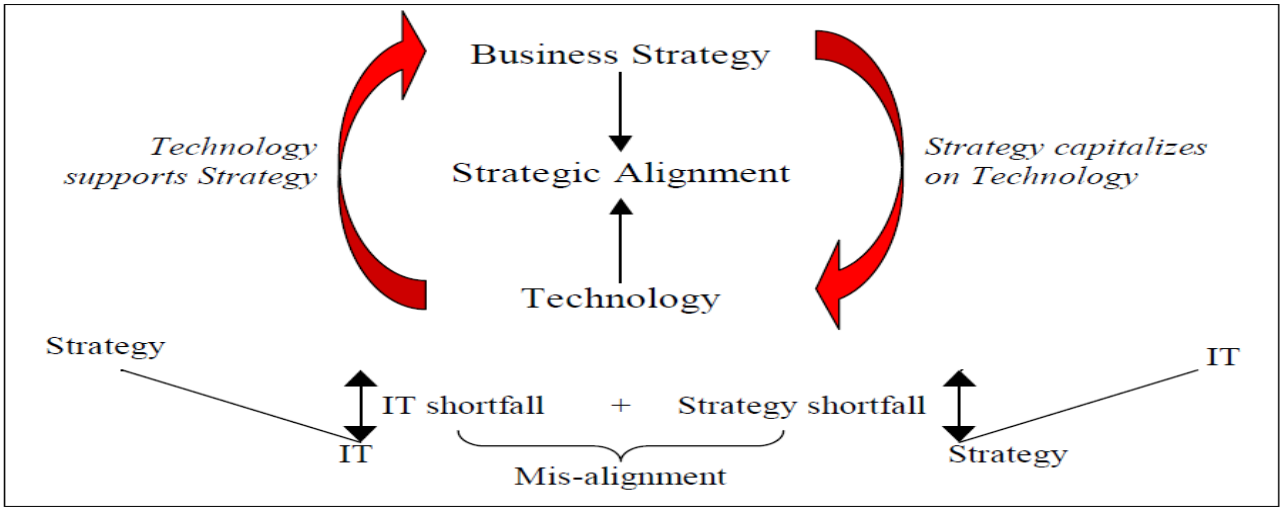


Figure 3.12. Dimensions of Strategic Alignment (Source: Tallon and Kraemer, 1999)

Curtis (2020) posits that ineffective communication and misalignment can result in inefficient use of resources, are barriers to strategic alignment, and can create a material risk to the strategic objectives of the organisation. Effective governance on the other hand can help organisations to prevent fraud and data breaches, ensure that organisations conform to applicable laws and regulations and establish mature organisational structures to help enforce due care and due diligence (ICASA, 2019; Curtis, 2020). Highly matured organisations that are the best at creating value-in-use, embed IS governance within the broader governance practices (Bloch & Hoyos-Gomez, 2009; De Haes et al., 2020), and follow models such as Enterprise governance of IT (EGIT), illustrated in Figure 3.13 by De Haes et al. (2020), that enables IS/business alignment, which then ultimately enables the BVIS.

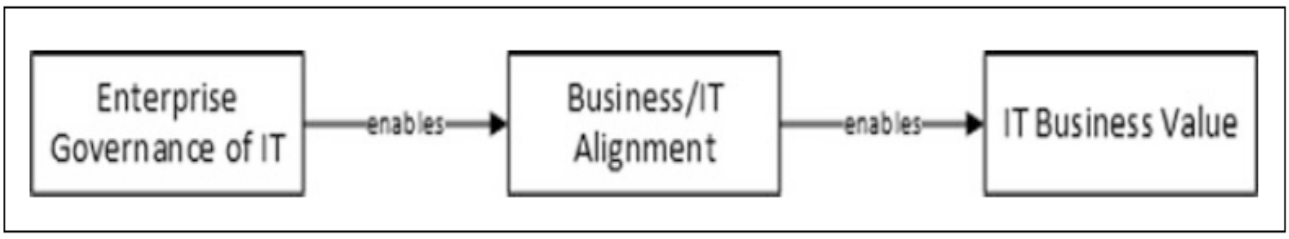


Figure 3.13. EGIT-Alignment-Value model

BVIS can be created and enhanced by the way organisations are structured. However, the degree to which this occurs and how this can be tested empirically remains undetermined and underdeveloped and as such a recommendation for future research around this is made in Chapter 6.

3.3.3 Principles, Policies, and Procedures

This section deals with the third component of the COBIT2019 framework namely Principles, Policies and Procedures that translate the desired behaviour into practical guidance for day-to-day

management (ICASA, 2019). The changes brought about by technology brings enormous gains, but the probability of failure also creates enormous risks – as is the case with cybercrime, a US$1 trillion problem globally in 2020 (Zupan, 2021), and yet the topic still does not receive sufficient attention at the highest levels within organisations (Zupan, 2021) and as such significant spend is associated with risk-related protection. According to Hubbard (2014), risk is the uncertainty that a loss or some other bad thing will occur and can be measured by the quantification of the set of possibilities that combines the probability of occurrence with the quantified impact of an outcome. This combination of probability (or likelihood) and the qualitative measure of "impact" is illustrated in Figure 3.14 by Hubbard and Seiersen (2016) in the well-known heat map where risk is expressed in qualitative terms (low, medium, or high) and not in quantitative terms.

			Impact				
			Negligible	Minor	Moderate	Critical	Catastrophic
			1	2	3	4	5
Likelihood	Frequent	5	Medium	Medium	High	High	High
	Likely	4	Medium	Medium	Medium	High	High
	Occasional	3	Low	Medium	Medium	Medium	High
	Seldom	2	Low	Low	Medium	Medium	Medium
	Improbable	1	Low	Low	Low	Medium	Medium

Figure 3.14. The heat map or risk map (Source by Hubbard and Seiersen, 2016)

The risk paradox is defined by Hubbard (2014) as follows: "If an organisation uses quantitative risk analysis at all, it is usually for routine operational decisions. The largest, most risky decisions get the least amount of risk analysis." However, Hubbard (2014) states that the qualitative approach generates ambiguity and provide little measurement value other than a sort of measurement placebo effect. Several authors have argued that even though an absolute value for risk might not be knowable, risk can be quantified as a range of values that make the understanding of the amount of risk, less ambiguous (Hubbard, 2014; Hubbard and Seiersen, 2016). Hajela (2009) proposes four ways in which risk can be accounted for within BVIS calculations namely by adding a risk dimension to all calculated results of the BVIS, by reducing the BVIS by a "risk factor", by increasing the cost of the initiative by factoring in a mitigation cost and to increase the internal hurdle rate factoring in the risk of probability/likelihood. The problem with this approach is that "risk" as a standalone item can become buried in some of the other metrics used to evaluate BVIS, which is why different authors urge that assessing the risk of IS investments should be an essential and separate component of the evaluation process (Lanzinner et al., 2008).

Protection against cyber risk is important and as such IS must balance the interest of the business in terms of cyber resilience and the impact on organisational performance (Dobrygowski 2016). The cost of risk-related failures and the cost of protection in the IS environment can be severe such the BVIS of risk must be measured. As such *risk* has been considered within the new framework proposed by this study in Section 3.4.

3.3.4 Information

Strassmann (1996) claims that all business value is created using information because the cost of information has surpassed the cost of capital in that “information” was the scarcer commodity of the two. Several other authors also argue that *Information* in itself has strategic business value that can be used to assist customers to achieve something they care about by, for instance, using the information provided by applications such as online maps, search engines, and social media which is available for free and with zero marginal distribution cost (Borges, 2015, Hubbard, 2014; Rubin et al., 2016b; Tallon et al., 2020). Others also argue that information is used by organisations to make better decisions (Hubbard, 2007) and that it reduces uncertainty about decisions that have economic consequences (Hubbard, 2014), as well as that information, can be a useful tool to reduce information asymmetry and so-called “decision-informing costs” (Aranyossy, 2014).

Even though data and information might be worth a multiple of what these activities cost, there is no formal mechanism for recognizing data and information as capital assets with no portion of this cost being capitalised as an asset on the balance sheet (Tallon et al., 2020). However, moves to recognise data and information as strategic balance sheet assets have been controversial (Tallon et al., 2020), but the literature is beginning to make the case that it should be monetized (Laney, 2018; Tallon et al., 2020). To do this, some form of economic value has to be ascribed to it. Numerous attempts have been proposed including Information Productivity (IP), proposed by Strassmann (1996), which requires a view of information as an input variable that can be converted into an income-generating stream. Another method proposed by Hubbard (2007), is an offshoot of game theory and decision theory and calculates the value of information as the chance of being wrong multiplied by the cost of being wrong, with being wrong being an opportunity loss which is the value that is lost if the decision doesn't work out. Hubbard (2007) defines Expected Opportunity Loss (EOL), within this context, as the factor of the opportunity loss by the chance of a loss with calculating the value of information is the determination of how much it will reduce EOL.

Hubbard (2014) proposes the following formula to calculate the value of information:
Expected Value of Information (EVI) = reduction in EOL, meaning that EVI = EOL before Info - EOL after Information

Besides the question of how data can be valued, there is also the question of how data can be used to create value. Research from the Centre for IS Research of the Massachusetts Institute of Technology (MIT) quoted by Tallon et al. (2020), describes that data can be monetized by selling it to the highest bidder, exchange/bartering it for something of equal value and wrapping it. Retailers, for example, might be willing to share data with third parties who, by aggregating data from multiple retailers, can uncover insights that may not be discoverable by anyone retailer in isolation (Tallon et al., 2020). Focusing only at the monetary value of information has been challenged within the literature because the knowledge and skills of a technology-enabled workforce can also be observed and measured as gains in overall business performance (Strassmann, 1996) and the organisational learning literature also suggests that inter-organisational learning through knowledge sharing between trading or alliance partners is critical to competitive success (Chen et al., 2013).

The Data, Information, Knowledge, Action, and Results (DIKAR) model of Peppard and Ward (2016) shown in Figure 3.15, is framed across a spectrum of value that starts with data and progresses through a series of transformations, each providing more business value as it moves through the stages. Organisations that are more to the left of the DIKAR model has higher levels of reliance on processes, procedures, and extensive application of technology while organisations to the right depend more on people. Peppard and Ward (2016) describe the linkages as important as they present the way value is increased typically and identify the linkages as Information management (which relates to the capture, processing, maintenance, storage, and presentation of data with most IS systems implemented for this purpose), Knowledge generation (the discovery of insights from the information which demand that new data/information be combined with existing or current data/information that might come from external or additional sources including social media, search results, blogs, and video clips), Decision-making (often involves the development and assessment of alternatives) and Execution (actions carried out because of decisions taken and then measuring the results of those actions).

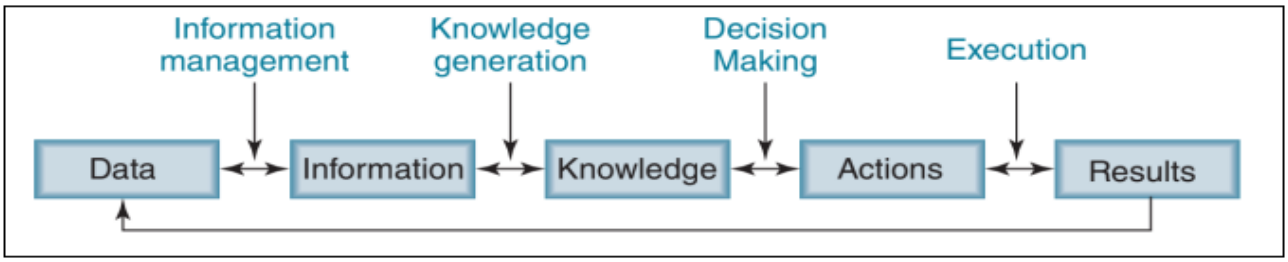


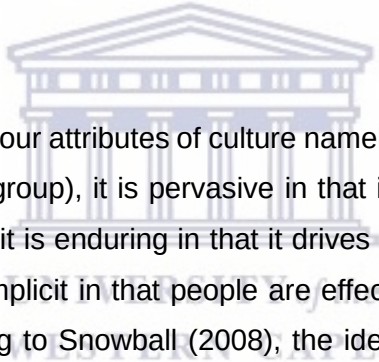
Figure 3.15. The DIKAR model (Source: Peppard and Ward, 2016)

The arguments presented above indicate that information is a key asset that leads to strategic advantage, and that has economic value that can and must be measured. The researcher believes that the well-known adage of James Carville in 1992, that “it’s the economy stupid” can be adapted

in the digital disruptive world of today to read “it’s the Information in Information Systems, stupid!” because of its importance and potential value As such, any framework/metrics that want to accurately measure the economic impact of the BVIS, especially in the digital world must reflect this which is the case with the new proposed framework presented in Section 3.4 below.

3.3.5 Culture, Ethics, and Behaviour

Culture has a significant influence on people’s lives and the operation of organisations. Groysberg et al. (2018), define culture as the tacit social order of an organisation that shapes attitudes and behaviours in wide-ranging and durable ways with cultural norms defining what is encouraged, discouraged, accepted, or rejected within the organisation. However, some key questions raised by Guiso et al. (2013), exist around the topic of culture such as “what constitutes a firm’s culture?”, “how can we measure it?”, “does this culture – however, defined and measured - impact a firm’s success? and if so, why?”, and “how can different governance structures enable or curtail the formation and preservation of a value-enhancing culture?” When cultures clash and merge, as they do for instance in the new SA, inevitable questions about the value of culture arise and, specifically, value to whom (Snowball, 2008).



Groysberg et al. (2018), articulates four attributes of culture namely that it is shared (it does not exist solely within an individual but in a group), it is pervasive in that it applies very broadly and across several levels within organisations, it is enduring in that it drives the thoughts and actions of group members over the long term and implicit in that people are effectively hardwired to recognize and respond to it instinctively. According to Snowball (2008), the idea of cultural capital in economics was first introduced by Throsby in 1999 who separated economic capital from cultural capital but emphasizes that cultural capital can give rise to both economic value (“ordinary” capital) and cultural value. Snowball (2018) argues that it becomes difficult to measure economic cultural value quantitatively, and as such qualitative valuations may be more fruitful by doing mapping, and attitudinal and content analysis.

Although research deals with the issue of the measurement of culture, this is about the adherence to cultural norms. The quantitative evaluation of culture in terms of the economic impact of the BVIS against organisational performance and how this can be tested empirically remains undetermined and underdeveloped. As such this study finds it prudent not to include culture as the “value of the prize” is not clear at this stage and as such a future research recommendation around this is made in Chapter 6.

3.3.6 People, Skills, and Competencies

Many authors recognise the potential impact of experienced and skillful people on BVIS, referring to people as the most important aspect of digital transformation (Eide, 2020), recognising that people also remain one of the most critical factors in achieving the goal of technology which is to improve organisation performance with human capital creating more economic value (Jordan, 2003) and people being scarcer than financial capital (Bryan, 2007; Field et al., 2020). Paradoxically though, organisations spend approximately 70% of their operating expenses on human capital, many leaders put much more weight on financial capital (Manning, 2017). It is also recognised that leading organisations establish a clear link between value and the talented people needed to create this value (Field et al., 2020).

Several attempts have been made to quantify value from *people* with Bryan (2007), suggesting Return on Talent (ROT) that links profitability to the number of people employed by using profit per employee as a metric. Strassman (1996), suggested Return on Management (ROM) as a measure defines ROM as the net result of all managerial activity, calculated by using the financial results of the organisation, minus those items that are outside of management control. The total value added by management is then calculated as the difference between net revenues and payments made to suppliers of raw materials, energy, contract labour, and leases with revenue by itself not regarded as a reliable measure since it includes the cost of resources employed by others (Van der Zee, 2002). The contribution of capital is thereafter separated from the contribution of labour, which leaves labour value-added and then taking out the direct operating costs leaves management value-added. When divided by the costs of management, this gives an indicator of the total performance of management or ROM (Van der Zee, 2002). Although theoretically valid, ROM has never been widely adopted because of its complex calculation (Strassmann, 1996; Van der Zee, 2002) and because measures such as ROA and ROE could equally be used to measure value (Van Der Zee, 2002).

Sadun et al. (2019) argue that data shows that management value-add is significantly higher at organisations with better-educated employees especially in emerging economies such as SA and research also shows that as computers became cheaper and more powerful, the business value of computers is limited less by computational capability, and more by the ability of managers to invent new processes, procedures, and organisational structures that leverage this capability (Brynjolfsson & Hitt, 2000).Skills and experience can also have negative consequences by leading to resistance to change and complacency with statements such as “we’ve always done it this way” being used frequently within some organisations.

The value of talented employees to convert the IS into valuable strategic assets is where business value lies that must be measured. Any framework/metrics that wants to accurately measure the economic impact of the BVIS against organisational performance must reflect this. This component is thus reflected in the new proposed framework in Section 3.4.

3.3.7 Services, Infrastructure, and Applications

This section deals with the seventh and last component of the COBIT2019 framework which is Services, Infrastructure and Applications that support effective organisation governance of IS (ICASA, 2019). Historically, software development has been treated as an expense, but recently the trend in a lot of companies have been to recognise software and some software development efforts as a capital asset (Brynjolfsson & Hitt, 2000). Technology assets itself such as hardware can add business value with studies showing that investment in computers contributed roughly 0.3 percentage points per year to output growth (Brynjolfsson & Hitt, 2000), the massive reduction in ICT costs leading to a substantial restructuring of the economy (Brynjolfsson & Hitt, 2000) and significant value added by the ability of computers to enable complementary organisational investments such as business processes and work practices enhancement that increases output quality and in improvements in the convenience, timeliness, quality and variety of existing products (Brynjolfsson & Hitt, 2000). Bloch and Hoyos-Gomez (2009) states that the IS function generates value at two complementary levels namely the core asset value of tangibles such as hardware and software, and at the “value-in-use” level.

BVIS discussions need to account for the shift towards third platform technologies such as Cloud computing, where the assets are the property of service providers and the spending on Cloud-based services using subscription or usage-based payments are treated as OpEx as nothing appears on the balance sheet (Tallon et al., 2020). Any initial outlay is replaced by a stream of payments over time which, according to Tallon et al. (2020), fundamentally alters the conversation around the use of NPV, ROI, IRR, EVA, or payback metrics since there is no upfront capital outlay in the way that is normally expected. Tallon et al (2020) also argue that unless these payments are predictable as in the case of a fixed subscription price model, it can be difficult to use discounting (as used with NPV or IRR calculations) to obtain a clear view of the real cash outflows.

Although hardware and software add to the BVIS, the measurement thereof with the growth in areas such as SaaS, and other third party-based technology offerings have a significant impact on the BVIS construct. The adaption rate within organisations, especially within developing countries such as SA is still relatively low. Thus, measuring the impact of Services, Infrastructure and Applications

as an independent variable was not considered for this study but a recommendation for future research around this area is made by this study in Chapter 6.

3.3.8 Summary of identified weaknesses in existing Frameworks

Table 3.2 below, summarises the weaknesses of the 10 frameworks described above namely the (1) CBA, (2) Process-based (Mooney et al., 1995), (3) BSC (Kaplan and Norton, 1996), (4) TEI (Forrester Research Group, 1997), (5) "B-Triple-E" (Van der Zee, 2002), (6) TVO (Gartner Group, 2002), (7) NIE (Benson et al., 2004), (8) Updated IS success model (DeLone and McLean, 2004) (9) AIE (Hubbard 2014), (10) BRM.

Table 3.2. Weaknesses identified within existing BVIS frameworks

Weaknesses	FRAMEWORKS									
	1	2	3	4	5	6	7	8	9	10
Intangibles inadequately represented	X	X		X	X	X	X		X	X
Risk of errors when put together by non-financial people	X									
Objective bias	X							X		
Crude measurement	X									
Can result in misleading results	X			X						
Inadequate for certain types of work	X									
Time-consuming to put together	X		X							
The difficulty of assessing the BVIS effects on specific processes		X								
Difficult to separate management and operational processes		X								
Organisation specific and requires customisation		X	X							
The steep learning curve when newly implemented			X							
Limited BAU metrics										X
No Supply-side metrics										X
Limited end-to-end measurement										X

3.4 Conceptual BVIS Framework

The Comprehensive BVIS Measurement Framework (CBMF) is a hierarchy of metrics that evaluates

the management, measurement and articulation of business value from IS projects, initiatives and BAU activities.

Different components of this framework measure IS value creation across all the dimensions identified by Van der Zee (2002) within the “B-triple-E” framework. It combines components from different existing frameworks discussed in Chapter 3 as well as work done by Gammelgard et al. (2010) and presents a comprehensive framework to be used to effectively measure and improve the effectiveness of the measurement of business value from IS for profit-based organisations

3.4.1 Comprehensive BVIS Measurement Framework (CBMF)

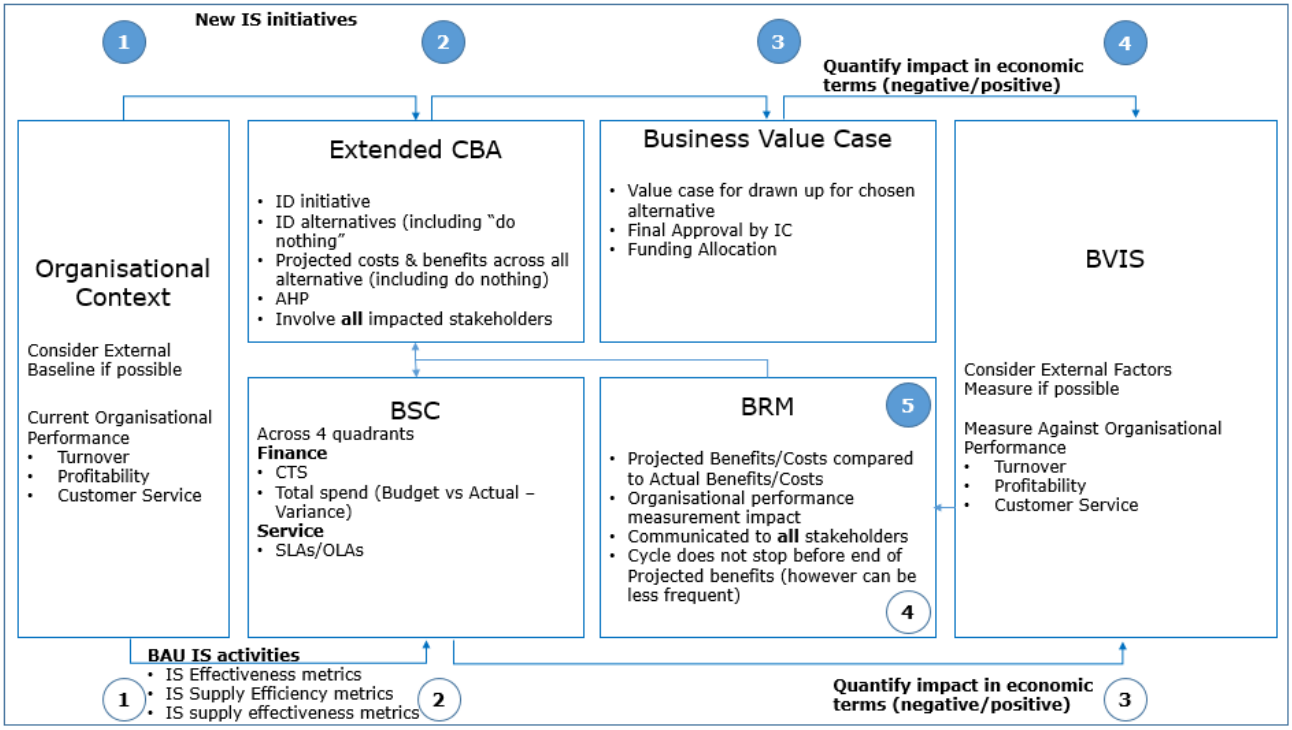


Figure 3.16. CBMF (Source: Author, 2021)

As argued by the literature BVIS can and should be measured across steps involved within a framework (Van der Zee, 2002), across BAU activities (Koller et al., 2015; Sabherwal & Jeyaraj, 2015; Peppard & Ward, 2016) and IS projects and other initiatives (Van der Zee, 2002; Lanzinner, 2008). The different building blocks of the CBMF is described below:

3.4.1.1 Organisational Context within CBMF

The literature findings (Mooney et al., 1995, Remez & White, 1999; Karmperis et al., 2013; Sandkuhl, 2013), presented a view that the context within which organisations operate influences BVIS measurement. As such the alignment of the IS project or initiative to the strategic objectives of the organisation, the competitive environment as well as the economic realities of the organisation

should be considered in the proposed framework. As such, determining the **organisational context** is the first step for both the BAU activities as well as for new IS projects and initiatives. This includes factors such as the competitive landscape, macroeconomic challenges as well as broader costs and pressures experienced by the organisation within which the measurement will occur.

3.4.1.2 Balance Scorecard (BSC) within CBMF

Step two for BAU activities within the framework **identifies all the critical variables** that need to be measured across the three of the four IS BSC (Sandkuhl & Siegerroth, 2018; Kidd, 2019) dimensions namely **user orientation, operational excellence and future orientation**. The researcher argues that measuring corporate contribution is aligned to organisational performance and as such this dimension is sufficiently covered within the broader CBMF and not as part of the IS BSC within the framework. However, the finance component defined within the organisational BSC by scholars (Kaplan & Norton, 1996; Van der Zee, 2002; Sandkuhl & Siegerroth, 2018; Kidd, 2019; Balafif & Haryanti, 2019) is added as a fourth dimension on the IS BSC because the literature argues for the importance of the measurement of finance metrics (Kaplan & Norton, 1996; Van der Zee, 2002; Sandkuhl & Siegerroth, 2018; Kidd, 2019; Balafif & Haryanti, 2019) and the research findings support this view because of the organisational realities of most organisations.

3.4.1.3 Extended Cost-Benefit Analysis (CBA) within CBMF

Step two for IS projects and initiatives within the framework incorporates the CBA framework to do a detailed analysis of the costs/benefits of the proposed initiatives. However, some key deviations are recommended to the standard CBA described in Section 3.2.1 of this thesis and as such in Figure 3.16 this is termed an extended CBA. These deviations are considered based on the hindrances and interventions identified from the study.

Gammelgard et al. (2010) suggest the use of an Analytical Hierarchical Process (AHP) developed by Saaty in 1980 to distinguish between the importances of all value variables to the organisation. Flynn (2012) defines AHP as a structured technique for organising and analysing complex decisions by decomposing the decision problem into a hierarchy of more easily comprehended sub-criteria each of which can be analysed independently. As was noted, evaluating alternative solutions, including the “do nothing” alternative is critical to a BVIS measurement regime.

3.4.1.4 Project Governance

The literature established that any effective, systematic, and consistent measurement framework of IS must be embedded within a broader management measurement governance regime (Van der Zee, 2002; Hammar, 2017), that links planned activities with the valuation of their results Van der Zee

(2002). This area is assumed by this study and not addressed explicitly by the proposed framework.

3.4.1.5 Metrics used within the proposed framework

Diverse scholars such as Koller et al. (2015); Sabherwal and Jeyaraj (2015); Peppard and Ward (2016); Ayers and Odegaard (2018) and Brahm et al. (2018) reflected on a multi-dimensional view of IS across projects, initiatives, BAU activities and the different metrics that may be appropriate to measure these activities and the business value they add. The design criteria in Table 3.4, also states that a few, relevant and high-profile key metrics should be used for evaluation instead of developing *too many metrics*, a phenomenon that Ayers and Odegaard (2018) warn against.

In Table 3.3 below, a list of metrics is presented that were prioritized based on the literature review as well as highlighted by this study.

BVIS Input	**Interrelated Functions**					**Output**	
						Tangibles	**Intangibles**
Organisational Context	**Supply Chain**	**Human Resources**	**Finance**	**Marketing**	**Stores**	**Profitability** including (Cost reduction and Cost Avoidance)	Improved Customer relations
New Projects and Initiatives						Turnover	**Information**
Functional Assessment variables (internal)						Productivity	Skilled and experienced **People**
Non-Functional Assessment variables (external)							Risk

Table 3.3. **Metrics from study to be included in Framework**

Within this section, some key insights that have been applied in constructing the new proposed framework which are discussed. The design criteria are also discussed, followed by an overview of the design process and the challenges encountered in the construction of the new proposed framework.

3.4.2 Design Criteria

Hubbard (2014) lays down a challenge when it comes to the development of new frameworks in that he states that model users always ask whether a new more complex model is an improvement on any alternative model. As such complexity and several other design criteria from the literature for effective framework/metrics design criteria were taken into consideration in the construction of the new framework which is summarised in Table 3.4 below.

Table 3.4. Principles for BVIS Framework/metrics

Criteria	Description
Comprehensive	Must be encapsulated within a holistic comprehensive framework (Borges, 2015), that connects all components of business and IS capabilities for a complete assessment of a decision (Hajela, 2009a). It covers both ex-ante and post facto analysis of IS investments (Schryen, 2013). Must not lead to metrics exhaustion (Proctor & Smith, 2017).
Quantitative	Metrics should quantify what you need to know (Brahm et al., 2018) for progress to be understood, explained, and monitored (Hajela, 2009a) and when used in aggregate, must be leading indicators of performance (Proctor & Smith, 2017).
Intangibles	Should not be restricted to just the traditional financial metrics but should include intangibles and the ability to innovate and prepare for the future (Van der Zee, 2002).
Usefulness	The measure must link to organisational strategies and objectives and must be significant and useful to the users, and attributable to "actionable activities" (Proctor & Smith, 2017).
Benchmark able	Standard, useful and accurately measurable metrics aligned with and corporate priorities that foster collaboration, that can be benchmarked over time with, activities or standards between internal departments and external organisations (Proctor & Smith, 2017; Brahm et al., 2018)
Reliable and Sustainable	The measure accurately represents what is being measured (valid, free from bias). Availability of timely data that produces results that can be implemented. Analysis that is free from error; not susceptible to manipulation; and balances/complements other measurements (Hajela, 2009a). Must be able to effectively communicate the BVIS through digital changes within the organisational landscape (Borges, 2015). The implementation of the measure should also be repeatable, feasible financially, flexible enough to evolve (Remez & White, 1999) and be calibrated over time to synthesize lessons learned to be carried forward (Hajela, 2009a).
Usability	User-friendly and clearly and consistently defined, well explained, measurable, with no ambiguity, easy to learn and communicate to new users in that it needs to simplify the interface, data collection, etc. (Hajela, 2009a; Hammar, 2017).

In addition to these criteria, Brahm et al. (2018) also argue that one should consider what factors matter most to organisational or functional performance. Whether the organisation “has analysed those factors fully to leverage current data and advanced analytic techniques?”. Whether their existing metrics contain any weaknesses and better reflect organisational performance in the areas that matter and whether the metrics can accurately be measured.

3.4.3 Design Process

In building the proposed framework/metrics, the thesis adapted work done by Gammelard et al. (2010) who propose a look at the organisation as a set of interrelated activities that consist of Input/outputs and that one link the technical properties to business value. *Inputs* refer to the products and services delivered to the organisation such as *inbound logistics*. *Outputs* refer to the services and products delivered to customers as well as external relations to third parties. Gammelgard et al. (2010) argue that the assessment of BVIS from a functional perspective involves identifying the functional areas that contain the business value dimensions. The non-functional assessment step involves assessing the impact of BVIS from the non-functional properties (Gammelgard et al., 2010). Gammelgard et al. (2010) posits that the process of calculating the BVIS factors has three components namely the priorities of the business value dimension, secondly, the strength of the links between functional and non-function attributes and the business value dimension needs to be taken into account and lastly, the figures from the technical assessment of the IS scenario are factored into the functional and non-functional evaluations.

Existing frameworks considered by the study were the CBA and BSC which are used widely within organisations especially the research site for this study. These frameworks were also considered in the development of the conceptual framework. IS experts in particular also encourage the adoption of the BSC to support the BVIS agenda of IS (Kidd, 2019). Several components of the other frameworks discussed, such as the strong focus on *Risk* of TEI, the strong metrics-based focus of TVO and the manner in which it converts projected value into actual business benefits were also taken into account. However, due to the factors discussed in Table 3.2, none of these frameworks, on their own, were found to be suitable for this study.

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An example of an AHP using a weighted scoring analysis is shown in Table 3.5 below.

Table 3.5. Example of strategic options AHP with weighted scoring

Criteria	Weight	Do Nothing		Option 1		Option 2...		Benchmark	
		Raw	Weighted	Raw	Weighted	Raw	Weighted	Raw	Weighted
Strategic alignment	30%	1	1	1	1	1	1	1	1
Cost	10%	2	4	2	4	2	4	2	4
Intangible value	30%	4	16	4	16	4	16	4	16
Tangible Value	10%	3	9	3	9	3	9	3	9
Information	5%	1	1	1	1	1	1	1	1
People	5%	2	4	2	4	2	4	2	4
Risk	10%	2	4	2	4	2	4	2	4
TOTAL	100%	15	39	15	39	15	39	15	39

The AHP criteria illustrated in Table 3.5, is a combination of the literature (Gammelgard, 2010) and

the result of this research. The components specifically added to the criteria based on the results of this study:

- **Intangible and Tangible Value** – CBMF includes both tangible and intangible value, which is reflected in the literature (Murphy, 2002a; Aranyossy, 2014, Hubbard, 2014; Solanki et al., 2018; Ross, 2020) because, any approach that is exclusively based on just intangible or tangible value, would be ineffective in most organisations, including the SA Retailer.
- **Information, Skilled and Experienced People and Risk** - The literature has demonstrated that these elements, above any of the other components of COBIT2019, has substantial economic BVIS**.** As such, the proposed framework incorporates these elements.

This AHP is then combined with the analysis done within the standard CBA framework described, but done for each of the alternatives, including the "do nothing" approach. The additional insight that the researcher has added to the AHP presented by Gammelgard et al. (2010), is the *benchmark* column that gives the organisation a view of how these alternatives compare against similar projects or initiatives within or external to the organisation. Baseline management is also presented within the literature as a key part of a successful project lifecycle (Van der Zee, 2002; Murray, 2016) and as such benefits must be modelled holistically and a baseline should be established to compare the change to the baseline value of the selected metrics (Apfel & Smith, 2003; Apfel, 2003b). Even though benchmarking can be a tedious and difficult exercise, two key things will happen; (i) it will stir the thinking to not only have an "internal" perspective on actions taken, thus addressing the "silo-mentality" described as a hindrance and (ii) the organisation can build up a database of benchmarks and compare this to new proposed initiatives, which again stimulates commercial thinking. As such baselines are part of benefits management within the proposed framework.

3.4.3.1.1 Business Value Case (BVC) within CBMF

The third step for IS projects and initiatives are to frame the results of the AHP and the work done through CBA for the projects and initiatives, into a BVC for the chosen alternative, including all tangible and intangible variables that might have a potential impact on profitability, turnover or customer service.

3.4.3.1.2 The actualization of BVIS within CBMF

The third step for the BAU activities is to measure the quantifiable impact against organisational performance for all BAU activities across IS effectiveness, IS supply efficiency and IS supply effectiveness metrics. These measures need to be quantified wherever possible and measured against the impact variables defined within organisational performance namely turnover, profitability

and customer service. It is key that the IS function starts moving away from IS-centred KPIs. For example, system outages should be measured in terms of the quantifiable impact against turnover. The same principle applies to new IS initiatives and projects and is reflected within the fourth step of the CBMF for IS initiatives and projects with the thinking that shifts to the metrics of organisational performance. This will take place in conjunction with the BVC prepared for the chosen solution.

3.4.3.1.3 CBMF steps for IS projects and initiatives

The last step is to review benefits against promised benefits in financial terms such as ROI as well as against organisational performance to improve the metrics or measurements regularly to ensure that it stays relevant and that it reflects activities that stay aligned with the strategic objectives of the organisation.

3.4.4 CBMF Uses

CBMF can be classified in the performance measurement space as an operational and monitoring tool with its main use being a framework by which IS effectiveness measurement can take place. It is split into two specific focuses that make it applicable to both new IS initiatives and BAU initiatives. The standard operational and strategic KPIs and OLAs that are measured by IS can be reflected in the BSC. The BRM component also ensures that benefits and costs are measured both ex-ante and ex-post-facto.

3.4.5 Evaluation of CBMF

This newly proposed framework will probably work in the SA Retailer environment, especially within the SC environment of this retailer and as such will be proposed to the SA Retailer. How transferrable this model is to the broader retailer and non-retailer landscapes, as well as other operating environments, need to be established by further research that extends the defined and limited environment in which this study was conducted. As such future research endeavours can be undertaken to either verify or falsify some of the theoretical propositions that have been formulated by this study around the new proposed BVIS framework/metrics.

3.4.5.1 Effectiveness against design criteria

This framework has however some limitations in its application– such as the sheer number of metrics and time it would consume to put it together. This is justified because of the amount of spent within IS based on the literature (Solanki, 2018; Egham, 2-19; Torres, 2021) as well as the findings of the study, the importance of governance called for by this research findings and literature (Bloch & Hoyos-Gomez, 2009; Schryen, 2013; Onik, 2019; De Haes et al., 2020) and the imperative to make the right investment choices (Borges, 2015; Solanki, 2018). A proper project implementation plan would be required to validate the CBMF. This would entail the researcher taking an active role in the

process, explain the steps and terminology used in designing the CBMF. Table 3.6 below summarises the researchers' view of how well CBMF was designed against the set criteria found within the literature.

Table 3.6. **CBMF effectiveness against design criteria**

Criteria	Description
Comprehensive	Measures both BAU activities and IS projects and initiatives
Quantitative	Based on CBA that is quantitative and BSC also contains quantitative metrics.
Intangibles	Contains Intangibles in the AHP and within BSC
Usefulness	Based on frameworks/metrics familiar to most organisations
Benchmark able	Includes a step for benchmarking, both internal and external to the organisation.
Reliable and Sustainable	The results across the CBMF should be reliable and sustainable across organisations that are already measuring the BVIS
Usability	Putting the framework together should not be challenging to the SA retailer. However, its usability might be difficult for organisations that have no BVIS measurement programs.

3.5 Chapter Summary

This chapter evaluates the most prominent frameworks identified by the literature. The strengths and weaknesses of each of these frameworks were identified and the appropriateness of the frameworks/metrics for consideration within this study were evaluated. In addition to this, the chapter also evaluated the different components of the COBIT2019 and framed arguments for its inclusion or exclusion from the new proposed BVIS framework. The chapter then makes a significant value-added contribution to the current thinking on the effective measurement of the BVIS against organisational performance, by using the identified weaknesses and COBIT2019 components to propose a new framework and set of metrics to address one of the secondary research objectives namely "to propose a new framework that addresses the identified gaps". In doing so it has addressed the research question that was found to be both relevant and persistent, namely "Is there an effective framework that addresses the identified hindrances, weaknesses and other potential areas of business value of IS?"

CHAPTER 4 : RESEARCH DESIGN AND METHODOLOGY

4.1 Introduction

This chapter describes the research design and the approach that was followed in doing the research. Some of the key issues that are discussed are the research paradigm/philosophy, ethical considerations, target population, sampling technique, and validity and reliability issues. The data collection method, as well as the data analysis technique used within this study, will also be presented. This will be based on a framework proposed by Creswell and Creswell (2018) that explains the interaction of the components of research and can be seen below in Figure 4.1. According to this framework, in planning a study, researchers need to think through the philosophical worldview assumptions that they bring to the study, the research approach to be taken, the research design that is related to this worldview, and the specific methods or procedures of research that translate the approach into practice (Creswell & Creswell, 2018)..

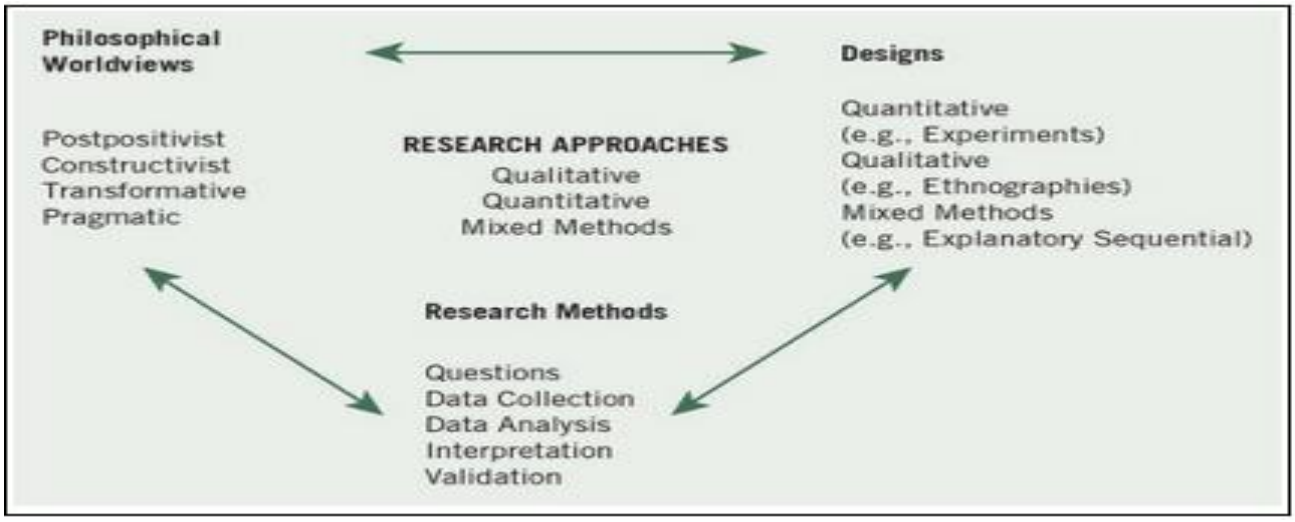

Figure 4.1. A framework for doing research (Source: Creswell & Creswell, 2018)

4.2 Research paradigm / philosophical worldview

There are several ways in which one can conduct research and each time researchers plan a research study they start by stating the research paradigm also often called a research “lens” or “worldview” (Terrell, 2015; Creswell & Creswell, 2018). Creswell and Creswell (2018) identify four worldviews (illustrated in Figure 4.1) widely discussed in the literature namely post-positivism, constructivism, transformative, and pragmatism. According to Creswell and Creswell (2018) post positivists hold a deterministic philosophy in which causes determine effects or outcomes. Constructivism (often combined with interpretivism) is typically seen as an approach to do qualitative research with the goal of the research being to rely as much as possible on the view of the situation being studied (Creswell and Creswell, 2018). The transformative worldview/paradigm, according to Creswell and Creswell (2018), includes groups of researchers that are critical theorists, participatory

action researchers, Marxists, feminists, racial and ethnic minorities, persons with disabilities, indigenous and postcolonial people, and members of the lesbian, gay, bisexual, transsexual, and queer communities. The main thrust of this worldview is to help marginalized people and providing a voice for these participants by raising their consciousness or advancing an agenda for their issues (Creswell & Creswell, 2018). The pragmatic worldview/paradigm, according to Creswell and Creswell (2018), is based on actions, situations, and consequences rather than antecedent conditions (as in postpositivist).

This research study adopted an interpretivist research paradigm because the worldview has a concern with applications in terms of what works to find solutions to problems. This worldview was also ideal as it emphasizes the research problems and questions and the understanding thereof to find practical solutions to these problems (Creswell & Creswell, 2018). This approach is also equally well suited for qualitative (Gunasekare, 2013; Creswell & Creswell, 2018). Interpretivists believe that reality is multi-layered and complex, thus, a single phenomenon can have multiple interpretations. The researcher was interested to understand how research participants interpreted and interacted within their social environment. Findings or knowledge claims are created through dialogue in which conflicting interpretations are negotiated among members of the community. This study relied heavily on naturalistic methods (interviews, observation and analysis of existing company reports). The researcher used these naturalistic methods to interact with participants in order to collaboratively construct meaningful reality (Creswell & Creswell, 2018).

4.3 Research Approach

Research approaches are the plans and procedures for research that span the steps from broad assumptions to detailed methods of data collection, analysis, and interpretation. The selection of a research approach is also based on the nature of the research problem or issue being addressed, the researchers' personal experiences, and the audiences for the study (Creswell & Creswell, 2018). According to Creswell and Creswell (2018), the distinction between qualitative research and quantitative research is often framed in terms of using words (qualitative) rather than numbers (quantitative), or even as closed-ended questions and responses (quantitative hypotheses) or open-ended questions and responses (qualitative interview questions).

This study has followed the qualitative approach as the study researched the problem of how organisations effectively measure the BVIS against organisational performance. Qualitative research is an approach for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell & Creswell, 2018). This process of research involves questions and procedures with data typically collected in the setting of the participant, the data analysis inductively

building from particulars to general themes, and the researcher making interpretations of the meaning of the data (Creswell & Creswell, 2018). The qualitative approach also suited this study because the research questions and objectives were addressed through open-ended and conversational communication. Qualitative methods are not about what people think, but also, why they think about the BVIS phenomena, the existing frameworks that measure the BVIS against organisational performance, the gaps that exist within these frameworks, factors that hinder the adoption of these frameworks within organisations, as well as interventions to overcome these hindrances. In order to complement the interpretivist worldview, a commensurate qualitative research approach was decided upon. Thus, data was collected using a semi-structured interview technique, resulting in the production of descriptive data. Non-numerical data was collected and analysed to understand the concepts, opinions and or experiences whilst gathering in-depth insights into a problem.

4.4 Research Design

According to Creswell and Creswell (2018), not only do researchers select a qualitative, quantitative, or mixed-methods study to conduct; the inquirer also decides on a type of study within these three choices. Research designs, also called strategies of inquiry, are types of inquiry within qualitative, quantitative, and mixed methods approach that provides specific direction for procedures in a research study (Creswell & Creswell, 2018). This study used a Qualitative design and collected data using the qualitative method.

There are several methods in qualitative research design namely, the phenomenological method, Narrative research, grounded theory, Ethnography, and Case studies. The methods are defined below based on Creswell and Creswell (2018):

- *Narrative research* is a design of inquiry from the humanities in which the researcher studies the life stories of individuals which is then often retold by the researcher into a narrative chronology.
- *Phenomenological research* is a design of inquiry from philosophy and psychology in which the researcher describes the lived experiences of individuals about a phenomenon as described by participants that culminate in the essence of the experiences for several individuals who have all experienced the phenomenon.
- *Grounded theory* is a design of inquiry from sociology in which the researcher derives a general, abstract theory of a process, action, or interaction grounded in the views of participants. This process involves using multiple stages of data collection and the refinement and interrelationship of categories of information.
- *Ethnography* is a design of inquiry coming from anthropology and sociology in which the researcher studies the shared patterns of behaviours, language, and actions of a cultural group.

- *Case studies* are a design of inquiry in which the researcher develops an in-depth analysis of a case, often a program, event, activity, process, or one or more individuals.

The choice of the researcher to base this research in the grounded theory method was influenced by the qualitative data collected and analyzed from the employees based within the SA Retailer on which this study was based (Terrel, 2015; Creswell and Creswell, 2018). The study used the grounded theory to derive a general, abstract theory of the measurement of the BVIS against organisational performance that was grounded in the views of these employees.

4.5 Unit of Analysis

Terrell (2015) describes the units of analysis as the major entity that will be analysed in a study. Terrell (2015) also suggests that there are five typical units of analysis namely Individuals, organisations social artefacts, social interactions and groups. For this study, the chosen units of analysis were individuals within the context of a SA Retailer and more specifically individual employees and managers in the organisation that plays a vital role across the IS, SC and Finance functions.

4.6 Sampling Strategy

The creation of a good sample involves first identifying the population you want to work with within the study which means that you must consider everyone or everything that could be used as a subject for the study (Terrell, 2015). Researchers have to identify whether the sampling design for this population is single-stage or multistage (called clustering) with cluster sampling being ideal when it is impossible or impractical to compile a list of the elements composing the population (Babbie, 2015). According to Babbie (2015), a single-stage sampling procedure is one in which the researcher has access to names in the population and can sample the people (or other elements) directly while in a multistage or clustering procedure, the researcher first identifies clusters (groups or organisations), obtains names of individuals within those clusters, and then samples within them. For this study, a multi-stage sampling approach was adopted in that the researcher firstly identified the departments that were to be included in the population which the researcher confined it to the SC, IS and Finance departments.

Following an appropriate sampling strategy, one must select a sample that works best for the study being conducted (Terrell, 2015). The two major approaches are probability sampling and non-probability sampling (Gunasekare, 2013; Terrell, 2015; Creswell & Creswell, 2018). Probability sampling strategies are generally used in quantitative studies with the aim of identifying samples that represents, as closely as possible, the population they are selected from (Terrell, 2015). In most

instances non-probability sampling is used for qualitative studies. In those cases, the size of the sample, and how it is created, is defined by the objectives of the study and the characteristics of the population (Terrell, 2015). For this study, non-probability purposive, and convenience sampling techniques were used to select participants for interviews. The original aim was to conduct these interviews face-to-face, but due to the COVID-19 pandemic, the researcher shifted the interviews to the Microsoft-Teams environment. The level that participants held in the organisation were used as a sampling technique (purposive), while the senior executives that the researcher had easy access to (convenience sampling) were used to further fine-tune the sample of people selected for the interviews. The original sample size was set for 30 participants, but due to an increase in access to participants nationally in SA, the number of participants interviewed increased to 38.

4.7 Research Instrument

Interviews were used as the research instrument to collect data for this study. The interview guide (See Appendix B) consists of five sections with section one containing organisational level information that was used in the categorization (coding) of the raw data. The rest of the interview guide contained the following broad categories that were linked to the research questions illustrated by the researcher in Table 4.1 below:

Table 4.1. Interview Questions

Interview Question	Broad Interview Category	Research Question
1	Organisational Information	
2	BVIS Frameworks/metrics	What framework/metrics measure the economic impact of the IS function against organisational performance?
3	Hindrances	What factors hinder organisations from using the existing frameworks?
4	Interventions	What interventions can be put in place to address the hindrances?
5	Other potential areas such as Information/People/Risk	Which other potential areas within IS not covered within existing frameworks add substantial business value?

The organisational information section was helpful to determine the selection criteria discussed earlier so that participants satisfying the conditions could be included in the study.

4.7.1 Pilot-Testing

Before conducting the actual study, the research instrument used was tested with a small group of

participants. Three participants were selected for face-to-face interviews. The pilot testing was an important phase in this study because it allowed the researcher to ascertain if the instrument was measuring what it was designed to measure. This approach is supported by Chigada (2014). Additionally, pilot-testing is also a good quality assurance process for ensuring that the instrument is free from spelling, grammatical and typographical errors. During the pilot-testing process, participants provided suggestions to improve the interview questions, which informed the final interview guide.

4.7.2 Semi-structured Interviews

Terrell (2015) states that interviews or observations are used most often to collect qualitative data and researchers use three approaches when interviewing namely structured, semi-structured interviews or unstructured interviews. The instrument used by the Researcher was a semi-structured interview, a copy of which is listed in Appendix B. The actual questions for this study were structured in such a way that provided participants with an opportunity to answer the questions in their own words. The interviews were conducted with a sample of thirty-eight (38) participants that represents a broad range of all categories of people in SC, IS and the Finance departments of the SA Retailer of this study. Even though the researcher would have liked to have done more interviews to ensure even broader participation, the time allocated to this phase of the research study and the fact that very little “new” data was collected after interviews with some of the most senior people in the different disciplines (SC, finance and IS) within the organisation, did not allow for this to happen. The latter mentioned phenomenon is referred to as saturation by Merriam and Tindell (2016), which gives the researcher comfort that continued data collection would have produced no new information or insights into the research questions and objectives.

4.8 Data Sources

The primary data source for this study consists of the notes of the researcher and the Microsoft-Teams recordings from the thirty-eight (n=38) interviews that were conducted with the population of the study over fourteen weeks between April 2021 and July 2021 within the SC, Finance and IS departments of a SA retailer. The initial population size was set at thirty (30) after the sampling exercise, but because the researcher had access to many more participants because the face-to-face interviews were replaced by Microsoft-Teams based interviews, which allowed the researcher the opportunity to do eight (8) more interviews within the SC area. The secondary data sources include information retrieved through preexisting sources such as research articles, the Internet, library searches, white papers, and articles published by consulting organisations as well as various business, leadership and academic books.

4.8.1 The Data collection process

The interviewing process consisted of the following steps:

Step 1: Meetings were scheduled directly with the participants of the study or through the Personal Assistants of the most senior participants using Microsoft Outlook (see Appendix C).

Step 2: The ethics clearance letter was attached to the meeting invite, with a request for the invitee to read this letter.

Step 3: At the start of the interview process, the researcher discussed the content of the letter of consent that contained an explanation of the research study and included information about anonymity and the rights of the participant to not participate or to refuse to answer any question. The researcher also requested that the participant complete the consent form (if they have not done so) and then return this to the researcher. One of the key consent questions that were iterated at this point in the Interview was whether the participant agreed for the interview to be recorded. Only 1 of the 38 participants interviewed refused the recording request. All other consent questions were answered positively across all the remaining participants.

Step 4: The recording commenced at the start of each interview session.

Step 5: During the interview process probing questions were asked. This was both based on the responses of the participant as well as the responses of some previous participants.

Step 6: At the end of the interview process, the researcher thanked the participants for their time and participation and the recording was stopped.

4.9 Data Analysis

This section presents the information about the method used and the steps involved in analysing the data. According to Merriam and Tisdell (2016), choosing a qualitative research design presupposes a certain view of the world that in turn defines how a researcher selects a sample, collects data, analyses data, and approaches issues of validity, reliability, and ethics. Merriam and Tisdell (2016) also quote Flick who in 2014 described the process of Data analysis as “the classification and interpretation of linguistic (or visual) material to make statements about implicit and explicit dimensions and structures of meaning-making in the material and what is represented in it”.

4.9.1 The method used for analysis

Before starting the analysis phase of this research study, the researcher ensured that all returned forms were completed and that all the responses were collected.

4.9.2 Content Analysis

There are several strategies such as discourse analysis, content analysis, and analytic induction that can be applied in analysing the raw data collected during the interviewing process in a qualitative

study such as this one (Merriam & Tindell, 2016; Denzin & Lincoln, 2018). This study used the content analysis strategy which is defined by Merriam and Tindell (2016) as “an unobtrusive technique that allows researchers to analyse relatively unstructured data given the meanings, symbolic qualities, and expressive contents they have and of the communicative roles they play in the lives of the data’s sources”. Content analysis is a tool that looks for words or phrases within the raw data that leads to the discovery of different dimensions, nuances and concepts (Chigada, 2014) and aims to be an objective, systematic, and observational method used in qualitative and quantitative research (Denzin & Lincoln, 2018) that should be used to analyse relatively unstructured data (Merriam and Tindell, 2016). According (Merriam & Tisdell, 2016), there are two general types of content analysis namely, conceptual analysis, which determines the existence and frequency of concepts in a text, and relational analysis that develops the conceptual analysis further by examining the relationships among concepts in a text. Each type of analysis may lead to different results, conclusions, interpretations and meanings. Some rudimentary data analysis was done simultaneously to the data collection in this study in line with the suggestion of Merriam and Tisdell (2016) that data collection and analysis should occur simultaneously both in and out of the field.

4.9.3 Data analysis steps

The steps within the “road map” (Terrell, 2015) that were used for analyzing the data are described below:

Step 1. The researcher listened to the interview recordings to ensure that the transcripts presented a fair reflection of the views of the participants and to reduce inconsistencies (Leavy, 2014).

Step 2. During this step, the researcher read through the transcripts several times highlighting recurring phrases that were significant and relevant to the study. All qualitative transcriptions were analysed using in-Vivo coding and thematic analysis. The term in-vivo comes from grounded theory research and means “in that which is alive” (Leavy, 2014), and refers to words or terms used by the interviewees that can be used as codes because it “stands out as significant or summative of what is being said” (Leavy, 2014). The NVivo analysis carried out by the researcher was done manually by highlighting the responses from participants on the transcripts that contained categories that were consistent, yet distinct.

Step 3. During the final step of the data analysis, the researcher summarised these tentative categories and refined them into tables. The responses of the participants were then tested and listed in support of these categories.

Step 4. Finally, the researcher integrated and refined the categories until distinct and more nuanced themes emerged. These themes, listed in Table 5.3, emerged were identified during the answering of the particular question under discussion that was lifted directly from quotes from some of the interviews.

4.9.4 Analysis of quality standards

Denzin and Lincoln (2018), states that the criteria of reliability and validity are crucial to establishing trustworthiness and that these criteria are not simply declared but must be earned and be built into the process of inquiry itself. According to Creswell and Creswell (2018), qualitative validity means that the researcher checks for the accuracy of the findings by employing certain procedures, whereas qualitative reliability indicates that the approach of the researcher is consistent across different researchers and among different projects. With qualitative researchers sometimes criticised for their inability to establish these criteria and accusations levelled against qualitative studies being anecdotal, impressionistic, unsystematic, and biased (Denzin and Lincoln, 2018), the researcher employed several strategies to ensure that this is not the case with this particular study. These are discussed below.

4.10 Trustworthiness

In a qualitative study, it is important to ensure that research findings are trustworthy to mitigate inaccurate reporting. According to Terrell (2015), trustworthiness is a function of four factors namely credibility, transferability, dependability and confirmability. Several processes were undertaken to ensure the study was trustworthy which are discussed below:

4.10.1 Credibility

Credibility refers to the interpretation and presentation of participants perceptions as reported by participants (Anney, 2014). The researcher made extensive notes during the interviewing process but also listened to the recordings of the interviews several times to ensure that the opinions of the participants were captured correctly in this research report. During the interviewing process, the interviews were recorded using Microsoft-Teams and the answers of participants were repeated to them for confirmation and recorded on the notes only when they agreed, to ensure that the responses were a true reflection of what was discussed during the interviewing process. Another way in which credibility was established is that the researcher had a prolonged engagement (Terrell, 2015) within the SA retailer in which the study was conducted. After the interviewing process, the researcher went back to several of the participants (including all the senior participants) in the study to check whether the results were a true reflection of the discussion during the interviews to improve the credibility of the results, as suggested by Terrell (2015).

4.10.2 Transferability

Transferability refers to an attempt to ensure that the research findings of a study are equally applicable in another context (Terrell, 2015). The techniques applied to support the transferability of

this study included the sharing of “rich, thick, detailed descriptions” (Terrell, 2015; Creswell & Creswell, 2018) of the result of this study that includes detail about the SA Retailer of this study, the population studied and keeping and maintaining records of field notes in a physical copy as well as the recordings on Microsoft-Teams so that anyone interested in transferability will have a solid framework for comparison (Creswell and Creswell, 2018). All research processes were documented, and the documents are kept safely for future references as it is important to keep an audit trail of everything if the study is challenged. Lastly, as stated, a pilot study was also conducted in-person with three participants to ascertain if the research instrument was plausible, error-free and whether it could be used in other settings and produce similar results under the same conditions (Creswell and Creswell, 2018). The pilot study was also used as an opportunity to ascertain whether the interview guide was plausible and could be used in a different environment, produce the same results under the same conditions.

4.10.3 Dependability

Dependability in qualitative research, much like reliability in quantitative research refers to the consistency and the replicability of the results, according to Terrell (2015). The dependability of the study was further enhanced through sharing of personal experiences during the interviews and by peer debriefing with several participants as suggested by Creswell and Creswell (2018). This is to ensure that recommendations of the research are a true reflection of the information collected from participants. The researcher kept an audit trail of documents, original data, notes from the interviews and voice recordings of the interviewees. The use of the interview protocol allowed the research to gather relevant data which enabled the researcher to address the research problems which meant that the research instrument was dependable to fulfil the completion of this research project.

4.10.4 Confirmability

Confirmability denotes steps taken by the researcher to prove that the findings of the research are based on the data that was collected from subjects, not from his or her biasness (Bwalya, 2017). From a reflexivity (Terrell, 2015) perspective, the researcher was consciously self-aware of potential bias, especially when interviewing participants that were junior to the researcher. Bias was also avoided by interviewing as wide a spectrum of participants as possible (level of seniority and divisions within the SA Retailer). The researcher also tried to avoid analysis bias by not assigning a higher level of validity to what was said by the senior participants. Lastly, the questions were also structured in an open-ended manner to avoid interview bias by allowing the participants to express their views freely. The researcher focused on potential areas of bias throughout the end-to-end research process to ensure the highest quality throughout the research project. The research design, its implementation and an audit trail were described in detail (Terrell, 2015). In addition, documents

and evidence of the decisions and choices made regarding the theoretical and methodological issues throughout the study were collated and kept in a safe. Prior to publishing the results, the researcher verified the results with participants to ensure that a true reflection of participants' inputs was captured. This was an important step to ensure that correct results were published.

4.11 Ethical Considerations

According to Creswell and Creswell (2018), the researcher needs to anticipate ethical issues that may arise during their studies because research involves collecting data from people, about people. In all the interactions with participants, the researcher was careful to protect the research participants (Creswell & Creswell, 2018) by developing trust with them and by reaffirming the importance of anonymity at the start of every interview. In the final report, the researcher was also careful not to share information about the SA Retailer that can be considered confidential or guarded against impropriety that might reflect on the SA Retailer (Creswell & Creswell, 2018). The researcher also ensured the ethical questions such as personal disclosure, authenticity, and credibility of the research report and issues of personal privacy (Creswell & Creswell, 2018) were maintained by respecting requests made by participants, for instance in the request of one participant not to be recorded. Even though this was never requested explicitly, the researcher also decided not to name the SA Retailer to avoid any potential ethical issue.

4.12 Chapter Summary

This chapter described the methodologies and processes adopted by this study. An interpretivist philosophical stance was adopted, leading to the adoption of a qualitative research methodology. The qualitative research study was conducted through the use of semi-structured interviews. The chapter also discussed the reasons for different research choices, the suggested method employed, and how the researcher dealt with the issues of reliability and validity and ethical considerations of the study. This methodology enabled the collection and accurate presentation of the opinions of the participants in the study summarised in Chapter 5 and followed by actions and recommendations in Chapter 6. The next chapter presents research findings.

CHAPTER 5 : PRESENTATION AND DISCUSSION OF FINDINGS

5.1 Introduction

This chapter focuses on the transformation of the raw data collected during the interview process into **i**nformation (meaning). It does this by following an approach suggested by Creswell and Creswell (2018) in connecting the results of previous studies with the findings of this study. The presentation of the findings is guided by the primary and secondary research questions of this thesis which are restated as follows:

The primary research question that this thesis address is:

i) What framework/metrics measure the economic impact of the IS function against organisational performance?

The research study also addresses the following secondary research questions:

ii) What weaknesses are posed by existing frameworks that measure the impact of IS against organisational performance?

iii) What factors hinder organisations from using the existing frameworks?

iv) What interventions can be put in place to address the hindrances?

v) Which other potential areas within IS not covered within existing frameworks add substantial business value?

Is there an effective framework that addresses the identified hindrances, weaknesses and other potential areas of business value of IS?

5.2 Qualitative Findings

According to Chigada (2014), the results of the data collected could be presented in the form of data reduction, data display and data transformation in a manner that simplified it. Chigada (2014) also states that data must be classified or be coded. Coding, a process of assigning some sort of shorthand designation to various aspects of your data (Merriam & Tindell, 2016, Denzin & Lincoln, 2018), were applied to the data collected in this study to ensure that the researcher could easily retrieve and reference specific pieces of the data. The coding system that was devised for organising the data that was collected in the Interview question 1, a copy of which is attached in Appendix B, is illustrated by the researcher in Table 5.1 below:

Table 5.1. **Codified Organisational Information**

Interview Question	**1.1**	**1.2**	**1.3**	**1.4**	**1.6**
Description	**Company**	**Area of**	**Company**	**Level within**	**Years of**

	Division	Operation	Department	company	experience
Code Category 1	**O** = Foods	**H** = Head Office	**F** = Finance	**0** = W0 & W1 (Senior Executive)	**T**= < 3
Code Category 2	**Y** = Fashion, Beauty and Home	**D** = Distribution Centre (DC)	**R** = Human Resources	**2 = W2 (**Executive)	**U** = 3 to 5
Code Category 3	**B** = Both	**G** = Racecourse Gardens	**I** = IT	**3 = W3 (**Senior Management)	**V** = 6 to 9
Code Category 4		**S** = Stores	**C** = Supply Chain	**4 = W4 (**Management)	**W**= >10
Code Category 5		**L** = LIC	**X =** Other	**5 = W5 (**Supervisor)	**Z**=Unknown
Code Category 6		**O** = Other area of Operations		**6** = **W6&W7** (Team members)	

Even though these categorizations were identified in table 5.1 above, the researcher decided not to use these codes in the interest of anonymity and to protect the identity of participants. In Section 5.2.1 and Section 5.2.2 the data for the demographics and organisational profile of participants are represented in a numerical format.

5.2.1 Demographic profiles of participants

A total of thirty-eight participants were selected from across the SA Retailer for participation within this study. Figure 5.1 below summarises the demographic characteristics of the thirty-eight participants and shows that even though the majority of the participants (68.4%) were males, a significant component of the sample was female (31.6%).

Demographics of particpants			
Description	**Code**	**Frequency**	**Percent**
Male	**M**	26	68.4%
Female	**F**	12	31.6%
Total		**38**	**100.0%**

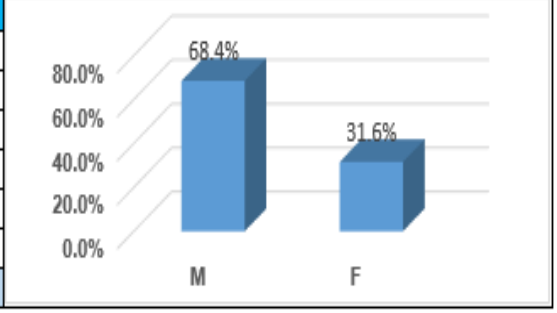

Figure 5.1. Demographics of participants

5.2.2 Organisational profiles of participants

Interview Question 1 of the questionnaire gathered organisational level information of the participants and are summarised in Table 5.2 below:

Table 5.2. Breakdown of totals across Organisational Information

Questionnaire	1.1	1.2	1.3	1.4	1.6
Description	**Company Division**	**Area of Operation**	**Company Department**	**Level within company**	**Years of experience**
Category 1	**O** = 21	**H** = 23	**F** = 07	**0** = 03	**T** = 15
Category 2	**Y** = 14	**D** = 05	**H** = 00	**2** = 09	**U** = 14
Category 3	**B** = 03	**R** = 03	**I** = 09	**3** = 07	**V** = 03
Category 4		**S** = 00	**C** = 22	**4** = 12	**W** = 05
Category 5		**L** = 07	**X** = 00	**5** = 04	**Z** = 01
Category 6		**E** = 00		**6** = 03	
Total (n)	**n = 38**	**n = 38**	**n = 38**	**n = 38**	**n = 38**

5.2.2.1 Divisions within organisation

The SA Retailer on which this study is based conducts its business across several categories of Foods Retail namely perishables, fresh and long-life food categories as well as across an extensive range of products within Fashion, Beauty & Home (FBH). The SA Retailer operates across three physical outlet types namely standalone Foods stores, standalone FBH stores and joint stores that trade across Foods & FBH (majority of stores). The online presence of the SA Retailer has seen rapid growth, especially due to the COVID-19 pandemic and specifically across the FBH category. The company structures are divided to service these different divisions with some IS, SC, HR & other departments within the company also split across these divisions. Most of the senior people (such as the c-suite executives) have a joint area of responsibility (referred to both or B in the split above). Most of the participants interviewed for this study were individuals focused on the Foods division within the company (55.5%). However, a reasonable size of participants was also from the FBH division within the company (36.8%). The three (7.9%) participants that were interviewed that oversee both divisions are the Chief Information Officer (CIO), Head of Supply Chain and the Logistics Executive.

In Figure 5.2 below, the researcher has summarised the distribution of the participants across the division within the SA Retailer in which the study was conducted.

In Figure 5.2 below, the researcher has summarised the distribution of the participants across the division within the SA Retailer in which the study was conducted.

Division within the company			
Description	Code	Frequency	Percent
Foods	D	21	55.3%
Fashion Beauty & Home	Y	14	36.8%
Both	B	3	7.9%
Total		38	100.0%

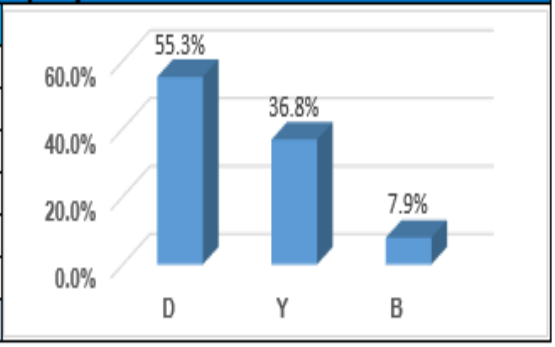

Figure 5.2. Interview Totals across company Divisions

5.2.2.2 Area of Operations

Most of the participants within the study (60.5%) were from the Central Office (referred to as Head Office or H in Figure 5.3 above). This is important as these included most of the senior participants in the study. They also include all IS and Finance and most of the Senior SC participants within the organisation. Another major category of participants (18.4%) is from the Logistics Integration Centre (LIC) which is the SC Centre of Excellence (COE) that was established about three years ago within the retailer and is one of the areas that leads the digital transformation journey of SC. As such they are probably the most directly impacted by the Capital-intensive Projects and Services that are delivered by IS into the SC area of the business. As such their opinion was key to this study. In Figure 5.3 below, the researcher has summarised the distribution of the participants across the different areas where they are based within the SA Retailer in which the study was conducted.

Area of Operations			
Description	Code	Frequency	Percent
Head Office	H	23	60.5%
Distribution Centre (DC)	D	5	13.2%
Race Course Gardens (RCG)	R	3	7.9%
Stores	S	0	0.0%
Logistics Integration Centre (LIC)	L	7	18.4%
Other	O	0	0.0%
Total		38	100.0%

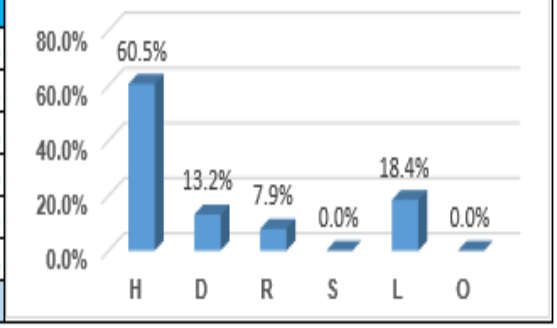

Figure 5.3. Interview Totals across Area of Operations

5.2.2.3 Department within organisation

Most (57.9%) of the participants are from the SC department, which is in line with the objective of this study which was to establish the BVIS within the SC organisation of a SA retailer. Even though this question on the interview guide was set up with the Human Resource (HR) department as a category, no participants from this department were interviewed as HR is also set up as a services department and as such the Researcher did not reach out to any participants from that department

and as such the study was confined to just the Finance (18.4%), IS (23.7%) and SC departments (hence Other also being 0%). In Figure 5.4 below, the researcher has summarised the distribution of the participants across the different departments within the SA Retailer in which the study was conducted.

Department within the Company			
Description	**Code**	**Frequency**	**Percent**
Finance	F	7	18.4%
Human Resources	H	0	0.0%
Informations Systems	I	9	23.7%
Supply Chain	C	22	57.9%
Other	E	0	0.0%
Total		**38**	**100.0%**

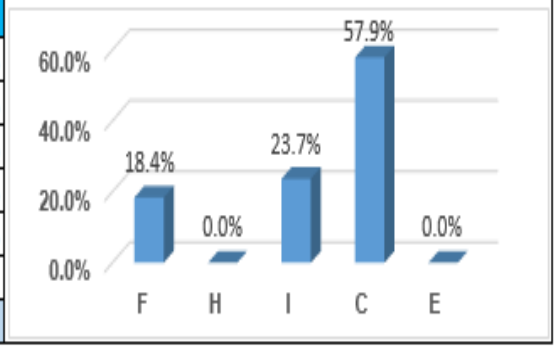

Figure 5.4. Interview Totals across company departments

5.2.2.4 Level of Seniority within Organisation

In Figure 5.5 below, the researcher has summarised the distribution of the participants across their levels of Seniority within the SA Retailer in which the study was conducted. The majority of the participants (81.6%) were at a management level or higher within the SA Retailer in which the study was conducted. This was important to the researcher as these participants were in a better position to answer questions around the BVIS because most managers are key participants in the realisation of benefits which is a keyway in which IS Projects are measured within the organisation.

Level within the Company			
Description	**Code**	**Frequency**	**Percent**
Senior Executive (W0 & W1)	0	3	7.9%
Executive (W2)	2	9	23.7%
Senior Manager (W3)	3	7	18.4%
Manager (W4)	4	12	31.6%
Supervisor (W5)	5	4	10.5%
Other (W6 & W7)	6	3	7.9%
Total		**38**	**100.0%**

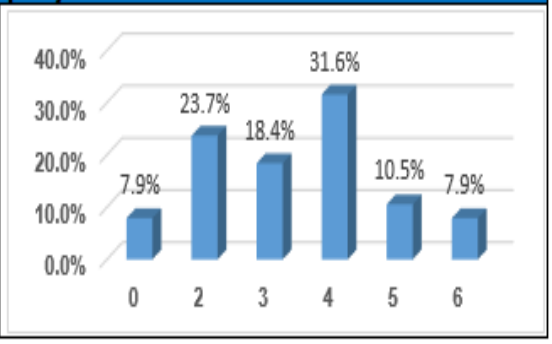

Figure 5.5. Interview Totals across Seniority Levels

5.2.2.5 Job title

Even though interview question 1.5 was used during the interview process searching to ascertain the Job Title of the interviewer the Researcher decided to ignore this from the raw data because it would have potentially gone against the anonymity principle established at the start of the research. The answer to interview question 1.5 was also deemed as insignificant to the results of the study by the Researcher and will as such are not used in further analysis of the results that follow

5.2.2.6 Years of Experience

From the responses to this interview question, it is interesting to note that most (76.8%) of the participants are in their roles for five or fewer years. Only one participant refused to answer this question, citing confidentiality. In Figure 5.6 below, the researcher has summarised the distribution of the participants across their level of experience within their current roles within the SA Retailer in which the study was conducted.

Years Experience in Role			
Description (Years)	**Code**	**Frequency**	**Percent**
< 3	T	15	39.5%
3 to 5	U	14	36.8%
6 to 9	V	3	7.9%
=> 10	W	5	13.2%
Unknown	Z	1	2.6%
Total		**38**	**100.0%**

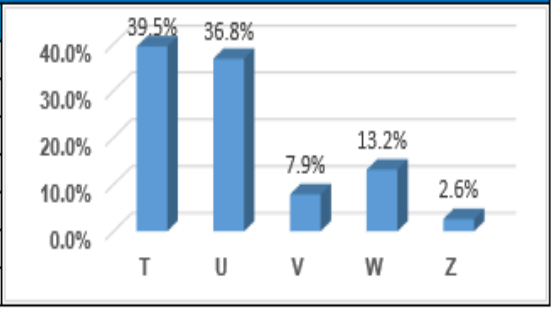

Figure 5.6. Interview Totals across Years of Experience

5.3 Thematic Data Analysis

The NVivo codes that emerged from the study are summarised in Table 5.3 below into a more distinct and nuanced categorizations of the NVivo codes identified to ensure that there is better clarity around the overarching categories that emerged within this study based on the questions that were asked by the researcher during the interviewing process. In addition to the themes listed in table 5.3, an interesting phenomenon was observed by the researcher that can be summarised by the statement "where you sit is where you stand" in that the responses of participants across several questions corresponded very strongly with the department in which they work. This phenomenon is discussed further in several sections below.

Table 5.3. Summary of Themes

Research Question	Interview Question	Emerging themes for each research question			
	1	Organisational information			
What frameworks/metrics measure the economic impact of the IS function against organisational performance?	2.1	Turnover	Cost	Profitability	Context appropriate metrics
	2.2	Cost to Sales (CTS)	Project Management	Business Case/CBA	BSC
What factors hinder	3.1	Very Effective	Fairly	Moderately	Not

organisations from using the existing frameworks?			Robust	Effective	Consistent
	3.2	BRM	Intangible Value	Project Governance	Lack of frameworks
What interventions can be put in place to address the hindrances?	4.1	BRM	Intangible Value	Project Governance	Digital Metrics
Which other potential areas within IS not covered within existing frameworks add substantial business value?	5.1	Adds Economic Value	Governance Structures	Difficult to measure	
	5.2	Adds Economic Value	Risk governance	Difficult to measure	
	5.3	Adds Economic Value	Difficult to measure		

5.4 Current frameworks/metrics used to measure BVIS

Question 2 established the framework/metrics that are used within the retailer to effectively measure the impact of the BVIS against organisational performance. This question is linked to the primary research question of this study. This interview question is also linked to the primary research objective of this study, namely:

> *to identify framework/metrics that measure the economic impact of the IS function against organisational performance.*

5.4.1 Understanding of Organisational Performance

Question 2 has two sections, though Interview Question 2.1 was not directly linked to a research question, it tested the understanding of the participants around *organisational performance* which is the key variable chosen by this study for the measurement of BVIS. The themes that emerged for this is discussed below.

5.4.1.1 Turnover

The study confirmed "Turnover" as a key variable that participants believe impacts *organisational performance*. Participants had the following to say about this theme:

> *"SLA with business and any Red day has a direct Impact on Revenue" (Participant 1, Male, 2021)*

> *"Both turnover and profitability is* (sic) *improved by IS" (Participant 4, Male, 2021)*

> *"Both turnover and profitability" (Participant 8, Male, 2021)*

"IT's contribution across the value chain has an impact on Turnover and Profit because in 2021 most of our processes are automated and systematized, which has an impact on Turnover and Profit targets…" (Participant 2, Male, 2021)

The views raised by the participants indicate that turnover is a key variable that impacts organisational performance. These views are supported by literature where it is stated that turnover has been a major measurement of organisational performance. Significant System downtime ("Red day") in a critical system of the retailer such as the Point-of-Sales (POS) system can have a direct impact on Sales/Turnover (or a lack thereof). The literature also indicates the importance of Turnover (see Table D.1) as a measurement of organisational performance regarding BVIS (Schryen, 2013; Onik, 2019; Zeng et al., 2020) and its importance is also confirmed by the published financial results of retailers such as PicknPay, Woolworths, Shoprite and Spar.

5.4.1.2 Cost

Cost is also a key component that was highlighted by the study as a variable that influences *organisational performance*. Participants had the following to say about this theme:

"Measuring IT we traditionally used a cost centre model vs. a Profit centre model. We need to move to a base valuation with anticipation of future value" (Participant 2, Male, 2021)

"Deviation from planned CapEx spend also referred to as the CapEx cost of non-conformance. Often it is about cost reduction with IT creating cost optimisation opportunities which leads to increases in profit" (Participant 3, Male, 2021)

"Cost is impacted" (Participant 18, Female, 2021)

Cost Savings with regards to systems that came about because of IT" (Participant 25, Male, 2021)

"Cost reduction is the primary one, but we should also look at others" (Participant 26, Male, 2021)

Participants unanimously agreed that costs are pertinent in determining the viability of IS projects. Capital spending in IS is quite significant and as such it is incumbent on management to ensure that project and non-project-related cost meets budgetary requirements with participants revealing that the overall cost of the IS department is benchmarked against local and international retailers. Most participants were firm around the ability of IS to deliver business value through cost optimisation whether through process optimisation, cost avoidance or cost reduction projects and initiatives. The findings of the study around *cost* are fully supported within the literature (Van Der Zee, 2002;

Brynjolfsson, 1993, 2003; Kohli & Devaraj, 2003; Mellville et al., 2004; Hajela, 2009a; Bloch & Hoyos-Gomez, 2009; Gammelgard et al., 2010; Schryen, 2013; Zeng et al., 2020). From the response of some of the participants, especially some of the senior participants it is clear that the IS department is seen as a cost centre, but there is an awareness that this has to change. This view of the IS department as a cost centre within some organisations is also reflected in the literature (Kishore et al., 2006; Solanki et al., 2018).

5.4.1.3 Profitability

The study revealed that participants believed that the IS department influences *profitability*. Participants had the following to say about this theme:

> *"Profitability. In International SC there are a number of pillars such as customs, imports and exports and the aim is to get the product into countries in the most profitable way, which is directly impacted by the systems we use" (Participant 9, Male, 2021)*

> *"Profitability because IT infrastructure is a cost which impacts bottom line." (Participant 28, Female, 2021)*

> *"Profitability. Cost efficiencies and that we meet certain cost requirements. We live in a data or digital world and IT drives the understanding of the value" (Participant 17, Male, 2021)*

> *"Definitely revenue, which impacts our profitability" (Participant 1, Male, 2021)*

> *"IT must increase profit and decrease cost" (Participant 24, Female, 2021)*

There was an acute awareness throughout the interviews that IS affects profitability with the only point of disagreement being whether this is directly or indirectly. Some participants referred to the profitability (or lack thereof) impact of the digital journey of the retailer and according to most participants improvements in operational efficiencies and productivity through IS have indirect impacts on profitability. The literature makes it clear that *profitability* is a significant indicator of *organisational performance* (see Table D.1) and that organisations are under increasing profitability pressures (Egham, 2019; Torres, 2020).

5.4.1.4 Context appropriate Metrics

This view was mostly shared by Finance department participants and reflects a view that IS projects and services have cost implications and as such have an impact on most (and for some all) typical *organisational performance* metrics reflected in the income statements of the retailer. Participants had the following to say about this theme:

"It is important to use context-appropriate measures to measure the impact of the IT department and sometimes a philosophical discussion is needed about whether existing metrics are context-appropriate" (Participant 10, Male, 2021)

"IT has a direct impact on all organisational performance metrics. If IT fails, we come to a standstill" (Participant 7, Male, 2021)

"Impacts all as IT enables all operations. The degree to which it impacts will vary but it directly impacts all" (Participant 14, Female, 2021)

"All organisational performance financial measures in general. IT plays a critical role" (Participant 7, Male, 2021)

"Finance in general as IT is like a skeleton and that plays a role in all areas" (Participant 12, Male, 2021)

"IT as a whole is an enabler and provides the capability and has a direct impact on organisational performance measures" (Participant 6, Female, 2021).

"All projects have an IT measure. However, for some, we don't measure IT directly." (Participant 15, Male, 2021)

Appropriate metrics should be applied that reflect the organisational context in which measurement of BVIS is happening as shown by the diverse views raised during the interviews. In one of the interviews, the participant stated that firms will focus on tangibles when the context in which they operate is severely capital constraint. Several IS participants saw IS as an enabler of organisational performance, however, there was little agreement as to what "enabler" meant in this context. The literature reviewed show a vast array of metrics (listed in Table D.1) to measure the impact of IS on organisational performance, which is in support of this view. In support of the participants' views, Schryen (2013) states that BVIS measurement should consider the organisational context.

5.4.2 Current way BVIS is measured by SA Retailer

Interview Question 2.2 (see Appendix B) addresses the primary research question within this study in that it deals with the frameworks/metrics used within the retailer to measure the BVIS against organisational performance. The main in-vivo codes and themes that summarise the responses from the participants to the interview question are categorized in Table 5.3 and discussed below.

5.4.2.1 Cost to Sales (CTS)

The cost of the IS department is compared and is kept in line with best-in-class benchmarks for local and international Retailers. Participants had the following to say about this theme:

"CTS – Experience the direct impact of x.xx%"(Participant 1, Male, 2021)

"IT overall cost as a percentage of Sales" (Participant 2, Male, 2021)

"Cost of IS service including maintenance cost is compared to the sales of company" (Participant 3, Male, 2021)

"CTS – Financial Year 21 it was x.xx% against a budget of y.yy%" (Participant 11, Male, 2021)

The study found CTS is a primary metric used within the retailer to measure BVIS, which is benchmarked with similar organisations in SA and globally. It is measured by expressing IS cost as a percentage of Sales. The current CTS of the SA Retailer is indicated as "x.xx%" intentionally in this paper as this information is confidential. The real percentage is however well within the indicated 2.04% for retailers expressed by the literature (Kark, 2018).

5.4.2.2 Project Management

Participants had the following to say about this theme:

"We have a capital planning process by our strategic executive that is part of our strategy review cycle that happens quarterly, where Projects are prioritised. Project matrix to deliver to agreed scope, timelines and budget." (Participant 19, Female, 2021)

"Categorisation of projects with P1 projects being key business enablers." (Participant 23, Female, 2021)

"…we have a Post Implementation Review (PIR) discipline after implementation that seeks clarity on whether objectives have been met." (Participant 9, Male, 2021)

"We evaluate Projects by using capital evaluations in the form of IRR and does it return a positive value NPV. We also use a PIR to check whether project has delivered on objectives" (Participant 11, Male, 2021)

"PIR as a critical control" (Participant 3, Male, 2021)

"PIR where we look at functions profit or benefits. But also continuous evaluation to see whether

project delivered to its priorities" (Participant 17, Male, 2021)

"PIR discipline to understand whether we have delivered to the business case" (Participant 21, Male, 2021)

"Have to take into account non-measurable benefits and no benefits. For example, online that is less profitable, but you have to do it" (Participant 11, Male, 2021)

"We have a portfolio of projects that is linked to IS specific investments…" (Participant 2, Male, 2021)

With reference to the extracts above, it was clear that a project-based approach was supported by all participants. However, the participants clearly outlined the importance of identifying the benefits and risks associated with projects. Based on the findings of the study, a thorough capital planning process is in place within the retailer to ensure that projects within the Project Portfolio are properly prioritized and funded. The study revealed an effective cost management regime for all IS activities through a strict budgeting cycle using cost/financial metrics (Budgeted cost vs. Actual spend). The company, however, is focused on tangible metrics and as such focuses on evaluation using standard metrics such as NPV and IRR. An interesting distinction was made between measurable and non-measurable intangibles. Intangible metrics that is used in broader business that was raised by IS participants as part of the discussion on the evolution of BVIS metrics. For every major project, a PIR is performed months after implementation to understand whether the project was delivered within cost, budget and time as well as the benefits that were promised. Risk, as a category is highly valued throughout the company and was also raised as part of the project management governance. The literature supports projects and project management as key components of effective IS delivery (PMI, 2019).

Figure 5.7 below, illustrates the current Project Management Framework used within the SA Retailer based on the responses of the employees interviewed. The Framework illustrates that projects are launched with a clear commercial focus in the for of a Business Case that is based on a detailed CBA. Projects are then submitted for approval by the Investment Committee where projects are prioritized and the necessary funding is allocated to projects identified as those that are beneficial to the business. Once this approval is granted, the Project preparation is initiated during which a detailed project plan is prepared and resources are secured. Projects are then implemented and a detailed Post-implementation-review is performed at the conclusion of the Project.

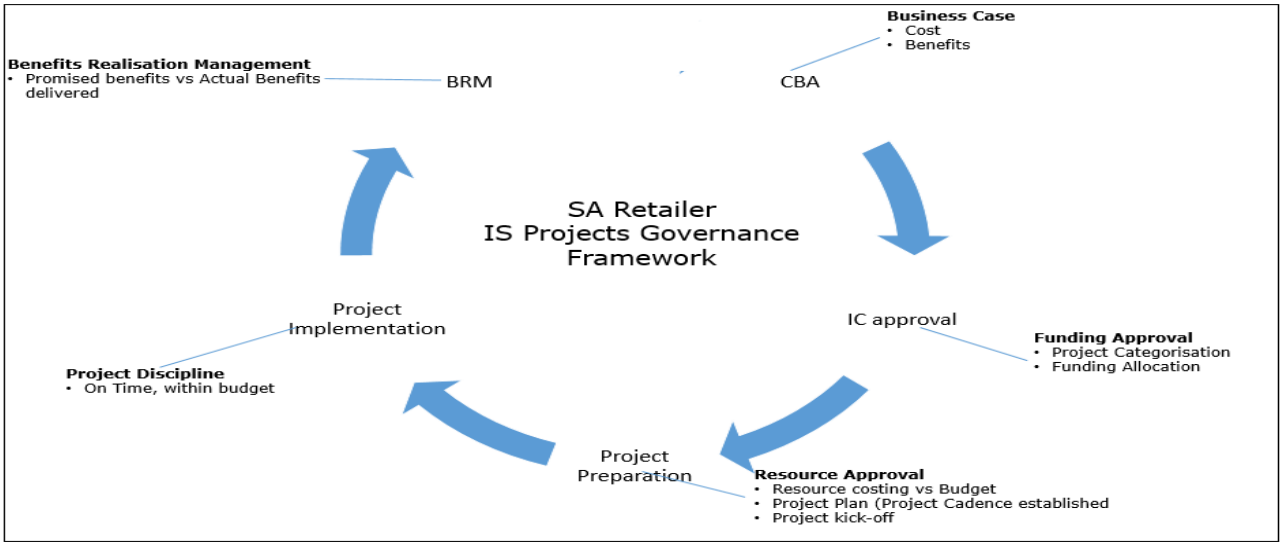

Figure 5.7. Current Project governance Framework

Figure 5.7 is used as the basis of one of the recommendations of this study in Section 6.4 below, where this framework is adjusted to introduce the element of agility (Brosseau et al., 2019).

5.4.2.3 Business Case/CBA

The primary framework used for BVIS measurement for IS projects and initiatives, especially within the SC space, identified by the study is CBA that is used to evaluate all *costs* and *benefits* metrics with the result thereof expressed within a business case that is reviewed, prioritised and funded by an IC. Participants had the following to say about this theme:

"Calculate the business case after performing a baseline review at the beginning of the project as well as reviewing after implementation. We do benefits tracking are on track" (Participant 10, Male, 2021)

"A business case to define the size of the opportunity. Opportunity model that defines what the impact will be." (Participant 6, Female, 2021)

"Measure the ROI with hard, above the line benefits as appose to the softer stuff in our business case." (Participant 12, Male, 2021)

"In SC we look at CBA to pay for development cost. If a good business case exists, we go ahead but if no clear business case exists in today's terms it's difficult to get funding." (Participant 5, Male, 2021)

"Business case if the basis for a decision on whether to move ahead with initiative or whether it's the right place to invest based on indicators such as sales growth or light business or heavy or

intensive business" (Participant 14, Female, 2021)

"…that include future returns with Discounted Cash Flows, Net Present Values (NPV) and Internal Rate of Return (IRR)" (Participant 1, Male, 2021)

"Benefits case where the opportunity is modelled to determine what the impact will be" (Participant 6, Female, 2021)

"Feasibility study at the beginning and financial benefits which create the business case that is evaluated by the board" (Participant 6, Female, 2021)

"The way we measure is by doing a CBA around the building capabilities through business process, skills, HR and systems which altogether gives us an outcome." (Participant 2, Male, 2021)

"Normally a business case is put forward with benefits and costs in terms of people, resources and infrastructure" (Participant 24, Female, 2021)

"Commercial benefits and ability to achieve business objectives but the reality is that we are running a business and we won't spend millions of Rands to deliver intangibles, so in international supply chain hard benefits are important." (Participant 9, Male, 2021)

"The way we measure is through CBA when building capabilities and business processes, HR, systems all together gives us an outcome…" (Participant 2, Male, 2021)

"…prove value first so that we can ring fence targeted benefits…" (Participant 2, Male, 2021)

"Business case in terms of time, cost, savings and financial returns." (Participant 7, Male, 2021)

"CBA of particular system such as the time and attendance system" (Participant 16, Male, 2021)

"CBA beforehand. From finance side ROI is the bottom line. It must increase value with rigorous assessments of assumptions" (Participant 17, Male, 2021)

The BVIS of strategic and transformational Projects within the company is evaluated differently from other types of Projects with different metrics/no metrics being used It was clear from most of the interviews that the CBA was the framework utilised by the company especially in the SC space.

Participants indicated different viewpoints in this question. What was important from all the opinions was that there was consensus that IS projects required proper planning and implementation for the organisation to record success. The metrics of costs and benefits are also fully supported by business cases funded and prioritised by the IC. Costs linked to both the delivery of services and other business as usual activities are tightly controlled through a firm budgeting cycle and costs associated with projects are analysed in detail as part of the CBA. Costs and the management thereof against projects are embedded in most of the frameworks reviewed in Chapter 3 and as such is widely supported by the literature. The element of risk is also discussed widely in the literature reviewed (Section 3.4.3) and the research found that *risk management*, as a category, was highly valued by **all** participants.

CBA is also widely supported in the literature and has widespread adoption and is also used as the underlying framework for some of the frameworks reviewed in Section 3. Although the "business case" concept is not directly supported within the literature, most frameworks have an output instrument that equates to a "business case". The literature is also in wide support of costs and benefits being included in the evaluation of BVIS (Murphy, 2002a; Hajela, 2009a; Aranyossy, 2014, Hubbard, 2014; Solanki et al., 2018; Burnette & Dittmann; 2018; Ross, 2020). The study also revealed that a PIR is performed six months after implementation measuring promised objectives (costs, benefits, time as well functionality) against actual deliverables. The effective management of benefits is discussed throughout this study (Peppard et al., 2007; Serra & Kunc, 2015; Murray, 2016).

5.4.2.4 Balanced Scorecard (BSC)

Another primary way used to measure BVIS within the SA Retailer is through a BSC that contains various elements across the four quadrants of the BSC. Participants had the following to say about this theme:

"We have SLAs and OLAs with business to which the capability of IT to deliver is linked to operational efficiency" (Participant 21, Male, 2021)

"More KPIs than typical are measured with these KPIs measuring the effective use of IT investments." (Participant 9, Male, 2021)

"… such as some digital touchpoints like Customer Acquisition and Customer Retention reflected on the BSC." (Participant 1, Male, 2021)

"BSC against which they will deliver at a business" (Participant 20, Male, 2021)

"Update of IT services with measures such as stability and reliability. Use Scorecards and reports

for this" (Participant 16, Male, 2021)

"System performance metrics that includes uptime for business critical systems to support the efficiency of our SC is reported monthly by IT" (Participant 3, Male, 2021)

As shown in the interview responses, participants confirm that the BSC was used in the organisation to measure BVIS (more performance of IS department in terms of service) and operational efficiency. Balanced Scorecards exist throughout the organisation to measure BVIS (more performance of IS department in terms of service) and operational efficiency. The BVIS of Projects linked to the maintenance of older IS assets is evaluated using different metrics for transformational projects. IS Services are measured through the use of SLAs/OLAs linked to operational efficiencies and encapsulated within a BSC which is widely used within the organisation to measure BVIS. These SLAs/OLAs were discussed in detail by some participants from the IS department and more specifically individuals that were responsible for IS services such as network or hardware availability. These SLAs/OLAs were key sets of metrics that were discussed in some detail by some participants, all from the IS department and more specifically individuals that were responsible for IS services such as network or hardware availability.

The literature is critical of using SLAs/OLAs as BVIS metrics, describing them as IS-centred (Murphy, 2002a). Operational efficiency is referred to by only Van der Zee (2002). The concept of organisational efficiency is more broadly supported within the literature (Kraemer et al., 1994; Van der Zee, 2002; Gliedman, 2003). The effectiveness of IS and operational efficiency metrics are also not necessarily identified as BVIS metrics as defined by Van der Zee (2002).

The phenomena of "*Where you sit is where you stand"* emerged from the responses given by the participants to this question in that individuals had a different perspective of BVIS based on the function within the business that they represent. The view of participants from Finance focused on the financial metrics and capitalisation that is used by the company, whereas IS participants focused on SLAs and Project governance. SC participants focused on the benefits, costs and quality of the overall business case. This theme also strongly emerged in the discussion of intangible vs. intangible benefits with participants from the financial department leaning strongly toward tangibles, SC people were balanced between the two and IS-people expressed the view that the company should focus more on intangibles. The study revealed an interesting distinction made by participants between *measurable* and *non-measurable* intangibles. However, even IS participants had an understanding of the organisational context that was driving the focus on tangibles with the study identifying this context as much the same as that of most organisations identified within the literature, i.e. constraint of capital, cost and profitability pressures.

5.5 Hindrances to effective BVIS measurement within the SA Retailer

The first of the secondary research questions "*What factors hinder organisations from using the existing frameworks?"* was addressed in Question 3 of the Interview (see Appendix B). This question was researched in two parts, with Question 3.1 assessing the participants' opinions of the effectiveness of the current way that BVIS is measured and Question 3.2 addressing the secondary research question directly by assessing the view of the participants on the current hindrances that impact the effectiveness of measuring the BVIS against organisational performance. This interview question is also linked to one of the secondary research objectives of this study, namely *"to evaluate factors hindering organisations from using existing frameworks, to measure BVIS effectively."*

5.5.1 Effectiveness of current BVIS measurement

Even though interview Question 3.1 was not directly linked to a research question, but it allowed participants to reflect on the effectiveness of the current way BVIS is measured within the retailer. In hindsight, the researcher recognises that it would probably have been more appropriate to have utilised a multi-item scale with this question, but the question was adapted to the last number of interviews to achieve a better-quality outcome which should be achieved throughout the process and not assigned after the fact (Denzin & Lincoln, 2018). When the scale was introduced during the latter interviews a general score between 6 and 9 (1 meaning non-existent and 10 meaning most effective) were mostly provided as an effectiveness rating by the participants. One participant distinguished between the effectiveness of our service measurement (9/10) and our Projects measurement (8/10).

5.5.1.1 Very Effective

The response that the way BVIS is measured is *"very effective"* was mostly given as a response by SC participants. The response of the participants is given below:

> *"Very effective because there are clear budgets with clear budgetary controls and a CapEx spend perspective is attached to projects." (Participant 1, Male, 2021)*

> *"Very effective. Especially in terms of bigger, broader business system implementations such as PeopleSoft" (Participant 9, Male, 2021)*

> *"Very well because we have a very good base with the right structures and processes in place. On a scale of 7/10" (Participant 14, Female, 2021)*

> *"Yes I do believe it is effective because we measure against stated objectives" (Participant 12, Male, 2021)*

"It works in that it gives us a view at an aggregate level" (Participant 6, Female, 2021)

"Very effective, for example in SC." (Participant 23, Female, 2021)

Participants indicated that the approaches to measuring BVIS were effective. However, within the overall responses given to this question though, the overarching view expressed by the participants was that the process of BVIS measurement in SC is more mature than in other operating departments with most participants expressing the view that the way SC projects are measured is "fairly robust" (Participant 15, Male, 2021) and "very effective".

5.5.1.2 Fairly Robust

The response that the way we measure BVIS is *"fairly robust"* was mostly given as a response by SC participants. The response of the participants is given below:

"Fairly robust. The Investment Committee (IC) approves the ask for money and there are regular updates to IC with a PIR at the end of the project. Finance also holds people accountable for deliverables on projects" (Participant 15, Male, 2021)

"Appropriate inputs and measures used on almost all projects" (Participant 3, Male, 2021)

"Our process is fairly robust. Driven through the Investment Committee (IC) where we ask for money with regular updates and PIR at the end of the process. Financially we hold people accountable for deliverables and projects" (Participant 1, Male, 2021)

"It works in that it gives us a view at an aggregate level" (Participant 33, Male, 2021)

"A fair way of measuring" (Participant 8, Male, 2021) and "Not as effective as it should be" (Participant 5, Male, 2021) were also the opinions expressed by participants in support of the view developed by the literature that there should be a more inclusive means of measuring intangible benefits (Aranyossy, 2014, Hubbard, 2014; Solanki et al., 2018; The CTI Group, 2019; Ross, 2020; Proctor & Smith, 2020).

5.5.1.3 Moderately Effective

Participants had the following to say about this theme:

"…the way we measure the business value of IT is moderately effective because we emphasize financial benefits." (Participant 11, Male, 2021)

"Only effective on certain projects because of risk" (Participant 18, Female, 2021)

Many participants indicated that this is not the case for some projects outside of SC with answers such as "moderately effective", "a fair way of measuring" and "not as effective as it should be" expressed by these participants. Even though no participant described BVIS measurement as "ineffective", some gaps were identified, but again mostly in non-SC areas.

5.5.1.4 Inconsistent

Most participants stated that the way SC projects are measured is very effective but that the same vigour is not consistently applied to projects outside of SC. Participants had the following to say about this theme:

"Evaluating the impact of IT projects and services are not consistently applied as on some projects it is applied and on some, it's not" (Participant 10, Male, 2021)

"It has been good, but it differs from the department from function to function and depends on the department that you are in" (Participant 17, Male, 2021)

"Difficult to answer because we manage to get things over the line but in the main, it's not as effective as it should be" (Participant 5, Male, 2021)

"Not effective enough in the way we measure" (Participant 27, Male, 2021)

"Don't think we are very effective. We could do better" (Participant 30, Female, 2021)

"Effective to some degree. I would say 6/10" (Participant 32, Male, 2021)

"It depends." (Participant 18, Female, 2021)

"Effective on paper, but not effective" (Participant 38, Female, 2021)

The viewpoints shared during the interviews for this question are consistent with what was said in the preceding themes. Participants clearly indicated that there were inconsistencies in the way SC projects were evaluated. Each department approached the processes differently, therefore, the organisation did not have a uniform process-flow.

5.5.2 Factors hindering the organisation from measuring BVIS

Interview Question 3.2 provided the participants with an opportunity to share what they believed were the factors that hinder the effective measurement of the impact of these projects and services on the performance of the SA Retailer of this study. Several hindrances were identified by the literature reviewed in Section 2.5 namely the multifaceted nature of BVIS, impact of changing business and technological realities, IS/Business misalignment, lack of effective communication of the BVIS, the complexity created by the pervasiveness of IS and failure of models to speak to intangible/soft benefits. Most of these hindrances were identified in this study in one form or the other and are categorized in Table 5.3. However, a hindrance raised within the literature that was not directly identified by any of the participants in the study was IS/business misalignment. This aligns with the experience of the researcher, working for this retailer, as IS/business alignment is not problematic within the retailer, especially between the SC and IS functions.

Even though communication was not highlighted as a theme directly in Table 5.3, communication and the impact thereof were discussed within the literature as a hindrance in many organisations (Solanki, 2018, Curtis, 2020). In Table 2.1 of the literature review, five potential BVIS communication hindrances were discussed namely an information, reporting, quality, understanding and perception gap. This study reveals gaps mostly across information in that data were sometimes lacking to do detailed forecasting at the start of IS projects and initiatives, and within *reporting and perception* in that, IS participants claimed that business functions were ineffective in communicating the benefits back to all stakeholders. These two hindrances are however encapsulated in the broader hindrances categorized in Table 5.3 above and are described below.

5.5.2.1 Ineffective BRM

Ineffective BRM was one of the topics that were consistently highlighted by most participants in SC and IS that hinder effective BVIS measurement. Participants had the following to say about this theme:

> *"…discipline and rigour with benefits realisation. Are we clear and do we fully hold business areas accountable…" (Participant 1, Male, 2021)*

> *"Self-review that happens means that that the project is reviewed by the same person which started or worked on the project" (Participant 15, Male, 2021)*

> *"Sometimes difficult to visualise the IT service or impact of the project beforehand and difficult to estimate benefits" (Participant 16, Male, 2021)*

"Complexity in delivering business case with benefits because benefits are not shown across all levels" (Participant 33, Male, 2021)

"IT not involved enough in the tracking of the benefits after the fact. We help put together the business case but, in the end, don't know whether benefits materialise as agreed in the business case. We are also not part of the celebration of the success of the benefits are realised." (Participant 38, Female, 2021)

"Objectives are sometimes not stated clearly as IS design depends on input into the system and the stated objective. The purpose of the system must be clearly understood" (Participant 12, Male, 2021)

"Involvement of all the stakeholders from conceptualization right through to deliverable and implementation not always effective" (Participant 9, Male, 2021)

"…do not have tools to analyse large sets of data together, which makes our modelling less effective"
"Transformational projects that span multiple years and the associated benefits" (Participant 12, Male, 2021)

"Lack of PIR on a long-term basis. Haven't seen a long-term view from the IC or finance to check this. PIR should also be checked 5 years after implementation" (Participant 32, Male, 2021)
"Do not have tools to analyze large sets of data together which makes our modelling less effective" (Participant11, Male, 2021)

"With multiple projects running at the same time that have an impact on the same attribute, it is complicated to calculate benefits accurately. Sometimes it's not easy to link the outcome of what you are doing to the outcome. To overcome this we should limit the number of projects that are run within an area and delineate the benefits accurately. Also holding things constant will help" " (Participant 10, Male, 2021)

The responses from the participants revealed that although BRM is in place, it is primarily used to get business cases over the line and the process to measure the actualised benefits are not effective and as such, BRM emerged as a hindrance that needs improvement. Participants identified a need to develop BVCs and to do CBA broader within the organisation. Several participants focused on the cultural aspect of silo-mentality that exist within certain areas where people are scared of losing

power and not being able to justify benefits

The literature stated that companies in general experience tension around ownership of projects, customers or initiatives (Torres, 2021b) but based on this study, tension also arise around the claim to benefits ownership as it is sometimes difficult to link a specific benefit to a specific project because of the multiplicity of projects happening at the same time (especially in SC but also in the broader business) that have an impact on the same attribute or variable, which makes benefit allocation and ownership (and thus BRM) difficult. The study also revealed that with the sheer number of projects that happen within the SC space and also within the broader business, some benefits realisation does not extend across the five years that is used within the business case to justify projects and putting the data together to do the CBA and BRM is also time-consuming. Having an effective BRM framework that *identifies value upfront* and *capture value from the start* to lessen normal organisational resistance to change is supported by the literature (Peppard et al., 2007; Cattell et al., 2014; Serra & Kunc, 2015; Murray, 2016).

5.5.2.2 Lack of Intangible Value

The focus of the business cases produced with the SA Retailer on financial benefits was also highlighted as a hindrance with the lack of intangibles highlighted. Participants had the following to say about this theme:

"Typical businesses are evolving from pure financials to complete value. The implication is that there is a shift from business case to a business value case (BVC)" (Participant 14, Female, 2021)

"Should include more intangibles because the focus of the company is more about cost. We should highlight all benefits" (Participant 18, Female, 2021)

"…group of people that have participated on the project and should have value in people because they add a lot of value even though it is an intangible benefit" (Participant 24, Female, 2021)

"Intangible benefits such as quality, innovation and brand integrity specifically to do with quality, which is core to the value of the company, must be measured" " (Participant 10, Male, 2021)

"No formal process to review intangibles with PIRs financially based" (Participant 17, Male, 2021)

"Commercial benefits and ability to achieve other objectives such as the softer side of the benefits such as user satisfaction and user friendliness." (Participant 18, Female, 2021)

"Lack of intangibles in benefits case. However, intangibles are subjective which is why the

company leans towards tangibles. The main benefits on a project should be tangibles so that it can be audited" *(Participant 15, Male, 2021).*

"We put too much focus on financials with not enough focus on the non-tangible because of focus is on making money…" (Participant 24, Female, 2021)

"Our current way of measuring is skewed towards financials…" (Participant 11, Male, 2021)

"There's an opportunity for us to improve because we heavily weigh financial benefits. That may lead to difficulty to launch a project because we don't spell out intangible benefits" (Participant 21, Male, 2021)

The above extracts revealed an over-reliance on tangible benefits within the business case as an output of the CBA, with tangible benefits closely linked with project funding, meaning that funding for a next project or initiative is put at risk if promised monetary benefits are associated with a particular initiative are not realised. This hindrance also speaks to the need that business cases should evolve to more comprehensive BVCs that reflect both tangible and intangible value. Responses from participants are supported by literature which points to this as an inherent weakness of CBA and effective arguments for the inclusion of both tangible and intangible value derived from IS with the lack of the inclusion of intangible benefits within existing frameworks being raised as a hindrance. Even though the literature makes a case that the evaluation of intangibles remains one of the biggest challenges in valuing IS investments in monetary terms (Aranyossy, 2014) and even that it is impossible to measure, several scholars challenged this view as a misconception and argue that intangibles are measurable and must be measured (Hubbard, 2014; Hubbard and Seiersen, 2016; Solanki et al., 2018) and calls on executives to evaluate and communicate how programs and portfolio items help create total value across tangibles and intangibles (Torres, 2021b).

5.5.2.3 Ineffective Project Governance

Another hindrance that was called out by participants was ineffective project governance. Participants had the following to say about this theme:

"Difficult to measure manual processes effectively, whereas with the system it does the same thing over and over again which makes measurement more effective" (Participant 29, Male, 2021)

"Manual intervention required which leads to subjectivity" (Participant 6, Female, 2021)

"Honest or negative feedback not given throughout the process" (Participant 15, Male, 2021)

"Project governance lacking to a degree can also be a hindrance" (Participant 23, Female, 2021)

"Signoff does not happen at the right level on some projects" (Participant 27, Male, 2021)

"Even though governance, in general, is in place, especially within SC, it can also be a hindrance" (Participant 19, Female, 2021)

"Lower priority projects that are still important to business and need to be delivered can create problems because of governance and structure which results in things taking longer" (Participant 23, Female, 2021)

"Not having access to funding fast enough" (Participant 18, Female, 2021)

"Rigid historical business unit (BU) costs/budgets" (Participant 12, Male, 2021)

"We are a traditional corporate environment that measures in terms of cost savings and effectiveness" (Participant 7, Male, 2021)

"Inability to execute on time and budget consistently and when there are inconsistencies it creates anomalies" (Participant 19, Female, 2021)

"Having the right skilled people on the project. However, some people don't want to make decisions" (Participant 30, Female, 2021)

"Silo'd in our approach and do not consider projects and its impact end-to-end" (Participant 26, Male, 2021)

"Underlying culture, especially when it's on a complex project and when you have an external partner involved. (Participant 14, Female, 2021)

"Ineffective, very vertical way of working" (Participant 15, Male, 2021)

A strong paradoxical theme emerged from the study in that even though most participants agreed that SA Retailer has strong governance in place to guide and prescribe how projects are governed from the initiation/approval phase through to the benefits realisation of the project. Participants shared that governance sometimes becomes restrictive in trying to get funding for important projects or to get a project through the initiation stage. For instance, due to the strict capital planning process,

some transformational projects with potential but with limited immediate ROI is not necessarily supported.

The literature identifies some of the problems that companies experience with capital planning such as the need to create a model in which benefits and costs are expressed as positive or negative cash flows (Tallon et al., 2020) and that accurate forecasting of financial costs/benefits are often difficult resulting in deductive financial assumptions to justify some project that is deemed necessary (Murphy, 2002a). Participants across the seniority spectrum also indicated that the strong governance framework was not consistently applied (in some departments, on certain initiatives and long-term projects), which impacted the measurement of the BVIS across the business. This is aligned with the literature review that stated that divisions within some organisations take varying approaches to BVIS measurement (Remez & White, 1999). Another hindrance that was supported by the study is that companies struggle within the existing SA context to get skilled resources with base resources required to do the BAU work as well as being involved in the sheer number of Projects that happens across the company.

5.5.2.4 Lack of Frameworks

Participants had the following to say about this theme:

"Our frame of reference is our biggest hindrance. There is an evolution of retailers that are taking place with traditional retailers structured around traditional buying and selling and with startup technology-focused companies focusing on emerging strategies vs. more overt traditional strategies." (Participant 2, Male, 2021)

"Overall business strategy should be taken into account, which is not always the case" (Participant 5, Male, 2021)

"Lack of synergies between systems. Duplication and overlap between systems and the complexity of systems" (Participant 28, Female, 2021)

"We don't have leading practices and internally focus and have no benchmarking" (Participant 18, Female, 2021)

"No framework exists to measure digital IT transformation- for example when Microsoft Teams were rolled out within six weeks, we bypassed normal processes. So, the speed of deployment required on some digital transformation needs to be improved" (Participant 22, Female, 2021)

With reference to the responses provided, it was established that here is a realisation within the

broader organisation that digitisation and the impact thereof need focus. In addition, the key challenge is the rigid way that the company use to prioritise and measure value from projects. This in general is a concern that was raised predominantly by the SC participants. A key challenge that exists is that the company lacks metrics in this area especially as was pointed out by some senior executives was that the Retailer should adjust its “frame of reference” that speaks to the awareness that a major portion of the current forecast of demand growth for the company exists mostly within the digital transformational space, with gaps in well-defined BVIS metrics lacking in this area, which was a view shared especially amongst participants from the IS department. According to some participants, this prohibits the retailer from the need to move quicker (agility) on some of these initiatives. Two examples were shared with the researcher of when the COVID-19 pandemic forced the roll-out of Microsoft-Teams example with the retailer taking a shortcut around the typical governance processes to get this software in place to ensure that some staff could work from home. The second example shared was when a competitor launched an application promising order fulfilment within 60 minutes to which the Retailer of the study had to react. Participants revealed that the BVIS of Strategic and Transformational Projects within the company are evaluated differently from other types of Projects with different metrics and even no metrics being used for these types of projects.

As presented by the literature organisations struggle to seamlessly unite digital capabilities, transformation projects and traditional IS work with leaders squabbling over projects and roles, hindering progress toward technical goals (Torres, 2021b) which is also revealed by the study as a hindrance as there are no formal framework/metrics in place for initiatives that fall into the transformational category. The literature review agrees with this hindrance in that it argues that current frameworks/metrics deployed to measure BVIS on the demand-side and for transformational projects have some major gaps or do not exist at all (Onik, 2019; Eide, 2020). The reviewed literature also states that even though most projects will have projected costs and benefits (Murphy, 2002a; Koller et al., 2015) accurate forecasting of financial benefits is often difficult to determine for many breakthrough projects or projects whose aim is cost avoidance that requires significant changes in operating methods (Murphy, 2002a).

5.6 Interventions to address the identified hindrances

The second secondary research question was addressed in Question 4 of the Interview (see Appendix B), namely: *What interventions can be put in place to address the hindrances?*

This question consisted of only one part (Question 4.1) being an assessment of the view of participants on the interventions that could be adopted by the organisation to address the hindrances

that the participants identified. Two participants indicated that they are not able to give input into this question. These participants were from the lowest level of Seniority of participants that were interviewed by the researcher. The main in-vivo codes and themes that summarise the responses from the participants to the Interview question are listed in Table 5.3 above.

5.6.1 Formalised BRM

BRM is an area that the company need to focus on as several issues have been highlighted that need to be addressed. Participants had the following to say about this theme:

"…formalised benefits realisation management review process for businesses to playback benefits on a regular basis. IC should be involved in these playback sessions." (Participant 1, Male, 2021)

"Having a more transparent way of measuring benefits, with benefits realisation maturity. Are we clear on the process that we use for benefits realisation?" (Participant 13, Male, 2021)

"Project Management Office (PMO) to drive PIR so that we get external people to review." (Participant 15, Male, 2021)

"Right framework and processing in place to measure the business value of IT. The templates that exist within the organisation, Excel mostly, must be broken up into pieces that you can track supported by skillful people that are on-boarded and understand the how" (Participant 14, Female, 2021)

"Upfront clarity about what is expected is key" (Participant 10, Male, 2021)

"Lagging and leading indicators are critical to understand value from projects" (Participant 5, Male, 2021)

"Must be clear on our objective from inception and alignment and clarity on how we will measure." (Participant 12, Male, 2021)

"Start as wide as possible and work closely with what is happening in the rest of the world." (Participant 29, Male, 2021)

"Open up benefits discussion at the beginning and the end of the project" (Participant 35, Male, 2021)

Participants highlighted that BRM required wider organisational adoption and the initial rigour applied at the start of the investment cycle for benefits realisation should be maintained throughout the investment lifecycle, with broader upfront clarity being advocated. Several IS participants also stated the view that IS teams are not part of the "value realisation" conversations, which leads to frustration that must be addressed by ensuring the inclusion of IS stakeholders that were part of project delivery in playback and "celebration" when promised benefits are achieved. Having an effective BRM framework that *identifies value upfront* and *capture value from the start* to lessen normal organisational resistance to change is supported by the literature (Peppard et al., 2007; Cattell et al., 2014; Serra and Kunc, 2015; Murray, 2016).

5.6.2 Include intangibles

Include intangibles and tangibles within a BVC. Participants had the following to say about this theme:

"There needs to be a shift in focus from capital prioritisation to include fewer tangible benefits" (Participant 11, Male, 2021)

"It's not always just about money. More public awareness is needed of intangible value and the value that they add which must be published." (Participant 16, Male, 2021)

"Assign a value to productivity measures to get to financial impacts and as such put a cost/value to everything" (Participant 12, Male, 2021)

"Shift from business case to business value case. Value is part of the end outcome and the value case must be established when business case is developed with the ability to connect benefits to a business value case" (Participant 14, Female, 2021)

"Opinion of people on the effectiveness of system and measuring adoption and adapting systems capability. Review how we do this and build metrics around this." (Participant 21, Male, 2021)

"For Intangible assets, we must be able to quantify intangibles" (Participant 26, Male, 2021)

Even though most participants recognize that the business case principle within the company has a definite tangible prioritisation, the majority expressed the view that the SA Retailer needs to transform from a tangible-value only approach in the current "business case" to include intangibles and tangibles in a BVC approach. However, there is an acute awareness of the organisational

context (financial) and stated that even intangibles where possible must be monetized. This phenomenon is addressed by the overarching theme that emerged in this study of “where you sit is where you stand” where the opinions of most participants were strongly informed or influenced by their department within the company.

The view that tangible and intangible benefits should be taken into account in BVIS measurement is shared widely within the literature (Murphy, 2002a; Aranyossy, 2014, Hubbard, 2014; Solanki et al., 2018; The CTI Group, 2019; Ross, 2020; Proctor & Smith, 2020) and even though this study revealed that participants felt that the measurement of intangibles will be difficult (or even impossible) it is a view opposed within the literature (Hubbard, 2014; Hubbard & Seiersen, 2016; Solanki et al., 2018).

5.6.3 Project Governance Consistency

Participants had the following to say about this theme:

“Change in culture needed and not only measure in a traditional way and also not fear failure which will ready us to accept the required change. Have a culture that embraces technology but does not lead with technology and systems but understand what problem we are trying to solve” (Participant 6, Female, 2021)

“Empower people to do what they have to do. There is a certain level of people holding onto things that need to change.” (Participant 10, Male, 2021)

“Must understand the culture. Leadership especially when it’s complex and when you have a partner in place” (Participant 14, Female, 2021)

“Research what best practice looks like on the ground through benchmarking by annually review how other companies are doing things, especially the new digital companies such as Facebook, etc. around Profit vs. effectiveness and have open discussions and bring external expertise such as Deloitte to advise on frameworks, etc.” (Participant 18, Female, 2021)

“Ways of working. HR has to support culture change” (Participant 36, Male, 2021)

The study also revealed that no alternatives are formally evaluated (including the “do nothing” option) within the business cases presented within the Retailer, as the business case is a view of a single solution. Even though the study did not explicitly highlight this as a hindrance, the literature argues that the evaluation of alternative solutions, including the “do nothing” approach, is of key importance within the CBA framework. On the other hand, the study revealed a weakness that is not explicitly

mentioned in the CBA framework analysis in Table 3.2, which is the lack of baselining within the *business case*. Defining a baseline is highlighted by the literature as part of effective BVIS measurement (Remez & White, 1999; Colkin, 2002; Apfel & Smith, 2003; Apfel, 2003b; Karmperis et al., 2013; Sankuhl & Stirna, 2018; Sandkuhl & Siegerroth, 2018) and is as such addressed in the new proposed framework in Section 6.5.

5.6.4 Appropriate digital metrics

Participants had the following to say about this theme:

"Leaders should reframe who we are and should be deliberate about measurement and digital metrics." (Participant 2, Male, 2021)

"Right framework and processes required to measure business value for digital projects" (Participant 14, Female, 2021)

"We must become a data-centred or data-led organisation that will assist in analysing benefits more effectively" (Participant 11, Male, 2021)

"I believe we should modernize our funding model. We must move to approve in Iterations and what I mean by this is that I would break a 5-year project up into smaller iterations. I would then wait to see the success of the first iterations and then funding is approved for the second iteration. This way we drive value from first and then set funding for a second." (Participant 22, Female, 2021)

"We should challenge the construct of IT in our organisation. The techies should run services, we should look after applications and have business services." (Participant 7, Male, 2021)

"Overarching business strategy should be taken into account. For example, automate 100% of processes by 2025 with a blueprint and roadmap" (Participant 12, Male, 2021)

"Making project portfolio management practices our way…" (Participant 19, Female, 2021)

5.7 Other applicable areas for BVIS

The third secondary research question, namely "*Which other potential areas within IS not covered within existing frameworks add substantial business value?"* was addressed in Question 5 of the Interview. This question has three parts and was used to test the assessment of participants on whether *Information*, *People,* and *Risk* have a significant impact on the BVIS and whether one would

be able to measure this impact in economic terms to show a causal link of these elements to organisational performance. In support of this discussion, it is important to understand that the Conceptual Framework for Financial Reporting 2018 of the International Accounting Standards (IAS) defines intangible assets as being identifiable, controlled by the company and having some future economic benefit.

The McNamara fallacy states these steps "*... The third step is to presume that what can't be measured easily isn't important. This is blindness.* ***The fourth step is to say that what can't easily be measured really doesn't exist. This is suicide.***" (Handy, 1995). This research has illustrated that the participants believe that the elements of *Information, Skilled and Experienced People and Risk* do have value, so one can say that the participants at least do not fall foul of the third step of the McNamara fallacy as both the research results, as well as the literature review, supports the view that these elements have value in itself. However, the result of this study shows that the majority of participants held the view that measuring this value economically will at best be difficult and at worst be impossible. One should then be careful not to fall foul of the fourth step of the McNamara Fallacy that states that it is **suicide** to believe that because the value of these elements is difficult to measure it is not important. The key question should rather be the ***how*** and not the ***what*** because ***statements such as*** "People are our most important asset" and that "Information is a valuable asset" frequently appear on the websites of companies, including that of the SA Retailer.

5.7.1 Information

This question sought to understand whether the participants regarded information itself as an asset that had direct economic value that can be measured. It also tried to establish whether the value of information could/ and should be measured by the SA Retailer (if the participants indicated that information had economic value). The responses were as follows:

5.7.1.1 Adds Economic Value

Participants had the following to say about this theme:

> *"Yes. Information of customers, products or transactional information has economic value." Participant 3, Male, 2021)*

> *"Yes and yes. Businesses that has the best information will perform the best" (Participant 17, Male, 2021)*

> *"Data and information have definite economic value as we can use data to shape things." (Participant 2, Male, 2021)*

"I think so. Information has value especially if it is translated into intelligence that helps the business in decision making." (Participant 9, Male, 2021)

"Information has value if enhanced with right knowledge. We should however measure its use and not the value thereof. We have rich information and should provide this as an output and should thus focus on how to share or use it." (Participant 7, Male, 2021)

"In today's world information is valuable as it gives you an opportunity. Can't do without it" (Participant 15, Male, 2021)

"Absolutely. Everything in the way of Analytics, Artificial Intelligence and Management of information" (Participant 14, Female, 2021)

"Absolutely yes. Has value to expand the business and gain market share and help with the understanding of the competitor landscape" (Participant 8, Male, 2021)

"Absolutely. New gold" (Participant 18, Female, 2021)

"Enormous value because we cannot make correct, timeous and informed decisions…" (Participant 31, Male, 2021)

"If we had to buy this information it will have a cost, so data is valuable. Even though the Information within the company is self-generated what will it be worth?" (Participant 1, Male, 2021)

"Information is an asset and any delay in information can change what the next stream of business looks like. It is also critical for future planning as all business decisions should be based on accurate information." (Participant 6, Female, 2021)

"Correct. Information at the correct time has economic value. Should measure the economic value of information that can have an impact on the Income statement or Balance sheet because making incorrect decisions based on incorrect information can be costly." (Participant 16, Male, 2021)

"Our dual challenge of competitiveness and economical challenges makes information invaluable" (Participant 24, Female, 2021)

Participants strongly agreed with this part of the question with responses ranging from "Yes" to

"Absolutely" with **all** participants indicating that information in itself has economic value, and that information is an asset. The study however reveals a concern as to the way the organisation is structured to fully realise the value of *information*. Interestingly, the negative view of the value of information overload was also expressed by one participant (Participant 3, Male, 2021). Data centricity was a theme that was consistently expressed by several participants. Some participants were clear in their distinction between data and information and the definite difference in value between these two with some believing that data has limited to no value, but that information has definite economic value. This distinction between the value of information and the value of data is supported by the literature, especially so by the DIKAR-model (Peppard & Ward, 2016).

5.7.1.2 Governance Structures

Participants had the following to say about this theme:

"Future enhancement of the governance structures for data required" (Participant 16, Male, 2021)

"Should have several partners from where we get project resources to overcome possible bottlenecks e.g., Project managers or Business Process Analysts to improve turnaround resources that need to fit in from a skill and value perspective" (Participant 19, Female, 2021)

"Even though we acknowledge information as an asset, we don't treat it as such. Appointing a senior executive in the form of a Chief Data Officer (CDO) with focus on information would go a long way…." Participant 32, Male, 2021)

One of the interventions proposed by some participants in the study to address this is that the retailer should organise the value of data/information within the portfolio of the new role of a Chief Data Officer (CDO) that should sit at a Senior Executive level and drive the business value of information. Interestingly this perspective was exclusively shared by participants from the IS department. This structural change suggestion is addressed as a recommendation within this thesis.

5.7.1.3 Difficult to measure

Participants had the following to say about this theme:

"It will be difficult to measure the value of information but it is valuable" (Participant 10, Male, 2021)

"Can't put Rand and Cents (R/c) to information" (Participant 15, Male, 2021)

"…it will probably be impossible to measure. Current accounting laws will never be able to breach the gap between the hidden value between market valuation and the value of the company on the balance sheet" (Participant 17, Male, 2021)

"Definitely possible to measure, but don't know how easy this would be." (Participant 26, Male, 2021)

"can be measured if dissected properly but it will be difficult" Participant 27, Female, 2021)

The study revealed a less definite positive response for the possibility of measuring the value of *information*, with most participants stating the opinion that this will be a difficult endeavour. Even though a minority of participants felt that it should be measured, none had clarity around how this could be done but a few participants did however venture the opinion that it can be measured. Most suggestions were focused on ensuring that the company recognise the value of Information by placing a senior executive in charge of this "asset" (how most participants referred to *information*). Most participants from the finance department indicated that representing this "asset on the Balance Sheet, will be difficult ("nearly impossible") because of "accounting standards" and the "criteria of objectivity" that is required to present an asset in the Balance Sheet. However, if one looks at the definition as laid down by the IAS, it is the opinion of the researcher, that *Information* certainly fulfils all the IAS criteria (see Appendix E).

The theme of "Where you sit is where you stand" also emerged within this question in that **most** participants from the Finance department expressed the view that the evaluation of Information would be problematic from a financial perspective (for instance representation on Balance sheets) because of "subjectivity".

5.7.2 Skilled and Experienced IS People

Question 5.2 was asked to understand whether the participants regarded skilled and experienced IS people as an asset that had direct economic value that can be measured and whether the skills and experience of IS people could and should be measured by the SA. The main in-vivo codes and themes that summarise the responses from the participants to the Interview question are categorized in Table 5.3 above.

5.7.2.1 Adds Economic Value

Participants had the following to say about this theme:

"Should be measured as the lack of experience can have a devastating impact on for instance service delivery" (Participant 8, Male, 2021)

"Absolutely. Efficiencies in managing IT and information leads to direct efficiencies in Operations"

(Participant 14, Female, 2021)

"Skilled and experienced IT people add immense value and should be measured against job requirements" (Participant 7, Male, 2021)

"Delivering effective service results in incremental growth opportunities" (Participant 10, Male, 2021)

"Adds immense value but more of an opportunity value" (Participant 11, Male, 2021)

"Deals with businesspeople and the technical capabilities and experience in terms of business can be measured. Skills and experience will be valuable especially in terms of team effectiveness" (Participant 19, Female, 2021)

"Inherently think that it adds value and company should move towards this. Skilled and experienced people add value but are different in that skills are the tools in the toolbox and experience is the ability to apply or use these tools" (Participant 22, Female, 2021)

"IT people only understand Technology and needs to upskill themselves with business skills and also to provide businesspeople with the skills needed to execute on their own responsibilities. We can also have more information sharing sessions between business and IT" (Participant 13, Male, 2021)

"The IP that you have with investment into talent can link business value directly to IT skills and experience. As such IT must be part of strategy development. This can be seen in most modern retailers, where the CIO and team is involved in strategy development" (Participant 2, Male, 2021)

"If they don't have skills and experience, they can cost the company financially because they can waste money by designing systems incorrectly which means a loss of time and money" (Participant 16, Male, 2021)

Participant revealed a less firm view of whether the skills and experience of People had a direct economic impact on the BVIS with answers ranging from "don't know" to "absolutely". Some participants struggled to answer this question specifically but still indicated from general experience that the skills and experience of people add value. However, an overwhelming majority of participants believed that the skills and experience of IS people in itself have definite economic value in that having experienced and skillful people ensure that the retailer delivers to the agreed SLAs

which results in increased effectiveness which results in several opportunities for companies, and which would have a positive impact on organisational performance. On the other hand, the study also revealed the belief of some participants that having inexperienced people and people with a lack of skills are and potentially resulting in the system delivery that does not meet the need of the user which can add to IS cost.

5.7.2.2 Difficult to measure

Participants had the following to say about this theme:

"Difficult to measure the value but it is valuable. Experience people that can see or make decisions give business value. One can also bring in the right people to change or optimize process" (Participant 10, Male, 2021)

"Measuring it will be difficult." (Participant 14, Female, 2021)

"Don't know whether it can be measured" (Participant 16, Male, 2021)

"Should be measured, but not sure how. Return on human capital should be used to measure IT as a business and not only in terms of an SLA" (Participant 6, Female, 2021)

"Should not be difficult to measure because some skills that do not exist should be bought in with the capability to projects in-house vs. skills that exist in-house" (Participant 22, Female, 2021)

"If they don't have the necessary skills and experience it can cost the company financially. If a person does not have for instance listening skills it can also end up with a substandard product that does not meet business requirements" (Participant 26, Male, 2021)

"In terms of IT skills, a lot of the skills that are available contractors which leads to a skills shortage within our organisation" (Participant 6, Female, 2021)

The study revealed that the measurement of the value that the skills and experience of people add to an organisation would be difficult. This was the view expressed by **most** participants within the study with the views expressed falling across three categories namely, that one should "measure through the normal Performance Management governance in the company", that it is "difficult to measure accurately" and that it is "impossible to measure". Only one participant from SC ventured a metric, namely, "Return on Human Capital". On further probing, participants stated that this would be difficult to measure. The relationship between skills and experience and the lack thereof

potentially resulting in ineffective systems delivery that does not meet the need of the user was highlighted by these responses. There is a definite need that was expressed by several participants that a broader focus is required by the company that takes developments nationally and globally into account around this area and that this could be achieved through benchmarking. It is also interesting that some of the non-IS participants indicated that it will be “not too difficult” or “possible” to measure for the IS department.

In the discussion of the valuation of *People*, the definition of an intangible asset as defined by the IAS is relevant. In the opinion of the researcher, it is more difficult to argue that *People* as a construct fulfils the criteria as laid down by the IAS.

5.7.3 Cyber-risks

Interview Question 5.3 was asked to understand whether the participants viewed the ability of the IS department to protect the SA Retailer from cyber-attacks/cyber-risks had direct economic value that can be measured and whether this economic value could and should be measured. Only one participant said that this is “not applicable” to his position. All other participants had a strong opinion that the ability of the IS department to protect the company from cyber-risks adds value to the business. The responses were:

5.7.3.1 Adds Economic Value

Participants had the following to say about this theme:

“Protecting the company from cyber-risks has economic value” (Participant 1, Male, 2021)

“World economic forum identified cyber-risk in the top tier of risks, and it is no different in the company in that it is the top risk on our risk-register.” (Participant 2, Male, 2021)

“Security is important and unavailability of systems, for instance, the warehouse management system (WMS) can be disastrous” (Participant 4, Male, 2021)

“HaaS – hacking as service is now a thing, so protecting the company against it is important.” (Participant 10, Male, 2021)

“Of course. Cyber-attack will jeopardise financial stability and impacts operations” (Participant 14, Female, 2021)

“We must measure the value of cyber-risk” (Participant 5, Male, 2021)

"..cannot operate without cyber-risk protection." (Participant 15, Male, 2021)

"Security is critical. For instance when a system like Triceps go down. Protecting the company is more important than ever" (Participant 4, Male, 2021)

"Very good in that we lead in this and this can lead to a conservative approach" (Participant 6, Female, 2021)

"Absolutely. Specifically in our financial services environment should be protected so that we don't lose millions" (Participant 8, Male, 2021)

"Critical responsibility that IT has, especially in financial services where we have the information of more than 5 million people." (Participant 13, Male, 2021)

"It does add economic value. There is some form of economic risk in terms of the commercial value of the potential of an attack" **(***Participant 9, Male, 2021)*

"Absolutely does. International retailer recently had to switch off 800 stores…" (Participant 11, Male, 2021)

"This ability is invaluable and should definitely be measured because businesses can operate without it" (Participant 16, Male, 2021)

Several participants indicated that protecting the company has economic value.

5.7.3.2 Risk Governance

Participants had the following to say about this theme:

"…recent appointment of a Chief Information Security Officer (CISO) to keep business safe." (Participant 1, Male, 2021)

"Must be measured at the highest level within a company" (Participant 2, Male, 2021)

"IT is the ultimate custodian of cyber-risk" (Participant 1, Male, 2021)

"…risk-assessment of a breach where we calculate the cost of avoidance to the tune of Rxm, which results in a value of Rxm" (Participant 13, Male, 2021)

"…and the impact of the risk from high to low and the likelihood of occurrence from high to low should be put on a continuum in dealing with the issue of cyber-risk" (Participant 30, Female, 2021)

Most participants expressed the view that risk assessment around cyber-crime is important. The perspective that one should not be complacent but also not over-restrictive on people was an interesting perspective that was shared by some participants. The SA Retailer, and more specifically the IS department of the retailer, understand the risk posed by cyber-attacks and take their responsibility seriously as the ultimate custodian of this risk. The level to which IS takes this responsibility seriously is well demonstrated by the appointment of a Chief Information Security Officer (CISO), a senior official, to lead the fight against cyber risk. This appointment happened in the period that this study was undertaken. Only one participant believed that the company was not ready to deal with cyber-crime. As to governance, most participants expressed the view that risk assessment around cyber-crime is important. Another interesting perspective that was raised by a participant from the finance department (Participant 10, Male, 2021) was that one should seek a middle ground and not be complacent but also not over-restrictive when it comes to the management of cyber-risks ("boogey-man mentality").

In the discussion of the valuation of Risk, the definition of an intangible asset as defined by the IAS is also relevant. In the opinion of the researcher, it is more difficult to argue that *Risk* as a construct fulfils the criteria as laid down by the IAS, especially if one looks at two of the criteria that it must be controlled by the company and have some future economic benefit.

5.7.3.3 Difficult to measure

Participants had the following to say about this theme:

"It absolutely adds value, but we might end up in the creative accounting space if we try to measure the economic value thereof." (Participant 11, Male, 2021)

"It should be measured but should be integrated into the way we do business and not as a separate task, which would be difficult" (Participant 7, Male, 2021)

"We know that there is value in it, but it is difficult…" (Participant 15, Male, 2021)

"Measurement, however, even in this instance will be difficult" (Participant 14, Female, 2021)

Most participants indicated that it would be difficult to measure the value that the protection from cyber risk adds to an organisation. The most senior participant from the Finance department thought that “one could come up with potential ways of measuring this” but stated that this would be a time-consuming endeavour that would not be “worth our while”.

5.8 Chapter Summary

The interviews were extremely insightful to the researcher. One of these insights is the concept of a BVC, where costs/benefits are measured across intangibles and tangibles instead of the business case concept that is currently in use in the business. The chapter also discussed the results that were collected and how this relates to the research questions that this study set out to address. These and other concepts will be explored further in the next chapter where the Data and Information that were laid out in detail in this chapter will be transformed into Knowledge and Actions that can potentially lead to better results for not only the SA Retailer of this study but also for other organisations. The next chapter provides the conclusion, recommendations and implications of the study.

CHAPTER 6: CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS OF THE STUDY

6.1 Introduction

This last chapter of the study provides conclusions, recommendations, and implications for future research. The first section of the chapter summarises major findings from literature review, primary study followed by recommendations. The implications of the study are presented and then the final conclusion of the study is discussed showing how the research project was conceptualised to its successful conclusion.

6.2 Conclusions from Literature Review

The literature review presented in Chapter 2, established that value and more specifically value creation and not only value preservation forms a fundamental part of organisational performance (Solanki, 2018) which has to be taken into account in measuring the impact of BVIS. In addition to this, the literature review also established that measuring the BVIS has proven to be a difficult endeavour due to the existence of several hindrances as discussed in Section 2.5 such as that existing frameworks are ineffective (Van Der Zee, 2002; Hajela, 2009a, Hajela, 2009b, Chen et al., 2010; Aranyossy, 2014; Solanki, 2018; Onik, 2019; Lynn & Mooney, 2020; Tallon et al., 2020; Zeng et al., 2020).

South African retailers were facing challenges in their operations, thus, were reconfiguring there is strategies to transform the value chain (Vader & Martin, 2020). There is evidence from empirical studies that integrating IS, SC and organisational performance created value for the shareholders and stakeholders. Adoption and implementation of IS in the retail space and beyond has transformed many firms and it is widely recognised that retailers have transitioned from the traditional physical retail experience to digital platforms (Achille & Zipser, 2020).

Despite the emergence of COVID-19 accelerating the adoption of digitisation, the global and SA realities are that physical stores still predominate within this sector as retailers struggle to seamlessly unite digital capabilities, transformational projects and traditional IS work (Torres, 2021b). The research site for this study had recorded a 3 percent online penetration rate. The importance of a strong online presence was a major driving force especially in the Covid-19 pandemic era, where the focus is to give consumers flexibility across online and offline channels.

Ayers and Odegaard (2018) posit that when developing SC strategies to create BVIS and BVIS metrics, SC organisations within retail must follow a “top-down” approach and ensure alignment to the performance and strategic objectives of the retailer. On one hand IS plays an important role in improving the sustainability, performance and efficiency of the operations of retailers and their SCs

(Zeng et al., 2020), whilst minimizing the number of integration points required to create end-to-end benefits.

Most of the investments made in the IS function of today remains predetermined, i.e. organisations cannot be in business without it (Kaufmann & Kriebel, 1988; Florentine, 2017; Dhasarathy et al., 2020) and fall into three broad investment classes namely mandatory IS, IS infrastructure spending and IS research (Van de Zee, 2002). The IS function does not operate within a vacuum but operates within the organisation who in turn operates within a broader economy. Ordinarily a business would try and measure performance at various levels using different IS artefacts across varying units of analysis from a business process, unit, organisational, inter-organisational, and value chain levels perspective (Lynn & Mooney, 2020).

Past studies have considered different antecedents and contextual factors, such as core organisational competencies, organisational structure and culture, governance including strategic IS/business alignment, management practices such as strategic planning and the competitive environment that influence the BVIS. Some scholars such as Ward and Daniel (2007) and Onik (2019) have established that BVIS derives largely from internal business processes, organisational capabilities and practices. Importantly this study established the question of when to measure the organisational impact of BVIS. Some scholars stress the importance of doing both *ex-ante (*that is, based on the forecast or before the event) and ex *post facto (*that is, after the fact or based on actual results) evaluations.

The four types of approaches to measuring BVIS include the scorecard-based, process-oriented, perceived value and project-focused. Not all approaches are compatible with each other and the whole evaluation process can become very expensive. Organisations typically use a variety of quantitative and qualitative metrics to measure organisational performance as well as the causal link between the BVIS and organisational performance, with a typical bias for quantitative metrics in existence in most organisations (Bryan, 2007). Cost optimisation is always a key focus area of BVIS within the retail landscape and their supply chains. Srimarut and Mekhum (2020) state that the second group of measures focuses on collaboration and responsiveness across the entire SC as well as the effectiveness of end-to-end business outcomes.

The factors that hinder organisations from measuring BVIS include the ambiguity and fuzziness of the BVIS construct. Valuations also change over time as more information becomes available leading to a degree of variation. Neglected disaggregation of IS investments was also raised a major factor. The multifaceted nature of BVIS contributes significantly to the confusion that abounds ITS importance in the organisation. On the other hand, many studies have shown strategic IS/Business

misalignment is the main reason for the failure to realise the full potential of IS investments. The lack of communication of BVIS and the complexities created by the pervasiveness of IS have been considered key in the hindrance of organisations from measuring BVIS. Some scholars believe that organisations have indicated the lack of tangible benefits from BVIS, therefore, have found no motivation to measure BVIS.

Several theoretical works were applied in this study to provide a better explanation and understanding of the problem at hand. These included the CBA, Process-based Framework, BSC, TEI, B-Triple-E, TVO, NIE, IS success model, AIE and BRM. Each of these frameworks postulated strengths and weaknesses, therefore, the research established that organisations combined them to achieve the desired results. The weaknesses in both literature review and theoretical works led to the development of a conceptual framework- Comprehensive BVIS Measurement Framework (CBMF) shown in Figure 3.16.

6.3 Conclusions from Primary Study

Data was obtained from research participants through a semi-structured interview process. Thirty-eight participants were interviewed through Microsoft Teams, an online communication channel that has capabilities to record webinars. Participants were drawn from Foods, Head Office, Fashion, Beauty & Home, Distribution Centre, Human Resources, Supply Chain, LIC and other areas of Operations. The majority (68.4%) of the participants were males and 31.6% were female participants. A cross-pollination of participants contributed to this study; therefore, mixed viewpoints were shared in the study. Most of the participants had been in their current positions for more than 3 years, thus, had the requisite knowledge required to answer the interview questions for this study.

Five broad open-ended questions were designed into an interview protocol. The first question focused on general organisational knowledge. All participants had the required exposure to their different divisions/departments. The second question sought to understand the existing frameworks/metrics that were used the economic impact of IS. With reference to the responses, four themes- turnover, cost, profitability and context appropriate metrics emerged during the interviews. All participants agreed that the four themes (elements) were paramount in how the organisation performed. Thus, were the key metrics or performance measures for the research site.

The third question established that cost-to sales (CTS), project-based approaches, CBA, BSC were used to measure the BVIS. Appropriate metrics should be applied that reflect the organisational context in which measurement of BVIS is happening. It was clear that a project-based approach was supported by all participants. However, the participants clearly outlined the importance of identifying

the benefits and risks associated with projects.

Participants indicated different viewpoints in this question. What was important from all the opinions was that there was consensus that IS projects required proper planning and implementation for the organisation to record success. Participants confirm that the BSC was used in the organisation to measure BVIS (more performance of IS department in terms of service) and operational efficiency. Balanced Scorecards exist throughout the organisation to measure BVIS (more performance of IS department in terms of service) and operational efficiency.

The hindrances to effective BVIS measure within the research site included an ineffective BRM. The responses from the participants revealed that although BRM was in place, it was primarily used to get business cases over the line and the process to measure the actualised benefits were not effective and as such, BRM emerged as a hindrance that needed improvement. Participants identified a need to develop BVCs and have a CBA broader within the organisation. The second factor was the lack of intangible value. Participants revealed that an over-reliance on tangible benefits within the business case as an output of the CBA, with tangible benefits closely linked with project funding, which meant that funding for a next project or initiative was put at risk if promised monetary benefits were associated with a particular initiative are not realised.

Participants shared that governance sometimes becomes restrictive in trying to get funding for important projects or to get a project through the initiation stage. For instance, due to the strict capital planning process, some transformational projects with potential but with limited immediate ROI is not necessarily supported.

With reference to the responses provided, it was established that here is a realisation within the broader organisation that digitisation and the impact thereof need focus. In addition, the key challenge is the rigid way that the company use to prioritise and measure value from projects. A key challenge that exists is that the company lacks metrics in this area.

6.4 Recommendations

The study revealed that there is still a long way to go to convince individuals, especially those within the financial department that the measurement of intangibles should be mainstream or even considered possible to measure. An interesting area of exploration for further research would be to see whether this belief is shared broadly within organisations in SA and globally, and whether the theme of “where you sit is where you stand” established within this study that held that the inclusion of intangibles within the BVIS construct was broadly rejected by financial department participants

and broadly supported by IS people are persistent across more organisations. Based on the conclusions from the literature review and primary, the following recommendations were suggested:

Recommendation 1: Apply governance consistently across all initiatives

The study revealed that the SA Retailer needed a shift in culture and strategic focus to ensure that every initiative goes through the same rigour that is embedded in the existing governance framework. This was a view that was shared amongst some of the senior executives with the organisation. The view of a culture shift was shared in the context of a need to change the silo-mentality to enable end-to-end BVIS measurement across departments impacted by an initiative. An example shared by a participant is that an increase in the cost of the one department (Stores having to employ an extra person to offload a vehicle for instance) should be offset by the better utilization achieved when multiple stores are combined on a single delivery (which decreases SC costs). The net effect across the two departments should be spelt out as a benefit to the organisation.

Recommendation 2: Adopt agility with project governance (formalization of the BRM)

Participants felt that bigger projects should be broken up into smaller projects so that the approval process becomes iterative, and to improve governance, stakeholders should return to the IC at the end of the project and for the duration of the promised benefit cycle, to ensure that projects meet their stated objectives, with current PIT practices being viewed as inadequate for this purpose. This intervention aligns with the Agile@scale principle advocated by The McKinsey group (Brosseau et al., 2019), but has several other advantages in that it addresses some of the hindrances identified by this research study, namely:

- Ensure that high-risk, high-cost and technically disruptive projects are started and instead of asking for a major upfront investment from the IC, smaller investment amounts can be approved, and subsequent investment asks based on the benefits realised during the first sprint, which lowers risk.
- This also ensures that the full lifecycle of BRM is closed with bigger projects.

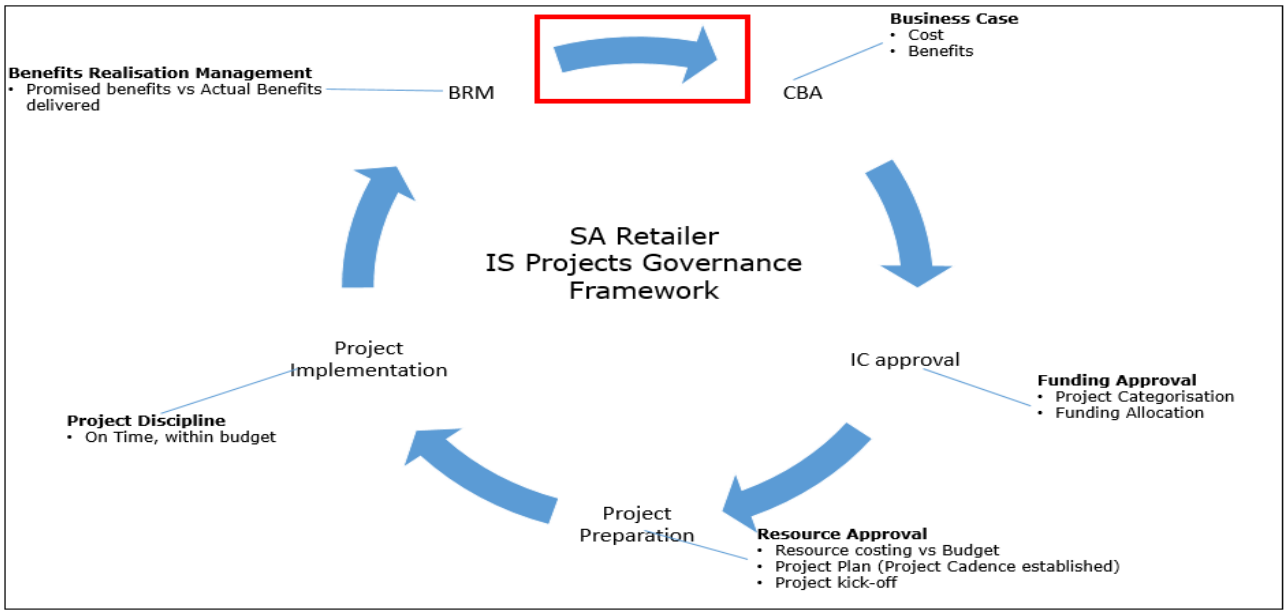

Figure 6.1 Proposed Project Governance Framework

Recommendation 3: Adopt frameworks/metrics that speak to digital drive

This addresses the hindrance that the transformative/digitisation agenda of the company is not well served by the existing framework/metrics that measure the BVIS and that the way the company fund IS investments need to be revisited. The study also found that digital transformation initiatives should be placed as a central theme within the organisations and that the transformative/digitisation agenda of the company and that existing frameworks/metrics should evolve to include digital metrics which could take the form of benchmarking and getting experts "different consulting houses" to advise on what the frameworks/metrics would look like. Reference was specifically made to benchmarking at the FAANG group of companies (Google and Facebook were mentioned specifically) on how they deal with the metrics that are needed to measure the impact of BVIS in the digital space (Participant 22, Female, 2021). The theme of digital at the centre of their operating model is reflected as an overarching reality throughout the literature reviewed (Begley et al., 2019; Achille & Zipser, 2020; Vader & Martin, 2020).

Recommendation 4: Inclusion of intangibles

Most participants recognized that the business case principle within the company has a definite tangible prioritisation, most of them expressed the view that the SA Retailer needed to transform from a tangible-value only approach in the current "business case" to include intangibles and tangibles in a BVC approach. The view that tangible and intangible benefits should be taken into account in BVIS measurement is shared widely within the literature (Murphy, 2002a; Aranyossy, 2014).

6.5 Recommendation for Practice

The literature reviewed for this study states that creating value in the IS space must answer the questions of “what benefits will the investment bring?” or “what is the ROI?” (Murphy, 2002a). The participants of the research mostly agree that the current way of BVIS measurement is focused on the second question of “what is the ROI”. There is however a majority of opinion from the research participants that the broader first question of “what benefits will the investment bring?” is as important as the second one, and that the typical financially based business case used within the organisation should evolve to a broader BVC. The research community may wish to do further research into the concept of the BVC based on this finding to validate or negate it. Lastly, *governance consistency* as a hindrance.

Another recommendation that has implications for practice, is that the measurement of the BVIS on projects are done within a CBA framework which is the primary framework used by the SA Retailer. A practical recommendation specifically to the Retailer, but that can be applied more broadly as a principle is that the approach to projects should be more agile. The highlighted area in Figure 6.1 below, is added to the existing governance framework of the SA Retailer which is illustrated in Figure 5.7. This area indicates that this is a continuum and has at its root the implication that bigger projects with bigger financial implications are broken up into smaller buckets/deliverables and that one of these smaller buckets are approved, started, and reported on before the cycle starts for the next bucket.

6.6 Contribution of the Study

The major contributions of this study are the development of a proposed conceptual framework to measure the impact of IS on organisational performance. The proposed conceptual model might be used by organisations to assess their maturity in measuring the BVIS. The study also provides a synthesis and analysis of the literature around existing frameworks that measures the BVIS against organisational performance. This generates new ideas and knowledge for the Information systems discipline. In addition to this, the study also makes a significant contribution by analysing COBIT2019 components to identify other potential areas for substantial business value from IS. The weaknesses identified within the existing BVIS frameworks analysed as well as the analysis of COBIT2019 contributed to the development of the proposed framework and development of new theory. Practitioners might also benefit from the study if they adopt the recommendations from the study.

The study also contributed to research by looking at the topic of Business Value from a broader perspective than just IT (BVIT) and included other elements such as People, Information and Risk that extends this concept to the concept of the business value of IS (BVIS). As presented in the

literature review, while most studies have to date solely focused on BVIT, few studies have examined the impact of BVIS from a practice perspective. This impact on the BVIS theoretical landscape is discussed in the remainder of this section and addresses one of the research questions of what a new proposed framework/metrics for BVIS measurement against organisational performance would look like that addresses some of the hindrances that were identified in both the literature and the research findings.

This finding is of both theoretical and practical importance as the distinction hyped in the literature is maybe not as practical as claimed and it potentially means that business people (and IS people for that matter) needs to be educated on this distinction or it needs to be reconsidered. This result has implications for practitioners as they engage with the concept of BVIS in that they may find it more beneficial to take a multi-dimensional view of BVIS. This should be an area where further research is required to potentially reconceptualise the practical meaning of BVIS or to validate or disprove this finding.

6.6.1 Evaluation of proposed BVIS Maturity Assessment Model (BMAM)

From this research, an overall maturity level of four (4) applies to the SA Retailer based on the criteria established by the researcher. This is calculated as follows (ratings applied are illustrated in Figure 6.3 below): Governance Maturity Rating (5) + BVIS measurement Rating (5) + Business Case vs. BVC rating (3) + Stakeholder involvement Rating (3) = 16 BMAM (4) = 16 / 4 which is the Total Score divided by the total number of categories.

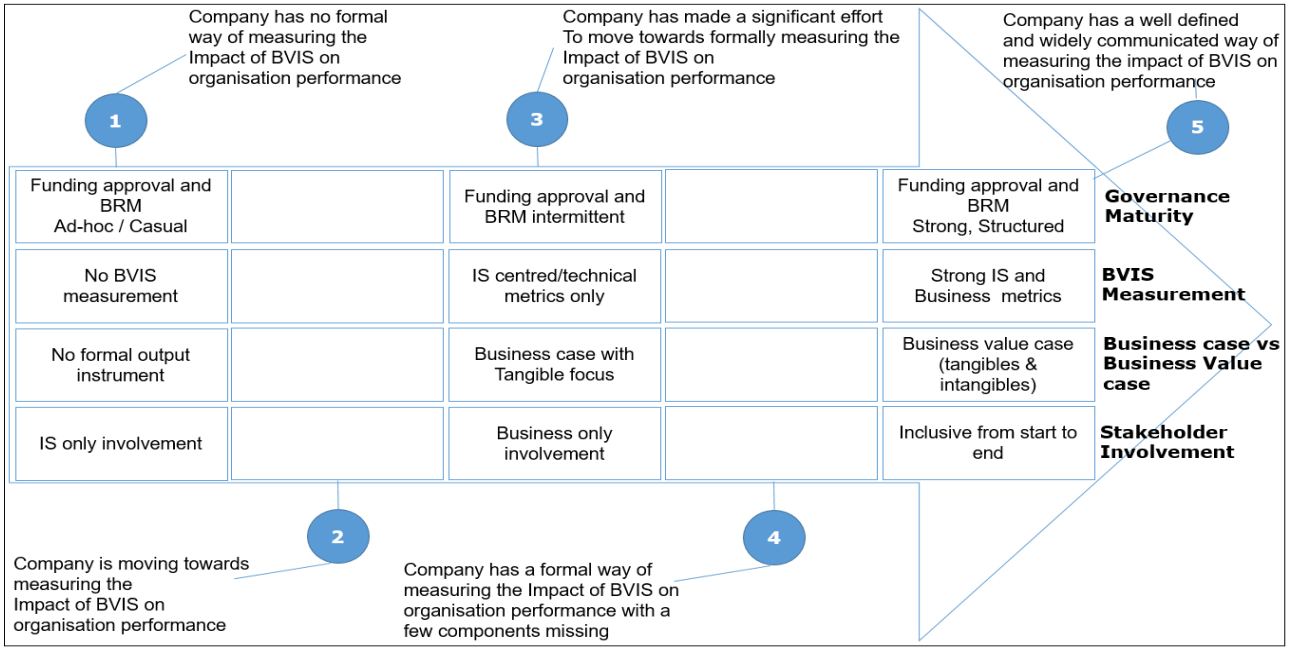

Figure 6.1. BVIS Maturity Assessment Model (BMAM)

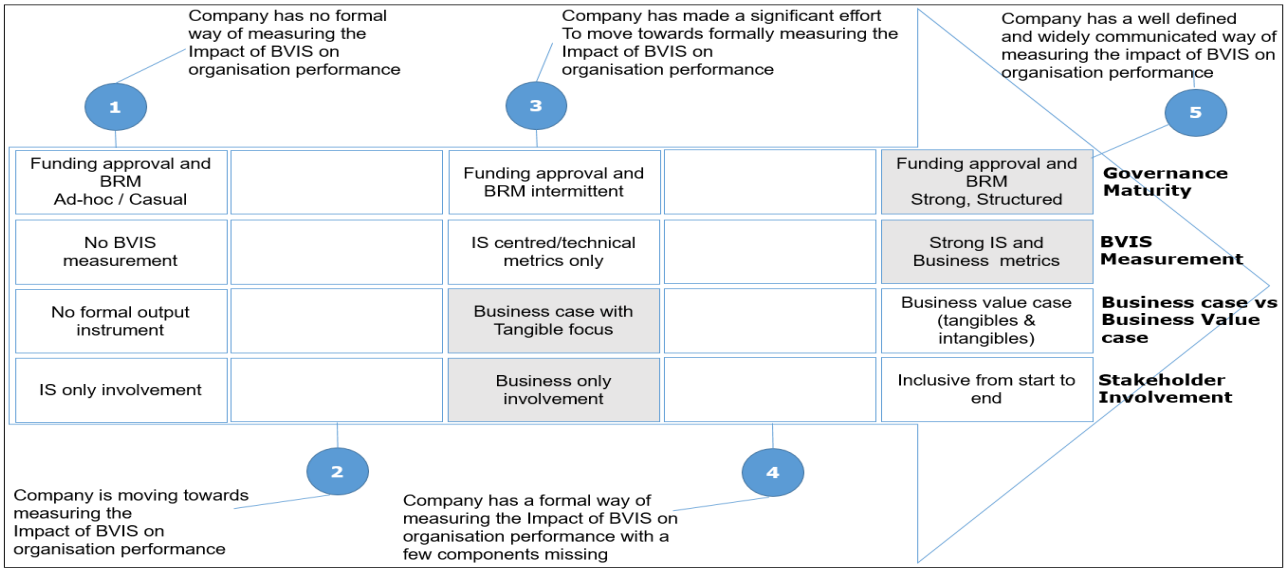

Figure 6.2. Assessment of SA Retailer using BMAM

BMAM is of theoretical importance as this type of assessment has not been encountered in any of the literature reviewed in this paper. Further academic research is needed to establish the validity or negate some of the proposed attributes and dimensions used within BMAM. BMAM is also of practical importance because of its potentiality for both business and IS leaders and consulting companies to use as the first step in the assessment of how effective the BVIS measurement regime is within organisations. BMAM can also be used by organisations to establish an action plan as part of an improvement roadmap around the effectiveness of BVIS especially across the dimensions in which they do not score well.

6.7 Limitations of the Study

Even though BMAM and CBMF developed by this study are relatively simple, their development forced the researcher to focus on the practices within the SA Retailer without necessarily focusing on the evaluation of the measurement of the BVIS against organisational performance across various industries and operating environments. In addition, it did not provide a means of explaining the relationship between BVIS and the different divisions within organisations as some areas within the organisation might be at a different level of maturity to others. One of the key limitations with the CBMF is that it will not work *ex-ante* for “emergency” initiatives such as the examples shared in the research findings of rolling out Microsoft-Teams under COVID-19 (where the lives of people were at risk) or having to react to a competitor rolling out an initiative such as Sixty (where the organisation can’t afford to fall far behind in services customer demand by offering new channels as this might cause the organisation to lose customers!

6.8 Suggestions for Future Research

Despite these limitations, this study has bridged an important gap in the literature by providing key insights into the factors that must be taken into account to measure the BVIS and in that sense make both BMAM and CBMF future-fit. However, some future research opportunities arise due to this study namely to further assess the validity of the theoretical propositions of BMAM and CBMF. More specifically, the following future research work is proposed:

- Extend the research scope and test the proposed framework/metrics at an organisation or organisations whose primary focus is within the digital transformation space (e.g. technology companies whose primary product is information, such as Google or even in SA companies such as MWeb or Take-a-lot. Further studies can also be undertaken within an organisation with similar dimensions to the SA Retailer used within this study. This would test the applicability of the framework within similar organisations to the one used as the basis of this study.
- Studies to test some of the limitations, assumptions, and different components of the BMAM to confirm or negate the limits of the generalisations proposed at the end of the assessment stage. This would serve to evaluate the generalisations made against a broader set of cases that should be undertaken across several organisations to validate the generalizability of the findings. It can also be extended to test maturity levels within the same organisation or even within the SA Retailer used for this study as the primary focus was on SC.
- How to measure BVIS effectively *ex-ante* for “emergency” IS initiatives

An area for further research identified in this study is the impact that Software-as-a-service (SaaS), and other third party-based technology offerings will have on the BVIS construct given the significant impact that these models have on IS capitalisation realities. As such further research will have to be conducted in the future when the adaption rate of these models increases to the point where the impact on more organisations, especially in those in the developing world such as SA, is more substantial.

In addition to these topics, there are a few under-explored topics in the area of the measurement of BVIS against organisational performance that were informed by the analysis of the COBIT2019 framework that was undertaken to identify additional areas where IS can add significant value:

- What is the impact of organisational structure on the measurement of the economic impact of the BVIS against organisational performance?
- What is the impact of organisational culture on the measurement of the economic impact of the BVIS against organisational performance?

  What is the impact of Services, Infrastructure and Applications on the measurement of the economic impact of the BVIS against organisational performance?

6.9 Final Conclusion

This research journey started in 2020 with the development and defense of a research proposal. This study sought to assess the existing framework/metrics that are used within the industry and presented within academic literature to measure the impact of the BVIS against organisational performance. Additionally, it aimed to establish the applicability of existing frameworks/metrics to measure the impact of the changes that are disrupting the environments within which most organisations must operate.

In Chapter 1 of this paper, the primary objective of the study was presented as an analysis of the extent to which existing frameworks and metrics measure the impact of IS on organisational performance. This was then followed by a literature review in Chapter 2 of the existing literature around the research objectives as well as the primary and secondary questions of this study. The underlying philosophical approach that was followed by this study was covered in Chapter 3, with a specific analysis of existing theoretical frameworks that measure the impact of the BVIS against organisational performance, and an analysis of the efficacy of these frameworks in terms of their potential applicability to this study. The research methodology was laid out in Chapter 4 and the findings of the study were presented in Chapter 5, with a specific focus on an NVivo analysis of the responses given by the participants.

It was also established that the effective measurement of the BVIS against organisational performance is a critically important topic and as such this concluding chapter presents a concise summary of the recommendations and conclusions of the research study around this topic. In addition to this, it also discusses the practical and theoretical implications of the findings of this study. A key insight that is generated by this study is that it takes significant steps towards the development of a proposed model to evaluate the maturity levels of organisations in measuring the BVIS. Thereafter, further theoretical and practical implications, limitations and further proposed research ideas derived from the findings are also discussed. Finally, the chapter concludes with some closing remarks from the researcher.

The recommendations made in Section 6 of this study can be utilised by the SA Retailer to improve the way it measures the value extracted from projects and the BAU activities of the IS function within the organisation. As stated, the strength and weaknesses of several theoretical frameworks were analysed during this research and even though different frameworks can be applied by organisations depending on the organisational context, this study recommends that the SA Retailer applies a single framework such as the CBMF consistently across all activities, which will lead to a more effective

way of BVIS measurement. This will also ensure consistent governance across the organisation and across different initiatives, including different transformative/digital initiatives.

In conclusion, the researcher would like to assure the reader that the conclusions and knowledge claims made in this study are the result of a thorough and detailed data analysis and triangulation to ensure consistency and reliability of the findings. Finally, conducting a study of this magnitude requires commitment, dedication and engaging people who have travelled the same journey to gain some insights in the intricacies of succeeding in the journey. There is always light at the end of the tunnel irrespective of how difficulty it might be. The journey has come to an end.

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APPENDIX A: DEFINITION OF KEY FINANCIAL MODELS

This appendix discusses, in brief, the most common financial models in use both in the business and the IS space to evaluate value from investment in organisations.

1. Benefits/Cost (B/C) Ratio

The B/C ratio includes a total evaluation of the time value of all potential business and system costs *with* and *without* the IS investment/new system and all benefits that will be derived from the investment (Remez & White, 1999). Karmperis et al. (2013), gives the following formula to calculate the B/C ratio: B/C = PVinflows / PVoutflow.

2. Total Cost of Ownership (TCO)

According to Harris et al. (2008), TCO captures the full cost of an IS asset from its purchase cost, implementation cost, operation cost, maintenance and "end of life" costs. Even though the primary focus of TCO is cost, it is useful for comparing different investment choices (Harris et al., 2008). Limitations of TCO are that it is focused on defining costs ex-ante (Harris et al., 2008) and that it does not take benefits into account, which means that organisations use TCO mostly in conjunction with other financial measures such as NPV, Payback Period and ROI (Tallon et al., 2018).

3. Net Present Value (NPV)

According to Tallon et al. (2020), NPV can be describes as the difference between the present value of all capital inflows and outflows over a specific time-period. NPV is used as part of investment planning to analyse the profitability of a projected investment/project. NPV is calculated as follows.
NPV = Today's value of expected cash flows (TVECF) - Today's value of Invested Cash (TVIC)

4. Internal Rate of Return (IRR)

According to Tallon et al. (2020), IRR is a financial analysis tool used in to estimate the profitability of potential investments by calculating the total value of all upfront investment and all future cash flow required on an IS project or initiative and then calculating the discount rate that would return a NPV of zero.

5. Modified Internal Rate of Return (MIRR)

In comparison to IRR, MIRR assumes that positive cash flows are reinvested at the cost of capital of the organisation and that the initial outlays are financed at the financing cost of the organisation which makes MIRR more accurate in reflecting the cost and profitability of an IS project or investment.

6. Return on Investment (ROI)

ROI is a financial metric that measures the probability of returning value from an investment by calculating the potential revenues or potential cost-saving from an investment (Harris et al., 2008),

by evaluating the potential return from an investment over a specified payback period. According to Harris et al. (2008), ROI typically uses an IRR linked to the cost of capital and the interest to be paid from borrowing the investment money. Even though the acceptable IRR and payback periods varies from project to project across organisations, Harris et al. (2008) suggests that a reasonable ROI on a project or initiative should be an IRR of at least 20% and a one to three year payback period.

7. Return on Invested Capital (ROIC)

According to Investopedia, ROIC or "return on capital" is used to assess the efficiency of allocating organisational capital to profitable investments which indicates how well a company is utilizing its capital for profit generating investments. Comparing the ROIC of an investment with its weighted average cost of capital (WACC) can give the company an indication of how effective the capital was invested.

8. Discounted Payback Period (DPP)

Payback period a capital budgeting procedure that is used to determine the feasibility and profitability of a project or investment by calculating the time period undertaking the initial expenditure to break-even. According to Investopedia, the discounted payback period recognizes the time value of money and discounts future cash flows.

9. Economic Value Added (EVA)

According to Tallon et al. (2020), EVA, also called economic profit, calculates residual value generated by a project or investment after deducting the invested capital. Harris et al. (2008) states that EVA uses the opportunity cost of using the money to make investment choices which differs from ROI that uses IRR.

10. Return on Assets (ROA)

Harris et al. (2008) state that ROA is widely used to measure organisational performance by calculating the net income by the value of the assets being used to generate the net income. To calculate ROA for IS assets, the organisation must isolate the IS-specific assets and net-income from the broader organisational asset base and net income, which is sometimes difficult, according to Harris et al. (2008), and requires that the accounting systems are set up appropriately.

11. Return on Infrastructure Employed (ROIE)

According to Harris et al. (2008), ROIE is similar to ROA but it focuses on IS services rather than IS assets and IS service cost. ROIE can be used for a single project but works more effectively when calculated across multiple projects (Harris et al., 2008).

12. Return on Equity (ROE)

Harris et al. (2008) states that ROE is widely used to measure organisational performance by dividing the net income by the total value of the assets of the organisation minus its debt. ROE is thus the return on net assets and is considered as a measure of organisational profitability in relation to stockholders' equity, and is calculated using the following formula:

ROE = Net Income / Average Shareholders' equity

13. Real Options Valuation (ROV)

ROV is a financial estimation technique that applies option valuation techniques to capital investment choices and is based upon stock-option theory (Harris et al., 2008). ROV is typically used in conjunction with ROI to justify for instance IS infrastructure implementations for one project for a business unit based on the future derived value, when the cost of implementing a completely new infrastructure across the business cannot be justified. According to Harris et al. (2008), using ROV could illustrate the overall value of the new infrastructure to all the business units in the organisation.

APPENDIX B: RESEARCH INSTRUMENT

This appendix lists the different Interview guide that was used within this study:

1. General organisational information (Please mark the appropriate answer with and "X")

1.1 Division within the company

Fashion, Beauty and Home	
Foods	
Both	

1.2 Area of Operations

Head Office	
Maxmead Distribution Centre	
Midrand Distribution Centre	
Montague Gardens DC	
Racecourse Gardens (RCG)	
Stores	
Any Other (please specify below)	

1.3 Department within the company

Finance	
Human Resource	
Information Technology	
Supply Chain	
Any other (please specify below)	

1.4 Level within the organisation

Job Grade	

1.5 Current Job Title

1.6 Number of Years in Current Job

2. Identify the most appropriate framework/metrics that measure the economic impact of the IT function on organisational performance.

The effective measurement of the value that departments add is an important task for organisations, especially given the disruptive nature of both the economic and technological challenges that these organisations face on a day-to-day basis. As such, it is important to understand what metrics are used by organisations to accomplish this task. The following set of questions is framed to give you an opportunity to share your opinion on the organisational metrics that are significantly impacted by the projects and services that are delivered by the IT department and the current metrics that are being used by the organisation to accomplish this task.

2.1 Companies typically use a range of measures such as profitability, turnover, etc. to measure organisational performance. Which of these measures, in your opinion, are most directly impacted by IT Projects/services? Please elaborate.

……

2.2 Please describe the current method that our company use to measure the economic impact of IT projects and services on organisational performance? Please elaborate.

……

3. General factors hindering the organisation from measuring the Business Value of the IT department

In addition to understanding what needs to be measured, it is also important to understand what factors hinder the task of effectively measuring the economic impact of the projects and services that the IT department delivers.

The following set of questions provides you with an opportunity to share what you believe the factors are that hinder the effective measurement of the impact of these projects and services on the performance of the organisation.

3.1 How effective do you think the current manner is that our company uses to measure the impact of IT projects and services on organisational performance? Please elaborate.

……

3.2 What factors do you believe are currently hindrances to the effective measurement of the impact of IT projects and services on organisational performance? Please elaborate.

……

4. Interventions that can be put in place to improve the measuring of the Business Value of the IT department.

4.1 Which interventions do you believe the company can use to improve the way it measures the impact of IT projects and services on organisational performance? Please elaborate.

……

5. Other potential areas where the IT department can add substantial business value

5.1 Do you think that information has any economic value that can be measured and should this be measured by the company? Please elaborate.

……

5.2 To what extent do you think that the skills and experience of our IT people contribute any economic value directly and do you think that this value should be measured by the company? Please elaborate.

……

5.3 To what extent do you think that the ability of our IT department to protect our company from cyber risks contribute direct economic value and do you think this value should be measured by the company? Please elaborate.

……

APPENDIX C: RESEARCH INTERVIEW INVITE

This appendix lists the different Interview guide that was used within this study:

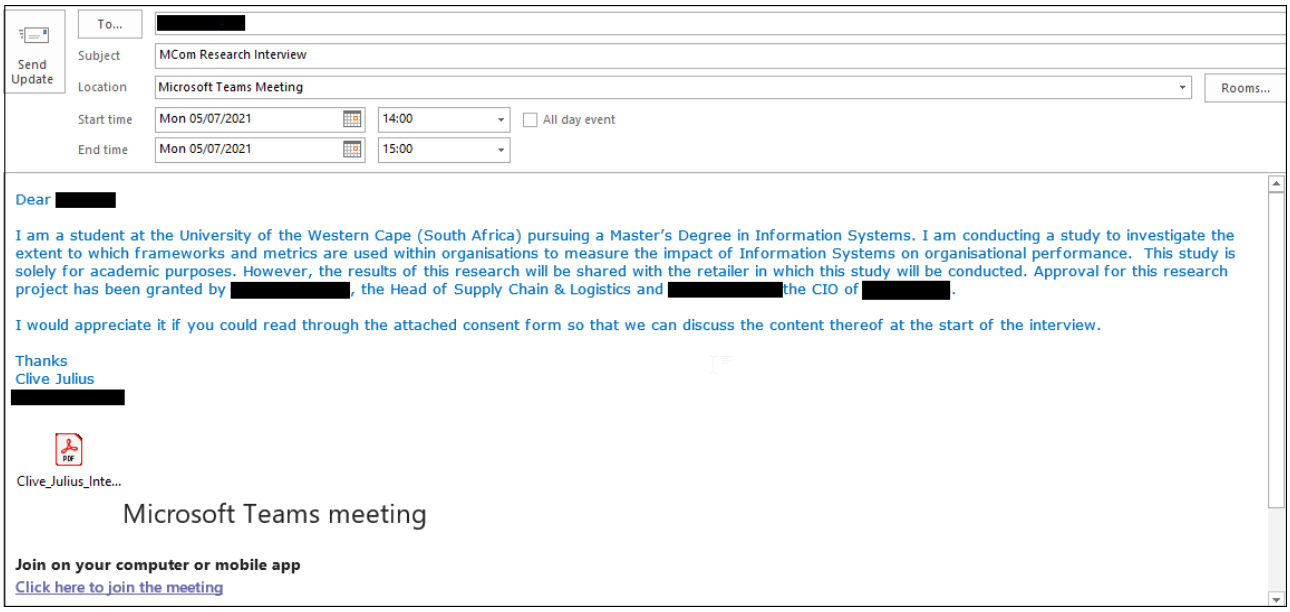

Figure C.1. Research Interview invitation

APPENDIX D: BVIS DEPENDENT VARIABLES

This appendix lists the different dependent variables used within BVIS. These variables are based on a detailed review of the literature and are listed by the researcher in Table D.1 below with the third column being the "relative importance" of the variable based on a study by Gammelgard et al. (2010).

Table D.1. **Dependent variables in BVIS research**

Dependent Variable	%
Capacity utilization (Schryen, 2013; Mellville et al., 2004; Van Der Zee, 2002; Brynjolfsson, 1993, 2003; Kohli & Devaraj, 2003; Hajela, 2009a; Bloch, 2009)	
Change Management (Gammelgard et al., 2010)	61%
Competitive Dynamics / Competitive advantage / avoiding competitive disadvantage (Kaufman & Kriebel, 1988; Brynjolfsson & Hitt, 2000; Van Der Zee, 2002; Brynjolfsson, 1993, 2003; Kohli & Devaraj, 2003; Mellville et al., 2004; Hajela, 2009a; Bloch, 2009; Gammelgard et al., 2010; Schryen, 2013; Onik, 2019)	22%
Improved communications (Gammelgard et al., 2010; Onik, 2019)	53%
Better Control and Follow up (Gammelgard et al., 2010)	44%
Cost optimisation (Van Der Zee, 2002; Brynjolfsson, 1993, 2003; Kohli & Devaraj, 2003; Mellville et al., 2004; Hajela, 2009a; Bloch, 2009; Gammelgard et al., 2010; Schryen, 2013; Zeng et al., 2020)	97%
Improved customer service/ satisfaction/responsiveness (Apfel, 2002; Onik, 2019; Zeng et al., 2020)	100%
Better Decision making (Gammelgard et al., 2010)	72%
Better delivery times (Gammelgard et al., 2010; Onik, 2019; Zeng et al., 2020)	59%
Efficiency (Gammelgard et al., 2010)	78%
Flexibility (Gammelgard et al., 2010)	43%
Flow of Products and Services (Gammelgard et al., 2010)	70%
Finance and regulatory responsiveness (Apfel, 2002)	
Departmental responsiveness (Apfel, 2002)	
Better Inbound Logistics (Gammelgard et al., 2010)	44%
Inter-organisational integration and coordination (Gammelgard et al., 2010; Onik, 2019; Zeng et al., 2020)	37%
Better Information sharing (Gammelgard et al., 2010; Onik, 2019)	54%
Higher Job satisfaction (Onik, 2019)	
Innovation/exploitation of business opportunities/ New Business Innovation (Onik, 2019)	
Faster inventory turnover (Onik, 2019; Zeng et al., 2020)	

Lock in / Switching cost (Gammelgard et al., 2010)	22%
Mandates or Statutes (Harris et al., 2008)	
Market Value (Borges, 2013; Hubbard, 2014)	
Market Share (Sandkuhl & Stirna, 2018)	
Market responsiveness (Apfel, 2002)	
Net profit for private and cost-to-serve in the case of public companies (Serra and Kunc, 2015; Solanki et al., 2016).	
Operational performance (Apfel, 2002; Van Der Zee, 2002; Brynjolfsson, 1993, 2003; Mellville et al., 2004; Kohli & Devaraj, 2003; Hajela, 2009a; Bloch, 2009; Schryen, 2013)	
Organisational impact (DeLone and McLean, 1992)	
Organisational Culture (Gammelgard et al., 2010)	65%
Organisational efficiency	
Organisational effectiveness (Kraemer et al., 1994)	
Organisational capability (Onik, 2019)	
Organisation Learning and Knowledge (Gammelgard et al., 2010)	45%
Product and service enhancement/ product development effectiveness (Apfel, 2002 Gammelgard et al., 2010)	25%
New product or service (Gammelgard et al., 2010)	26%
Faster and/or more focused Product development (Murphy, 2002a; Schryen, 2013)	
Productivity / productive efficiency (Gammelgard et al.; 2010; Onik, 2019)	63%
Risk reduction (Harris et al., 2008)	
Sales effectiveness (Apfel, 2002)	
Quality / Product Quality (Van Der Zee, 2002; Brynjolfsson, 1993, 2003; Kohli & Devaraj, 2003; Mellville et al., 2004; Hajela, 2009a; Bloch, 2009; Gammelgard et al., 2010; Schryen, 2013; Onik, 2019)	92%
Safety improvements (Harris et al., 2008)	
Schedule improvements (Harris et al., 2008)	
Staff morale increases (Harris et al., 2008)	
Strategy formulation and planning (Gammelgard et al., 2010)	86%
Improved Supplier relations/ Supplier effectiveness (Apfel, 2002; Gammelgard et al., 2010; Onik, 2019)	38%
Synergy/compounded value (Harris et al., 2008)	
Better Technology / Tools (Gammelgard et al., 2010)	45%
Third Party Relations (Gammelgard et al., 2010)	46%

APPENDIX E: GLOSSARY OF TERMS

In this appendix, some key definitions around the BVIS construct are defined.

1. What is an Asset?

The Merriam-Webster dictionary defines an **asset** as an economic resource that a) can be owned, and b) is expected to provide future economic benefits and gives the following sub-classifications of assets:

1. **fixed asset** is anything that has a physical form, commercial or exchange value, generates revenue and has a lifespan of longer than one year.
2. A **current asset** is a shorter-term asset that can be quickly converted into cash
3. **intangible asset** is an asset that has no physical form.
4. A **tangible asset** as an asset that has a physical form and has commercial or exchange value.
5. A **wasting asset** is a property or security that loses value over its lifespan and has a limited life.

Further to the definition given above by Merriam-Webster for an intangible asset, the Conceptual Framework for Financial Reporting 2018 of the International Accounting Standards (IAS), gives the following criteria for eligibility to be recognized as an intangible asset; it must have some future economic benefit such as revenues or decreased costs, it must be identifiable and be controlled by the company. The IAS gives the following examples of intangible assets namely developed technology such as computer software, licenses, or franchises, copyrights, customer lists and patents. According to the IAS, items such as employee know-how for instance, would not meet the given criteria. Additionally, Aranyossy (2014) states that in their study on the new economy, the FASB (Financial Accounting Standards Board) research team drew the following conclusions that:

- There is no regulatory or conceptual distinction justified between internally generated and purchased intangible assets.
- That the fact of control is an important criterion of assets which is challenging as in the case of some intangibles such as customer satisfaction, which means that they cannot be treated as assets in accounting terms.
- While on the one hand, it can be argued that value-generating capacity valuations often lack any real market reference points and foundations, cost-based valuations also lack a realistic view of the actual value of the asset.

2. What is meant by benefits?

The Merriam-Webster dictionary defines **benefits** as:

1. a.: something that produces good or helpful results or effects or that promotes well-being: ADVANTAGE

// discounted prices and other benefits of a museum membership

// the benefits outweigh the risks of taking the drug

// reaping the benefits of their hard work`

// changes that will be to your benefit

b.: useful aid: HELP

// without the benefit of a lawyer

It is also important that one must establish a set of principles that can guide the discussion of the realisation of benefits from the IS function:

- IT in itself has no inherent value because just having a technology layer does not provide the organisation with any benefits or create value per se. (Peppard and Ward, 2007; Lanzinner et al, 2008; Anomah and Agyabeng, 2013) as unlike many other assets, such as real estate, the value of IT is not in its possession but that this potential must first be converted into reality through effective operational execution against the business/IS strategy (Anomah and Agyabeng, 2013),.
- Benefits from IS arise when business user are able to do things more effectively and efficiently (Peppard and Ward, 2007).
- Only the business community can release business benefits since benefits emerge from changes and innovations in how organizations interact with customers and suppliers and in finding different and more effective ways of working within the organization (Peppard and Ward, 2007).
- Some IS projects can benefit but some can also produce negative outcomes that sometimes even affect the survival of the organization itself (Peppard and Ward, 2007).
- As outcomes do not occur automatically from an IS investment, benefits must be managed actively as there is often a lag in benefits realisation after the implementation (Peppard and Ward, 2007)