TOWARDS A SUSTAINABLE BUSINESS MODEL FOR FINANCIAL MARKETS

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ABSTRACT

The implementation of different business models has enabled financial markets to not only create value for their benefits, but it has also helped them contribute to economic growth, as well as fulfil their roles in the society. However, the impacts of technological advancements, cross-border flows and regulations continually introduce new dynamics into the business environments of financial markets and as a result, financial markets are faced with future uncertainties. These have increased the dire need for markets to continue to devise methods that can be adapted to survive and thrive in the economy. Hence, financial markets are focusing on profitability than growth, or ideally profitable growth. As a means to achieve this, financial markets need to continually innovate and re-examine their business models to sustain growth. However financial markets still have to adapt general business model frameworks to design new business models because of the lack of a business model framework that has been designed specifically to meet the needs of financial markets. In the midst of these uncertainties, "business as usual" is not an option for a sustainable future; financial markets need sustainable business models that can be used to future proof their business strategies and create long-term value.

This research identifies the need for sustainable business models in financial markets and identifies the lack of a framework for sustainable business models. Hence it aims at developing a business model framework that can be used to develop sustainable business models; with an objective of achieving long-term profitability while only having a minimal long lasting impact on the physical and social environments and to be sufficient enough to compare the business models of financial markets. This research contributes to the knowledge of business models, sustainability, and competition in financial markets.

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I dedicate this thesis to God Almighty; without Him I can do nothing. Also to my parents; Mr. and Mrs. Abioye, thank you for your encouragement, support, prayers and constant love. I love you.

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CHAPTER 1 - INTRODUCTION

1.1 Background

Financial markets are a public good (IOSCO 2000). They are seen as a catalyst to the growth of the economy (Morsy 2007); they are the primary avenues through which capital is allocated to emerging economies, as well as developed ones. However, the impacts of the increasing use of technologies, globalization, and the effects of regulations, have introduced new dynamics into financial markets and as a result, financial markets are faced with future uncertainties (The Government Office for Science 2012a). A project carried out by the Government Office for Science on the future of computer trading in financial markets, highlights the possible long term impacts that could be expected in the near future as a result of the impact of regulatory changes and the increase in business and technological innovations and their accompanied risks (The Government Office for Science 2012a) (The Government Office for Science 2012b). In the midst of these uncertainties, "business as usual" is not an option for a sustainable future (Evans et al. 2014); financial markets need to continually innovate and re-examine their business models to sustain profitable growth. Although financial markets are making efforts to survive and thrive in the market economy by developing innovative business models which involves the design of new products and the delivery of new services or the modification of already existing ones, the success of the innovative products and services depends greatly on the commercial performance of the products and services, and one primary criterion for the steady generation and capture of value through these products and services is an effectual and robust business model design (Tavlaki & Loukis 2005). Financial markets need business models that can be used to future proof their business strategies and capture long-term value.

The implementation of different business models has enabled financial markets to not only create value for their benefits, but has also helped them contribute to economic growth, as well as fulfil their roles in the society. However, in the midst of these challenges and future uncertainties, there is a need for a business model framework that can be used to develop sustainable business models that are safe, that will generate profits as well as fit into the requirements of market regulators (Banziger 2012). Here, a sustainable business model is defined as one that allows an organization to remain profitable in the face of uncertainty while having minimal long lasting impact on the social and physical environments (Karan & Netessine 2013); this encompasses financial, environmental and social sustainability.

In relation to environmental and social sustainability , the extent to which financial markets practice sustainability and partake in sustainable developments has been questionable (Busch et al. 2015). Sustainable developments in this context is defined as "a development that meets the needs of the present without compromising the ability of future generations to meet their own needs (Brundtland 1987). The interests of the larger society are strongly tied to financial markets; a reflection of this can be seen in the amount of control systems and regulations under which financial markets operate (Myklebust 2013). A survey carried out by (Panwar & Blinch 2012) suggests that there is a greater focus on revenue generation than in sustainability practices. It could be understandable that financial markets are not fully committed to all the aspects of sustainability because they do not see a strong business case for it (Panwar & Blinch 2012). However, the functionalities of financial markets are not just to the market participants but to the society at large (Myklebust 2013).

Having this in mind, while designing new products and developing new services, financial markets should not focus on financial goals alone, but should also consider social and environmental goals. The combination of these goals in the implementation of a new business model can enable them to be financially sustainable for themselves while having the capability to contribute to sustainability in the larger society.

1.2 Research Motivation

Based on the discussion above, the following are identified as the motivation of this research:

i) The present challenges and the future uncertainties require financial markets to adapt sustainable business models (Banziger 2012). However, there is a gap in the availability of business model frameworks designed specifically for financial markets; to develop sustainable business models, analyse and compare the business models of financial markets in their very competitive ecosystem. As a result, financial markets have to adopt general business model frameworks to develop business models.

ii) In order to remain profitable, financial markets are focusing more on generating revenue and not totally committed to the other aspects of sustainability i.e. social and environmental sustainability (Panwar & Blinch 2012). Financial markets require a business model framework that can enable them to integrate financial, social and environmental sustainability methods into their business operations.

1.3 Aim and Objectives

This research identifies the need and importance for financial markets to remain financially sustainable, while adapting environmental and social sustainable measures. The primary aim of this research is to develop a business model framework that can be used to develop sustainable business models for financial markets. However, a business model framework should not be confused with a business model. A business model framework here refers to a collection of interlinked components or elements that serves as a guideline for the development of a business model.

As discussed earlier, the challenges faced by financial markets point towards financial strain and the struggle to be fully involved in sustainable developments. These are the focus of the proposed framework; to develop a business model framework that can help capture long term value while considering the social and environmental impact. In addition, the proposed framework is designed such that it can also be used to compare the business models of markets; competitively distinguishing the operations of market operators.

In general, the objectives of this research are to:

iii) Contribute to the study of business models generally as well as the knowledge of business models in the context of financial markets by expanding the outlook on what business models can be used for.

iv) Comparatively review existing business model frameworks and identify their drawbacks.

v) Bring together the necessary dimensions that are can be used as references to develop a sustainable business model.

vi) Demonstrate the relevance and applicability of the proposed framework by instantiating its components with selected markets

1.4 Research Questions

This research aims at making its contributions by answering the following research questions:

i. What does the current literature reveal about sustainability in business models? What are the existing gaps?

ii. What components are necessary to develop a sustainable business model?

iii. How can the proposed business model framework be used to compare the business models of financial markets? What business model components are necessary?

1.5 Research Methodology

As mentioned earlier, this research aims at designing a framework for sustainable business models. Unlike traditional research, business model research is not focused on the building or testing of theories but designing a model that can be used to solve business problems or improve situations in organizations (Xu & Chen 2011); in this case financial markets. As a result, this research adapts the Design Science Research methodology which focuses on the development of artefacts to solve problems or improve situations (Dresch et al. 2015a). The Design Science Research methodology is applied in this research through four main phases. Its application in this research is explained in detail in chapter 3. In summary the phases are:

i. Awareness of problem: this phase involves the identification of the research problem. Here, the primary problem identified is the lack of a framework that can be used to develop business models in general and especially for financial markets.
ii. Suggestions: this includes the examination of the various ways in which the solutions can be developed for the research problem. Here, it involves the exploration of the knowledge area of the research problem; reviewing related literature that focus on business model conceptualizations, business model classification, existing frameworks, methodologies adapted, as well as the literature related to sustainability in business models.
iii. Development: the artefact is developed in this phase. In this case, the business model framework is developed here.
iv. Evaluation: the evaluation phase examines the artefact and checks for its validity and relevance and most importantly if it addresses the research problem.

1.6 Thesis Outline

Chapter one presents the background and the relevance of the research i.e. justifying the need for designing a business model framework for financial markets; highlighting the research problem and research questions, describing the general objectives of the research as well as the methodology adapted. Lastly, it sets the direction of the entire thesis; describing briefly, the contents of the succeeding chapters.

In chapter two, more light is shed on the challenges faced by financial markets, and how these challenges have evolved over time. Also, the concept of business model is examined more thoroughly; a comprehensive literature review of already existing business model frameworks is presented by examining the different types of business model frameworks in different knowledge areas, and also the different business model types that have been described in literature. Works on sustainability in business models are also reviewed in order to identify any already existing business model framework that can be used for the development of sustainable business models for financial markets or in other business areas.

After reviewing the position of business model frameworks for sustainable business models, the literature gaps were highlighted and explained.

Chapter 3 presents and describes the methodology that was adapted for this research. This research adapts "The Design Science Research Methodology". The justification of the chosen methodology is also described in this chapter; the different phases of the Design Science Methodology as well as its application to the different aspects of this research.

Chapter 4 focuses mainly on the proposed framework. It aims at describing the development of the framework and also providing a full description of the framework itself.

Chapter 5 shows how the proposed framework can be applied. Each of the dimensions of the framework is mapped to a corresponding feature in the business models of selected stock markets to demonstrate the plausibility of the proposed framework and its ability to compare the business models of markets.

Lastly, Chapter 6; the concluding chapter of the thesis provides a summary of the thesis. The contributions of the research, the novelty of the research as well as the limitations of the research are explained in this chapter. Finally, further works that can be done with the research are highlighted.

CHAPTER 2 – LITERATURE REVIEW

This chapter aims at shedding more light on the challenges facing financial markets and providing an extensive background on already existing business models i.e. the theoretical roots and the recent developments in the area of business models and the works done in the area of sustainability in business models. After reviewing the position of business model frameworks generally and in the context of sustainability, the gaps in literature are identified and explained.

2.1 The Need for a Sustainable Business Model

Financial markets are very important components of the world economy and at the same time, their structure and operations have changed substantially over the years. Historically, most markets were not owned by investors. Then, income was mainly generated by annual membership dues (Panwar & Blinch 2012). Their performance was evaluated by trading activities and an orderly operation of the markets. Over the years, markets have been bending towards a possible replacement of governance in the stead of traditional governance structures. This has led to the transformation of markets to "for-profit" markets owned by shareholders. This process is referred to as demutualization (Morsy 2007). The World Federation of Exchanges (WFE) defines demutualisation as a process by which a non-profit, member owned organization is transformed into a for-profit shareholder corporation; ownership is somewhat open (Devai & Grégoire 2011).

In the world of business, the transformation and change of the governance structure of an organization is usually a reflection of the strategies adopted by that organization to respond to the changes in the business environment (Morsy 2007). Making a change in the governance structure of financial markets can reflect the challenges they face in their environment such as the impact of technology and financial innovation, changes in regulation and global competition. However, it is important to mention that the sources of these challenges are not entirely new; they have just evolved through the years. This evolution is further described below.

2.1.1 Technology

Financial markets have experienced and are still experiencing an innovative era in the design and development of products and services. One major contributor to this is technology. Although financial markets have been early adopters of technology (Clive et al. 2010); it (technology) has been crucial for the development and expansion of financial services (Pryor et al. 2011); financial markets are still critically dependent on technology (Dave Cliff 2011).

This has been evident in its use in the storage of market data, processing speed and trading strategies. However, as technology as evolved over the years, so as its accompanied risks evolved.

2.1.1.1 The Evolution of Technology in Financial Markets

"Virtually gone are the days when nearly all securities were traded across the vast floors of exchanges by men yelling and wearing checkered jackets in order to stand out amongst the crowd" (McGowan 2010). There has been a highly noticeable change in financial markets; the drastic increase in trading volume and the fragmentation of trading venues have been as a result of technological innovation. This technological innovation includes computer-based trading that involves ultrasonic algorithmic devices that send and execute orders without the interception of human traders (Daniel & Fisher 2013). Although computer-based trading seems to be very popular now, it is not new to financial markets (McGowan 2010). It was introduced in the mid 1970's when buying and selling of orders electronically began at the New York Stock Exchange (NYSE). An electronic workstation was used to display the orders sent by traders. This workstation was called the "display book". A trading strategy called *program* trading strategy was introduced in the 1980's. Traders who adopted this trading strategy could trade stock index futures contract at NYSE. Also, using the *program* trading strategy, orders could be pre-programmed to be automatically sent to the order routing system of NYSE at a time when there is a higher possibility of profit. This process was identified as a contributing factor to the Black Monday crash of October 1987 (Dave Cliff 2011). For this reason, the interest to issue, buy and sell orders via computers plummeted.

The decline in the cost of computing, by the end of the 20th century created the possibility to develop intelligent automated trading systems; compared to the ones that exacerbated the 1987 crash. These trading systems were modelled with mathematical methods that were soundly rooted in statistical modelling and probability theory. The automated trading systems were built primarily for trade execution and not the choice of either buying or selling shares. The decision making was carried out by humans. Afterwards, the decisions are passed to an Automated Execution System (AES).

A new method of trading emerged, known as High Frequency Trading (HFT). HFT is defined by the Securities and Exchange Commission (SEC) as:

"*The use of extraordinarily high-speed and sophisticated computer programs for generating, routing, and executing orders; use of co-location services and individual data feeds offered*

by exchanges in other to minimize network and other types of latencies; very short timeframes for establishing and liquidating positions; the submission of numerous orders that are cancelled shortly after submission; and ending the trading day in as close to a flat position as possible"(Securities and Exchange Commission 2010).

The European Securities and Markets Authorities (ESA) define HFT as:

"Trading activities that employ sophisticated, algorithmic technologies to interpret signals from the market and, in response, implement trading strategies that generally involve the high frequency generation of orders and a low latency transmission of these orders to the market. Related trading strategies mostly consist of either quasi market making or arbitraging within very short time horizons. They usually involve the execution of trades on own account (rather than for a client) and positions usually being closed out at the end of the day (European Securities and Markets Authority 2011)*."*

From the definitions above, in a simpler term, HFT is an algorithmic trading that involves the use of computer programs to "understand" and translate market signals that will inform when to automatically input orders, the size and price at which the orders should be traded.

One very important element in HFT is the speed, also known as latency (McGowan 2010). The trading strategies deployed by the algorithms are highly dependent on the latency. The value of the HFT business model is optimized better with a very low latency; speed as quick as less than a microsecond. This is the time required to access and process market data, decide on when to buy or sell, and execute a trade. The resulting situation of this is the radical change HFT has brought into the markets; trade carried out manually by human traders are being replaced by super-fast computerised trading system. A plausible reason for the saying by (David Cliff 2011), "that humans are an endangered species in financial markets".

The processing time of trades is not the only aspect of trading in financial markets that has been affected by technology. Technology has also caused the fragmentation of trading and trading venues. Electronic order routing and trading networks have been in use in financial markets. These networks are used for order-driven matching systems for those (participants) seeking to be invisible during trading (Panwar & Blinch 2012) as in the case of dark pools. The SEC defines dark pool as an Alternative Trading System (ATS) (Tuttle 2013) that conceals order quotations data from the consolidated quotation data which is used by the U.S. equity markets (U.S. Securities and Exchange Commission 2009). Similarly in the EU, dark

pool is described as exchanges that waives the pre-transparency demanded by the Market in Financial Instruments Directive (MiFID) (Daniel & Fisher 2013). In a general sense, it involves the matching and execution of bulk trades without first routing them to an exchange where the orders can be viewed publicly (Bogoslaw 2007).

A study carried out by (Dave Cliff 2011) on the future of computer trading in financial markets reveals that profitability in financial markets is being affected by the development and increasing use of new technologies because automated trading has become cheaper than trading by humans, hence a reduction in the cost of transactions.

Also, traders are being discouraged to execute bulk trades on exchanges because other players can make use of sophisticated technologies (such as HFT) to view their positions i.e. size and price of orders, and interfere with their trade (Mathias & Prandey 2011). As a result, such traders execute large volumes of their trades on alternative trading systems. This is not without consequences; one of the consequences is a significant reduction of the market share of exchanges (Mathias & Prandey 2011). In addition, because it is cheaper to trade through computers than to trade through humans, trading costs have steadily declined (The Government Office for Science 2012c); this in turn affects the generation of revenue for financial markets.

2.1.2 Competition

Competition among financial markets is also not entirely new. However, it has escalated over the years, especially in the areas of trading, listing and settlement (IOSCO 2005). Competition has not also remained within local borders; the activities of financial markets have been expanded geographically, into foreign markets (Issing 2000).

Financial innovation and technology have also played a major role in the globalisation of markets. Markets are faced with higher competition due to the increase of automation in financial markets (Barclay et al. 2003). Exchanges expand their activities geographically through direct computer connections and by installing local access points (Ramos 2006). The expansion has resulted into the demand for foreign alternatives for the raising and investment of funds by issuers and investors (IOSCO 2005). Technological advancements have made this possible by enabling a quicker access to information and trading platforms.

Financial markets are also focusing on gaining large international companies. The competition to list “large” firms has intensified competition between markets for both

domestic and foreign listings (Hans & Kolderstova 2009); they create an international profile since they benefit from the listing fees and the trading volume (Ramos 2006).

Asides technological advancements, deregulation has also contributed to competition among markets (Mathias & Prandey 2011). Deregulation has opened-up foreign competition (Hawkins & Mihaljek 2004) by allowing companies to be able to list in foreign exchanges without first listing in national exchanges (Mathias & Prandey 2011). As a result, the boundaries between financial institutions are being destroyed gradually. This has consequently increased the pressure of competition since companies now have more options of exchanges to choose, especially the competitively priced exchanges.

2.1.3 Regulation

Market regulations have contributed to the fairness and orderliness of market operations but have also contributed to the reduction of profitability for financial markets (Lumpkin A. 2009). Regulations imposed on markets indirectly could affect their stock listings. For instance, a company can decide which stock exchange to list in based on the regulations under which that particular exchange operates. A study carried out by (Piotroski & Srinivasan 2008) shows that after the enactment of the Sarbanes- Oxley (SOX) Act on NASDAQ and the Alternative Investment Market (AIM) of the London Stock Exchange, the probability of small foreign companies listing in these markets reduced because the incremental costs associated with the SOX compliance have negative effects on their profitability. In addition, financial markets incur costs in order to adhere to some regulations i.e. compliance costs (IBM Corporation 2012). These costs vary from operations to architecture. Examples of these costs include:

- Staff training costs: this refers to the cost of training staffs; some regulations require additional training of staffs e.g. The Third Anti-money Laundering Directive (Europe Economics 2009).
- Capital requirements for investments such as technology investments, architecture restructuring and the necessary data storage requirements (e.g. the MiFID's requirement to store tick data may incur additional costs)
- Additional capital for maintenance and administrative costs

The decision for a market to demutualize could be to create an organizational structure that is capable to react rapidly to challenges (Morsy 2007). However, financial issues may arise as a result. There has been a concern for the financial viability of demutualized markets (IOSCO

2000). Regulators address this issue by imposing capital requirements on markets in order to minimize the risk of failure that could arise as result of unexpected financial loss. This has also contributed to the pressure of steady revenue generation and profitability in financial markets; these challenges could be a primary reason why financial markets are focusing more on a sustainable generation of income than in any other type of sustainability.

Although there are some markets that have been able to transform the value of social and environmental sustainability into monetary terms (Panwar & Blinch 2012); the Johannesburg Stock Exchange for example is globally known for their futuristic initiatives on sustainability. On the other hand, the Singapore Exchange has benefited from the non-monetary value of sustainability, enabling them to continue implementing sustainability initiatives. However, for-profit exchanges still need a direct monetary case to act on sustainability (Panwar & Blinch 2012). These motivated the research; to design a business model framework that integrates not only financial sustainability but environmental and social sustainability.

Before focusing on the core of this research, the following sections describe the background of the business model concept, existing works on business models in general and sustainability in business models. This aims at providing knowledge of the meaning of a business model, the different components of already existing business model frameworks, the purpose of a business model in organizations, its relevance in achieving sustainability and the reasons why existing business model frameworks are not adequate enough to develop sustainable business models.

2.2 Emergence of the Business Model Concept and Definitions

The concept of the business model emerged from 1957 when it was first used in an article by Bellman and Clark (Osterwalder et al. 2005). During the early usage of business model, it was mostly linked to business modelling (Seddon et al. 2004), although there was no common understanding of its meaning and its application. However, the concept of business model became prevalent during the Digital Economy (Zott et al. 2010). Since then, it has become a buzzword in scientific journals and business publications. This was also in parallel with the shift from traditional business to electronic business. During this period, companies influenced by the Digital Economy used the concept of business model as the core of their existence. Although, not all companies that adapted the use of business models succeeded i.e. some failed, others succeeded. The possible reasons for the success or failure of a company became an interest for researchers (Burkhart et al. 2011). As a result, the study of business

models from an academic perspective evolved, and has been increasingly popular in scholarly journals.

Examining the concept of business model, from an academic perspective has expanded the scope of its understanding and has led to its evolution in areas such as information systems, organizational theory and strategic management research (Writz 2011).

The application of business models in the area of information systems shows the relevance of business model from a technological approach. The advent of the internet did not guarantee that traditional businesses could automatically change to an electronic business. This challenge as well as the increase in competition among businesses created the need to include the business model concept in modelling the technical systems of the electronic businesses i.e. electronic businesses were not just built according to a technical structure but by building them around their different business models.

In the area of organizational theory, a business model is used to represent the structure of a company (Al-Debei et al. 2008). According to (Eriksson & Penker 2000), business model can be used to understand the logistics of a business, improve the operations of the business, and represent the framework of a business.

The connection between business model and business strategy became apparent from the year 2000 onwards, as evident in published works (Writz 2011). The work of (Chandler 1962) described the relationship between business models and strategy by stating that the strategies considered by a company are reflected in the business architecture of the company. This notion was referred to by many authors as the first crucial work to understand the concept of business model from a strategic perspective. In an article by (Hamel 2000), business model was described to also have a competitive-strategic dimension that can be used to have a competitive advantage over competitors.

According to (Osterwalder et al. 2005), a business model can be used to examine and understand a company's business. The work of (Yuwei & Manning 2009) stated that the concept of business model can be used as a tool for communication to inform the stakeholders of a company about a business idea.

2.2.1 Business Model Definitions

Business models are not definitional consistent, hence there is no definition that has been generally accepted (Zott et al. 2010). The table below summarizes frequently used, scholarly definitions of business model.

Author/Year	Definition
(Timmers 1998)	"An architecture of the product, service and information flows, including a description of the various business actors and their roles; a description of the potential benefits of the various business actors; a description of the sources of revenues"
(Hamel 2000)	"A business model is simply a business concept that has been put into practice. A business concept consists of four major components: Core Strategy, Strategy Resources, Customer Interface, Value Network"
(Writz 2000)	"A business model refers to the depiction of a company's internal production and incentive system. A business model shows in a highly simplified and aggregate form which resources play a role in the company and how the internal process of creating goods and services transforms these resources into marketable information, products and/or services. A business model therefore reveals the combination of production factors which should be used to implement the corporate strategy and the functions of the actors involved."
(Linder & Cantrell 2000)	"The organization's core logic for creating value."
(Eriksson & Penker 2000)	"A business model is a simplified view of a

	business. It is an abstraction of how a business functions"
(Amit & Christopher Zott 2001)	"A business model depicts the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities"
(Rayport & Jaworski 2001)	"A business model is comprised of four parts: a value proposition or "cluster" of value propositions, a marketspace offering, a unique and defendable resource system, and a financial model."
(Chesbrough & Rosenbloom 2000)	"A business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers into economic outputs"
(Magretta 2002)	"Business models are stories that explain how enterprises work. A good business model answers Peter Drucker's age-old questions: Who is the customer? And what does the customer value? It also answers the fundamental questions every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?"
(Hedman & Kalling 2002)	"A business model includes the following causally related components, starting at the product market level: 1) Customers, 2) Competitors 3) Offering, 4) Activities and Organisation, 5) Resources and 6) Factor and Production Input suppliers. The components are all cross-sectional and can be studied at a

	given point in time. To make this model complete, we also include a longitudinal process component, which covers the dynamic of the business model and highlights the cognitive, cultural, learning, and political constraints on purely rational changes of the model"
(Osterwalder et al. 2005)	"A business model is a conceptual tool containing a set of objects, concepts and their relationships with the objective to express the business logic of a specific firm."
(Morris et al. 2005)	"A business model is a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets"
(Johnson et al. 2008)	"A business model consist of four interlocking elements (customer value proposition, profit formula, key resources and key processes), that taken together, create and deliver value"
(Al-Debei et al. 2008)	"A business model is an abstract representation of an organization, be it conceptual, textual, and /or graphical, of all core interrelated architectural, and financial arrangements designed and developed by an organization presently and in future, as well as all core products and/or services the organization offers, or will offer, based on these arrangements that are needed to achieve its strategic goals and objectives."

(Casadesus & Ricart 2010)	"A business model is a reflection of a firm's realized strategy"
(Teece 2010)	"A business model articulates the logic, the data and other evidence that support a value proposition for the customer, and a viable structure of revenues and costs for the enterprise delivering that value."

Table 1 Business Model Definitions

The differences in the definitions of a business model show that, despite the recognized importance of the business model concept, there is still no uniform clarity in its definition and/or its meaning. In an attempt to provide a definition for a business model, some authors highlight the components of a business models while other authors provide a general description of their understanding. For instance (Rayport & Jaworski 2001), (Hedman & Kalling 2002) and (Johnson et al. 2008) highlight the components of a business model in their definitions of a business model. However, (Hamel 2000) seems to be in between these two parts of definitions as a business model was first defined as a concept before going further to list the components of the "concept". Other authors define business models as architecture, concept, representation, a tool or a framework. For instance, (Timmers 1998) refers to a business model as an architecture; focusing on the crucial parts of an organization in his definition; including the flow of information. On the other hand, (Eriksson & Penker 2000), (Amit & Christopher Zott 2001), (Al-Debei et al. 2008), (Casadesus & Ricart 2010) describe a business model as a representation of the capability and the system of operation of a company. Similarly, (Linder & Cantrell 2000) and (Magretta 2002) sum up the whole architecture of a company in their description by referring to a business model as the logic of a company. From a practical perspective, (Osterwalder et al. 2005) and (Teece 2010) adopt an instrumental view in their understanding of a business model by referring to a business model as a tool that can be used to manage the business logic of an organization.

In summary, one common characteristic that all the business model definitions seem to have is their focus on the crucial functions and elements possessed or needed by a company to create value. What else can a business model be used for?

2.3 Purpose of a Business Model

The various definitions of a business model may cause confusion in understanding the primary purposes of a business model. However, in order to prove its relevance, some researchers have proposed possible uses of a business model.

A business model can be used as a tool to communicate the understanding of a business to stakeholders (Dieter 2001) (Gordjin & Akkermans 2001), this can help improve decision making (Hayes & Finnegan 2005). A business model can be used as a unit of analysis to examine the business logic of a company (Stahler 2002). The development of a business model can help to improve the management of a business logic, as well as oversee the implementation of the business strategy of a company (Camponovo & Pigneur 2004). Business model developers can make use of a business model to improve and change some dimensions of an existing business model (Otto et al. 2001); this can be useful for companies challenged by competition (Osterwalder et al. 2005). In addition to these, (Osterwalder et al. 2005) proposes the following has the possible uses of business model:

- It can be used by a company to compare the business models of its competitors.
- It can be used as a bridge that connects a business organization, its strategy and technology.
- It can help to stimulate innovation in a company. (Amit & Christopher Zott 2001) and (Burgi et al. 2004) agree with this perception as well; they imply that the elements of an existing business model can be used to develop an entirely new business model
- As the logic of a business model changes over time, a business model can be used to track the particular changes over a period of time.

2.4 Sustainability Business Model as Innovation

A firm has to continually create value for its shareholders, customers and other stakeholders in order to be successful (Mahadevan 2002). Amongst other critical factors, innovation has been identified as a crucial factor for value creation. Innovation in business can be in different forms such as technological innovation (Teece 1986) and product and process innovations (Ghemawat 1986). In general, the forms of innovation in firms have been classified into three forms (Damanpour & Evan 1984): product vs process (Utterback & Abernathy 1975), administrative vs technical (Damanpour & Evan 1984) and radical vs incremental (Nord & Tucker 1987). According to (Amit & Zott 2012), innovation in business models is very essential in firms because it represents a source of future value and it

represents a tool that can help to attain a strong market position. (Zott et al. 2010) explains that innovation in business models is more beneficial than product innovation. Unlike product innovation that can easily be replicated, business model innovation can help maintain or improve the competitive advantage of a company. Also, the whole activity system in a business model will be very difficult to replicate by competitors.

The need for sustainability has begun to have significant impact on the competitive landscape of businesses in general (Nidumolu et al. 2009). Consequently, companies are examining their business models in the context of sustainability. Asides the other types of innovation i.e. process, technical, administrative, technical, radical and incremental, firms can also use sustainability as a form of innovation to develop competencies that will be challenging for competitors to imitate. It is not enough to develop sustainable products and services; sustainability as an innovation should be introduced into the core of the business model (Evans et al. 2014) in order for a firm to achieve financial, environmental and societal sustainability.

2.5 Business Model Classifications

Research on business models has revealed the different types of business models. These different business model types have also been classified by different authors for a better understanding of the business model concept and for their possible application to the design and management of business models in different business areas (Fielt 2013). The classification done by (Timmers 1998) is probably the most referred classification. It consists of different business models in the area of internet business. They are described in the following table.

Business Model Type	**Description**
E-Shop	This business model is usually implemented to promote the products and services offered by a company through the web. The author identified different benefits for the company and this may include an increase in demand and a low-cost global presence, while benefits for the customers may include a wide range of product options and convenience of purchase of the products. The

	sources of revenue are from cost reduction, advertising and increased sales.
E-Procurement	This type of business model is usually used by large companies that tender and procure products and services electronically. Such companies have a wider range of suppliers, the possibility of a lower cost of products and delivery. Revenue is generated primarily from cost reduction.
E-Auction	The e-auction business model is implemented by companies in the business of auctioning products. Unlike the traditional auctions, bidding here is done electronically with the products presented via the web. The auction provider benefits from transaction fees while the suppliers and the buyers benefit from global sourcing and time efficiency.
E-Mall	This is similar to an e-shop, but unlike an e-shop which consists of one company, the e-mall is a collection of e-shops. The benefits are similar to the e-shop.
Third Party Market Place	This used by companies that are interested in using a third party to offer their goods and services. Revenue generation can be from membership fee, transaction fees or percentage interest from transactions.
Virtual Communities	A virtual company implements this type of business model by creating a web platform where members of the virtual community provide different type of information. This can also be useful for customer feedback.
Value Chain Service Provider	Companies that belong to this type of business model specialise in a particular part

	of the value chain of another company. Revenue is generated from a fee or percentage-based agreement.
Value Chain Integrators	Using this business model includes the integration of different parts of the value chain in order to utilize the information flow between the parts. Transaction and consultancy fees contribute to revenue for this business model type.
Collaboration Platforms	This is used by companies that develop and manage tools and platform designed for the collaboration between companies. The companies generate revenue through membership or usage fees.
Information Brokerage, Trust and Other Services	This is used by companies that serve as information consultants. They provide information services that can add value to a business. Subscription fees or payment per usage are usually the sources of revenue.

Table 2 Classification of Business Model Types (Timmers 1998)

In addition, the author distinguished these business model types by their level of innovation and integrated functions. The level of innovation refers to the shift from the traditional methods of business operations and processes to innovative methods, while the functional integration ranges from single function business models such as the E-Shops to the highest level of functional integration such as the value chain integration.

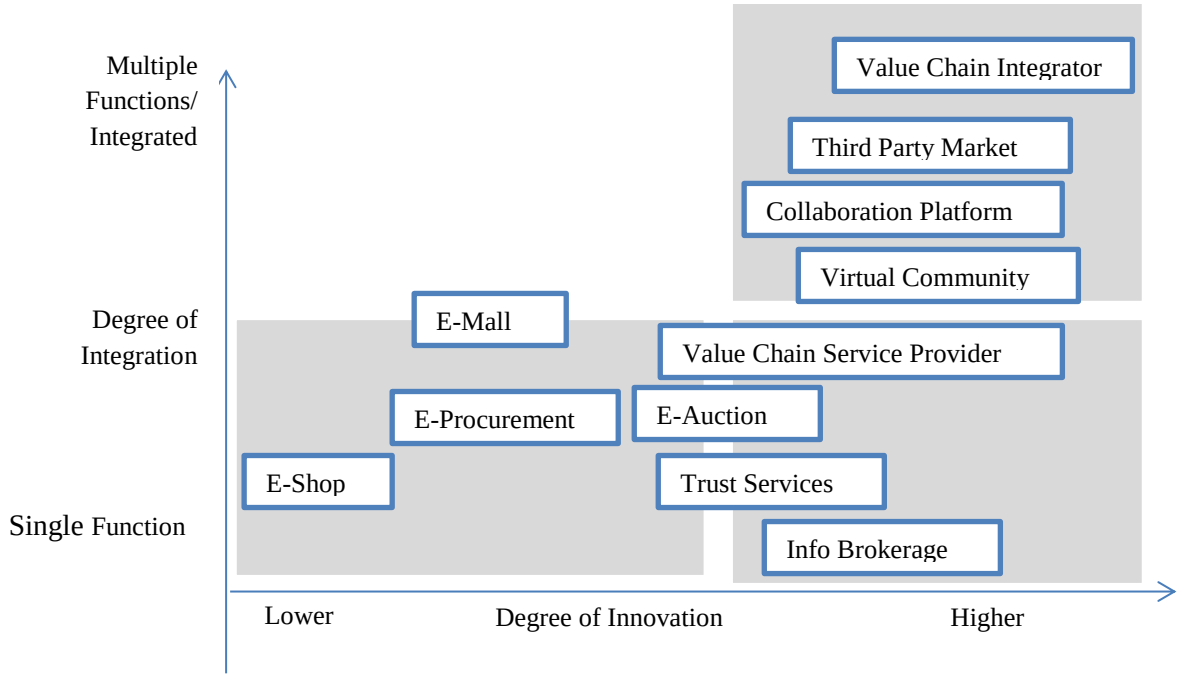

Figure 1 Business Model Classification Scheme (Timmers 1998)

(Bambury 1998) presented 2 main business model categories with 15 subcategories. These categories also classify internet business activities. The main categories are the Transplanted Real-World business models and the Native internet business models. The Transplanted Real-World business models represent those business models that are already in use in the real world, but have been moved into the internet environment. The Native Internet business models are the business models that are not developed for the purpose of revenue generation. The following table describes the sub-categories of the two business model types.

Business Model Type	**Description**
Transplanted Real-World Business Models	
The mail-order model	According to the author, this is probably the most common business model for internet business. Companies that belong to this business model type are web-based retail companies. They sell their products and receive payment via their websites.
The advertising based model	This business model type is used by companies that generate their revenue through advertisements, linked to a free service. An example is a search engine

	company that is paid to advertise other companies' products and services.
The subscription based model	Companies that provide digital content belong to this category. Their customers pay (subscribe) to gain access to the digital products they offer. Examples are the online rental movie site.
The free-trial model	This is mainly used by software development companies. They provide a free online access and usage of a type of software for a specified duration of time. Afterwards, the users are required to pay a fee to continue usage.
The direct-marketing model	In this sub-category, companies are paid to provide direct marketing services. This is usually done by spamming email accounts of target companies
The real estate model	Examples of companies that apply this business model are those companies that sell web space, domain names and email addresses.
Incentive scheme models	This business model type is sometimes combined with advertising. The companies lure people to provide personal information in order to receive free products or services.
Business to Business model	Unlike the business models that involve transacting directly with individual customers. This is used by companies that deal directly with other corporate companies
Combination model	The internet environment has enabled the possibility to combine different business models; companies that combine any of the aforementioned business models belong to

	this category
Native Internet Business Model	
The library model	This is used by those who disseminate free information over the internet.
The freeware model	Unlike the free trial model, the software developer allows a free download and an unlimited usage of the software.
The information barter model	This is used by organizations or individuals who exchange information freely via the web.
Digital products and the digital delivery model	This is similar to the subscription model. The difference is the absence of a financial transaction. Access to the digital contents is free.
The access provision model	This business model involves a collaboration of a company with an internet service provider to provide a free internet access.
Website hosting and other internet services	This model type is used by companies that provide free e-mail and web hosting.

Table 3 Business Model Classification (Bambury 1998)

In addition to the works on business model classification is the work of (Rappa 2006). The author also presented different forms of electronic business models and mentions that the business model types can be combined as the business strategy of a company. The classification is described in the table below:

Business Model Type	**Description**
Brokerage model	This is used by brokers/market makers who bring buyers and sellers together and facilitate transactions between them.
Advertising model	This is similar to the advertising based model of (Bambury 1998). A website provides services for free (in most cases); the services are combined with advertising messages in

	the form of banner ads. The source of revenue here is usually through advertisement fees.
Infomediary model	This model is used by companies that gather customer data, including their consumption habits. These data are analysed; the results are then used for marketing purposes.
Merchant Model	Wholesalers and retailers apply this model. They sell their products online through direct sales or through auctions.
Manufacturer (Direct) Model	This business model type is used by manufacturers who aim at reaching their target customers directly; bypassing a middle man.
Affiliate model	Unlike the general retail web portal, applying this model involves a company developing a web portal/platform that hosts other partner sites. Sales can be generated from the products the partner sites provide via the parent site. The company generates revenue by receiving a percentage of the revenue generated by the partners.
Community model	Revenue can be generated through this business model type through the sales of ancillary products and services or through voluntary contributions.
Subscription model	Depending on the type of service provided, the customers are required to pay periodically for the services provided.
Utility model	Unlike the subscription model, the users of the services provided are not charged periodically, but the users are charged for the actual usage of the service.

Table 4 Business Model Classification (Rappa 2006)

(Weill & Vitale 2001) present "atomic e-business models" as business model types. They mention that these so called atomic e-business models can also be used as building blocks for a more complex business model design.

Business Model Type	Description
Content Providers	Companies that belong to these type provide digital contents (information, products and services) to customers through third parties
Direct to Customer	They are the companies that sell their products directly to their customers, without using any intermediary
Full-service provider	In this business model type, a full range of services in a particular domain are provided directly to customers. Examples are in the areas of health care and financial services.
Intermediary	This is further classified into six categories; electronic mall, shopping agents, specialty auctions, portals, electronic auctions and electronic markets. The intermediary connects the buyers and sellers. The intermediary generates revenue by receiving selling commissions. In some cases, the buyers pay membership fee.
Shared infrastructure	Here, a company provides a shared IT infrastructure and provides a service that is not being offered in the market place.
Value net integrator	The company that applies this business model type acts as a value chain coordinator by controlling and managing the activities across the value chain of another company.
Virtual Community	In this business model type, an online community is developed and facilitated by a

	company. The virtual company consists of people with a common interest, who are able to communicate directly with each other.
Whole-of-Enterprise/Government	The companies under this business model integrate all the services provided by a multi-unit organization, and provide the services through a consolidated point.

Table 5 Business Model Classification (Weill & Vitale 2001)

2.6 Review of Business Model Frameworks

As part of the effort to develop a comprehensive framework, a review of already existing business model frameworks was done. Table 6 presents a synopsis of the different business model frameworks presented by different authors.

Authors	Focus of Study	Applied Methodology	Contribution
(Timmers 1998)	Developing a framework for the classification of internet electronic commerce business models	Not available	Product/Service/Information Flow Architecture, Actors and Roles, Actor benefits, Revenue sources
(Chesbrough & Rosenbloom 2000)	Capturing value from innovation (technology) through business models	Not available	Value proposition, Target markets, Internal Value Chain Structure, Cost Structure and profit model, Value Network, Competitive Strategy
(Linder & Cantrell 2000)	Differentiating between business model components, operating models and change models	Interviews with 70 company executives and analysts as well as extensive secondary research	Pricing Model, Revenue Model, Channel Model, Commerce Process Model, Internet-enabled Commerce Relationship, Organizational Form, Value Proposition

(Mahadevan 2000)	Developing a business model framework for internet based businesses	Review of different aspects of business models in the context of internet based business	Value Stream, Revenue Stream, Logistic Stream
(Amit & Christoph Zott 2001)	Value creation in e-business	Review of theoretical framework in the areas of entrepreneurship and strategic management	Transaction Content, Transaction Governance, Transaction Structure
(Alt & Zimmermann 2001)	Understanding the components of a business model from an e-Commerce perspective	Theoretical review of existing business model definitions	Mission, Structure, Processes, Revenue, Legal Issues, Technology
(Vliet et al. 2001)	Development of a business model ontology for e-business	Understanding the relationship between the development of electronic commerce systems and e-Business models	Actor, Value Object, Value Port ,Value Interface, Value Exchange, Value Offering, Market Segment, Composite Actor, Value Activity
(Otto et al. 2001)	Developing business models for e-business	Modification of the model by (Writz 2000)	Value Model, Resource Model, Production Model, Customer Relations Model, Revenue Model, Capital Model, Market Model
(Hedman &	Improving the	Theoretical review	Customers, Competitors,

Kalling 2002)	understanding of the business context of Information and Communications Technologies	of existing business model frameworks	Offering, Activities and Organisation, Resources, Factor and production input suppliers
(Dubosson-Torbay et al. 2002)	Developing a business model framework for internet based businesses	Review and decomposition of existing e-business models	Value proposition, Customer relationship, Infrastructure and the network of partners, Financial aspects
(Morris et al. 2005)	Developing a business model framework that can help an entrepreneur create value.	Theoretical review of existing business model frameworks	Factors related to offering, Market factors, Internal capability factors, Competitive strategy factors, Economic factors, Growth factors
(Richardson 2005)	Developing a business model framework for strategy execution	Theoretical review of existing business model frameworks	Value proposition, value creation and delivery system, Value capture
(Johnson et al. 2008)	Reinvention of business models	Not available	Customer value proposition, Profit formula, Key resources, Key processes
(Osterwalder & Pigneur 2010)	Designing and re-inventing innovative business models	Exchange of ideas from business model innovation practitioners through online platform, case studies, customer insights	Customer segments, Value propositions, Channels, Customer relationships, Revenue streams, Key resources, Key activities, Key partners
(Lecocq & Demil	Changes and	Inspired by Edith	Value proposition,

2010)	innovation in an organization	Penrose's view of the firm	Resources and Competences, Organisational structure

Table 6 Review of Existing Business Model Frameworks

(Timmers 1998) belongs to the group of authors that define the business model concept by listing its components. The author highlights the components of a business model as product/service/information flow architecture, actors and their roles, actor benefits and revenue sources. However, the author mentions that in order for a firm to examine its commercial viability in terms of its market position and competitive advantage (as examples), a business model must be accompanied with a market strategy. Here, the combination of business model and a market strategy is called the marketing model.

(Chesbrough & Rosenbloom 2000) argues that a successful business model creates some sort of logic that connects technology and economic value. They present the components of a business model by describing its functions from a technological perspective. According to them, the functions of a business model are to express the value proposition, identify the users of the technology i.e. market segment, define the value chain structure, and analyse the cost structure and profit potential of the technology provided based on the value proposition and the structure of the value chain, value network of suppliers, customers and competitors. Asides these individual functions, the combination of all the functions also provide a function; to know the financial capital that will be required for the implementation of the business model.

(Linder & Cantrell 2000) argues that business model components are not enough to create and capture value; they are just pieces of the logic of value creation of firm. From their perspective, a business model actually consists of business model components, operating models and change model. The business model components are the core for value creation. They describe the operating business models as the logic for profitability in which the success of a firm lies. The change model is the logic for a firm to remain profitable in a dynamic environment.

After reviewing existing business model representations in the area of internet-based businesses, (Mahadevan 2000) concluded that the business model frameworks lack comprehensiveness. They argue that a business model is a unique combination of three crucial components: value stream, revenue stream and logistical stream. The value stream

focuses on the value propositions and identifying the possible sources of value; the revenue stream is the logic for ensuring the generation of revenue while the logistical stream focuses on the supply chain required to implement the business model.

(Amit & Christopher Zott 2001) placed a lot of emphasis on value creation; they described their business model framework as a single unit of analysis that encapsulates the creation of value from different sources. They examined the sources of value creation from a theoretical perspective in the areas of entrepreneurship and strategic management, and proposed a business model construct that consists of the content of transactions; the products that are being exchanged and the required resources and capabilities necessary for the exchange, structure of transactions; the actors involved in the exchange and the linkage between them, and the governance of transactions; the control of the product flow and the legal structure of the organization.

(Alt & Zimmermann 2001) mention that having a broad knowledge and a deep understanding of the strategic goals, vision and value proposition are very crucial elements of a business model. They focused on the e-market environment and proposed six components that can be used to develop sustainable business models. These components are as follows:

i) Mission: represents the value proposition and overall vision of a company.
ii) Structure: focuses on the customers, industry, the actors in the value chain or value web and the roles they play.
iii) Processes: centre on the process of value creation.
iv) Revenues: refer to the logic of generating income
v) Legal issues: refer to the possible legalities that could influence all the other business model components.
vi) Technology: focuses on the effect of technological developments on the design of a business model

Asides considering these six elements, they also mentioned that the dynamics of the business model components must also be considered, in terms of the relationship between all the components.

In the course of defining the constituents of an e-business model, (Vliet et al. 2001) developed a business model ontology. The e-business model ontology focuses on value creation and value exchange in a network of stakeholders. The business model concept was

described using three perspectives; the global actor view, detailed actor view, and the value activity view. The global actor view consists of the actors and the exchange of value objects between them. According to them, value exchange begins and stops at value ports, the value ports are then grouped into value interfaces. The detailed actor view describes the collaboration between actors while the value activity view explains how value activities are carried out by actors and how the activities result to value objects for other actors. Based on these three perspectives, they developed a model which consists of an actor, value object, value port, value interface, value exchange, value offering, market segment, composite actor and value activity.

(Otto et al. 2001) describes a business model as the core logic of a business. Their perspective on business models is that the foundation of a business model is a complex mental model that can only be modified when the mental representation of the real world has first been changed. The mental model here is described as a network of facts and concepts.

The framework proposed by (Hedman & Kalling 2002) combines the internal aspects of a firm necessary to deliver a product or a service. They argue that the resources and activities do not necessarily have to change to deliver multiple value offerings. Also, that business models are dynamic; they change over time as customers, competitors and the organizational structure of the firm changes.

(Dubosson-Torbay et al. 2002) aimed at developing a framework that can be used to develop model that can enable an organization satisfy the demand of its customers, anticipate their future needs and remain competitive. They view a business model as the architecture of a firm which consists of a network of partners, through which value is delivered to the customers.

In comparison to other frameworks, (Morris et al. 2005) created a business model framework with a unique dimension. Their focus was not just on a firm in general but also on an entrepreneur, as an individual. In defining the basic components of a business model, they adapted an inquisitive approach which was centred on making certain entrepreneurial decisions. Based on common themes identified in literature, they formed six decision areas with different objectives. They are as follows:

i) How will the firm create value? (Value offering)
ii) For whom will the firm create value? (Customer segments)

iii) What is the firm's internal source of advantage? (Internal capability factors)
iv) How will the firm position itself in the market place? (Competitive strategy)
v) How will the firm make money? (Economic factors)
vi) What are the entrepreneur's time, scope and size ambitions? (Personal/investor factors)

(Richardson 2005) sees a business model as a tool that can be used to execute the strategy of a firm. The proposed framework was developed with the aim of using a business model framework to strategically think of how a firm does business. The components of their business model framework are centred on value because they observed that value was consistently linked to business models and strategy. The components of their framework include value proposition, value creation and delivery system and value capture. The author argues that value proposition can be summarized as a theory for competition, derived from the combination of different strategy frameworks. Also, that the value creation and delivery system reflect the consistency of a firm to implement its strategy. Lastly, for value to be captured, a firm has to use a strategy that enables the firm to make more revenue than the costs incurred.

(Johnson et al. 2008) proposed four components of a business model. They include the value proposition, profit formula, key resources and key processes. Their perspective on value proposition is about precision; value propositions should aim at perfectly meeting the needs of the customers. They also had a unique perspective to the profit formula of their business model framework. They explained the necessity of a firm to evaluate how the available resources are to be utilized to implement a business model and achieve the desired profit.

The framework proposed by (Osterwalder & Pigneur 2010) seems to be a broader unified framework, consisting of various components mentioned earlier in literature. They present nine building blocks of a business model. They are customer segments, value propositions, channels, customer relationships, revenue streams, key resources, key activities, key partnerships and cost structure. However, some of these components were described with a unique perspective. For instance, they explained the different segment of customers possible. These customer segments are those that:

i) Require distinct value offerings in other for their needs to be met
ii) Provide significantly different profitability
iii) Willingly pay for a different aspect of a value offering

The value proposition discussed here, does not only consist of the products and services as discussed by other authors, but it is seen a "bundle of benefits" offered to customers. Value can also be received quantitatively or quantitatively. For instance, in terms of the price of the products and services offered or the service experience respectively. The Channel building block refers to the various ways a firm can reach and communicate with its customers in order to deliver a value proposition. Customer relationships addresses the issues of identifying the kind of relationship a company should have with its customers and how it can be integrated with the other business model components.

(Lecocq & Demil 2010) reiterates the possibility of a firm to use resources and competences provided externally. This was described under the resources and competences component of their framework. Their description of the organizational structure of a firm was different from other authors. Their organizational structure includes the people included in the value network and the relationship between them.

Despite the variations of already existing business model frameworks, there seems to be some common elements that unify them. For instance, most of the business model frameworks such as (Otto et al. 2001) and (Osterwalder & Pigneur 2010) and (Johnson et al. 2008) among others considered how a firm will capture value, mostly in the form of revenue, by offering a product or service that is beneficial to the customers. Even though these authors agree on value creation and value capture through business models, the understanding of value creation differs for some. Value creation was limited within the boundaries of the firm for some authors such as (Morris et al. 2005) and (Mahadevan 2002) unlike the works of (Osterwalder & Pigneur 2010) and (Richardson 2005) where the importance of a value network was acknowledged. The value network breaks through the limitations of the boundaries of the firm by creating a relationship between the suppliers, networks and customers, needed for the value creation process. (Otto et al. 2001) and (Osterwalder & Pigneur 2010) also described how the value will be delivered to the customers i.e. the logic behind the value delivery process.

In relation to financial performance as a means of evaluating how much value is captured by a firm, (Alt & Zimmermann 2001) focused on the necessary investments needed and sources of revenue. This is not as detailed as the other approaches presented by some authors to describe the logic of the financial performance of a business model. (Chesbrough & Rosenbloom 2000) refer to this logic as "architecture of revenues", (Johnson et al. 2008) refer

to it as the “profit formula”, while (Morris et al. 2005) refer to it as the “economic model). They all describe how a firm can create value for itself while also providing value for their target customers. As regards this, the business model framework of (Johnson et al. 2008) consists of the revenue model i.e. price x volume, the cost structure primarily consisting of the cost of key resources, the margin model which was described as the amount of revenue required from each transaction, in order to obtain the desired profit, and finally the resource velocity which refers to the utilization of resources such that the expected profits and sale are achieved. The description of (Morris et al. 2005) follows closely to this but (Johnson et al. 2008) went further by including the pricing mechanism that will determine how much a firm will charge for the products and services delivered in order to make profit.

The emphasis on value creation through business models shows that there is a strong correlation between business models and value correlation. It can be inferred that the value creation process varies among business models; alterations in business models will most likely create changes in how value is created. As much as there are recurrent components, there are also components that are unique to certain authors, such as in the work of (Alt & Zimmermann 2001); they described the legal and technology components. The legal component was described as a possible influence on the composition the value creation systems, the value creation process, as well as the revenue model. The possible impact of technological developments on the design of business models was acknowledged. Although this was in the context of IT-based business models, it was also mentioned that the technological issues directly affect the other components of a business model.

In addition to describing the ability of a firm to control its financial performance, and the configuration of the resources, activities and capabilities (from both within and outside a firm) to deliver a product or service, another theme that can be identified amongst the business model frameworks is the “marketing” theme. Related frameworks consist of components that address marketing specific issues; including methods that can be adapted to reach and develop relationships with customers.

Interestingly, two different perspectives were presented by (Otto et al. 2001) and (Osterwalder & Pigneur 2010) regarding developing and maintaining relationships with customers. (Otto et al. 2001) describes this perspective as the customer relation model which means the “logic of reaching, serving and maintaining customers. They further explained the model using three sub models: the marketing model which describes how a firm decides to

reach and maintain their customers, the service model which is the adopted to serve the customers and finally the distribution model; which describes how a firm decides to deliver its value propositions. The second perspective presented by (Osterwalder & Pigneur 2010) is described under the customer relationship component in their business model canvas; it focuses on the type of relationship a firm aims at developing with specific customer segments. They further mentioned that this relationship may be developed based on certain reasons such as boosting sales or acquiring and retaining customers. It is worthy to mention that the distribution model mentioned earlier is similar to the "channel" component of the business model canvas which was described as how the firm reaches and communicates with its customer segments in order to deliver its value proposition.

2.6.1 Overview of Business Model Components

Similar to the inconsistency in the definition of the business model concept, there has also not been a consensus on what the exact components of a business model should be. The review of business model frameworks showed that there are different level of abstractions of the business model components, and there is no unique set of components that has been generally accepted; some are just more frequently referred to than others [e.g. (Timmers 1998) and (Amit & Christopher Zott 2001)]. These dissimilar views on the scope of a business model may be as a result of the different disciplines within which the different business model components were developed. For instance, some authors focused on e-Commerce, some focused on information technology, while some focused on developing a business model framework that can be put into general use. As a result of the various business model components that exist, it is useful to identify those components that can be considered as foundational. Identifying foundational business model components can be useful for further research on the design of business model frameworks.

After reviewing the business model frameworks, themes could be seen to develop across the various business model components. These themes are mainly based on the frequency of occurrence of some components as well as their meaning; value proposition, customer segment, revenue, key resources, key partners, key activities and related components. However, in some cases, some of these components could be identified as sub-dimensions of other components. In general, two main themes could be identified; the value and financial model themes.

The value theme covers the components that are related to value offering, value capture and value creation while the financial theme consists of all the components that relate to financial planning and control of a business model (Writz et al. 2016). The value offering encapsulates all the elements necessary to provide value to customers. Asides products and services which have been commonly identified as means through which value can be created, some authors such as (Krumeich et al. 2012) and (Hedman & Kalling 2002) mention the necessity to consider competitors while designing the value offering. In the business model component framework by (Krumeich et al. 2012), the author includes competitive advantage and competitive model as part of the value offering model in a business model. The competitive advantage assures the long-term sustainability of the products and the sustainability of the products and services while the competitive model helps to identify the competitors and the risk they pose to the success of a business model.

The second dimension of the value theme is value creation. The value creation focuses on all the elements necessary to create value. (Krumeich et al. 2012) identifies organisational structure, resource model, competence model and activities and processes as the necessary components of value creation. (Writz et al. 2016) includes core competencies assets and core assets in the resource model. The competence dimension consists of the abilities that are unique to a particular firm and that are needed for the usage and transformation of resources into outputs that can provide value. In delivering a value proposition, the activities that are needed to be carried out can be done internally i.e. within the boundaries of the firm or externally (Osterwalder & Pigneur 2010). The activities and processes dimension identifies the activities required and provides an answer to which activities should be done internally or externally. Those responsible for the implementation of the activities and processes model are defined in the organization structure.

Lastly under the value theme is the value capture dimension. The target customer and market segments are determined in the value capturing model (Krumeich et al. 2012). According to the author, the success of the value offering model is determined by connecting the model to the customer and market segments. Other components that have also been identified are customer relationships and the communication and distribution models. The communication and distribution channel specify the appropriate channel through which the customer and market segments will be reached. Lastly in this model is the customer relationship which can be used as a decision-making tool for the development of the value propositions.

The second main theme that can be identified from the business model components that have been reviewed is the financial model theme. A well-structured financial model is needed for financial planning and financial control through a free flow of capital; and the analysis of the cost structure (Writz et al. 2016).

Referring to the business model component framework of (Krumeich et al. 2012), the financial model should consist of 6 dimensions. The funding or capital model, revenue model, pricing model, cost model, profit model and distribution model. Sources of the capital required to implement the business model are identified in the funding model. The revenue component focuses on the generation of revenue by evaluating the overall cost incurred to fulfil the value proposition and determining the right prices; this is done in the Pricing dimension. The cost dimension focuses on the primary capital-intensive activities and resources, and aims at minimising the costs of these activities and resources. Profit analysis is done in the profit dimension; this includes determining how profit will be made and how much profit will be made. Finally, the distribution model specifies how the cost and revenue will be shared among all stakeholders.

2.7 Sustainability Business Models: The State of the Art

Empirical and theoretical researches on sustainable business models are still in the beginning stages. Most of the works that have been carried out on sustainable business models have been focused on specific industries, creating a lack of a general understanding for sustainable business models.

(Tukker & Tischner 2006) explained how different types of product-services (PSS) can contribute to environmental sustainability. They define a product-service as a "value proposition that consists of a mix of tangible products and intangible services, designed and combined so that they jointly are capable of fulfilling final customer needs". This simply means that a company provides a product-service if the company sells a product alongside other intangible services, such as satisfaction, and good experience.

In order to understand how the different types of PSS contributes to environmental sustainability; the different types of PSS are first described below:

1) Product-Oriented Services: this category is further divided into 2 sub-categories:
    i. Product-related service: this type of service is provided when a company sells a product and offers the necessary services needed while a customer is using

the product. The services can be in the form of a maintenance contract or a financial scheme.

ii. Product-related advice/consultancy: for this type of service, a company offers advice on how to make the best use of the product purchased by the customer.

2) Use-Oriented Services: this category is divided into 4 sub-categories:
   i. Product lease: here, a customer pays a regular fee for an unlimited use of particular product. However, the ownership of the product does not move from the provider to the customer.
   ii. Product renting or sharing: this is similar to the product lease. However, for this type of service, the user of the product has limited access to the product; other users can use the same product sequentially.
   iii. Product pooling: this is similar to product renting, but in this case the product can be used simultaneously.
   iv. Pay-per-service: here a customer does not pay for a product, but for the output of the product, based on the usage of that output.
3) Result-oriented services: this category is divided into two subcategories:
   i. Activity management/outsourcing: here, a company outsources some of their activities to a third party.
   ii. Functional result: this service is based on an agreement between a customer and a company to provide a particular service.

The various ways PSS can contribute to environmental sustainability are explained below:

i. Product-related service: the focus here is to improve or change user behaviour in the consumption and use of a product through the service component that is provided along with the product. Since a customer receives a service with a product, sustainability can be improved with the use of the product because of the professional services provided. For instance, a user might be educated on how to minimize the energy usage of a technological product.

ii. Product-related advice and consultancy: the value here is similar to that of the product-related service; the PSS provider offers advice for an efficient use of a product, which can minimize the impact on the environment.

iii. Product lease: the principle here is that since it is the responsibility of the product provider to repair and maintain the product, the energy use of the product might

be efficient as a result of regular and better maintenance. Although there is still a possibility of reverse effects, since the user of the product might not optimize the product use because the provider still owns the product.

iv. Product renting and sharing: the value here is based on the method of consumption. In comparison to the production of the product, such a product can reduce environmental impact from production, since the same product can be used sequentially.

v. Product pooling: the difference between the value provided by product renting and sharing PSS type and the value provided by Product pooling is that for the later, the environmental impact from the production of the product can even be minimized even more since the same product can be used simultaneously.

vi. Pay-per service unit: the sustainability value provided here is described in two dimensions. First, since the cost of the life-cycle of the product is the responsibility of the provider, the provider will aim at designing the product in way that the product will be highly optimized during and after use i.e. including components that can be re-used after the product's life-cycle. Secondly, in some cases, the user will be responsible for an efficient use of the product especially if the costs are accumulated over a period of time.

vii. Activity management/outsourcing: the value here is very minimal because the activities depend on the company that has been outsourced. However, it is the responsibility of the company outsourcing activities to make use of materials and capital efficiently.

viii. Functional result: this has the highest potential for sustainability; it can significantly improve user behaviour. Also in the course if delivering the agreed product, the provider might develop the product in a cost-effective way, using innovative methods. Theoretically, this might lead to environment improvements as well.

(Stubbs & Cocklin 2008) worked on conceptualizing a "sustainability business model" that can be used to integrate sustainability into the decision making process of a firm and also influence the mission of the firm. According to the authors, a sustainable business model can be represented in different forms; a description of sustainability practices, a representation of business processes, a firm-level description; a systems level description; or some combination of these. They carried out interview-based case studies of two organizations that had

incorporated sustainability in their business models; one focused on addressing social sustainability while the other focused on addressing environmental sustainability. Based on the interviews, similar themes were blended and summarized. They are as follow;

i. Redefining the Purpose of Business: The purposes of the businesses of both firms were defined outside the boundaries of financial returns. The organizations acknowledged that profitability is an output of implementing sustainability practices.

ii. Reporting Financial, Environmental and Social Outcomes: both firms produce an environmental and social based sustainability report annually. The authors' understanding about sustainability reporting is that it is capable of influencing the perceptions of the stakeholders of a firm. The organizations also mentioned the importance of monitoring the performance of the internal system, such as the contribution of the employees to sustainability initiatives.

iii. Stakeholder View of the Firm: the importance of getting support and engaging stakeholders in sustainability plans were also identified. Here, engaging the stakeholders means a continuous communication and education on the issues of sustainability.

iv. The Role of Leadership: the CEO's of the two organizations imbibed the essence of sustainability into the minds of the stakeholders. As a result, the values of the firms are in conjunction with the sustainability objectives developed by the CEOs. This showed how influential those in the position of leadership are in institutionalizing sustainability in a firm.

v. Nature and Environmental Sustainability: the narrative here suggests that; a firm has to make deliberate changes for environmental sustainability to be successful. This includes investing in making structural changes (e.g. purchasing renewable energy facilities) and making behavioural changes towards energy consumption. However, it was also highlighted that some organizations find it challenging to achieve sustainability; organizations may not have adequate financial resources to make such capital investments in making structural changes.

vi. Modifying the Taxation System: the taxation system was identified as a barrier to sustainability. It was suggested that the tax system must be modified in such a way that the weight will be shifted to the consumption of non-renewable

resources. According to the organizations, this would encourage a re-evaluation in the design of products in order to minimize their impacts on the environment.

vii. Retaining and Re-investing Local Capital: the importance of retaining locally produced capital was emphasized as a necessary factor for a sustainable society.

These themes were translated into the characteristics of a sustainable business model. These characteristics are also described below:

Economical Characteristics	**Environmental Characteristics**	**Social Characteristics**	**Multidimensional Characteristics**
Structural Attributes			
External bodies that track performance of companies use a triple bottom line (TBL) approach.	Threefold strategy: offsets (do no harm but make amends if you do), sustainable (do no harm), restorative (leave the world better than you found it).	Stakeholder engagement skills: understanding stakeholders' needs and expectations (being relevant to stakeholders).	Systems approach: • Cooperative business strategy and planning. • Collaborative model including supply chain, competitors, government agencies, communities.
Lobby industry and government for changes to taxation system and legislation to support sustainability.	Closed-loop systems: responsible for product throughout its lifecycle	Educate stakeholders; "relentless" communication.	TBL approach to measure organizational performance.
Keep capital local: local shareholders and investment in local sustainability initiatives.	Implement a services model.	Implement stakeholder consultation program.	Institutionalise sustainability in the business: "relentless" communication, stakeholder education, leadership, champions, and align

			internal performance measures
	Industrial ecosystems and stakeholder networks.	Get "buy-in" from internal and external stakeholders	Demand-driven model, not supply-driven model (driven by what people need, not driven by companies trying to get people to buy more).
Cultural Attributes			
Profit is a means not an end. Business makes a profit to do something more. "Higher purpose" to business than making money.	Treat nature as a stakeholder.	Stakeholder approach (managing the organization for the benefit of all stakeholders and not prioritizing shareholders' expectations above other stakeholders)	Medium to long-term focus
Shareholders invest for social & environmental impact reasons as well as for financial reasons		Alignment of stakeholder expectations.	Reduction in consumption.
Shareholders temper expectations for short term financial returns		Sharing of resources (people, profits, and time) among stakeholders to achieve sustainable outcomes	
		Relationship	

		building (trust, two-way loyalty, honesty, integrity, and fairness, equity).	

Table 7 Characteristics of a Sustainable Business Model (Stubbs & Cocklin 2008)

In the course of devising methods that can be used to develop and establish new business models in China, (Birkin et al. 2007) proposed a framework for integrating sustainability into a business model. Their argument was that sustainability is more likely to be treated with a higher priority outside the business world, but if left addressed, it will adversely impact and change businesses. In order to gather information about the social and environmental performance of companies, the authors interviewed 10 companies; a number of issues were identified regarding the efforts of the companies towards sustainability:

i. Sustainability issues: regarding the issues of sustainability in the companies, the common challenge was the inability to understand and then integrate sustainability into their businesses. Also, there was a lack of financial incentives to facilitate sustainability practices. In some cases, there was a misconception on whose responsibility it is to ensure that sustainability initiatives are developed and implemented i.e. the government or the company. The authors perceived that some of the small and medium sized companies view sustainability as a duty of the government.

ii. Environmental Awareness and Performance: a significant number of the companies were aware of the environmental sustainability issues. However, only one of the companies worked towards being sustainable. The others were not just able to improve their environmental performance.

iii. Community Matters: this was regarding social sustainability. There were set rules and regulations that protected the rights of workers, in respect to their wages and their overall conditions.

iv. Performance Drivers and Barriers: in general, the perceived barriers to sustainability were the lack of financial incentives, lack of understanding and the skills needed to implement the necessary changes.

The authors developed steps that could change the companies using traditional business models in such a way that they can address societal and environmental sustainability.

Action for Corporate Sustainability	Investigating	Internalizing	Integrating	Innovating
THE PROCESS OF IMPROVEMENT				
Capability and Understanding	Sustainable Development business drivers: • Scenario analysis • Impact assessment • SWOT • Risk Analysis Top level discussions, decisions and delegation of responsibilities	Detailed understanding of important impacts throughout supply chain Sustainability as part of standard leadership curriculum Establish learning networks across businesses	Exploring new ways of meeting customer and market needs Active development of sustainable leadership traits for key staff Completion of 1st round conceptual education of organization Extract value from learning networks	'Sustainable' culture – • Cultural work sheet process • Impact awareness activities and field trips
Commitment	Statement of own views: Internally- • Statement of commitment	Clear sustainability policy/codes of conduct, goals, targets,	Coordinating structure for sustainability agenda clearly embedded in	Sustainability indicators part of organizational and personal goal hierarchy

	• Statement of intentions Externally – • Basic communication	gap identification and action plans based on an understanding of how sustainable development interacts with your business model Identification of impact and value indicators	top management Communication plan: - Who, what, how, when Integration of impact and value indicators throughout the decision-making process within the organization Sustainability focused R&D strategy Generate & communicate relevant/require information	Sustainability credibly integrated in corporate brands & reputation
Partnerships	Allow others to state their views • Stakeholder analysis • Structure dialogue • Understand	Define advisory boards Partnership culture development tool in use	Partnership Portfolio Management System in place at corporate level • Who is	Partnership Portfolio Management System in place throughout the organization • "Who is

	competence needs	Set of defined partnerships with "sustainability oriented" organizations & pilot projects	"in" • Project goals monitored etc. Measure trust & mutual usefulness of partnerships	in"? • Project goals monitored etc. Job exchange program with key partners

Table 8 Main Steps in Integrating Sustainable Development into a Business Model (Birkin et al. 2007)

(Florian 2010) aimed at conceptualizing business model for sustainability by developing a framework that combines sustainability strategies and eco-innovation, while considering both the private and the public environments. In order to achieve this, they focused on examining the possibility of business models being eco-innovations. For the purpose of understanding the concept of eco-innovation, the following table describes the different approaches of eco innovation:

	Technological	**Organisational**	**Social**	**Institutional**
Approaches	Curative or preventive process and product innovations; prevention can be integrated or additive	Management systems, concepts and instruments at the firm level	Change of lifestyles, consumer behaviour and consumption pattern	Arrangements of networks, regimes of global governance; also including new assessments and public participation

Table 9 Classification of eco-innovations (Rennings 2000) **in** (Florian 2010)

(Florian 2010) also posits that business model eco-innovation is a possible route towards creating extended customer value. The extended customer value in this context is the value created to both the customers and the public. The concept is further divided into 4 modes:

i. Creating value for individual customers and the company: this refers to the traditional offering of products and services to customers by companies.

ii. Creating value for the public and the company: this involves the use of compliance schemes such as regulations, and other mechanisms to minimize environmental impacts.

iii. Creating value for the public and individual customers: this may involve Corporate Social Responsibility activities that are not necessarily integrated into the business logic of a company.

iv. Creating value for the public, individual customers and the company: this involves the creation of value through innovation.

Based on the concept of eco-innovation, the framework was developed. This is represented below:

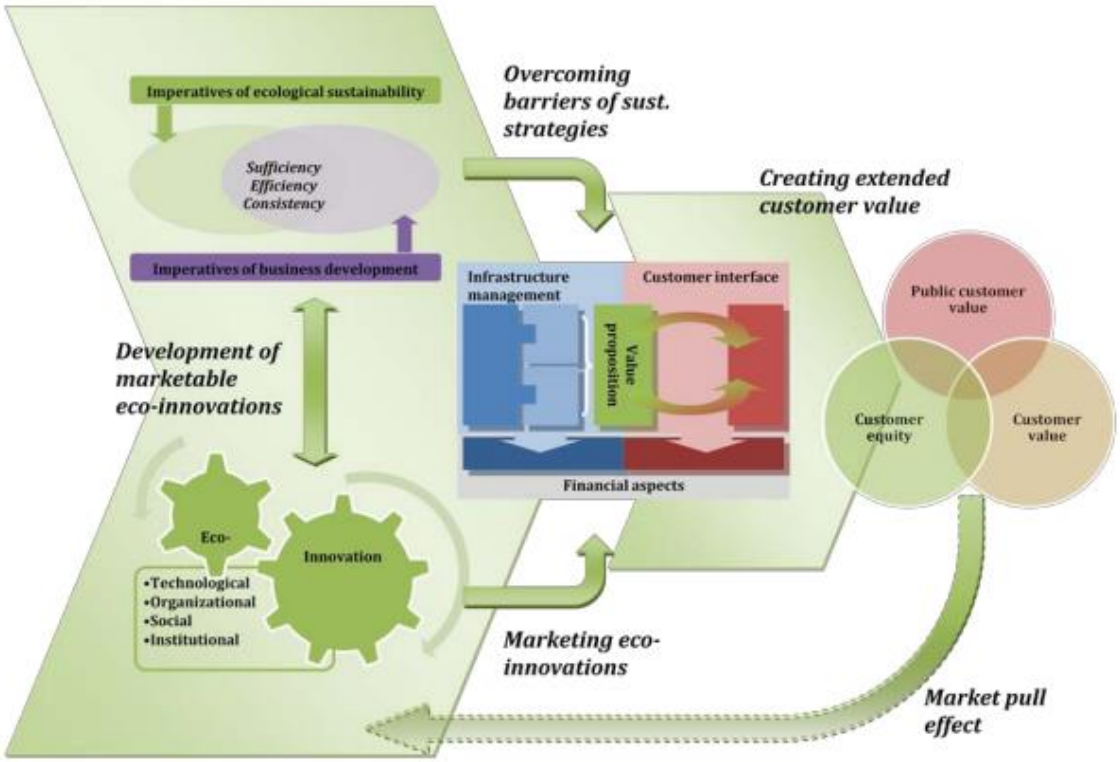

Figure 2 Conceptual Framework of Business Model eco-Innovation (Florian 2010)

Here, the linkages between eco-innovation and business models are as follow:

i. Business models can be used as drivers to promote eco-innovations. They can also become organizational eco-innovations

ii. Business models can be used as a platform for eco-innovation based value propositions that can be used as a competitive advantage, as well as to overcome the barriers of ecological sustainability strategies.

According to (Karan & Netessine 2013), there are two types of inefficiencies that can negatively affect the performance of business models. These inefficiencies are information inefficiencies and alignment inefficiencies. They mention that in most cases, decision making in traditional business models is done before the necessary information needed to make the decision is completely available. Hence, decisions are made with inadequate or inaccurate information. In relation to sustainability, organizations adapt and invest in sustainable technology without gathering complete information on the possible future advancements in technology, which can make organizations face the challenges of uncertainty (e.g. changes in regulations). For the second inefficiency, the alignment inefficiencies occur when decisions made by organizations do not correspond with the objectives of the value chain of the organization. These inefficiencies directly affect the performance of a sustainable business model. The aim of the authors was to describe methods that can be adopted to develop sustainable business models. These methods were incorporated into the four main decisions made by organizations when implementing business models. These decisions are the "What", "When", "Who" and "Why".

i. The "What": this type of decision can be related to the type of products and services an organization aims to offer or the specific customer needs they plan to address. This type of decision making can influence sustainability in organizations; it can include choosing the type of by-products to use, deciding on the scope of activities that can minimize environmental impact.
ii. The "When": the timing and sequence of decision making for a business model can contribute to the development of sustainable business models. This can include altering the methods of information collection or waiting till the complete information about a particular technology is available before investing in it.
iii. The "Who": changing the decision maker can contribute to sustainability in business models. An example is changing the person that decides on the methods of carbon emission reduction to energy efficiency services companies.
iv. The "Why": this focuses on attaching incentives to sustainability initiatives. This can influence decision making of participants towards sustainability.

Table 10 represents ideas of the authors for business model sustainability innovation:

What	**When**	**Why**	**Who**
Select focused versus flexible business model	Delay decisions as much as possible	Transfer decisions to best-informed players	Change the profit revenue streams to aligns incentives
Change the scope of decisions	Change the sequence of decisions	Transfer decision rights to the party for which consequences are the best	Replace short-term relationships with long-term relationships
Hedge/complement decisions with each other	Split decisions to obtain partial information before decision is completed	Move the consequences (costs) of the decision to the party that benefits the most	Integrate misaligned parts of the value chain

Table 10 Ideas Triggers for Business Model Innovation (Karan & Netessine 2013)

Lastly, a framework for sustainability innovation was developed by (Florian 2013). The author assumes that business models have a mediating function; they can support the commercialization of sustainability innovations. The mediating function is an important element in the creation of economic, social and ecological value because of its capability to help overcome barriers to profitability from sustainability innovation.

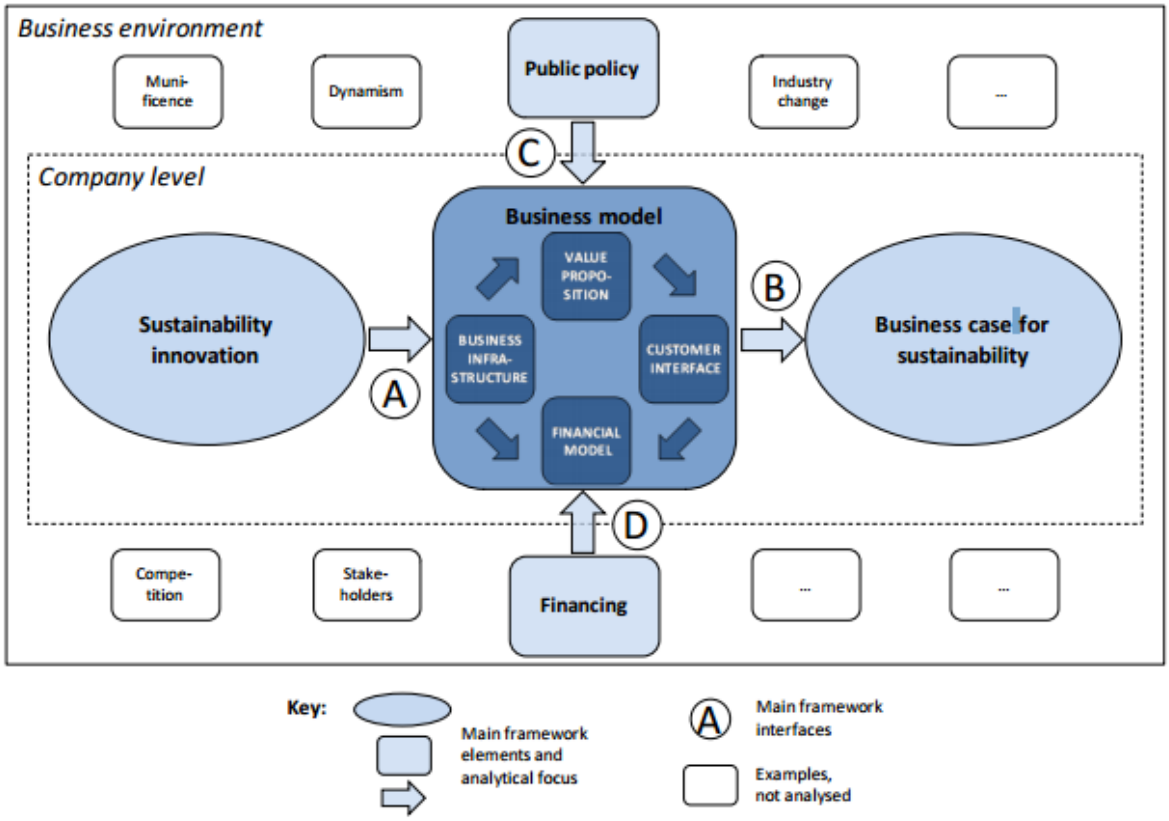

Figure 3 The Business Model for Sustainability Innovation Framework (Florian 2013)

The horizontal components consisting of sustainability innovation, business model and business case for sustainability, show how sustainability innovation is used to create a business case for sustainability. The vertical components show the connection between a company and its external environment. The dotted lines that separate the company from the business environment show that there cannot be a complete division between a company and its business environment as a result of possible relationships with competitors, suppliers, impact of regulations, among other exchange relationships.

2.8 Literature Gaps

Financial markets have been known for innovation in both the development of new products and services as well as in their business processes (Lumpkin A. 2009). This evolution is usually to support the provision of new services or for the reduction of the cost of existing ones. Regulations and policies either encourage or inhibit the success of business models; the new products and services that result from new business models are usually influenced by regulations that guide the operations of a particular market (White 1997). The business model frameworks presented by the authors included the dimensions that explain the activities and processed that are required to create value, but these frameworks did not consider the impact

of regulations on the design of the business models, irrespective of the business area. Examining regulations and policies can help markets to evaluate new business models in the context of the specific regulations guiding the market and also help anticipate and assess the potential implication of the regulations.

In addition, although there was a lot of emphasis on value capture, in terms of generating revenue and making profits, the authors did not address the sustainability of the resulting business models developed from the frameworks. The sustainability referred here does not only refer to environmental sustainability, but also financial sustainability. A business model should be developed in such a way that it is sustainable financially despite factors that could threaten its profitability such as competition and regulations. Ecological and societal factors should also be integrated into the core of the business logic (Drimmelen 2013). Considering the uncertainties in which financial markets operate, and their efforts to remain profitable, financial markets need to incorporate methods that will ensure continuous profits without disregarding their impact on the society and the environment. The best sustainable business model is the business model that contributes to financial, social and environmental goals, without one of the goals deteriorating for the other (Drimmelen 2013).

(Tukker & Tischner 2006) presented an interesting perspective on sustainability in business. They argue that value propositions as product-services can contribute to decoupling. Decoupling here is defined as "economic growth that does not cause a similar growth in environmental pressure (resource use and emissions)". In simpler terms, they posit that different types of product services can influence environmental and social sustainability in business, in different ways. The authors mention that product-service should be described in the context of business models;

- What is the offering or value proposition?
- Which parties in which roles make up the value network?
- How is the technological architecture organized?

However, it is still unclear how the business model concept is mirrored in relation to the contribution of product-services to sustainability. Although the authors clearly describe the potential of sustainability each type of product-service holds, there is still obscurity in understanding the linkage to the development of a sustainable business model in an organization.

The contribution of (Stubbs & Cocklin 2008) was a suggestion of the characteristics a "sustainability business model" should have. This was done through a case-study based empirical research. Their work showed the challenges and complexities of integrating sustainability in to the core of their businesses. They developed a framework for an ideal "sustainability business model" consisting of economic, environmental and social characteristics. This is similar to the work of (Birkin et al. 2007) which suggests the changes that should be made in traditional business models, in order to respond to the needs of sustainability. These suggestions focus on managerial activities and organizational development; the relation of these characteristics to the core components that constitute a business model were not considered. This makes it unclear, how sustainability can actually be achieved through business models.

(Florian 2013) focused on conceptualizing a business model in the context of ecological sustainability. Their conceptual framework consists of ecological sustainability strategies, eco-innovation and the role of business models. Again, this framework does not describe how the sustainability strategies will translate in to the business model of organizations. Also, the framework is not robust enough to accommodate the other aspects of sustainability i.e. the social and the financial aspects.

In general, an integrated business model framework that consists of components that can be used to develop a sustainable business and that address environmental, social and financial sustainability is missing. There has been a lot of emphasis on ecological and social sustainability, but the financial aspect is barely discussed. However, reviewing the challenges and barriers to social and environmental sustainability, such as in the case studies of (Birkin et al. 2007) and (Stubbs & Cocklin 2008), one common factor is the lack of capital/financial incentives to implement the other aspects of sustainability. This suggests that working towards financial sustainability should be treated with as much importance as environmental and social sustainability. If a company cannot meet its financial sustainability goal, the company will fail (Drimmelen 2013).

In the development of sustainable models, there should be a synergy between the business model concept and the three aspects of sustainability mentioned above. A company is not really sustainable until the environmental, social and financial sustainability goals are met (Drimmelen 2013).

2.9 The Relationship between Business Models and Sustainability

Integrating sustainability into the business model of a firm requires that asides the economical stakeholders, the environment and the society are also considered as stakeholders (Evans et al. 2014). (Zott et al. 2010) explains that a business model focuses on the value captured for the firm and its major stakeholders such as third-party suppliers. Including the society and the environment as part of the range of stakeholders, a business model can be a tool that can be used to achieve sustainability. Since the business model concept has always been described in terms of value creation and the value capture throughout literature, a business model can serve as a linkage between the value created and captured and the recipients of the value (Drimmelen 2013); sustainable business models capture economic, social and environmental value for a wide range of stakeholders (Bocken et al. 2013). However, a firm needs the capacity to change business models or create new business models in order to create and apportion value to the stakeholders (Teece 2010). Hence, the business model of a firm has to change to be sustainable or be newly developed in order to create the complete value that will benefit all the stakeholders of the firm (Drimmelen 2013).

CHAPTER 3 – METHODOLOGY

This chapter explains the set of choices and processes that were used as a method to fulfil the objectives of the research. The chapter begins by providing a general description of the chosen methodology, followed by a justification; explaining the reasons why the methodology is appropriate for the research. The philosophical stance of the methodology is also explained and finally, a detailed description of how each step of the methodology was applied to the research.

3.1 Design Science Research Methodology

This research adapts the Design Science Research (DSR) in Information Systems methodology. (Dresch et al. 2015b) defines Design Science Research as a method that establishes and operationalizes research when the desired goal is an artefact or a recommendation. The artefacts provide solutions or improvement in a problem context by interacting with the problem. The figure below shows the interaction of artefacts examples with different contexts.

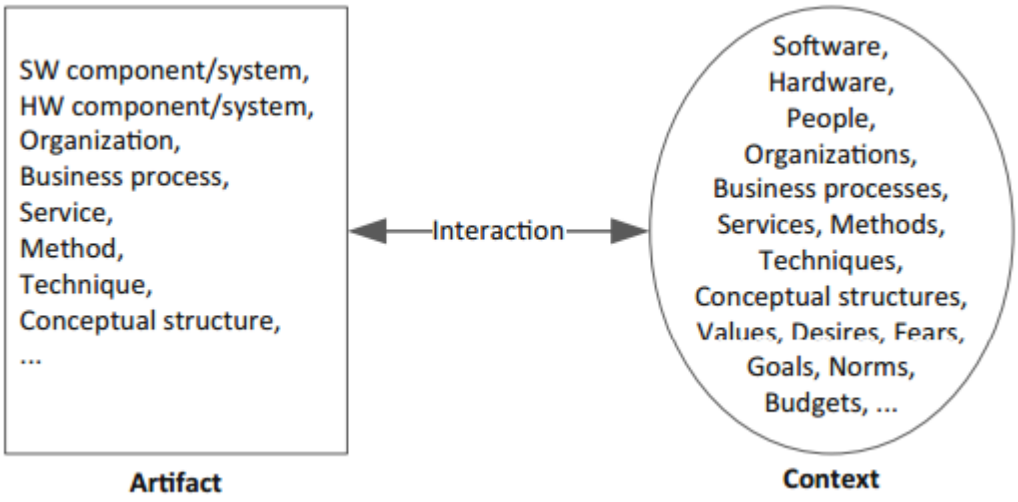

Figure 4 The Subject of Design Science: an Artefact Interacting with a Context (Wieringa 2014)

(Wieringa 2014) highlights two types of research problems in design science; the design problems and knowledge questions. The design problem includes an evaluation of hypothetical or real goals of a stakeholder in order to change something in the real world. For this type of research problem, there are usually many solutions. The solutions are in form of designs which will be evaluated in terms of the goals of the stakeholder. On the other hand, the knowledge questions do not require for change in the real world but seek to obtain

knowledge about the world. Unlike the design problem, the answer to this type of research problem is usually one proposition which will be evaluated by the truth.

Design Problems	**Knowledge Questions**
Call for a change in the world	Ask for knowledge about the world
Solution is a design	Answer is a proposition
Many solutions	One answer
Evaluated b utility	Evaluated by truth
Utility depends on stakeholder goals	Truth does not depend on stakeholder goals

Table 11 Heuristics to Distinguish Design Problems from Knowledge Questions (Wieringa 2014)

3.2 Research Goals in a Design Science Research Project

In design science research, there are differences between the goals of a researcher and the goals of an external stakeholder. (Wieringa 2014) provides some examples of the goals of a researcher and an external stakeholder. The goals of a researcher are usually driven by inquisitiveness, to provide the answers to the knowledge questions and to design new artefacts. These may be similar to the goals of an external stakeholder. However, in the case where the external stakeholder is the sponsor of the research project, the stakeholder provides capital for the project, with an expectation to receive relevant artefacts (designs) in return. These designs must meet the design specification of the stake holders. Figure 5 shows a hierarchy of goals within a design science research.

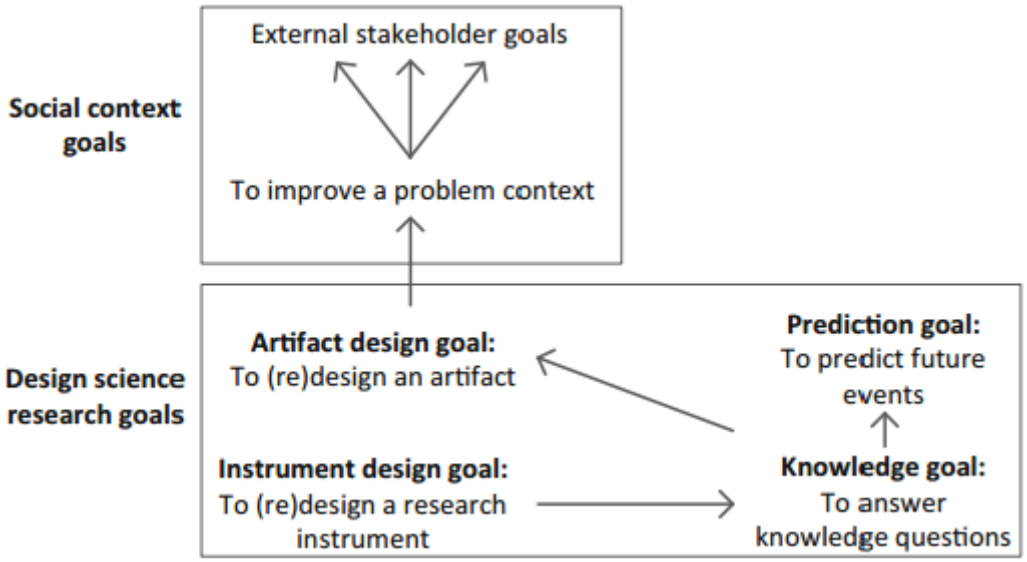

Figure 5 Goal Structure of a Design Science Research Project **(Wieringa 2014)**

The prediction goal is the goal of the researchers about the possibility of the occurrence of a future event. The prediction can only be made with knowledge of the event. The knowledge goals can include a detailed description on the event. There might be a need to design instruments to answer the knowledge questions. These instruments might be in the form of questionnaires, simulations or any other means that can be used to collect the opinion of users. The artefact design goal aims at designing or redesigning an artefact for the purpose of improving the artefact. As mentioned earlier, the artefact is designed or re-designed in order to provide solution or improvement to a problem context. Where higher-level stakeholders are present, the solution provided may correspond to the goal of the stakeholders.

3.3 Design Science Research Cycles

(Henver 2007) presents three cycles for design science research. These cycles are represented in Figure 6:

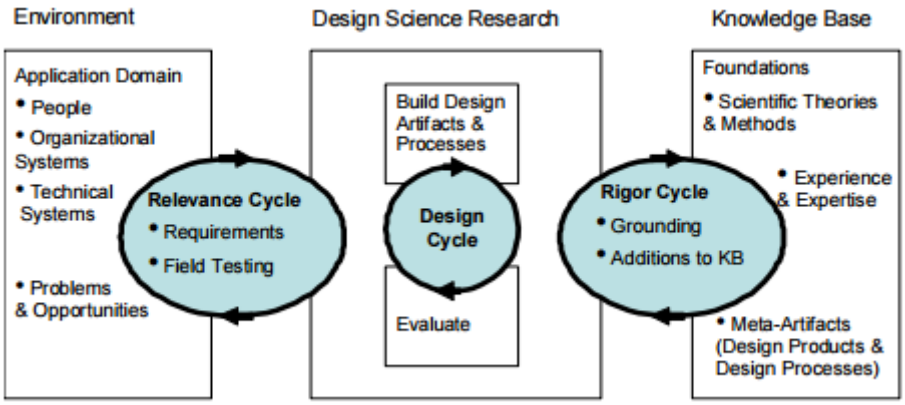

Figure 6 Cycles for Design Science Research (Henver 2007)

i. **Relevance Cycle:** a design science research begins with the relevance cycle. From the diagram, the constituents of the application domain i.e. people, organizational systems and technical systems, interact with each other to achieve a certain goal in regards to a problem context. In some cases, new opportunities are first identified before any problem is identified. The requirements of the research are identified in the application domain. These requirements are used as a set of criteria to evaluate the results of the research. There is a possibility of iterations in the relevance cycle as a result of the artefact's failure to pass the evaluation test. For instance, the artefact might not meet the design specifications or the set of requirements used to design the artefact might be incomplete.

ii. **Rigor Cycle:** in the rigor cycle, information from the knowledge base of the research problem is first gathered. The rigor cycle also involves the selection of the appropriate theories and methods to design and evaluate the artefact. In this cycle, the researcher can also make contributions to the knowledge base by extending already existing theories or methods.

iii. **Design Cycle:** this is the core of the research. It combines the requirements highlighted in the relevance cycle with the methods identified in the rigor cycle to develop the artefact. It is expected that equal amount of work is done in developing and evaluating the artefact.

(Vaishnavi 2004) simplified these cycles by breaking them down in to 5 steps for a design science research process model.

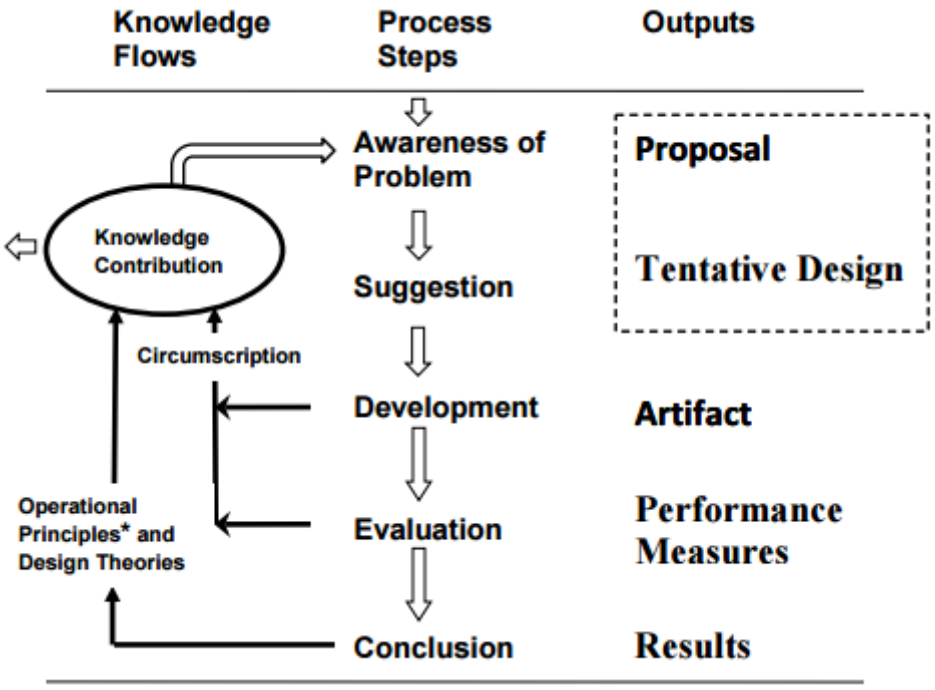

Figure 7 Design Science Research Process Model (Vaishnavi 2004)

i. Awareness of problem: this step usually involves the identification of a problem that needs a solution or a need for an improvement. The output here is usually a formal or an informal proposal for a research project.

ii. Suggestion; here, various ways in which the problem can be solved are examined; drawing ideas from the knowledge base in that problem area. It also includes an extensive review of similar or related works; identifying their features, the methods used and limitation of contributions. A tentative design linked with the

research proposal is the output here. The tentative design represents an initial representation of the proposed artefact.

iii. Development: in this step, the tentative design is extended and implemented. This is done based on the suggested methods that were reviewed or an extension of the methods identified in the previous phase. The output here is the designed artefact.

iv. Evaluation: is the end result relevant? Does it address the research issues? These are the kind of questions that should be asked at this stage in order to test the validity of he developed artefact. There is a possibility of iteration between the suggestion, development and evaluation phases. The number of iteration is determined by the performance level of the designed artefact. An explanation should be provided in cases where the requirements are not met.

v. Conclusion: this ends the research process. In some cases, the final results might not totally correspond with the design requirements, but results that are satisfying or "good enough" may be settled with.

According to (March & Smith 1995), there are four possible outputs of a design science research. (Vaishnavi 2004) proposed "better theories" as an addition to the list. These outputs are:

i. Constructs: they include a conceptualization that can be used when describing a problem.

ii. Model: this is a collection of statements or hypotheses that shows the relationship among constructs.

iii. Method: a method is a collection of different procedures that can be adapted to perform a task.

iv. Instantiations: this is an illustration of an artefact to show its applicability or feasibility.

v. Better theories; this refers to the contribution to existing theories. This can be in form of improving theories or identifying their deficiencies.

The circumscription helps to understand the design science research process of a particular research. The knowledge contribution represents the new knowledge that is being generated from the research process.

3.4 Evaluation Methods in Design Science Research

(Venable et al. 2012) developed an evaluation framework for design science research projects. The author created a list of questions that should be considered before starting an evaluation process in a design science research project. These questions are listed below:

i. Determine what the evaluands are/will be. Will they be concepts, models, methods, instantiations, and/or design theories?

ii. Determine the nature of the artefact(s)/evaluand(s). Is (are) the artefact(s) to be produced a product, process, or both? Is (are) the artefact(s) to be produced purely technical or socio-technical? Will it (they) be safety critical or not?

iii. Determine what properties you will/need to evaluate. Which of these (and/or other aspects) will you evaluate? Do you need to evaluate utility/effectiveness, efficiency, efficacy, ethicality, or some other quality aspect (and which aspects)?

iv. Determine the goal/purpose of the evaluation. Will you evaluate single/main artefact against goals? Do you need to compare the developed artefact against with other, extant artefacts? Do you need to evaluate the developed artefact(s) for side effects or undesired consequences (especially if safety is critical)?

v. Identify and analyse the constraints in the research environment. What resources are available – time, people, budget, research site, etc.? What resources are in short supply and must be used sparingly?

vi. Consider the required rigor of the evaluation. How rigorous must the evaluation be? Can it be just a preliminary evaluation or is detailed and rigorous evaluation required? Can some parts of the evaluation be done following the conclusion of the project?

Methods with which design science research can be evaluated were also proposed. Table 13 consists of evaluation methods for design science research:

DSR Evaluation Method Selection Framework	Ex Ante	Ex Post
Naturalistic	• Action Research • Focus Group	• Action research • Case study • Focus group • Participant observation

		• Ethnography • Phenomenology • Survey (qualitative or quantitative)
Artificial	• Mathematical or Logical Proof • Criteria-Based Evaluation • Lab Experiment • Computer Simulation	• Mathematical or logical proof • Lab experiment • Role playing simulation • Computer simulation • Field experiment

Table 12 Design Science Research Evaluation Methods (Venable et al. 2012)

The difference between naturalistic and artificial evaluation is that artificial evaluation includes activities such as simulations, laboratory experiments, mathematical proofs while naturalist evaluation evaluates an artefact by using real people, systems or settings (Sun & Kantor 2006). The Ex Post evaluation is used for instantiated artefacts while the Ex ante evaluation is used to evaluate un-instantiated artefacts e.g. models and designs

3.5 Justification of Methodology

Traditional research approaches i.e. qualitative, quantitative and mixed methods are common forms of research approaches in social and natural sciences (Creswell 2014). These approaches are usually used to explain, describe or predict phenomena (Mason 2006). Qualitative research approach focuses on exploring and understanding human problems while quantitative research is used in research areas that require testing of theories. These approaches are less suitable for business model research because business model research does not aim at building or testing theories (Xu & Chen 2011). Business model research does not seek to understand or explain phenomenon but aims at solving practical problems. As a result, a "problem-solving" approach is most suitable for business model research (Xu & Chen 2011). Hence, the adaptation of the Design Science Research methodology. Since Design Science is more focused on problem solving (Dresch et al. 2015a) than theory building or testing, it is was chosen for this research.

Also, Design Science Research aims at developing solutions through artefacts that can be used to solve problems, improve existing systems, organizational or even societal

performance (Dresch et al. 2015a). In relation to business models, business models can be described as artefacts (tools) that can be used to solve practical organizational problems or improve a situation in an organization (Xu & Chen 2011)

Another reason the Design Science Research methodology was chosen is the philosophical stance of this research. According to (Creswell 2014) and (Saunders et al. 2009), the choice of a research strategy and methodology is dependent on the philosophical stance of the research. The following table compares four research philosophies in management research i.e. positivism, realism, interpretivism and pragmatism using three basic research beliefs i.e. ontology, epistemology and axiology.

	Positivism	**Realism**	**Interpretivism**	**Pragmatism**
Ontology: the researcher's view of the nature of reality or being	External, objective and independent of social actors	Is objective. Exists independently of human thoughts and beliefs or knowledge of their existence (realist), but is interpreted through social conditioning (critical realist)	Socially constructed, subjective, may change, multiple	External, multiple, view chosen to best enable answering of research question
Epistemology: the researcher's view regarding what constitutes acceptable knowledge	Only observable phenomena can provide credible data, facts. Focus on causality and law like generalisations, reducing phenomena to	Observable phenomena provide credible data, facts. Insufficient data means inaccuracies in sensations (direct realism). Alternatively, phenomena create sensations which are open to misinterpretation (critical realism). Focus on explaining	Subjective meanings and social phenomena. Focus upon the details of situation, a reality behind these details, subjective meanings motivating actions	Either or both observable phenomena and subjective meanings can provide acceptable knowledge dependent upon the research

	simplest elements	within a context or contexts		question. Focus on practical applied research, integrating different perspectives to help interpret the data
Axiology: the researcher's view of the role of values in research	Research is undertaken in a value-free way, the researcher is independent of the data and maintains an objective stance	Research is value laden; the researcher is biased by world views, cultural experiences and upbringing. These will impact on the research	Research is value bound, the researcher is part of what is being researched, cannot be separated and so will be subjective	Values play a large role in interpreting results, the researcher adopting both objective and subjective points of view
Data collection techniques most often used	Highly structured, large samples, measurement, quantitative, but can use qualitative	Methods chosen must fit the subject matter, quantitative or qualitative	Small samples, in-depth investigations, qualitative	Mixed or multiple method designs, quantitative and qualitative

Table 13 Comparison of Four Research Philosophies in Management Research (Saunders et al. 2009)

This research takes a pragmatic philosophical stance. Although there is a limited research on the philosophical underpinning of design science research, (Henver 2007) mentions that design science research has a basis in pragmatism. The author further explains that pragmatism is a "school of thought that considers practical consequences or real effects to be vital components of both meaning and truth". From an epistemological point of view traditional research (behavioural or natural research) centres on descriptions and explanations because this type of research aims at providing an explanation for cause and effect patterns (Goldkuhl 2012). Here, knowledge is built on the current state of the world; "what already is". This characteristic is reflected in both positivism and in interpretivism. However, in pragmatism, knowledge is not seen as a tool that just describes the patterns of cause and effect, but also as a tool that can be used to create a change or improve a situation in the world. Unlike the positivism and interpretivsm research perspectives, the knowledge orientation here is "what is to be" or "what might be". One must not assume that knowledge is used to forecast a possible future occurrence but as a tool for change. From an axiological view, the goal of a pragmatist is to improve the "what will be".

In design science research, the creation and use of an artefact is to create or improve a situation. In order for this to be successful, an understanding of the problem is needed; as a result of this, the "what already is" is needed to begin the process of creating the desired artefact. (Dewey 1931) describes this process as a pragmatic inquiry. In a pragmatic inquiry, a problematic circumstance is transformed into a "good enough" situation through a solution (artefact). Evaluation of such an artefact is not done through observation and description but through a set of criteria, in relation to an initial set goal or objectives (Goldkuhl 2012).

Another reason the Design Science Research methodology was the chosen methodology is that Design Science Research is used to address problems that are considered to be "wicked problems". (Rittel & Webber 1973) formulated a list containing the properties of a wicked problem; the issue of sustainability can be described using these properties.

3.5.1 Sustainability as a Wicked Problem

Property 1

There is no definitive formulation of a wicked problem: this means that a problem solver does not have access to the complete information about a wicked problem, which could

provide the total understanding needed to solve the problem. The problem is solved based on all possible solutions conceived by the problem solver.

In relation to the issue of sustainability, financial markets and the business world in general are very dynamic. In achieving financial, environmental and social sustainability in these business environments, it will be a great challenge to obtain an exhaustive list of all the causes and barriers towards achieving sustainability. However, through the knowledge of possible solutions such as the use of sustainable business models in this case, the needed information can be anticipated. One can begin to search for information such as the importance of business models in achieving sustainability, the challenges faced by financial markets towards sustainability, and why already existing business models are inadequate to achieving this solution and so on. Such inquisitiveness can help provide a better understanding of the problem.

Property 2

Wicked problems have no stopping rule: this property means that the there is no absolute end point in providing a solution for a wicked problem. The challenge of sufficiently understanding the causes of a wicked problem might be the reason for this. A solution cannot be referred to as the perfect solution, but solutions that are "good enough" can be accepted.

Achieving sustainability in financial markets can only be progressive and not final. The effect of changes in regulation, technological advancements, globalization will continue to require changes in proposed solutions over time. This also applies to achieving sustainability through business model as future challenges in financial markets may require further addition of dimensions to the business model framework in order to achieve sustainability.

Property 3

Solutions to wicked problems are not true or false, but good or bad: there is no general complete set of criteria to evaluate a solution to a wicked problem. Solutions are evaluated to be good or bad based on the interests of the stakeholders involved in the problem context.

Proffering an optimal solution for sustainability for all financial markets might be impossible because it might be a great challenge to consider all the objectives of all the stakeholders in every market. A good solution will be highly dependent on the goals set by regulators governing individual markets, the market operators and other stakeholders.

Property 4

There is no immediate and ultimate test of a solution to a wicked problem: the appropriateness or efficiency of a solution to a wicked problem cannot be known

immediately. This is usually determined after an extended period of time.
This is typically the case in creating solutions to achieve sustainability. The full benefits or consequences of sustainability solutions cannot be known until a certain period of time.
Property 5 Every solution to a wicked problem is a "one shot operation" because there is no opportunity to learn by trial and error, every attempt counts significantly: in solving a wicked problem, every trial counts significantly; it is usually difficult to reverse the consequences of a solution.
Actions or inactions towards sustainability have significant consequences.
Property 6 Wicked problems do not have an enumerable set of potential solutions nor is there a well described set of permissible operations that may be incorporated into the plan: it has not be proven that all the solutions to a wicked problem can be identified and implemented. This is because wicked problems evolve over time, creating a need to modify their solutions over time.
As mentioned earlier, issues regarding sustainability are not static; they also evolve over time. Therefore, relating this to sustainability, it can be said that there is no exhaustive list of possible solutions towards sustainability.
Property 7 **Every wicked problem is essentially unique:** although wicked problems may have some identifiable properties, they also usually have distinguishing factors that override the similarities of the problems. As a result, one has to be careful when applying the same solution to two seemingly similar problems; a solution used for a previous wicked problem might be insufficient for a present similar one because of the possibility of an overriding unique element.
In the case of issues regarding sustainability assumptions and generalizations cannot be made to address the issues. For instance, not every market might need to be totally dependent on technology to remain financially sustainable. Solutions are most likely to be developed based on individual market needs.
Property 8 **Every wicked problem can be considered to be a symptom of another problem:** according to the authors' perspective, no wicked problem has its own natural level; the complexity of a wicked problem is based on how "high-level" the problem is. A particular

problem is seen as a product of more complex problem. These problems are more efficiently solved if they are addressed from a high level of occurrence.
Marginal efforts to improve sustainability will not lead to a general improvement. In the case of financial markets, as the sources of revenue are being threatened; the effect of cost control might be minimal compared to developing innovative business models.
Property 9 **The existence of a discrepancy representing a wicked problem can be explained in numerous ways:** explaining the cause of a wicked problem is subjective to the analyst; the explanation of the existence of a wicked problem is usually based on the "world-view" of the examiner. There is no generally accepted rule that can be used to explain the possible causes of a wicked problem.
In dealing with sustainability, an explanation for the causes of a low level of sustainability and general issues regarding sustainability depend on those directly affected by it.
Property 10 **The planner has no right to be wrong:** this property is similar to property 5. The consequences of adapting wrong methods to provide solutions for a wicked problem is usually high and recovery from faulty implementations takes a very long while.
In addressing issues regarding sustainability, the impact of the consequences of the actions taken is usually also significant, especially on those that are directly affected by the actions.

Table 14 Sustainability as a Wicked Problem Based on the Properties by (Rittel & Webber 1973)

3.6 Methodology Implementation

Integrating the design science research cycle by (Henver 2007) and the steps in a design science research project by (Vaishnavi 2004), this section describes how the Design Science Research methodology was implemented:

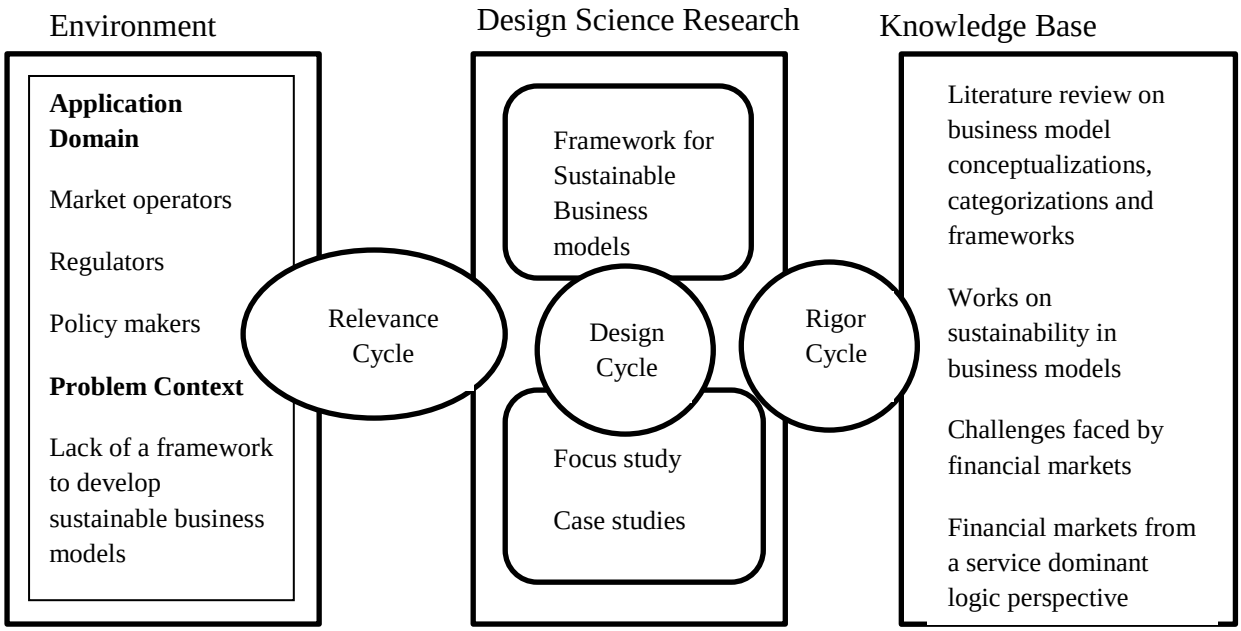

Figure 8 Application of the Design Science Research Cycle

As mentioned earlier, in the relevance cycle the application domain consists the people, organizational systems and technical systems that interact to work towards a goal within a problem context. Relating this to the research, market operators, regulators and policy makers have been included in the application domain. Bearing in mind that the artefact in this research is a business model framework that can be used to develop sustainable business models, market operators can develop and apply methods that can contribute to all the aspects of sustainability. For instance, while developing business models, innovative products and services can be developed to improve the market's competitiveness and resilience. They can also develop special markets and products that could attract investors that are interested in supporting sustainability or that could only be for those companies that have a disclosure or evidence that they are working towards being environmentally and socially sustainable. There will be a need to consider regulatory and policy frameworks in order to evaluate the developed products and services for the purpose of compliance. The identification of the problem context in this cycle is equal to the "awareness of the problem" in the design science research steps in (Vaishnavi 2004). The problem identified is the lack of a business model framework that can be used to develop business models that can help attain sustainability in financial markets.

The "suggestion" step was implemented in the rigor cycle. In order to draw information from the knowledge base, a literature search was carried out. The state of the art of business

models in general and in the context of sustainability was understood after reviewing related literature. The articles reviewed from this search were grouped into two; those that focus mainly on detailed explanation of business model conceptualizations, business model classifications and existing frameworks, while the second group of articles were literature related to the context of sustainability in business models. The first group provided an extensive understanding of the already existing business model frameworks developed for specific business areas. The common components from the respective frameworks were identified. While reviewing the different dimensions of the business model frameworks, it was realized that, although some dimensions had heterogeneous names, they either had the same definition or were similar in context; such dimensions were grouped under one common name. These can be seen in Table 16. The occurrence of some dimensions was more frequent across all the frameworks. These common dimensions were used to build a foundation for the proposed framework.

In order to achieve a well-integrated review of the different components of the business model frameworks, the methodology to develop a business model component framework (Krumeich et al. 2012) was used.

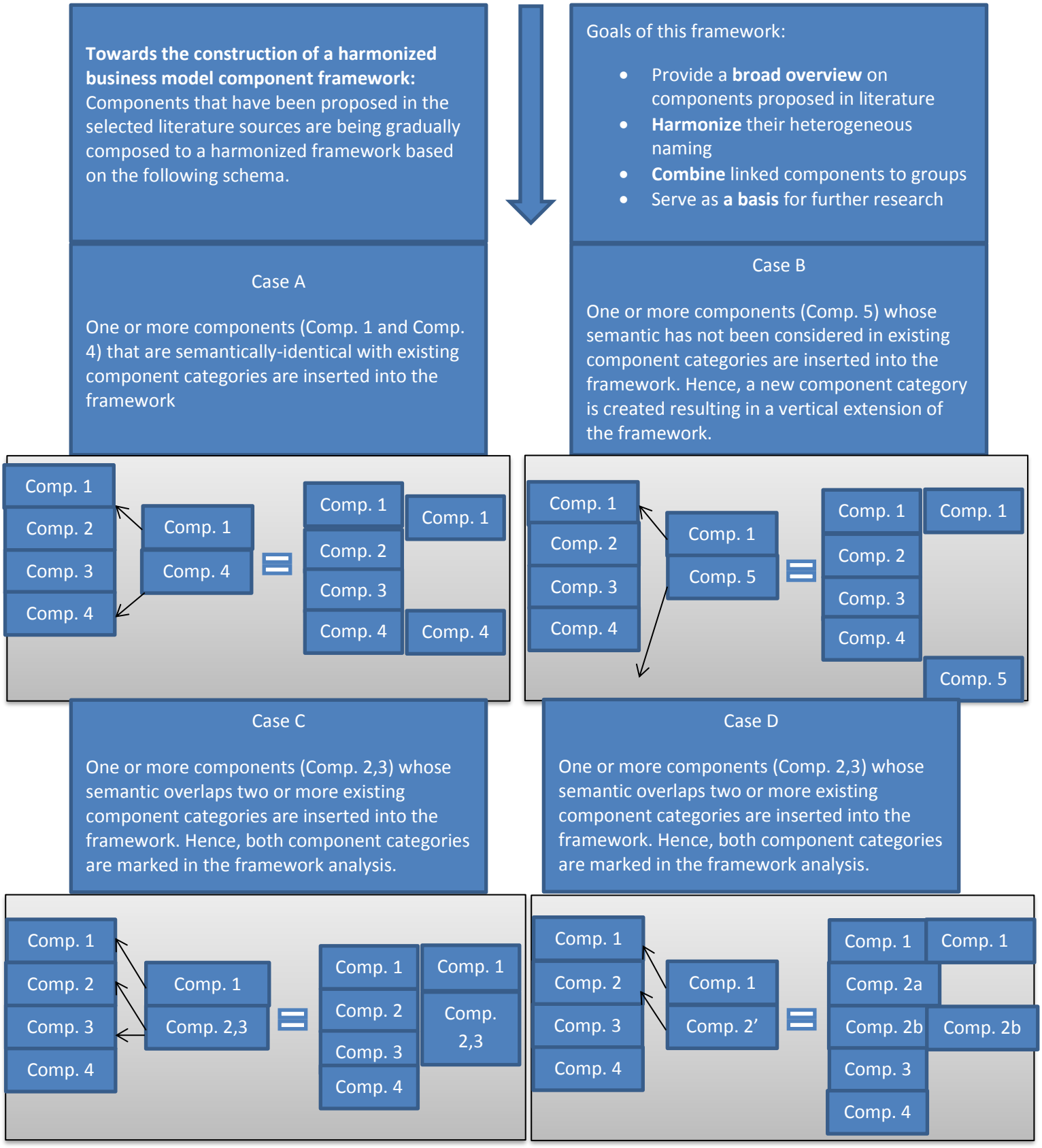

Figure 9 Methodology to Develop a Business Model Component Framework (Krumeich et al. 2012)

The adaptation of this methodology will be described by explaining how the different cases were applied to carry out a component based review.

Case A

One or more components that are semantically-identical with existing component categories are inserted into the framework:

Based on the frequency of occurrence, the dimensions of the frameworks that were proposed in at least 50% of the literature sources were used as the initial component category (column headings). These components are the value proposition, customer segments, revenue, key resources, key partners, and key activities. Using these components as a foundation for the component review, the table was then populated with all the components of the frameworks that belong to the component categories based on their definitions or similarity in context. Components placed in the brackets represent the components that are similar in context or have the same definition as their corresponding component category, but have been named differently in the framework they belong to.

Case B

One or more components whose semantic has not been considered in existing component categories are inserted in the framework: the foundation component categories were further extended with the components that were proposed in less than 50% of the literature sources. These components are cost structure, channels, value chain, competitive strategy, actor benefits, actor and roles, Product/service/information architecture, resource velocity, logistic stream, core competency, growth model, legal, technology, capital model and value port.

Case C

One or more components whose semantic overlaps two or more existing component categories are marked into the framework. Hence, both component categories are marked into the framework analysis: there were instances where some of the business model categories overlapped with the components i.e. a component consisted of two component categories. Hence such components were added as component categories. For instance, the Revenue and Cost structure component categories overlapped with the Economic model component in the framework by (Morris et al. 2005).

Case D

One or more components whose semantic does only overlap existing components are inserted. Hence, the initial component category is split, resulting in two component categories: referring to the framework of (Dubosson-Torbay et al. 2002), the product/service/information architecture component seemed to encompass three different components category. However, they were not considered into different component categories because the seemingly different dimensions were not described independent of each other by the authors. There were no other possible instances that could be considered in this case.

The table below represents the result of the component review of the business model frameworks. It is accompanied by a "reference table" which links the numbers used for representation in the table with the corresponding author names or business model component.

Dimensions	**Occurrence (%)**													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
Value Proposition	92	×	√	√ (3.1)	√ (4.1)	√	√ (6.1)	√ (7.1)	√ (8.1)	√ (9.1)	√	√	√	√	√
Customer segments	50	×	√ (2.1)	×	×	×	×	√ (7.2)	√	√ (9.2)	√	√	×	√	×
Revenue	71	√	√ (2.2)		×	√	×	√ (7.3)	×	√ (9.3)	√ (10.1)	√ (11.1)	√ (12.1)	√	×
Cost structure	35	×	√	×	×	×	×	×	×	√ (9.3)	√ (10.1)	×	√	√	×
Channels	14	×	×	×	×	×	×	√ (7.4)	×	×	×	×	×	√	×
Key resources	57	×	×	×	√ (4.1)	×	×	√ (7.5)	√	√ (9.4)	×	√ (11.2)	√	√	√
Key partners	50	×	√ (2.3)	×	√ (4.1)	×	×	×	√ (8.2)	√ (9.4)	×	√ (11.2)	×	√	√ (14.1)
Key activities	57	×	×	×	√ (4.1)	√	×	√ (7.6)	√ (8.3)	√ (9.4)	×	×	√	√	√
Customer relationships	21	×	×	×	×	×	×	√ (7.4)	×	√	×	×	×	√	×

Value chain	21	×	√	×	×	√ (5.1)	×	×	×	×	×	√ (11.3)	×	√	×
Competitive strategy	21	×	√	×	×	×	×	×	√ (8.4)	×	√	×	×	×	×
Marketing strategy	7	√	×	×	×	×	×	×	×	×	×	×	×	×	×
Actor benefits	7	√	×	×	×	×	×	×	×	×	×	×	×	×	×
Actor & roles	7	√	×	×	×	×	×	×	×	×	×	×	×	×	×
Product/service/ information architecture	7	√	×	×	×	×	×	×	×	×	×	×	×	×	×
Resource velocity	7	×	×	×	×	×	×	×	×	×	×	×	√	×	×
Logistic stream	7	×	×	√	×	×	×	×	×	×	×	×	×	×	×
Core competency	14	×	×	×	×	×	×	×	×	×	√	×	×	×	√
Growth model	7	×	×	×	×	×	×	×	×	×	√	×	×	×	×
Legal	14	×	×	×	√ (4.2)	√	×	×	×	×	×	×	×	×	×
Technology	7	×	×	×	×	√	×	×	×	×	×	×	×	×	×
Capital model	7	×	×	×	×	×	×	√	×	×	×	×	×	×	×

Value port	7	×	×	×	×	×	√	×	×	×	×	×	×	×	×

Table 15 Component Review of Business Model Frameworks

No.	Authors	No.	Business Model Component	No.	Business Model Component
1	(Timmers 1998)	2.1	Market Segment	8.1	Offering
2	(Chesbrough & Rosenbloom 2000)	2.2	Profit	8.2	Factors and production input suppliers
3	(Mahadevan 2002)	2.3	Value network	8.3	Activities and Organisation
4	(Amit & Christopher Zott 2001)	3.1	Value Stream	8.4	Competitors
5	(Alt & Zimmermann 2001)	4.1	Transaction content	9.1	Products
6	(Gordjin & Akkermans 2001)	4.2	Transaction governance	9.2	Target
7	(Otto et al. 2001)	5.1	Structure	9.3	Financial Aspect
8	(Hedman & Kalling 2002)	6.1	Value objects	9.4	Infrastructure management
9	(Dubosson-Torbay et al. 2002)	7.1	Value model	10.1	Economic model
10	(Morris et al. 2005)	7.2	Market model	11.1	Value capture
11	(Richardson 2005)	7.3	Revenue model	11.2	Value creation and delivery system
12	(Johnson et al. 2008)	7.4	Customer relation model	11.3	Value proposition
13	(Osterwalder & Pigneur 2010)	7.5	Resources	12.1	Revenue and profits
14	(Lecocq & Demil 2010)	7.6	Production model	14.1	Organisational structure

Table 16 Reference Table for the Component Review of Business Model Frameworks

The various methodologies used to develop the business model frameworks were also identified. Although not all the methodologies were clearly stated in the reviewed literature sources, most of the frameworks were developed from theoretical review of existing business frameworks such as in the case of (Alt & Zimmermann 2001). Others frameworks were mostly developed through interviews with organizations and case studies.

The second group of literature i.e. the articles centred on sustainability in business models were also reviewed to identify possible frameworks or themes that could contribute to financial, environmental and social sustainability. As mentioned in the literature gaps, there was no specific framework that can be used to develop sustainable business models. There were specific recommendations of how sustainability initiatives can be implemented and how sustainability can generally be achieved in organizations. These recommendations were developed mainly from case studies of selected organizations. The literature was further reviewed to search for business model frameworks that focus any other aspect of sustainability apart from financial, environmental and social sustainability, which might have been discussed. However, none could be identified.

Since the focal business area of this research is financial markets, the business model framework could not be developed independent of the context of financial markets. Two perspectives were explored in regards to this:

i. Financial markets from a service dominant logic perspective: being a service industry, the provision of services in financial markets is seen from a service dominant logic perspective; where services and competencies are exchanged for the benefits of the stakeholders (Vargo et al. 2008). Here value is not just created, but co-created through a collaboration of clients, partners and customers in the delivery of services. This collaboration can be referred to a Service Value Network. A Service Value Network can be defined as a dynamic configuration of people, technologies, shared information, and other resources connected via value propositions (Haluk et al. 2011).
ii. Challenges faced by financial markets: the following are the common challenges identified to be faced by financial markets.
    a. Competition from existing markets and new entrants
    b. Rising volumes of trades but decreasing transaction costs and margins
    c. Impact of regulations

d. Rising cost of capital (to fulfil compliance costs and to improve operation etc.)

It was noticed that these challenges could affect the revenue generation for financial markets. This pointed towards a need to devise methods that could not only improve the generation of revenue for financial markets but that could also sustain the generation of revenue.

3.6.1 Design

In the design cycle, based on the different aspects of literature examined, an initial framework for sustainable business models was developed. From the literature review of the existing business model frameworks, the analysis of the frequency of occurrence of each of the components showed that out of the 23 business model components, only 6 were proposed in at least 50% of the literature sources. These components are value proposition, customer segments, revenue, key resources, key partners and key activities. Consequently, these components were selected as foundation elements of the proposed framework. However, noticing how the "revenue" component overlapped with the economic model and profits, the "revenue" component was modified such that it consists of revenue, profit and cost structure. This is referred to as the financial model.

Regarding the works done on sustainability in business models, (Stubbs & Cocklin 2008) mentioned that organizations found it challenging to incorporate sustainability into their business logic. One possible reason for this is that sustainability is treated independent of the core business logic of the organization. Examining the business model definition by (Osterwalder et al. 2005), a business model is seen as "a conceptual tool that contains a set of objects, concepts, and their relationships with the objective to express the business logic of a specific firm". This can suggest that integrating sustainability into a business model can be seen as a concept that can partly reflect how organization does business. This simply means that sustainability can be considered in the value proposition, the value creation and the value capture processes. Hence, sustainability is also considered as a component of the proposed framework. Taking a cue from (Drimmelen 2013), the author's stance on sustainable business model is that, it should consider financial, social and environmental goals

The impact of regulations and policies in financial markets is evident in both practice and literature. Achieving the three aspects of sustainability cannot be possible without market authorities and regulatory disciplines (Myklebust 2013). Since products and services cannot be provided in a regulatory vacuum, regulations were seen as necessary in the proposed framework. In order to accommodate the rules and regulations developed by market operators

that govern the activities within a market, the internal and external rules and regulations were combined as “compliance” and as a proposed component of the business model framework.

Based on all these different perspectives that were considered, possible components of the proposed framework were identified. Table 17 shows the different components that emerged:

Literature Review on Business Models and Sustainability in Business Models	**Financial Market Operations**
Value proposition	Compliance
Financial model	Service Value Network
Key resources	
Key partners	
Key activities	
Customer segments	
Sustainability	

Table 17 Components Derived from Literature Review

In order to integrate all these components, some modifications were made. First, since the Service Value Network is a collaboration of people and their resources, the key resources, key partners and key activities were excluded from the preliminary framework in order to avoid repetition. Also, because the value proposition component was mostly defined in literature in terms of products, services and the target customers, the customer segments component was merged in to the value proposition component. By so doing, the value proposition component is then defined as offerings (in form of products and services) that have the potential to create and spread value to the beneficiaries i.e. the company and the customers (Vargo et al. 2008). The resulting framework is shown below:

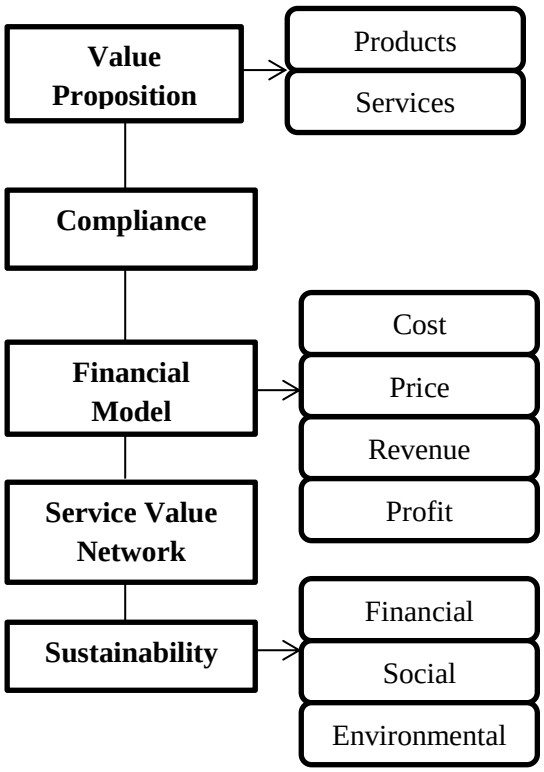

Figure 10 The Preliminary Framework

3.6.2 Evaluation

The design science research evaluation method by (Venable et al. 2012) was used as a guideline to evaluate the preliminary framework. A focus study was selected as the evaluation selection method.

Determine what the evaluands are/will be. Will they be concepts, models, methods, instantiations, and/or design theories?	A business model framework
Determine the nature of the artefact(s)/evaluand(s). Is (are) the artefact(s) to be produced a product, process, or both? Is (are) the artefact(s) to be produced purely technical or socio-technical? Will it (they) be safety critical or not?	Not applicable
Determine what properties you will/need to evaluate. Which of these (and/or other aspects) will you evaluate? Do you need to	The components of the preliminary framework will be evaluated for relevance and applicability while the development

evaluate utility/effectiveness, efficiency, efficacy, ethicality, or some other quality aspect (and which aspects)?	process of the framework will be evaluated for appropriateness and adequacy
Determine the goal/purpose of the evaluation. Will you evaluate single/main artefact against goals? Do you need to compare the developed artefact against with other, extant artefacts? Do you need to evaluate the developed artefact(s) for side effects or undesired consequences (especially if safety critical)?	• To evaluate the development process of the proposed framework by stimulating ideas or new concepts which were not considered in the development of the proposed framework • To evaluate the proposed framework in terms of its applicability and its relevance in relation to sustainability • To check the sufficiency of the proposed framework to competitively distinguish markets by comparing the business models of financial markets
Identify and analyse the constraints in the research environment. What resources are available – time, people, budget, research site, etc.? What resources are in short supply and must be used sparingly?	Time and people
Consider the required rigor of the evaluation. How rigorous must the evaluation be? Can it be just a preliminary evaluation or is detailed and rigorous evaluation required? Can some parts of the evaluation be done following the conclusion of the project?	A thorough examination of the dimensions of the preliminary framework

Table 18 Application of the Design Science Research Evaluation Method by (Venable et al. 2012)

3.6.2.1 Participants and Procedure

Due to time constraints and availability of participants, the focus group was conducted on two separate occasions which lasted between 90-103minutes. There were four participants in the first group while the second focus group consisted of six participants; making a total of ten participants. The group discussions were tape-recorded with the permission of the participants; however, the anonymity of all the focus group participants is protected in this thesis. A document containing a background study of the research was sent to the participants prior to the focus groups taking place. This document consisted of the aims and objectives of the research and an explanation of the development process of the preliminary framework and the components of the preliminary framework. In order to demonstrate the applicability of the preliminary framework, the framework was instantiated with a trading scenario. The process of the focus groups consisted of:

i. Brief presentation: the participants were reminded of the development process of the preliminary framework and the dimensions of the framework. The dimensions of the framework were explained by describing how the dimensions can be applied in a business model that provides trading services.
ii. Discussion: the discussions were divided into two parts. The first part of the discussion focused on gathering the opinion of the participants concerning the steps that were taken to develop the preliminary framework. The discussion was based on this following foundation questions:
    - What are your thoughts on the development process of the proposed framework?
    - Are there any other perspectives that could have been considered?

For the second part of the discussion, a scenario was described to the participants:

- Consider the application of the proposed framework for the development of a business model for "Green market". Make any assumptions as a necessary and comment on the applicability and appropriateness of each dimensions of the framework.
- Consider the application of the proposed framework for the development of a business model for a new market. Make any assumptions as necessary and comment on the applicability and appropriateness of the framework.

In addition, the participants were also asked about their opinions on the sufficiency of the framework to compare the business models of markets and competitively distinguish markets.

iii. General feedback: after the participants provided their opinions related to the questions, there was a general feedback session. The purpose of the feedback session was for the participants to discuss other important issues that were not considered during the discussion session. This session rounded up the focus group process. To begin the session, the following questions were asked:

- Is the proposed framework fit for purpose?
- Are there any other dimensions that could have been considered?

CHAPTER 4 – THE PROPOSED FRAMEWORK

This chapter explains the various themes identified from the focus studies and how they were translated into the proposed framework. It also presents and describes the proposed framework for sustainable business models; the dimensions of the framework are described in details.

4.1 Development Process (Focus Groups Output)

4.1.1 Analysis

In preparation for the analysis of the focus groups discussions, the recordings of the focus groups were first transcribed. A preliminary analysis was done in order to gain a general understanding and reflect on the opinions provided by the participants. Afterwards the contributions that were directly related to framework were extracted from the transcript. The data were further examined to identify major themes and the interconnections among the themes. The following are the identified themes:

i. **Too many components in the Service Value Network**: many participants pointed out that the Service Value Network component in the preliminary framework encapsulated other relevant components that should be identified separately. They further mentioned that the internal capabilities and resources needed by a market to deliver a product or service were not shown in the framework. It was also suggested across participants that the people, processes and resources provided within a market to provide a service should be differentiated from those that are being outsourced. In general, breaking down components that consisted of other sub-components was suggested in order to explicitly list all the elements that make up a particular component.

ii. **The need to specify the different types of customer segments:** as mentioned earlier, while explaining the design cycle of the methodology application, the value proposition was combined with customer segments such that the value proposition is described in terms of the products and services provided as well as the customers the products and services are targeted at. However, in order to directly identify the different types of customers a particular product/service is developed for, it was suggested that the customer segment should be an individual component. It was also mentioned that there is always a possibility for multiple business models to serve the same customers; identifying each customers can also

help to segment the customers whose needs are met through an interconnection of business models.

iii. **Innovation and best practices:** what is standardized? What is automated? How do you get to replace what people do with technology in order to capture value? These are the kind of questions asked by participants in relation to considering how emerging innovation can be integrated into a business model to capture new set of value. The participants mentioned that it is worth considering innovative ways that can be used to provide value and to identify how innovation can be applied throughout the business model framework. In order words, innovation and best practices can be applied not only in the value proposition process, but also in the value creation and value capture processes.

iv. **Identifying the competitors:** this was another element that was discussed during the discussions. Participants mentioned that competitors should be included in the framework so that a competitive analysis can be done in relation to the products and services provided by other competitors. In addition, it was also mentioned that, a means to for markets to be sustainable is not just by improving their value propositions and operations but also by examining what the competitors are providing for their customers.

v. **Anticipating future changes:** possible future changes such as changing factors in the economy, changes in regulations, changes in the needs of customers, and demographic changes were discussed as issues that a business model should consider. Based on these, it was suggested that a component should be included in the framework that can help anticipate the future needs of the customers, and the impacts of the possible future environment in their (financial markets) business environments.

vi. **Business model performance:** it was also mentioned that the framework should also consider the possibility of evaluating the performance of the resulting business model i.e. in terms of success or failure based on specific performance indicators.

vii. **Identifying the stakeholders:** it was suggested that the proposed framework should include a component that can be used to identify the specific stakeholders of a particular business models.

Regarding the development process of the preliminary framework, the processes and steps taken to develop the preliminary framework were generally accepted by the participants. However, it was suggested that the business operations and functionalities of markets should be examined in order to understand how they do business. By doing this, their business models can be examined with the preliminary framework to check for aspects in their business models that were not considered in the framework.

In relation to the sufficiency of the framework to compare the business models of markets, the participants mentioned that most of the components of the business model framework can be used to compare markets; only if the sub-components of the components have been explicitly listed as suggested earlier. In particular, the value proposition component was selected to be of high priority when comparing markets; they mentioned that the elements of the value proposition must be used. Other elements such as local rules and regulations, trust, customer stickiness and value added services in general, were given as examples. In addition, it was also mentioned that the extent to which a market adapts best practices and innovative practices can also competitively distinguish markets.

These themes were evaluated in comparison to the preliminary framework in order to examine if they have already been directly or indirectly considered in the framework and to determine how the themes can be incorporated into the framework. This following explains the process:

i. Too many components in the Service Value Network: as suggested in the focus studies, in the course of developing and providing a product/service, there should be a distinction between the capabilities and resources that can be provided within the market and the capabilities and resources that are required outside the market. In the first version of the framework, the Service Value Network component consisted of elements that are both outsourced and provided internally, however based on this suggestion, this component was modified to consist of two sub-components. They are Internal Service Value Network and External Service Value Network.

ii. The need to specify the different types of customer segments: it was identified that there was no clear distinction between the value proposition and the customers of interest. Based on this, a "customer segment" component was included in the framework.

iii. Innovation and best practices: best practice is the "adoption of a new practice or policy based on some generally accepted view amongst practitioners of what is a "state of the art" approach, frequently drawing on what has been put in place and thought to work well elsewhere" (Brannan et al. 2008). These authors further describe best practice and innovation as closely inter-related concepts; identifying best practices as a form of innovation. (Slywotzky 1995) argues that consistent innovation is necessary for profitability. Although (Mahadevan 2002) argues that profitability in an organization cannot be sustained through innovation only, (McGrath et al. 1996) argue that innovation combined with a unique competitive advantage can be used to achieve sustainability in value creation and value capture. For instance, (Parmar et al. 2014) explains the possibility of combining data within and across industries as a method of innovation of when developing a product or service.

Although best practices and innovation were identified in the focus studies as elements that the proposed business model framework should consider, these elements were not directly considered as components of the proposed framework but identified as ways financial sustainability can be achieved. Since best practices can be used as a form of innovation to achieve a distinct competitive advantage and to sustain both value creation and further capture, best practices can be used for further detailing of the (financial) sustainability component.

iv. Identifying the competitors: although the participants of the focus studies suggested that the proposed framework should consider competitors, however it was not considered as a component in the framework because asides being able to develop sustainable business models, another defined objective of the framework is for it to possess features such that the framework can be used as a unit of comparison. Therefore, including it in the framework might cause redundancy since the entire framework is developed with the purpose of being a unit of comparison. For instance, the proposed framework can be used as a unit of competitive analysis; information about markets based on the components of the framework can be used to compare and competitively distinguish market. Based on the comparison, a market can determine its competitive position in the industry or identify methods that can be adapted to gain a strong competitive advantage.

v. Anticipating future changes: similar to the "best practice and innovation" theme, this theme was not directly considered as a component in the framework.

Anticipating possible future changes such as changing customer needs, changing factors in the economy and changes in regulations can be considered as means to a sustainable creation and capture of value. For instance, according to (Mahadevan 2002) not identifying and addressing changing customer needs can result to a decline in the creation and capture of value. In view of this, this theme can also be used for further detailing of the sustainability component.

vi. Business model performance: as suggested, a "performance" component was included in the framework.

vii. Identify stakeholders: although it was suggested that the framework should be able to identify specific stakeholders when implementing a business model, it was not directly included as a component of the proposed framework. However, in the stead of that, a "value" component was included in the framework to identify the benefits all stakeholders will receive as a result of the implementation of a business model.

4.2 The Proposed Framework

The diagram below represents the proposed framework; a busine Performance nework for sustainable business models for financial markets:

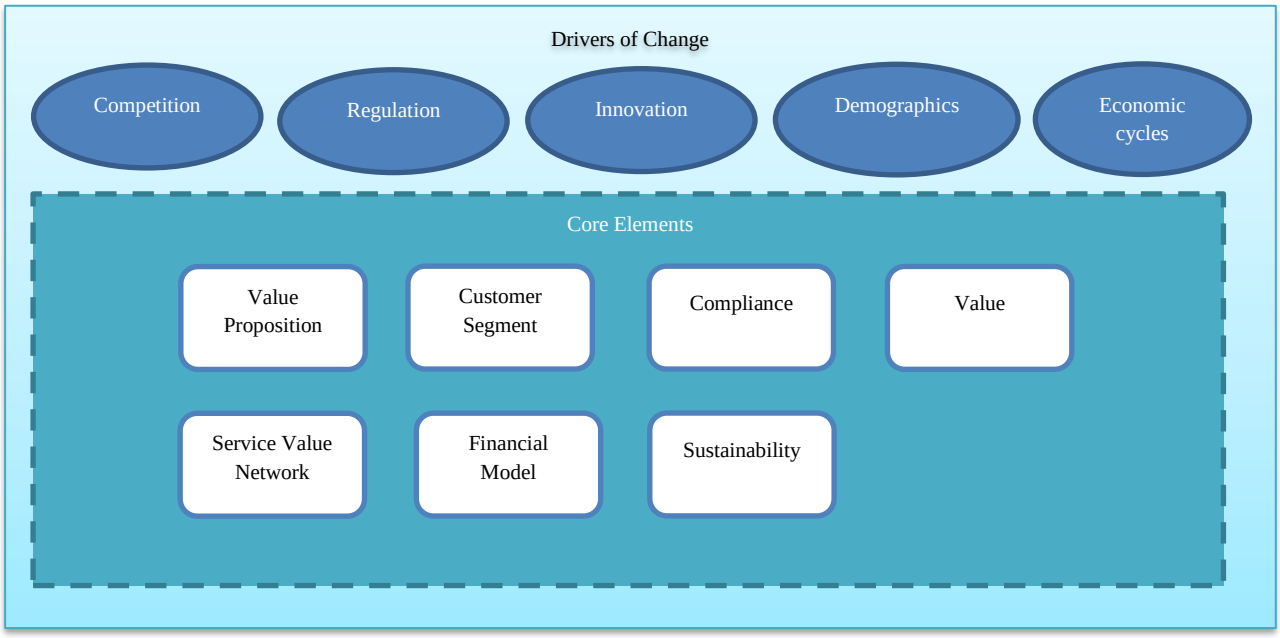

Figure 11 The Proposed Framework - A Framework for Sustainable Business Model for Financial Markets

The components in the inner space are the eight main dimensions of the proposed framework, while the components in the outer space represent the "drivers of change". The drivers of

change are the issues that were raised during the focus studies as well as been identified and discussed in the works of (The Government Office for Science 2012a) (The Government Office for Science 2012b), that could continue to contribute significantly to the changes in the business environment of financial markets. These factors have been included as external forces that exist in the business environment of financial markets because financial markets do not operate in a vacuum; the possible relationship between a firm and the elements of its business environments should be considered while implementing a business model (Florian 2013). Although these factors have already been identified as contributing factors to the dynamic and ever-changing environment of financial markets, their impacts will continue to evolve and change with time.

4.2.1 Drivers of Change

i. Regulation: changing rules and uncertainty in regulatory measures are not new in financial markets; the environment in which financial markets operate has always been characterized with many regulations, either those that have already been implemented or those that have been proposed and still under consideration. Regulations will continue to affect financial market operations and will also continue to encourage or inhibit the implementation of business models (European Banking Authority 2015). This does not automatically mean there will only be an increase in regulations, in fact there is also the possibility for lesser regulations i.e. more deregulations; deregulation can also impact the implementation of business models.

   Although regulations or deregulations can be restrictive in some cases, markets can still aim at using them for their advantage where possible. For instance, the work of (The Government Office for Science 2012b) mentions that markets might require more regulations to guide their operations and protect their customers, and this might have an adverse effect on the level of trust in the market. In this scenario, markets can use this seemingly disadvantageous situation as an advantage by working towards a higher level of transparency in order to restore trust of their customers. A market can use a higher trust, gained from customers, as a competitive advantage and to distinguish itself from other markets.

ii. Innovation: innovation can be in form of innovative technology and new financial instruments (The Government Office for Science 2012a). Asides new products

and services that can evolve from innovation, innovation can also revolutionize the ways business operations are being done. Innovation can be an enabler for some markets and serve as a constraint to others. From a competitive perspective, innovation can be examined before the implementation of a business model and even during the implementation of a business model. Through this, markets can identify methods to create a competitive advantage over markets offering similar products and services and also in delivering other value added services. For instance, innovation can be used to improve customer experience and foster better customer relationship.

iii. Demographics: the impact of changing demographics was one of the factors identified in the focus groups that can influence business models in financial markets. It was also mentioned in the work of (The Government Office for Science 2012d), changing demographics especially in regards to age distribution can influence the demand of investments, the type of investments that are requested for and the group of customers that request for specific types of investments. The aging population may focus on financial instruments that have lower levels of risk exposure instead of those with higher dividends. There might also be requests of synthetic products in the place of listed derivatives and equities. On the other hand, the customers in the middle age class may focus on increasing their wealth, hence demanding for investments that can provide higher dividends. This group of customers are classified as the "revenue-generating" customers.

Understanding the changes in age distribution and anticipating, demographics in general and the shifts in investment demands can inform the design of products and services and can also help target the right group of customers.

iv. Competition: technology, cross-border flows and globalisation have been common causes of competition, however (The Government Office for Science 2012b) identifies the design and implementation of new and innovative business models as possible tools that could be used by markets to compete with one another. The value proposed to customers and the costs of the value propositions could also shape the dynamics of competition. In addition to including value-added services, markets can focus on other forms of business models such as data driven business models. These innovative business models and the price

customers have to pay could be used to lock customers in and probably influence how easily a customer can switch from one market to another.

v. Economic Cycles: positive and negative changes in the economy will continue to affect the needs of customers; in other words, the need of customers will continue to change though economic cycles. Markets will have to be intentional in anticipating the changing needs of their customers which can reflect in the types of asset classes that are demanded for, the amount of risk and return that can be accepted per investments and the volume of trades that are executed (The Government Office for Science 2012d).

4.2.2 Business Model Components

1) Value Proposition: different definition of value proposition can be found in literature when describing it as a component of a business model. The different perspectives shown by different authors portray value proposition as a very critical element in the creation of value. For instance, (Richardson 2005) describes the value proposition of a company using three dimensions; the offering, the target market and the strategic positioning which can include competitive strategy and strategy of improvement. Referring to the value proposition as one of the building blocks of a business model, in simple terms, (Osterwalder & Pigneur 2010) describes a business model as a mixture of products and services that are of value to a customer. However, in this framework, the value proposition defines how a market will create value. It also refers to the offerings (in form of products and services) a market is willing to provide to solve a customer's problem or to meet the needs of its customers. Value proposed to customers could influence their choice of markets; the value proposition can be designed in such a way that a market can distinguish itself from other markets that provide similar offerings. This can be in form of extending the features of a product or service or by providing distinct value added services such as an improved customer experience or delivering a value offering at a reduced cost and so on. A strong value proposition can provide superior value when compared to other markets and increase the possibility of gaining sticky customers; increasing the switching costs for customers. The strength of a value proposition can also be improved by designing and delivering a similar offering through innovative methods, such as incorporating best practices across other industries.

2) Customer Segment: here, the customer segment component refers to the customers that will benefit from the value propositions. It answers the question; for whom are the value propositions for? Customers can be treated as a mass market or can be grouped into segments. According to (Morris et al. 2005) customers can be segmented based on the type of value they receive, the kind of resources and customer relationship they require, how profitable they are or even their geographical dispersion or their position in the value chain i.e. a final consumer, service provider or supplier. Although the review of existing frameworks shows that most of the business model frameworks did not consider "customers" as a component in their framework, the importance of identifying whom a particular product or service is designed for was emphasized in the focus studies. (Osterwalder & Pigneur 2010) also refer to profitable customers of an organization as the heart of a business model.
3) Compliance: this component will evaluate the value propositions in the context of the specific rules and regulations and policies designed by authorities as well as the rules developed by individual markets to govern the operations of the markets. The aim of this evaluation is for a market to assess the potential implication of regulatory measures and policies on its business model. However, this evaluation would be an ongoing process (European Banking Authority 2015); some of the contradictory effects of regulatory measures on business model components might be clear from the starting point of a business while the others can only be identified in the course of time. This is necessary because the commercial success of a product or service in a financial market greatly depends on their compliance with the standardized regulatory framework guiding the market environment in which the products and services will be introduced into (Lumpkin A. 2009). In order to create a balance between the objectives of the stakeholders and of regulatory initiatives, there is a possibility of revising the features of the products and services such as reducing complexity in the design of the products and services that could debar measuring inherent risks, leading to a misconception of the actual benefits of the products and services.

   In order to distinguish the sources of the rules and regulations, this component is further broken down into two sub-components: the internal rules and regulations and the external rules and regulations. This component is one of the unique contributions of this research in terms of the components that constitute a business model. The compliance component, either in the context of internal rules and regulations or

external rules and regulations could not be identified as part of the components of the business model frameworks that were reviewed during the literature review.

4) Value: here, value refers to the value the market operators, customers, shareholders/corporate owners, suppliers, partners, society, environment and all other critical stakeholders will receive from the implementation of the business model. Value to the market can be in form of financial gains or improved financial performance, a good reputation, increase in market share, expansion of customer base and so on.
5) Service Value Network (SVN): a service value network is a dynamic configuration of people, technology, information and other resources, that all connected by value propositions (Haluk et al. 2011). As mentioned earlier, the SVN in this framework is divided into two; the internal value network and the external value network. The internal value network consists of processes, key individuals and other resources that exist within the market, and that are needed by a market to deliver a product or offer a service to target customers, while the external value network consists of other key individuals, organizations (in form of partners and suppliers) and other resources that are needed to deliver a value proposition but are not available within the market.

   Since the configuration of the SVN is based on specific value propositions, the constituents of the SVN can change as the value propositions change. Also, the dynamic nature of financial markets; from changes in regulations to technological developments and so on, can affect what constitutes a SVN at different points in time.
6) Financial Model: this consists of four sub-dimensions. They are revenue, cost, profit and price. (Timmers 1998) refers to the generation of revenue as the "bottom line" of a business model. A solid value proposition and the creation of value do not always lead to a successful generation of income (Richardson 2005), therefore the revenue model of a firm should enable a firm to convert the value created to customers into income (Dubosson-Torbay et al. 2002). Revenue in this framework refers to the logic of revenue generation based on the value a market offers to its customers; it includes the identification of the different sources of revenue that can be generated from the products and services provided to customers.

   The cost refers to all the costs a market will incur in order to deliver the value propositions and create value. This can include compliance cost, the cost of configuring both the internal and external value networks and so on. The profit sub-dimension refers to the generation of a positive cash flow.

Lastly, the price sub-dimension represents the logic of setting the right price of products and services offered to customers such that the profit potential of the product and services can be realized.

7) Sustainability: this dimension covers three aspects of sustainability; financial sustainability, environmental sustainability and social sustainability. This dimension focuses on identifying ways and adapting methods that can help to achieve financial sustainability while considering the impact of the business model on the environment and the society.

   Regarding financial sustainability, the aim is to achieve a long-term value creation and value capture. According to (Drimmelen 2013), achieving financial sustainability does not only involve being profitable, but also includes devising methods that can help to gain other economic values such as a strong market position. Financial sustainability can also be considered in the "value proposition" component of a business model. As mentioned in the focus groups that were conducted while developing the proposed framework, the use of best practice and innovation can play a very significant role in achieving financial sustainability through value propositions. Here, innovation could be through the design of the value propositions i.e. features as well as the processes involved in the delivery of the products and services. For instance, the concept of business platforms could be introduced here. (Gorevaya & Khayrullinaa 2015) identifies business platforms as a form of innovation. (Gawer & Cusumano 2013) highlighted two types of platforms; internal and external platform. The internal platform is defined as "a set of assets organized in a common structure from which a company can efficiently develop and produce a stream of derivative products while external platform is defined as products, services or technologies that provide a foundation upon which outside firms can develop their complementary products, technologies or services".

   Financial markets can adapt this concept towards being financially sustainable. Value propositions can be designed in efficient ways such that value is created through product platforms, as described by (Wheelwright & Clark 1992). Through product platforms, the needs of customers can be met by simply modifying the different features of the product platforms and different products can be created.

   The concept of platforms can also be seen as a collection of assets such as components, processes, knowledge, people and relationships connected by a set of

products (Robertson & Ulrich 1998). Consequently, this can also minimize fixed costs and create efficiency in the design of products and services by enabling the reuse of resources to produce a family of products. Asides helping to manage costs, an external platform can also help with the generation of more income by solving business problems for many users. An instance is the trading cloud developed by the New York Stock Exchange (NYSE) which provides services such as regulatory reporting, low latency trading as well as market and risk analysis to trading firms. Trading firms can provide services such as launching new trading strategies to their own users through the use of the computing power of NYSE and their provision of extended access to market data. By so doing, value is created to NYSE through income generated and to the trading firms through the access to the resources provided by NYSE and also by NYSE eliminating the possible cost of infrastructure maintenance and the longer time to reach markets.

Achieving financial sustainability is equally as important as achieving environmental and social sustainability. The environmental and social sustainability aspects focus on adapting sustainable practices while implementing a business model; they aim at examining the impact of the resources and activities required to deliver a value proposition on the environment and the society in order to ensure minimum environmental and societal negative impact. In relation to social sustainability, the sustainability dimension can also consider the effect of "organisational culture" of a particular market. Sustainability has to be integrated into the underlying assumptions and values of an organization in order to be fully sustainable" (Russell & McIntosh 2011). Embedding sustainability into the organisational culture of markets can integrate culture of sustainability; a culture in which market operators and members will be very aware of and accept the importance of being accountable financially, environmentally and socially especially with the aim of being sustainable.

8) Performance: this dimension is based on the need of a market to measure the success of a business model. How well are we doing in fulfilling our value propositions? Are we meeting our set targets i.e. Financial, regulatory, social and environmental? These are the kind of questions that can be addressed when assessing the performance of a business model. The aim is to evaluate the performance of a business model based on the value propositions and other set performance indicators. The output of this

assessment can be used to inform the re-design of product and services, re-define business goals and assess business efficiency and so on.

CHAPTER 5 – CASE STUDIES

This chapter demonstrates the applicability of the proposed framework, in terms of its capability to compare the business models of markets. Comparing the business models of markets can be beneficial for the following reasons:

a) A market can determine its competitive position by comparing its business model with the business models of other competing markets.
b) A market can identify and explore possible solutions to common problems related to its business model, which are also faced by other markets. This can be done by comparing the different approaches adapted into the business models of other markets in the same problem context.
c) The attributes of successful business models can also be identified through a comparison and evaluation of the business models of markets.

In this chapter, the comparison was done by instantiating each of the components of the proposed framework to the corresponding feature of two Stock Exchange Groups. This also demonstrates the applicability of each of the dimensions of the framework. The proposed framework was mapped to the business models of the London Stock Exchange Group (LSEG) and the Deutsche Boerse Group (DBG). The choice of LSEG and DBG was made after reviewing the 20 largest stock exchanges based on market capitalization. However, more specifically, LSEG and DBG were chosen as a result of the availability and accessibility to necessary information. It was important to have access to information regarding the business models of the selected markets such that each of the dimensions of the proposed framework could be mapped with the related components of the business models of the markets. Although there were other markets that could be completely mapped with the proposed framework, but some of the required information were not publicly available. After carefully reviewing the available information regarding the business models of the 20 stock exchanges, it could be seen that based on the publicly available and accessible information, the components of the proposed framework could be instantiated with the business models of LSEG and DBG to a very large extent.

In an attempt to compare their business models, an explanation of how each of the components of the proposed framework can be used to compare business models was provided, as well as the possible results that can be achieved from each comparison. The business models of the Groups are first described and then the comparison is done after. The

comparison was done with the information that were publicly accessible; mainly from the websites and annual reports of the two Groups.

5.1 London Stock Exchange Group

5.1.1 Brief History

LSEG is a diversified international exchange Group that can be referred to one of the oldest Stock Exchange Groups; its history can be traced to the year 1801. The table below shows a timeline of some of the significant events that have occurred in the Group:

YEAR	EVENT
1995	AIM - their international market for growing companies was launched.
1997	SETS (Stock Exchange Electronic Trading Service) was launched for the purpose of introducing speed and efficiency into the market.
2000	Their role as UK Listing Authority with Her Majesty's (HM) Treasury was transferred to the Financial Services Authority (FSA). In the same year, London Stock Exchange became a public limited company; London Stock Exchange plc.
2003	An international equity derivatives business; EDX London was created.
2007	London Stock Exchange merged with Borsa Italiana; Milan Stock Exchange to create London Stock Exchange Group.
2008	London Stock Exchange Group partnered with Oslo Stock Exchange; Oslo Bors to provide trading services for the equities, fixed income and derivatives markets.
2009	London Stock Exchange Group acquired a technology solutions provider for capital

	markets named Millennium IT. In the same year, London Stock Exchange Group acquired a majority stake in Turquoise; a trading platform that offers variety of stocks to European and emerging markets, US stocks, International Order Book (IOB) Depository Receipts, Exchange Traded Funds (ETFs) and European Rights Issues.
2010	The Group launched its charitable foundation with the purpose of supporting selected initiatives in the communities in which it operates.
2011	A partnership with Mongolian Stock Exchange was signed. In the same year, the Group acquired 50% of Financial Times Stock Exchange (FTSE) International Limited.
2012	An agreement was made to acquire majority stake in LCH Clearnet Group Limited; an European-based clearing house
2013	London Stock Exchange Group acquired a 67% stake in Gatelab; an Italian and UK based technology company. In the same year, the full acquisition of LCH Clearnet was done.
2014	The Group completed the acquisition of Frank Russel Company.

Table 19 History of the London Stock Exchange Group (London Stock Exchange Group 2013b) (London Stock Exchange Group 2015)

5.1.2 The Business Model of the London Stock Exchange Group

1) Value Propositions

LSEG operates three core business areas namely; capital formation, risk management and intellectual property. Through these areas, they provide the following services respectively; capital markets; post trade services; technology and information services. The capital market consists mainly of the primary market and secondary market. The primary market is located in London and Italy and their primary purpose is to provide companies and other issuers of equity and debt globally with an access to liquid pools of capital through the issuance of equity and debt. The primary market is further divided into two markets; the Main market and the AIM market. The main market focuses on large and already established companies that aim for admission to trade equity, debt and other securities. The main market is further divided into three segments of operations:

- Premium: companies/corporations in this segment are subject to the highest standards of regulations.
- Standard: this segment deals with shares and debt securities. Companies belonging to this segment are governed by the minimum standards of the EU.
- High Growth Segment: this is basically for high growth equity securities and businesses that generate revenues and has the intent to be listed as a premium company

The AIM market aims at raising capital for growing businesses and companies in other to assist their growth process. Already established companies also use the AIM market to continue growing their businesses. In the secondary market, trading solutions are provided for investors and institutions to access UK and Italian equities, pan-European equities, international depository receipts, European equities, European corporate and government bonds (fixed income) and equity and index derivatives. The secondary market also includes different types of trading services with the aim to maximize liquidity for the stocks traded. The London Stock Exchange (LSE) carries out both domestic and international trading services. The domestic trading services are the SETS; an order driven electronic trading service that also provides liquidity via a market maker, SETSqx (Stock Exchange Electronic Trading Service – quotes and crosses); provides electronic auction services at certain time

intervals during the day as well as a quote driven Market Making, SEAQ (Stock Exchange Automated Quotation); a platform for securities traded in the AIM market but not on the SETS or SETSqx. The SEAQ is also quote driven. In addition to the Main and the AIM markets, LSEG operates a professional securities and a special fund market. The professional securities market focuses on helping companies to raise capital through the listing of specialist securities, debt and depositary receipts to professional securities market. The specialist fund market focuses on specialized investment entities that are targeted at institutional or professionally advised investors.

The international trading services include the International Order Book; used to trade Global Depositary Receipts from some international markets, European Quoting Service; a service used for reporting trades of liquid MiFID securities that has not been listed on another exchange alongside providing quote driven market maker, European Trade Reporting; deals with the non-liquid MiFID securities that has not been listed on another Exchange, International Boards; allows member firms and their clients to trade MSCI Singapore Free Index and the Straits Times Index.

A variety of information and data products are provided through their information services. LSEG provides different data on share price movements, level of data of trades and company announcements; the data can also be customized to meet the needs of customers. Other services include indices and benchmarks, coding and post trade analytics, reporting and reconciliation services. In regards to technology services, the Group offers trading systems, post trade software, market surveillance and order routing services, data centre and network services, and data distribution.

LSEG also provides risk management for traders through their post trade services. These services include clearing/central counterparty services, and settlement and depository/custody services.

In addition to these main areas of businesses, LSEG also provides educational services. This is done through the LSEG Academy; its purpose is to train clients across the UK, Italy and internationally to develop the necessary skills and expertise needed to work in financial markets.

2) Customer Segments

The customer profile of LSEG can be seen in the table below:

SERVICES	CUSTOMERS
Primary market	Companies from 69 countries
Secondary market	Banks and brokers worldwide
Clearing and settlement services	Banks, brokers, fund manager firms worldwide
Information services	Asset managers, active and passive buy-side firms, trading venues, trading firms, service providers (e.g. Bloomberg and Thomson Reuters), fund managers, traders, retail brokers and market makers
Technology	Other exchange groups, other capital market clients, banks, IT and Large Sri Lankan companies, trading firms, depositories in Europe, North America, Africa and Asia-pacific region

Table 20 Customer Profile of London Stock Exchange (London Stock Exchange Group 2013a) (London Stock Exchange Group 2014b)

3) Compliance

In relation to the regulatory landscape that governs the activities of LSEG, the group identifies the following regulatory measures that have a growing impact on their operations. These are stated in the table below:

LSEG DIVISION & BUSINESS AREA	LEGISLATION/MEASURE	SCOPE
Capital Markets		
Primary Markets	MiFID (political agreement reached at Level I; work on technical aspects, Level II – under way)	SME (Small and Medium-Sized Enterprises) Growth Market proposals to support SME funding and markets
Secondary (trading) markets	Financial transaction tax (FTT) non UK but in Italy and France. Commission proposal	To impose transaction tax on equity, bond and derivatives trades that involve one

	under negotiation	financial institution with its headquarters in the EU FTT zone
	MiFID (political agreement reached at Level I; work on technical aspects, Level II – under way)	— Non-discriminatory open access to trading venues and CCPs — Extension of pre and post trade transparency to non-equity asset classes, including bonds and derivatives — Increased regulatory requirements for high frequency trading strategies and algorithmic trading — Additional organisational, transparency and market surveillance requirements for trading venues — Platform trading obligation for shares and OTC derivatives
	MAD/MAR (political agreement reached at Level I; work on technical aspects, Level II – under way)	Index manipulation and non-listed issues within Market Abuse regime
POST-TRADE		
Central Counter Party (CCP)	EMIR (Level II under implementation)	— Mandates CCP clearing for a wide

		range of eligible derivatives contracts — Mandates the reporting of derivative trades to Trade Repositories —Establishes harmonised requirements for CCPs and Trade Repositories, so that they can demonstrate safety, soundness and efficiency
	EC regime for recovery and resolution for CCPs (awaiting Commission proposal	— Commission likely to propose recovery and resolution measures in 2015 for CCPs — May provide regulators with expanded powers to intervene at an early stage, including the power to require an entity to implement measures under its recovery plan — Authorities will also be provided with wide range of resolution tools
Settlement Monte Titoli	CSDR (political agreement reached at Level I agreed;	Measures to harmonise: – the authorisation and

	work on technical aspects, Level II – under way)	operation of central securities depositories – certain aspects of securities settlement in the EU, including settlement periods and settlement discipline
	T2S (ECB project)	— Monte Titoli signed the ECB's Framework Agreement, reconfirming its positioning in the 'first wave' of the project aimed at facilitating cheaper cross-border settlement across Europe — The implementation date for phase 1 has now been set for June 2015
INFORMATION SERVICES		
FTSE	Benchmark Regulation – (Commission proposal under negotiation)	Regulation of specified benchmarks/indices
	MiFID (political agreement reached at Level I; work on technical aspects, Level II – under way)	Access under MiFIR Art 37 requires non-exclusive licensing of benchmarks
Market Data	MiFID (political agreement reached at Level I; work on	Post trade consolidated tape (CT)

	technical aspects, Level II – under way)	— Introduction of requirements for harmonised post trade data reporting to enable consolidated tape and data provision on a 'reasonable commercial basis'

Table 21 Regulatory Landscape of London Stock Exchange Group (London Stock Exchange Group 2014b)

In addition to these, the Group operates a rule book. The rule book contains rules that are closely linked to the operations of the trading systems. It consists of the core rules, order book trading rules, off order book trading rules, market rules and settlement and clearing and benefit rules.

The core rules govern the member firms and the member firm services. They also include rules regarding charges and payment of fees, general conduct; including rules against misleading acts, conduct and prohibited practices, and rules guiding trading usage of the trading systems. The order book trading rules contain rules that guide trades, order entry and govern liquidity provision in order driven security. The off order book trading rules are rules that also guide trades, however rules here are less reliant on the rules guiding the trading systems; they are mainly rules that guide the interaction of member firms when trading on the exchange but not on the order book. Rules regarding market makers include registration rules, rules that govern market makers in quote driven securities, gilt-edged market makers. Lastly, settlement, clearing and benefit rules contain rules regarding settlement, clearing through a central counterparty, capitalisation issues and entitlement issues.

4) Value

The creation of value by LSEG can be described in different aspects; the employees, the Group; the community, the customers and the environment. In addition to the value customers receive via the value propositions, LSEG states that their markets, post trade operations and information services provide a connection to variety of issuers, traders and investors; the access to these entities in turn create a valuable network that provides deep liquidity. Also customers are offered the choice of using a range of open access connected

market without imposing a usage restriction. LSEG also mentions that transparency, well governed market infrastructure, highly regulated capital markets, trusted independent and resilient market services are part of the value provided to its customers (London Stock Exchange Group 2014b).

Regarding the community, LSEG mentions that their activities benefit the communities where they have significant present and even worldwide. The London Stock Exchange Group Foundation was established by the group in 2010. The purpose of the foundation is for charitable giving and the promotion and facilitation of staff engagement with the community. In the year 2014, the group donated £1,511,000 to charity; a 21% increase in comparison to the year before. Asides financial benefits, the group engage with governments, inter-governmental agencies and regulators to promote sustainable practices and to support the local communities and the environments. Also, in collaboration with other financial organisations, the group launched the "Gateway to the City" apprenticeship scheme. The foundation aims at improving long-term employability of individuals by training apprentices and providing them with trading opportunities, formal development and training opportunities.

Apart from the generation of the income for the group, it is not clearly stated what other benefits the other stakeholders receive from the activities of the group.

5) Service Value Network

All the information regarding the Service Value Network of LSEG are not publicly accessible. However, based on the nature of its business, the external service value network can be assumed to include the following:

a) Hardware and software providers
b) Communication and network providers
c) Information and data providers

6) Financial Model

In terms of revenue generation, the main sources of revenue and profit for LSE are as follow:

i. Admission fee for the initial listing or raising further capital
ii. Annual fees for securities traded
iii. Fees based on value traded or number of trades
iv. Fees based on trades or contracts cleared

v. Settlement of equity and fixed income trades
vi. Custody fees
vii. Subscription fees for data and analytic services
viii. License fees for passive funds and derivatives
ix. Fees from infrastructure services

The identifiable main expenses incurred in their business model are:

i. Cost of sales
ii. Employee costs
iii. IT costs

It is not clearly identifiable what the pricing mechanism and logic of profitability of the group are.

7) Sustainability

LSEG has set some strategies in place that can enable them to achieve financial, environmental and social sustainability. In relation to financial sustainability, the group has devised some methods that seem to have the capability to contribute directly or indirectly to their financial sustainability. As stated in (London Stock Exchange Group 2014a), these strategies include:

i. Constantly working towards the improvement of infrastructure and operational technology capabilities.
ii. Using value enhancing acquisitions and partnerships to increase business growth.
iii. Anticipating the evolving needs of the customers
iv. Developing skills and people necessary to create innovative products and enhance customer service around the world.
v. Adapting a strict cost discipline and prudent investment.
vi. Continuously creating new avenues of revenue through the capitalisation of assets of intellectual property, financial market experts and the global customer needs.
vii. Engaging with leading financial markets participants globally and understanding their needs in order to provide the necessary solutions.
viii. Prioritizing the highest levels of governance and integrity across all business areas

ix. Seeking new opportunities to provide services in key geographies.
x. Enhancing customer services through global partnerships.

In regards to environmental sustainability, LSE understands the importance of reviewing their approaches towards sustainability continually. According to the Group, their main sources of direct environmental impact come from the energy consumed in data centres and offices, travel, waste, water and indirectly from the supply chain. In order to reduce the environmental impact from these sources and their activities in general, LSEG plans an active approach that includes:

i. Frequent calculation of emissions using a sustainability software
ii. A commitment to resources utilisation in ways that contribute to long-term sustainability and profitability of the business while having minimal impact on the environment.
iii. Constantly working towards developing and providing low carbon economy services.

Regarding social sustainability, LSE works towards the following:

i. Deploying a framework for charitable giving and community involvement
ii. Continuously working towards meeting environmental targets
iii. Scaling up national diversity and social inclusion programme (including gender)

8) Performance

The identifiable performance assessment activities done by the group are:

i. A monthly review of financial performance

ii. A review of environmental performance and sustainability approaches

5.2 Deutchse Boerse Group

5.2.1 Brief History

Deutsche Boerse Group (DBG) is located in Germany; it can also be referred to one of the largest exchange organisations. The table below shows a timeline of some of the significant events that have occurred in the Group:

YEAR	EVENT
1990	The derivatives exchange was created
1991	IBIS; an integrated exchange trading and information system for the cash market of the Group was introduced.
1992	An order routing system named Boss was introduced into Frankfurt Stock Exchange
1996	MDAX; the index for medium sized company was launched
1997	The market segment for growing markets was introduced. In the same year, IBIS was replaced with Xetra; a fully electronic trading system for cash market
1998	Eurex; a derivative exchange was founded.
1999	Deutsche Boerse takes over from Wienner Boerse AG (Vienna Stock Exchange) in the operation of electronic trading.
2000	Clearstream was founded; a service provider for the settlement of German and international securities transactions and securities custody. In the same year, XTF Exchange Traded Funds; a trading segment for exchange-traded index fuds was launched.
2002	Deutsche Boerse AG acquired a 50% stake in the Spanish Infobolas; a provider of real time financial information.
2003	The General Standard and Prime standard market segmentation were established (Market segments for companies governed by the highest European transparency requirement)
2005	The Entry standard market segment for small

	and medium sized companies was launched.
2006	The trading of commodities in the exchange commenced.
2010	Deutsche Boerse acquired a majority stake in Tradegate Exchange GmbH; a stock exchange that specializes in the execution of the orders of private investors.
2012	The electronic securities trading of Prague Stock Exchange was moved to the Xetra trading system
2014	A London supplier of cloud-based software solutions named Impendium Systems was taken over by Deutsche Boerse. In the same year, the link between Eurex and Taiwan Futures Exchange was established. Also in that year, Deutsche Boerse joined the UN Sustainable Stock Exchange.

Table 22 Brief History of Deutsche Boerse Group (Deutsche Boerse Group 2014)

5.2.2 The Business Model of Deutsche Boerse Group

1) Value Propositions

The business areas of Deutchse Boerse Group are listing, trading, clearing and settlement, market data and IT services.

a) Listing

The Group helps small, medium-sized and large companies to raise capital by linking them with investors that can provide capital. This service also includes the issuance of shares by companies, issuance of corporate and government bonds. The group offers companies that aim to increase their equity, three transparency standards; the prime standard, general standard or entry standard. Companies under the prime and general standards are governed by the highest European transparency requirement and are given the full benefits of a full-listing. The Entry standard is mainly targeted at the small and medium sized businesses; these groups of companies are provided with a cost-effective fast access to exchange trading.

b) Trading

Trading is done in their cash market and their derivatives market. The cash market offers varieties of tradeable securities, access to the capital markets and support different trading techniques. The trading of securities is done through the Xetra trading system. The Group's derivative is one of the largest regulated markets for derivatives trading. Investors are provided with access to different futures and options contract, equity index and equity products; gas, electricity and emission rights inclusive.

c) Clearing

Within the group, the clearing activities are done by Eurex clearing. Eurex clearing serves as central counterparty for products that are traded on Xetra, Eurex Zurich, Eurex Deutschland, the Frankfurt stock exchange and the Irish Stock Exchange. It also provides risk management for trading participants of equities, derivatives, fixed-income securities.

d) Settlement

Settlement activities are done by Clearstream; the post-trade securities service provider of the Group. Clearstream provides custodian services and settlement of securities transactions. The custodian services include tax services, dividend payments and corporate actions.

Market Data and IT Services

Market data belong to the information services business area. Under this business area, the Group provides real-time and historic market data and analytical indicators. Marketing activities are also done here; this involves marketing data that do not originally emanate from Deutsch Boerse markets. Such data include financial news, algorithmic newsfeed and analyses and business sentiment indicators. Indices and benchmarks are also provided to issuers of financial products.

Under the technology business area, the group provides connectivity solutions and specialised trading software. In collaboration with software partners, the Group also offers hosting services to banks and asset managers.

2) Customer Segments

The customer segments of the DBG consist of the following:

SERVICE	CUSTOMER SEGMENT
Listing	Investors, Companies and other issuers
Trading	Institutional and private investors, Brokers and Banks
Clearing and Settlement	Banks, Other Stock Exchanges, Irish and European Energy Exchange
Market Data	Asset managers, Banks, Private and institutional investors, securities trading houses, hedge funds, international cash, energy and commodity market places

Table 23 Customer Segments of Deutsche Boerse Group

3) Compliance

The Group identifies three EU legislative packages that are of central relevance to their operations. They are:

a) Markets in Financial Instrument Regulation (MiFID)
b) European Market Infrastructure Regulation (EMIR)
c) Central Securities Depositories

In addition to these regulatory initiatives, the Group also implements its own rules and regulations. They are:

a) Exchange rules for the Frankfurt Stock Exchange
b) Trading regulation for the regulated unofficial market on the Frankfurt Stock Exchange
c) Fee regulations on the Frankfurt Stock Exchange
d) Admission regulations for Exchange traders at the Frankfurt Stock Exchange
e) General Terms and Conditions of DBG for the regulated unofficial market on the Exchange
f) Conditions for utilization of Eurex Trade Entry Services
g) Technical Regulation
h) Admission regulations into the Eurex Exchange

4) Value

Financially, value is added by the Group through dividends to shareholders, salaries to employees, taxes to the government/economy and income to the Group. For the community, the Group develops innovative long-term projects that have the capacity to create value for the society, especially in the areas of education and science, culture and social involvement. In addition to the value received by customers through the value propositions, DBG offers the following benefits to its customers:

a) Provision of efficient access to the capital markets

b) Support of state of the art trading technologies

c) A continual expansion of tradeable securities

d) Highly reliable, secure fast and innovative trading system

e) Low costs and transparency

The Group also provides value to its staffs and community through the following:

a) Training and professional development: the staffs of the Group undergo intermittent training that aims at helping them overcome their personal challenges, as well as increasing their knowledge in the area of financial markets.

b) Support programmes: the support programmes are targeted at different aspects for the benefits of the employees. For instance, one of the support programmes called the "High Potential Circle" aims at enhancing the methodological and social skills of the employees. Other programmes include the mentoring programme and academic support programmes.

c) Special training for executives: This includes training and coaching for managers. Special events dedicated for networking and exchange of views are also organized for managers.

d) Apprenticeship: The Group organizes three apprenticeship programmes; the office management specialist apprenticeship, IT specialist (Application development) and IT Specialist (Systems integration)

5) Service Value Network

All the information regarding the Service Value Network of DBG are not publicly accessible. However, based on the nature of its business, the external service value network can be assumed to include the following:

a) Hardware and software providers
b) Communication and network providers
c) Information and data providers

6) Financial Model

The main sources of revenue and profit for DBG are:

a) Market Data services
    - Market solutions
    - Tools
    - Index
    - Information services
b) Xetra – Cash trading system
    - Trading
    - Central counterparty for equities
c) Clearstream – Post trade services
    - Net interest income from banking business
    - Global securities financing
    - Settlement
    - Custody
d) Eurex – Derivatives exchange
    - European index derivatives
    - European interest rate
    - European equity derivatives
    - US Options
    - Commodities
    - Repo
    - Others

The costs incurred by the Group are mainly from the following:

a) Staff costs
b) Depreciation amortisation and impairment losses
c) Other operating expenses

There is no adequate information that can help to identify the pricing mechanism of the Group.

7) Sustainability

In terms of ensuring financial sustainability, some strategies have been put in place by the Group that can directly or indirectly contribute to financial sustainability. They include:

a) Expansion of the product and service offering: the Group is working towards developing new products and services, with a strong collaboration of the interests of the customers, regulators and the central bank. This also includes developing new products that are built around transparency, fairness and liquidity.
b) Extension of leadership in data and technology: this involves a continuous combination of data and technology services in a single market segment. The purpose is to adapt business digitization to support the customer through the value offerings. The Group also aims at using technology as a powerful tool that can be used to help customers to comply with regulatory requirements.
c) Geographic expansion and acquisition of new customer groups: the Group aims at establishing itself as an offshore trading centre for reminibi; the Chinese currency. Also, the Group is working at connecting Xetra trading platform technology with the pan-African Stock Exchange (AFSX), devising methods that can enable the market participants of Xetra to connect to African financial markets and also developing a technical link for African traders to access the pan-European network of traders. The Group is also planning to expand its range of products and their customer segments in the energy markets.

In terms of environmental sustainability, the Group made sustainable investments through the development of index products that can direct the attention of market participants to the companies that incorporate sustainable practices into their business operations and company activities. Other strategies related to sustainable sustainability include:

a) Energy-efficient IT Management: The Group aims at operation efficiency; a method to achieve sustainable IT management. Also the houses built to accommodate the servers are designed to meet the requirements for environmental sustainability.
b) Resource-efficient business ecology: the ecological footprint of the Group is usually recorded so as to monitor their environmental performance and develop methods that can be adapted to reduce the environmental footprint.

The group aims to being socially sustainable though the following:

a) Employee diversity: The Group promotes diversity if its employees, especially in relation to educational backgrounds and nationalities.
b) Code of conduct for suppliers: The Group ensures that its suppliers and external service providers satisfy the environmental and social requirements. This is achieved by imposing a sustainability requirement on the suppliers and external service providers, in relation to their responsibility for people and the environment.
c) Stakeholder engagement: Deutsche Boerse Group ensures a continuous interaction and exchange of views with their stakeholders, irrespective of what their interests are. These are done mainly through personal dialogue and committee participation. The essence of the stakeholder engagement is to promote trust and improve the decision making processes.

8) Performance

DBG makes use of both financial and non-financial performance indicators. In respect to the financial indicators, the Group examines the results of their operations by comparing the net revenue generated from each business area in the present year and the previous years. The percentage increase or decrease is calculated to examine how well each of the business area is doing in terms of revenue generation. Also, the operating cost (including staff cost) of the Group is also calculated and compared with previous years. This is also done to determine how well the Group is performing in terms of cost efficiency.

The non-financial key performance indicators used by the Group includes the following:

a) Gender Diversity in Employment: The Group aims at filling 20% of upper and middle management positions and 30% of their lower management positions with women by the year 2020. As a result, the Group checks by percentage, their success in employing women with the right qualifications such as educational qualifications and

other intangible qualifications like their willingness to deliver outstanding performance, their dedication, sense of responsibility and their dedication to work. As at December 2013, after examining their gender distribution of the employees that have filled such positions, the Group has succeeded in achieving a 13.9% of employment of women in upper and middle management positions and 21.7% in lower management.

b) Corporate responsibility: this includes an assessment of transparency, security, supply management, compliance, environment and corporate citizenship. The table below show a more detailed list of the performance indicators and their performance levels for the year 2013 and 2014.

Performance Indicators		**2014**	**2013**
Transparency			
Proportion of companies reporting in accordance with maximum transparency standards	%	82	81
Number of calculated indices		10,825	10,513
Number of sustainable index concepts		25	23
Security and reliability			
System availability of cash market trading system (Xetra)	%	99.981	99.999
System availability for derivatives trading system (T7)	%	99.986	99.969
Market risk cleared via Eurex Clearing (gross monthly average)	€bn	16,343	15,861
Supplier Management			
Share of revenue generated with suppliers or service providers that have signed the Code of Conduct or have made voluntary commitment over and above those required under the Code	%	94.7	95.3
Compliance			
Punished cases of corruption		0	0

Proportion of business units reviewed for corruption risk	%	100	100
Number of employees trained in anti-corruption measures		518	372
Number of justified customer complaints in relation to data protection		0	0
Environment			
Energy consumption	MWh	69,901	74,662
Greenhouse gas emissions	t	13,200	20,437
Thereof travel based Greenhouse gas emissions	t	7,111	6,222
Water consumption	m^3	70,049	67,932
Paper consumption	T	105	101
Cash value of material administrative fines and total number of non-monetary penalties due to non-compliance with legal requirements in the environmental area	€	0	0
Corporate Citizenship			
Corporate responsibility project expenses per employee	€	620	730
Corporate volunteering days per employee	days	2	2

Table 24 Corporate Responsibility: key figures for Deutsche Boerse Group (Deutsche Boerse Group 2014)

5.3 Comparison of the Business Models of London Stock Exchange Group and Deutsche Boerse Group

5.3.1 Value Proposition Comparison

Market operators can be compared based on the products and services they offer. Their value propositions can be evaluated based on certain qualities that can distinguish one market's offering from another. These qualities can include the quality of the value propositions, the cost in terms of how much a market request from its customers in order to receive a particular product and service, or even the overall customer experience. There is a relationship between value propositions and competitive advantage (Rintamäk et al. 2007); in order to identify the distinct characteristics of the value propositions of different markets, the core elements that

distinguish the value propositions of one market from the other or that contributes to the competitive advantage of the markets can be used. In relation to LSEG and DBG, it can be seen that both Groups offer very similar value propositions. However, there are still some distinct features that can competitively distinguish them.

SERVICE	LSEG	DBG
Trading data (real time and historic)	√	√
Company announcements	√	√
Indices and benchmarks	√	√
Provision of post trade software	√	√
Business sentiment indicators	×	√
Order routing services	√	√
Reporting and reconciliation services	√	√
Data centre	√	√
Data distribution	√	√
Algorithmic newsfeed and analysis	√	×
Network services	√	√
Provision of trading systems	√	×
Trading software	√	√
Financial news	√	√
Coding and post trade analytics	√	√
Hosting services	√	√
Post trade software	√	√

Table 25 Comparison of Services Provided by LSEG and DBG

Starting with their similarities, although classified under different business areas, both markets offer listing, trading, clearing and settlement services and data and technology services. Regarding their listing services both Groups cater for small, medium-sized and already established large companies. Also, referred to as premium, standard and high growth segments in LSEG and prime standard, general standard, general standard and entry standard

in DBG, the Groups also offer the same levels of transparency to companies. The post-trade services provided by each group cover the same areas of services i.e. clearing and central counterparty services, settlement services, depository services, custodian services and risk management. Both groups also provide real-time and historical data, some type of data analytic services, indices and benchmarks. Connectivity services, hosting services are also provided by both groups.

The Groups seem to have many similarities in their value propositions; in addition to their closely related business areas their individual products and services under each business area are also closely related. However, in an effort to distinguish these Groups, there are still some distinct elements that can make one Group have higher competitive advantage than the other. First, each of the value propositions offered by both market operators, although similar; do not cover the same scope. In the secondary markets, both markets allow the trading of almost same products.

Products	LSEG	DBG
Cash equities	√	√
Exchange Traded Funds (ETFs)	√	√
Fixed Income (Corporate and Government bonds)	√	√
Commodities	√	√
Power	√	√
Specialist products	√	×
Derivatives		
Equity	√	√
Index	√	√
Gas	√	√
Electricity	√	√
Commodities	√	√
Emission	√	√
Power	√	√

Table 26 Financial Products Offered by LSEG and DBG

As shown in the table above, the only distinguishing factor in the types of products traded is the specialist product offered by LSEG. However, other factors related to the value propositions can also be examined. For instance, LSEG provides access to not only UK equities and Government bonds but also to Italian equities, bonds and derivatives. The expansion in geographical accessibility and the offering of specialist products provide more advantage for LSEG than DBG. Although the provision will be for different customer groups, DBX can gain a competitive advantage in terms of geographical presence if they successfully execute their plans of gaining new partners in other regions of the world, such as connecting with pan-African stock exchange.

The difference in the information and technology services is the sentiment indicator analysis offered but DBG but not by LSEG. Similarly, DBG lags in the provision of trading systems.

Regarding the post trade-services, the Group also offers same kind of services. Nonetheless, "positions of advantage of a value proposition is consequential of cost leadership and product differentiation" (Porter 2008). In cases where two or more markets offer the same products, other elements such as quality of service, price and the value added components that accompany the value propositions can be used to compare markets based on their value propositions.

5.3.2 Customer Segments Comparison

Examining the customer segments reached by the two Groups through the same value propositions, it can be seen that each Group does not serve the same customer segments. For instance, both Groups offer clearing and settlement services, but the customer groups of DBG include banks, other Exchanges, while the customer groups of LSEG includes banks, brokers, fund manager firms. The same applies to the information services of LSEG and the market data services of DBG. The possibility of two markets reaching different customer groups but offering the same value propositions indicates that there is also a possibility of a market losing out by not accessing certain customer groups through their value propositions. This means that the needs of certain groups of customers are still yet to be provided for even though the means to which the needs can be met i.e. value propositions are already available and accessible by the other customer groups of other markets. Competitors that provide similar products and services can capitalize on this gap in the customer grouping of a market which can consequently reduce the number of revenue streams that could have been created

through the provision of the same products and services to diversified customer segments. However, comparing customer segments can help identify the customer groups that are yet to be reached (Goyat 2011). Also, using the customer segment as an element of comparison can help a market identify the specific needs of certain customer segments that are met by other competitors. This can also help to identify the aspects of a product or service that needs to be improved or the need to create value added components in order to be able to serve more customer segments (Goyat 2011).

5.3.3 Compliance Comparison

The extent to which a market is regulated can also distinguish one market from the other. Depending on the purpose of comparison, this can be either positive or negative. From a positive perspective, a well regulated market can suggest that the market can be well trusted which can contribute to the competitive advantage of that market. On the other hand, regulations might also restrict potential customers; creating a negative impact.

5.3.4 Value Comparison

LSEG and DBG provide similar benefits to their employees, shareholders and to the Government. The community in which both Group operate benefit from apprenticeship schemes. The apprenticeship scheme organized by LSEG focuses on improving the career prospects of candidates through the provision of support and knowledge in business administration and also improving their skills in presentation, information technology, career planning, teamwork and networking. Comparing this apprenticeship scheme to the scheme provided by DBG, DBG offers three separate apprenticeship schemes i.e. office management, specialist apprenticeship and IT specialist in application development and systems integration. Although not centred on the same areas of development and training with LSEG, more opportunities are provided for individuals by DBG; candidates of DBG are not restricted to only one area of development in the apprenticeship schemes. Also, in addition to the charitable donations provided by both Groups, DBG also contributes to their community through the long-term projects developed with the capacity to create added value to the society. Regarding, the employees and shareholders of the Groups, both Groups provide financial benefits through salaries and dividends respectively. However, DBG differentiates itself here by providing other benefits to its benefits asides financial benefits. These benefits are: training and professional development for the staffs, support programmes and the training and coaching for executives.

In general, while analysing the different forms of value created by a firm it is important to understand its competitive position and to understand how one firm differs from the other (Lagunes Garcilazo 2012); value creation can distinguish one firm from the other (Prahalad & Hamel 1994). Regarding their customers, the value provided by the Groups and received by the customers is dependent on the individual customer or customer segment. Asides the specific constituents of their value propositions, it can be seen that both Groups provide other forms of value to their customers. Although these value are not entirely similar, speculating which Group is more beneficial to its customers is not a straight forward evaluation because it is dependent in the customers' view of value. This is in agreement with (Maas & Graf 2009), that value for customers can only be identified from the customers' perception of value and their evaluation of the attributes of the value propositions that contribute to the goals and purpose of the customers; value is created when the beneficiary of the value realizes the value (Haluk et al. 2011). As mentioned earlier while describing the output of the focus group, the level of trust that exists within a market plays an important role in comparing the value provided by markets. In addition to this, risk and personal customer relationships are also important elements of value (Maas & Graf 2009).

5.3.5 Service Vale Network Comparison

The "what" and "how" can differentiate and competitively position markets. In relation to the service value network, the strategic partners and the type of suppliers chosen to implement a business model and how the processes necessary to deliver the value propositions are carried out, can all contribute to the competitive advantage of a market. By comparing the Service Value Network of markets, markets can also identify opportunities to improve their competitive advantage by examining ways to adapt unique methods, skills and resources that can distinguish them from their competitors. For instance, in a scenario where neither of competing markets makes use of best practices, the integration of best practices can enhance the value creation process as well as improve the competitive position of the markets.

5.3.6 Financial Model Comparison

For the comparison of markets, the financial model can be used as a benchmark between markets or as a performance indicator to determine how well a market finances are doing in comparison with other markets. Its usability is further explained under the "Performance" component instantiation.

5.3.7 Sustainability Comparison

The issue of sustainability is treated with importance in both Groups. As regards financial sustainability both Groups have strategies that can directly or indirectly contribute to a steady generation of income. However, with the understanding that sustainability is relational to long-term profitability and the diversifying methods that can help overcome possible challenges that can deter achieving sustainability; LSEG seems to be in a better position. As discussed earlier, while explaining the possible drivers of change that could impact financial markets, there is a probability that the demands of customers will evolve or change as a result of changing economic cycles or changes in age demographics. It is part of LSEG's plan to continually anticipate the evolving needs of their customers. This can enable them identify what possible products or services could be requested for by customers, as changes in the economy are taking place, as a result of an economic recession or global economic imbalances in general. This approach can also be useful as the demand of customers change as a result of changing age distributions. Such futuristic plan is absent in DBG. Although DBG aims at expanding its products and service offering, in collaboration with its customers, the focus still seems to be on the present interests of the customers are and not what they are likely to be in years to come. Also, the plan of LSEG to deliver value offerings not only within UK and Italy put them in a better place in terms of geographical diversification. By so doing, risks within customer groups and segments are distributed and new avenues of revenue are created. The role of integrity and good governance cannot be overemphasized; being intentional about prioritizing integrity and governance across the business areas of LSEG is indicative of LSEG's efforts to continually renew the trust of their customers. These futuristic plans that contribute to the sustainability of value creation are absent in the plans of DBG towards financial sustainability.

Regarding environmental sustainability, both Groups recognize the importance of efficiently managing their ecological footprints and constantly calculating their emissions in order to analyse their environmental performance. Examining which Group is more environmentally sustainable will include how emissions are managed, the availability of a clear plan on how to design and implement initiatives that can continually help to reduce environmental impact and the extent to which these initiatives are integrated into their business models.

One thing that seems emphasized in the approaches of DBG towards social sustainability is the stakeholder involvement approach. The Group imposes sustainability requirements on its suppliers and external service providers as well as engaging their stakeholders in its decision

making processes. Although, the internal capabilities of a firm can play a significant role in achieving sustainability goals, but a firm cannot be totally sustainable if the system in which it operates is not sustainable (Jennings & Zandbergen 1995). DBG aims at not just achieving sustainability at an organizational level but at a system level through collaboration with suppliers, partners and other stakeholders.

5.3.8 Performance Comparison

Individual markets can set key performance indicators to evaluate their business model performance or assess certain areas of their businesses in order to improve their performance. However, comparing the performance of a market with external factors such as the performance of competitors can help to identify certain factors a market could not have been able to identify within its market indicators. First, assessing the performance of other market operators can help identify hidden key indicators that are not directly identifiable by a market. Also, using the performance of other markets as bench marks, a market can identify its weaknesses; this can help prevent complacency in performance level especially in cases where the markets used for comparison have higher performance levels in similar business areas. The result of this comparison can inform the necessary improvement in the identified areas.

In the case of LSEG and DBG, the performance indicators of the two Groups include financial performance and environmental sustainability performance. However, the distinguishing factors in their performance indicators can be seen to be gender diversity in employment and performance in corporate responsibility in favour of DBG. Being in the same business area, LSEG can also assess the performance of their business model by including these performance indicators in their performance indicators. This output of the evaluation can inform their decision-making process for improvement.

CHAPTER 6 - CONCLUSION

((Florian 2010); (Stubbs & Cocklin 2008); (Evans et al. 2014)) argue that incorporating sustainability into the methods of value creation of a firm is most possible through the business model of that firm. Business models are very crucial in achieving sustainability (Lovins et al. 2007). Despite these claims and the works that have been done on sustainability in business models, there is still an obscurity in the business model feameworks developed for sustainability i.e. sustainable business model (Florian 2013). Although value creation has been identified as a consequence of business model implementation, (Roome & Louche 2015) highlight the possibility of value destruction when implementing traditional business models that only focus on the creation of value for the economic actors without considering other stakeholders such as the environment and the society. However, a company can only be sustainable if it balances societal, environmental and economic goals (Drimmelen 2013). Identifying the value that can be destroyed and devising strategies to minimize the impact of the value loss is as important to achieving sustainability in on organization as the creation of value is important to a firm and the society (Roome & Louche 2015).

However, having the capacity to create value for all economic actors as well as the society and environment do not come cheap, and the financial markets are not exempted from this challenge. Financial markets are placing more priority on surviving and thriving in their market economy than in other sustainable initiatives; the challenges faced by financial markets are posing as threats on their revenue generation. Although financial markets are constantly developing various innovative business models and revising already existing ones, innovative business models are not enough, means to sustain them are also necessary. As mentioned earlier, innovative products and services can be replicated by other competitors. This being said, financial markets need a sustainable business model; one that will enable them to incorporate methods, processes and activities that can ensure or contribute to sustainability, into the core of their business. This research agrees with earlier researchers such as (Drimmelen 2013), that a company is not sustainable until it is financially, environmentally and socially sustainable. However, sustainability should not be treated as a fragmented entity of a business model; sustainability should be integrated into every aspect of the business model. General business model frameworks cannot achieve this purpose; the business model frameworks that have been identified in literature focus on value creation and value capture, but not on sustaining value. Also, the "value" that is being described in the reviewed frameworks refers to the value that customers will receive through the value

propositions and the income that will be generated for the organizations. The apportioning of value in these frameworks does not include stakeholders that should benefit from sustainability; these stakeholders include the economic stakeholders, the society and the environment. The other works that attempted to conceptualize business models for sustainability still used a fragmented approach towards sustainable business models; there were no clear explanations of how sustainability can be integrated into the business model design. These works only suggested possible sustainable activities/initiatives that could be adapted in the decision making processes of firms even in their business operations. These drawbacks make the already existing frameworks inadequate to fulfil sustainability in financial markets. This was another motivation to develop a business model framework that can be used to develop sustainable business models for financial markets.

6.1 Overview

The thesis was written to provide an understanding of the research problem, highlight the aims and objectives of the research, review already existing theoretical works in the problem area, identify their drawbacks in relation to the identified problem, explain the methodology adapted and how the methodology was implemented, present and describe the proposed framework and demonstrate its application through a comparative evaluation of the business models of two markets. These were presented in six chapters.

In details, Chapter 1 sets the backdrop of this thesis. It explains the significant relevance of financial markets and how they contribute to the economy and the society. It further identifies and highlights the challenges that threaten the capability of financial markets to fulfil their roles to the society and to the economy. The challenges identified contributed to the formulation the first aspect of the problem area i.e. the need for sustainable business model in terms of a sustained revenue generation. Also because the interests of the society are strongly tied to the activities of financial markets, the need to attain the other aspects of sustainability i.e. social and environmental was also highlighted. These two perspectives; the ability for financial markets to continue to fulfil their roles to the society and the economy and the need to consider the interest of the society and the environment contributed to the formulation of the research problem. After defining the purpose of the research, the other objectives were also explained. Finally, the research questions that should be answered in order to fulfil the purpose and objectives of the research were also highlighted.

Chapter 2 represents the theoretical background and the knowledge base of the research problem. To begin, a brief background of the evolution of the contributing factors of the challenges faced by financial markets and their impacts were described. The chapter also provided an extensive background of the business model concept. The emergence of the business model concept and the various definitions that have been presented in literature were explained. The review of this business model definition showed that there is still a lack of consensus on the exact definition of a business model. However, the focus on the important functions and processes needed for value creation was identified as a common feature among the definitions. In addition to formulating definitions for the business model concept, scholars also proposed different functions of a business model. These functions were also described in this chapter. The different business model types as classified in literature were also reviewed. The review revealed the different categories of business models; it provided knowledge of the different business model groups that exist within different business areas. In order to acquire knowledge on the early and recent developments in the area of business model frameworks, a review of already existing business model frameworks that have been developed was done. The review showed that some frameworks were industry specific while others were designed for general application. Since the main research area was on sustainability in business models, the works on business models for sustainability were also reviewed. Although some "frameworks" were identified, these frameworks were not designed for the development of sustainable business models but for integrating sustainable practices into an organization. The literature gaps were further explained, highlighting the different drawbacks of the reviewed frameworks and their inadequacy to achieve sustainability.

Chapter 3 focused on the methodology that was adapted in designing the proposed framework. The chapter began with a general description of the chosen methodology; the Design Science Research methodology. This description includes understanding what the goals of a design science research is, an explanation of the research cycles of a Design Science Research; as explained by (Henver 2007), the DSR process model by (Vaishnavi 2004) and possible evaluation methods in a Design Science Research. The chosen methodology was then justified providing reasons why it was suitable for the research. This was explained alongside the philosophical stance of the research. Also in this chapter, the application of the methodology in the research was explained. This includes how the three design cycles and the steps in the research process model were integrated and implemented in this research; how the literature review contributed to the design of the preliminary

framework; the development of the proposed framework and the evaluation process of the preliminary framework i.e. the focus group activities.

The analysis of the data collected from the focus groups as well as the description of how the results of the analysis were translated into the proposed framework was done in Chapter 4. This included an explanation of the different themes that were identified from the focus groups and how each of the themes was applied in the development of the final version of the proposed framework. Afterwards, the proposed framework was presented and described in details; explaining all the main components of the framework as well as the "drivers of change" that have been identified in the focus groups.

6.2 Contributions

The main contribution of this research is the proposed framework; a framework for sustainable business models for financial markets. This fulfils the first and third objectives and answers the second research question of this research. The framework is developed based on the knowledge that financial markets need to continually implement strategies, revise business models and develop innovative business models and adapt methods to sustain their business models in order to survive their very competitive and dynamic environment. Although various business model frameworks already exist, there is no business model framework that has been designed for the development of business models in general or specifically for financial markets. It was also observed while reviewing literatures that sustainability was commonly understood in the aspect of environmental sustainability. However, sustainability in the proposed framework represents financial, environmental and social sustainability; the three aspects of sustainability required for a business to succeed (Drimmelen 2013).Asides this, evidence from literature, such as in the work of (Panwar & Blinch 2012) show that market operators that have not benefited from sustainable investments (environmental and social) will rather focus on making profitable growth through a steady generation of revenue. Also the uncertainty in the future of financial markets that can be consequential of the drivers of change explained earlier in this thesis, or other unidentified drivers of change create a need for a sustainable business model that can ensure a long-term profitability without having a significant impact on the environment and the society. The importance of the minimal impact on the environment was highlighted here because the financial, environmental and social goals must be met for markets to be truly sustainable.

In addition to the main contribution, other conceptual contributions were made. In relation to the second objective of this research and the first research question, a comparative review of existing business model frameworks and works on sustainability in business models was carried out. Although a review of works on sustainability in business models has also been done and presented in literature, the gaps in these works have not been identified in relation to the development of sustainable business models; the "sustainable business model frameworks" are not significantly relevant to the development of a sustainable business model. Also, neither of the works was developed based on an integrated synthesis of literature on business models and sustainability, which can provide a basis for the improvement of future works on sustainable business models.

This research also contributes to the study of competition in financial markets. This was done by demonstrating the possibility of comparing the business models of markets through the proposed framework in order to competitively distinguish markets and probably identify the competitive advantage of markets. This also fulfils the fourth objective of this research and answers the third research question of this research. Comparing markets with earlier business model frameworks will exempt important aspects of the business models of markets such as how the markets are governed; both internally and externally, the value they provide to all their stakeholders i.e. economic stakeholders, the society and the environment and their level of sustainability.

Finally, in this thesis, a component based review of existing business model frameworks was done. Many components of business model frameworks can be found in literature and no consensus has been made to specify what the exact components of a business model should be. Many of the components are labelled the same but have very different contexts or definitions; this can create confusion and the possibility to assume that the components all mean the same. In order to identify of what the common components of a business model are, a component based review was needed. Although (Krumeich et al. 2012) attempted a component based review, each individual components were not examined to identify similarities in context, definition or application. The review also revealed that many of the components of the business model frameworks overlapped because of the close similarities in their definitions but differences in their labels. The resulting components after integrating the overlapping components can be referred to as foundational components of business models, and can be used as a pivot for further work on the design of business model frameworks.

6.3 Limitations

This research has a number of limitations. First, although there are numerous works on the conceptualizations of business models and the design of business model frameworks, there is a dearth of works on sustainable business models; relevant works on sustainable business models that can be used for further research on the development of sustainable business models could not be found in literature. As a result, the proposed framework could not be developed on a holistic theoretical foundation. Although, works on general and industry specific business model frameworks were relevant to the development of the proposed framework, and certain literature sources showed efforts of the exploration of possible theoretical interrelations between sustainability and business models, these later works could not create a strong theoretical and conceptual foundation that could be useful for the development of the proposed framework.

Also there is no specification on how to apply the proposed framework in practice nor are there specific methods proffered that can be adapted by financial markets to achieve their financial, societal and environmental goals, through the application of the proposed framework to develop sustainable business models. Although the proposed framework can be generalized across financial markets, but no two markets are entirely the same, generalizations in the application of the proposed framework might be problematic because they differ in their value propositions, governance; rules and regulations, business organizational structures and even the competitive environments; and the methods to achieve sustainability through the framework may differ. The components of the proposed framework can be used as a guideline to develop a sustainable business model, but individual markets will have to tailor the means to achieving the purpose of sustainability to fit their capacities.

6.4 Further Works

As mentioned in the literature review and while describing the development process of the proposed framework, there is a dearth of literature on sustainable business models, especially in relation to financial, environmental and social sustainability. Also the works that have been reviewed in literature related to sustainability in business models do not describe how sustainable business models can be developed using the framework. As a result, the foundational components (identified in Chapter 2) used to develop the preliminary components were limited. In future research, the foundational components could be extended in the availability of more theoretical works on sustainable business models that are directly relevant to the design of a business model framework for sustainable business models.

For the purpose of this research, the proposed framework was used to compare the business models of LSEG and DBG. However, the proposed framework can be instantiated with even more markets because although markets offer very similar products and services, they are not entirely the same. Doing this can help to further evaluate how the proposed framework fits into the different business model components of markets; identifying any part of their business models that has not been considered in the proposed framework. Identifying these exempted areas can also help to determine the aspects of the business models of financial markets that can still be translated into business model components and then included in the proposed framework. Similarly, as more business model frameworks are developed, other business model frameworks that has been identified in literature can be used for the instantiation in order to identify components that fit into the business model of markets but do not exist in the proposed framework.

Without doubt, the integration of financial, environmental and social sustainability is a very important research area, but still no sufficient research is available yet. The proposed framework can be used to further initiate more research curiosity and be used as a basis for the expansion of the works on business models in general and sustainable business models. Being a research area that is still in its early stages, further work can still be done. Even though the proposed framework has been applied theoretically, it has not been applied practically. A practical approach can be used to explore the possible ways the framework can be applied in real markets or other real life settings. In the course of doing this, challenges or barriers to the application of the proposed framework or the implementation of sustainable business models can be identified. Also, ways sustainability can be achieved through each of the component of the proposed framework can be practically examined. For instance, avenues through which the "compliance" component can contribute to sustainability can be examined; policies, rules and regulations that can promote financial, environmental and social sustainability can be identified. Code of conduct for traders and other customer segments, the internal and external value networks and even environmental policies are other possible avenues. As mentioned earlier, value should not only be created for customers and market operators but it should be created such that it contributes to all aspects of sustainability.

Considering how dynamic financial markets are, it is expected that their business models will continue to evolve over time. This could be as a result of the already present drivers of change (i.e. competition, technology advancements, globalization etc.) or those drivers that have not been anticipated. As a result, there might have to access different channels in order

to create value. Based on this, the proposed framework can be used as a unit of comparison to compare the business models of incumbent markets over time or even the business models of incumbent markets and new entrants. By so doing, the new directions to which business models are being extended can be identified. For instance, the differences in value propositions, internal and external service value networks and other dimensions over time can be identified. In addition, business architectures can be used to compliment the framework to evaluate and compare the evolution of business models of financial markets. New and evolving business model concepts can be articulated through the use of a business architecture; internal and external impacts can also be visualized. For instance, while implementing new business models, there might exist new external elements in the business environments of markets. A business architecture can be used to visualize how markets will interact with these elements or even how internal resources can be combined to successfully implement the business model.

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