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YASAR UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES
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MASTER THESIS**

**GROUNDING THE BLUE OCEAN STRATEGY ON TECHNOLOGICAL
INNOVATIONS AND NETWORK EXTERNALITIES**

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TEXT OF OATH

I declare and honestly confirm that my study, titled "Grounding the Blue Ocean Strategy on Technological Innovations and Network Externalities" and presented as a Master's Thesis, has been written without applying to any assistance inconsistent with scientific ethics and traditions, that all sources from which I have benefited are listed in the bibliography, and that I have benefited from these sources by means of making references.

Date: 02/June/2016

Signature: 

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ABSTRACT

Master Thesis

GROUNDING THE BLUE OCEAN STRATEGY ON TECHNOLOGICAL INNOVATIONS AND NETWORK EXTERNALITIES

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Contemporary trends in the area of business strategy have shown an inclination toward searching new markets and creating new demands. Deriving from a similar line of inquiry, the Blue Ocean Strategy (BOS) has become very popular among practitioners particularly during the recent decades. However, the evolution of such strategies also brings with it the question of sustainability. This study interrogates the sustainability aspect of the BOS and thereby aims to propose an integrated model designed to address this issue. By grounding the BOS on the models of technological innovations and network externalities, a new model, entitled as the Blue Innovations Network (BIN), is proposed as a generic framework to help achieve sustainable blue oceans in the future. Using a systematic approach, this model is applied to and tested on the case of Blackberry, a Canadian mobile handheld manufacturer which is accredited with being the pioneer of the smartphones industry. The study thus highlights three different periods of the success, peak and decline of Blackberry, consequently applying each dimension of the proposed model individually and then collectively in an effort determine how BIN could have helped the company sustain its BOS. The BIN model thus carries the possibility of being explored and further refined through cross-industry applications and hence provides solid ground for the future researches.

Key Words: 1) Blue Ocean Strategy 2) Technological Innovations 3) Network Externalities 4) Blue Innovation Networks 5) Blackberry 6) Smartphones Industry

ÖZET

Yüksek Lisans Tezi

MAVİ OKYANUS STRATEJİSİNİN TEKNOLOJİK YENİLİKLER VE AĞ DIŞSALLIKLARI ÜZERİNDE TEMELLENDİRİLMESİ

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İşletme stratejisi alanındaki çağdaş gelişmeler, yeni pazarların arayışı ve yeni taleplerin yaratılması noktasına doğru kanalize olmaktadır. Benzer bir sorgulama hattından hareket eden Mavi Okyanus Stratejisi (MOS), uygulamacılar arasında özellikle son yıllarda oldukça popüler hale gelmiştir. Fakat bu tür stratejilerin evrim süreci, sürdürülebilirlikleri sorusunu da gündeme getirmektedir. Bu çalışma, MOS'un sürdürülebilirliği konusunu sorgulamakta ve bu konuyu hedef alan bütünleştirilmiş bir model sunmayı hedeflemektedir. MOS'u teknolojik yenilik ve ağ dışsallıkları modelleri üzerinde temellendirerek, gelecekte sürdürülebilir mavi okyanuslara ulaşmaya yardımcı olacak genel bir çerçeve sunan ve Mavi Yenilikler Ağı (MYA) olarak adlandırılan yeni bir model önerilmektedir. Bu model, sistematik bir yaklaşım kullanılarak, Kanadalı mobil cep telefonu üreticisi olan ve akıllı telefon sektöründe öncü konumda bulunan Blackberry konusu üzerinde uygulanacak ve test edilecektir. Çalışma böylelikle, MYA'nın MOS'u nasıl sürdürülebilir kılabileceğini bulgulamak üzere Blackberry'nin başarılı olduğu, zirveye ulaştığı ve düşüşe geçtiği üç dönem üzerinde odaklanarak, modelin her boyutunu ayrı ayrı ve bütüncül bir şekilde ele alacaktır. MYA modeli, farklı endüstrilerdeki uygulamaları ile ele alınıp, tartışılmaya açık olup, gelecekteki çalışmalar için bir zemin sunmaktadır.

Anahtar Kelimeler: 1) Mavi Okyanus Stratejisi 2) Teknolojik Yenilikler 3) Ağ Dışsallıkları 4) Mavi Yenilik Ağları 5) Blackberry 6) Akıllı Telefon Endüstrisi

TABLE OF CONTENTS

THESIS EXAMINATION/ DEFENSE REPORT.....	II
TEXT OF OATH.....	III
ACKNOWLEDGEMENTS.....	IV
ABSTRACT.....	V
ÖZET.....	VI
CONTENTS.....	VII
LIST OF FIGURES AND TABLES.....	VIII
LIST OF ABBREVIATIONS.....	IX

CHAPTER I: INTRODUCTION

1.1. Purpose and Objectives	1
1.2. Significance of the Study.....	3
1.3. Structure of the Study.....	4

CHAPTER II: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1. Conceptual Framework	6
2.1.1 Blue Ocean Strategy	6
2.1.2. The Impact of Blue Oceans.....	6
2.1.3. Best Practices	7
2.1.4 The Four-Action Framework of the Blue Ocean Strategy.....	8
2.1.5. The Strategy Canvas	10
2.2. Theoretical Background	11
2.2.1. Distinguishing Blue and Red Oceans	11
2.2.2. Achieving Creative Value.....	12
2.2.3. The Disruptive Innovation Debate	14
2.2.4. Innovations in the Technology Sector	16
2.2.5. The Network Externalities Effect.....	19
2.3. The Blue Innovations Network (BIN) Model.....	22

CHAPTER III: RESEARCH METHODOLOGY

3. Methodology.....	24
3.1. Methodological Approach and Research Goals.....	24

3.2. Selected Case: Blackberry	24
3.3. Data Collection	25
3.4. Reliability and Validity of Data Sources	26
3.5. Findings	27
3.5.1. Case Snapshot: A Story of Success and Failure	27
3.5.2. BIN Model on Blackberry	28
3.5.3. Application of the BIN Model	43

CHAPTER IV: CONCLUSION AND IMPLICATIONS

4. Conclusion and Implications	46
4.1. Implications	47
4.2. Limitations	48
References	49

TABLE OF FIGURES

Figure 1. Strategy Canvas of Khan Academy	10
Figure 2. The Four Actions Framework for Blackberry	30
Figure 3. Strategy Canvas for Blackberry	32
Figure 4. The Three Tiers of a Blue Ocean	37
Figure 5. The Strategy Canvas; Post iPhone	41
Figure 6. The BIN Model Cycle	43
Figure 7. Achieving the BIN	45

LIST OF TABLES

Table 1 Blackberry and BIN	29
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LIST OF ABBREVIATIONS

BOS	: Blue Ocean Strategy
RIM	: Research in Motion
BIN	: Blue Innovations Network
R&D	: Research and Development
DI	: Disruptive Innovations
QWERTY	: Keyboard Layout Design



1. Introduction

1.1. Purpose and Objectives

Derived from the Greek word of '*strategos*', which was a title assigned to a person who demonstrated leadership, prowess, acumen and intelligence, the term of *strategy* has been very frequently used in our modern corporate world and does not differ much in terms of practical usage. Today, it is commonly accepted that competing with rivals by using innovative ideas and tactics and gaining a competitive edge is the basic purpose of a corporate strategy. Considering its highly visible impacts over the firm's long-run performance, adopting and crafting the best strategy has become a critical task for managers.

The search for performance increasing strategies for companies has largely affected the scholarly world and, over the years, the literature has been proliferated with various approaches, concepts, models, or frameworks to help firms to gain a competitive advantage over. The last decades have witnessed the emergence of mainstream theories and approaches, such as the theories of competitive strategy (Porter, 1980; Porter, 1985), the resource-based approach (Wernerfelt, 1984; Barney, 1991) or the knowledge-based approach (Grant, 1996) as well as the rise of essential concepts like the core competencies (Prahalad and Hamel, 1990) or dynamic capabilities (Teece, Pisano, and Shuen, 1997). In line with the scholarly world, the useful frameworks, tools, and techniques such as SWOT Matrix or Boston-Consulting Group (BCG) Matrix have been also widely recognized by the scholars and practitioners. Although head-on competition has been the main focus for most strategies, only a few of them focus on taking a flanking approach, to go beyond the idea of competition. Taking such a leap from the dominant logic to the non-explored fields requires the adoption of *disruptive innovation*.

Christensen first introduced the term disruptive innovation in 1995, to describe a phenomenon whereby a smaller and less established company successfully gives a much larger and well established firm a run for its money (Christensen, 1995). However, disruptive innovation could be linked to the previous phenomenon of creative destruction as highlighted by Schumpeter (1942); the continuous creation of new value and the simultaneous destruction of old ones. As an invaluable strategy, disruptive innovation could be considered as a form of flanking, wherein the incumbent does not realize it is under attack until it is too late, and widely manifests

itself in the technology sector. Here, the technological changes have been seen to cause disruptions that threatened the survival of firms that fail to adapt to the change (Ho and Lee, 2014).

It is clear that the concept of disruptive innovation has significantly captured how firms can take further steps in the future and, as a relatively new concept of literature, *Blue Ocean Strategy* (BOS) can be traced back to the concept of disruptive innovation itself. Simply defined as an uncontested market space, the blue ocean represents an entirely new market that has been untapped and promises higher revenues and growth possibilities as compared to highly competitive and saturated markets (Kim and Mauborgne, 2005). The BOS, unlike most other strategies, promotes the concept of completely avoiding or eliminating direct competition by finding unexplored fields of current market field. Considering the strong emphasis of strategic management literature on the phenomenon of competition, this notion brings some new starting points into the field.

However, despite it seems new in the world of strategic management and entrepreneurship; the concept of the BOS is not entirely new in practice. In reality, it has been around for well over a hundred years, as documented by the Kim and Mauborgne's research on old and new firms. The focus of the BOS relies greatly on the creation of value and new market demands. In order to achieve a well-defined concept that continues to capture the future of strategic management by focusing on those flanking strategies of firms, BOS must be grounded on a well-established conceptual framework of disruptive innovation. Therefore, the purpose of current study is to analyze BOS in line with the concept of technological innovations to shed light on its implications and discuss its sustainability on a real-life business case - Blackberry.

Since this paper presents the case of the smartphone industry in general and the smartphone manufacturer Blackberry in particular, it would be essential to include a third dimension to the model, one that is known to relate well to technological innovations; the *network externalities effect*. Realizing the importance of dominant designs in the smartphone industry (Cecere et al., 2014) and the extent to which dominant designs are influenced by network effects (Schilling, 2002; McIntyre and Chintakananda, 2013), this study treats the network externalities effect as a major dimension of the proposed model. Holding the premise that it is the combined effect

of the product's installed base, service complementarity and information flow coupled with the timing of market entry and the firm's learning orientation (Schilling, 2002; McIntyre and Chintakananda, 2013; Zheng, 2013); the network externalities effect can prove to be a useful resource in determining the sustainability of the BOS and subsequently prevent firms from becoming victim to technological lockouts.

Applying the BOS, technological innovations and network externalities models separately and collectively on the case of Blackberry, this paper consequently proposes the integrated model of *Blue Innovations Network* (BIN) to address the sustainability issues of blue oceans. As explained above, the BIN model comprises of three dimensions; the first is the mapping of the BOS on the case in question (Blackberry), the second dimension entails the identification of the type on technological innovation in question and the third dimension emphasises on the need and importance of network markets for establishing sustainable BOS and avoiding technological lockouts. The BIN consequently provides an integrated and holistic approach that builds upon the BOS and how sustainability can be achieved through the collective mapping of technological innovation models (Henderson and Clark, 1990; Christensen et al. 2015) and network externalities (Schilling, 2002; McIntyre and Chintakananda, 2013).

1.2. Significance of the Study

Sustaining blue oceans and a trade-off between value and cost can be difficult task for entrepreneurs and incumbents alike. As past literature and examples show, many blue oceans were unable to retain their territories owing to a number of factors. This paper seeks to discover those factors by taking the example of one such company; Research in Motion and its acclaimed smartphone, the Blackberry. Moreover, the paper analyzes the concept of the BOS in light of disruptive innovations and network externalities, which is a phenomenon whereby a product or service is attributed as having more value depending on its customer base, complementary products or both (Schilling, 2002), outlining the link between the three and deducing ways in which to integrate the concepts so as to reach a practical proposition for the effective use of these models in the business world. The integrated Blue Innovations Network (BIN) model will thus be used to present the findings of the paper.

The paper attempts to respond to the following research questions:

1. Can the BOS be linked to technological innovations and network externalities in the technology industry?
2. Can an integrated model be proposed to provide a sustainability strategy for blue oceans and if so, how can the model be applied?
3. Can the smartphone company, Blackberry, be used as an example from the technology industry to ground the BOS on and how does the integrated model for sustainable blue oceans apply to it?

The paper consequently tracks the success factors and strategies behind the rise of the Blackberry as a smartphone pioneer and its sudden decline following the entrance of Apple and Google (Android) into the smartphones market. Analyzing the applicability of the four-action framework, the strategy canvas and the value-cost tradeoff (Kim and Mauborgne, 2005); this paper would be a small-scale yet significant step in better understanding of the BOS and the possibility of its integration with other well-established concepts and strategies.

The smartphone industry is currently one of the biggest technological industries in the world with a worth of approximately \$401.3 billion (Forbes, 2016). While the case of Blackberry has gained considerable attention from strategists and practitioners due to its unexpected downfall, it still requires further research and quantification in order to fully analyse the company in relation to the industry. Therefore, the current study will contribute to the development of literature by analysing a downfall to draw some meaningful conclusions for scholars and practitioners.

1.3. Structure of the Study

This study is organized as follows. Following this introduction, the conceptual framework of the BOS is discussed based on its main characteristics. In doing so, after clarifying the BOS in line with the concept of disruptive innovation and network externalities, the study focuses on the link between the BOS and creative value creation. Integrating the BOS frameworks with other models is not entirely new. Therefore, the study builds its theoretical framework over the proposed integrated model of Blue Innovations Network (BIN).

The methodology section is devoted to first outlining the research method chosen for the study and then presenting the proposed Blue Innovations Network

(BIN) model. Consequently, the three dimension; BOS, technological innovations and network externalities are applied individually and then collectively to the case of Blackberry before proceeding to validating it through application. The final section is devoted to the conclusion and discussion on the implications of the proposed model for strategists and practitioners followed by the identification of areas for further applications of the BIN model.



2. Literature Review

2.1. Conceptual Framework

2.1.1 Blue Ocean Strategy

Throughout the modern history of business strategy and management, research and practice has mainly focused upon market competition and the battle to gain greater market shares. However, with the Blue Ocean Strategy, W. Chan Kim and Renee Mauborgne divided the business environment into two so-called oceans; the red and the blue (Kim and Mauborgne, 2005). So what exactly are the red and the blue oceans? To better understand this concept, we can think of an ocean that is home to plenty of predatory creatures that are continuously fighting for the same prey. They use various tactics and evolve their hunting techniques over time in order to gain the largest amount of the prey. Due to this consistent competition and fierce rivalry, we shall name this the Red Ocean. On the other hand, there is a specific part of the ocean that was recently discovered by one of those predators or a new predator. This part of the ocean has no other rivals and the food is in plenitude. Without wasting energy and mind on developing tactics and fighting with the others, this predator can simply focus on getting the most of the abundant prey in this part. This can be termed as the Blue Ocean.

Consequently, in business terminology the red ocean is a market that has a number of competitors fighting to gain the larger market share from within a limited amount of customers or target markets. The main idea is to gain the bigger chunk of the market. The blue ocean, on the other hand is an uncontested market space that has been identified and conquered by a single actor who has no direct competitors and has a relatively large customer base that promises greater revenues (Kim and Mauborgne, 2005).

2.1.2. The Impact of Blue Oceans

The study of Kim and Mauborgne (2005) summarizes the story of how BOS is applied over the history of business. In the study, of the one-hundred and eight companies studied in their research, the authors (2005) identified eighty-six percent as line extensions of existing companies or products that were aimed at the same target markets as other companies. New markets or completely innovative products and

companies were a mere fourteen percent. These actors focused upon moving into an uncontested market space with innovative products and ideas. The line extensions showed a large percentage of revenues, averaging up to around sixty-two percent as compared to just thirty-eight percent in the share of the new markets. The most prominent difference however, was in the profitability results. The small percentage of new markets managed to earn a staggering sixty-one percent of the profits as compared to just thirty-nine percent of the line extensions. The Blue Oceans clearly showed how profitable an uncontested market space can be. Therefore, it is not astonishing why the BOS attracts the attention of both business professionals and researchers.

2.1.3. Best Practices

Before moving onto the strategy frameworks of the BOS, it might be instructive to take some major examples of blue ocean success stories in recent times.

- *Apple Inc.:* Perhaps one of the most innovative companies that emerged in the twentieth century, Apple has been at the forefront of technological innovation since its inception. It has been noted by many that real blue ocean product that the tech giant came up with was the iTunes software. This was the first time that music was made legally available online. Not only that, iTunes became a cloud service allowing people to synchronize their music and libraries across different devices and giving them access to it anytime and anywhere. Furthermore, the iTunes paved way for the success of the future devices like the iPod, iPhone and iPad due to its synchronization abilities (Kim and Mauborgne, 2015).
- *Khan Academy:* One of the biggest online resources of education and distance learning, Khan Academy was an innovation that truly changed the course of learning and made it into a fun and easily accessible activity. Started as an online educational resource, the Khan Academy now offers free learning and online education to millions of users from all over the world. All they require to access this wonderful resource is a computer and an internet connection. The innovative idea of providing free education and learning through fun games and activities appealed greatly to a number of organizations and foundations who now support the program with generous funding (Khan Academy, 2016).

- *Nintendo Wii*: Nintendo regained superior recognition in the gaming industry through an extremely successful BOS. For the first time in gaming history, they did not target the youngsters or children who play video games; instead they went for the parents and the families. They decided to come up with a device that would be centred at promising fun-filled family times for those who buy it. They introduced a gaming console that did not appeal to teenagers with violent shooting games or car racing games with high end graphics that made one feel as if they were in a realistic world. They focused on fun; games that had low graphics quality but ones that promised fun and required the players to be active. With the innovative motion sensing handheld controllers, Nintendo Wii marked the first time when families came together in the living room to play video games together. Nintendo successfully created a new demand (Kim and Mauborgne, 2015).
- *TATA Nano*: One of the world's largest automobile manufacturers and India's largest; TATA is a company that promises growth and sustainability. In 2008, TATA realized the need for an automobile that would be able to cater to the large and ever-expanding Indian middle class families who had to rely on two-wheeler transportation modes for their daily commute. They successfully realized the previously un-catered demand for a cheap family car and introduced the TATA Nano. This relatively tiny automobile offered a respectable transport for small families in an extremely affordable price of just sixteen hundred dollars (one hundred thousand Indian rupees). Manufacturing a car with just the essentials and no extras, TATA managed to focus on increasing the value and bringing down their costs. (Kim and Mauborgne, 2015).

2.1.4 The Four-Action Framework of the Blue Ocean Strategy

The framework developed by Kim and Mauborgne (2005), is the backbone of the BOS as it gives a precise and streamlined basis for the product/service and its offerings. The four criteria set for a company to consider while launching a blue ocean product are as follows:

- *Eliminate:* While launching a blue ocean product, it is important to eliminate certain characteristics that do not add any sort of value. For example, Khan Academy eliminated the need for paying for education, considering that education should be a free resource. It created more value for the organization by gaining immense recognition and attracting massive funding from various organizations.
- *Reduce:* Certain features or non-value adding resources need to be reduced in order to reduce costs while maintain value. Nintendo for example, reduced the graphics quality of the Nintendo Wii and instead focused on improving the fun and excitement level of the games, which were targeted at families. They were not competing with consoles such as Xbox and PlayStation, therefore they focused on increasing the value of their product by not focusing on expensive graphic cards and violent games.
- *Raise:* It is also equally important to promote those aspects that are adding the extra value that the product is offering. For example, TATA Nano raised factors such as fuel efficiency and compactness of the car while eliminating the need for luxury or aesthetics.
- *Create:* Finally, some aspects and features need to be created in order to boost the innovativeness of the product. Nintendo Wii was the first gaming console to offer motion controlled gaming. This was a revolutionary innovation that changed the gaming industry.

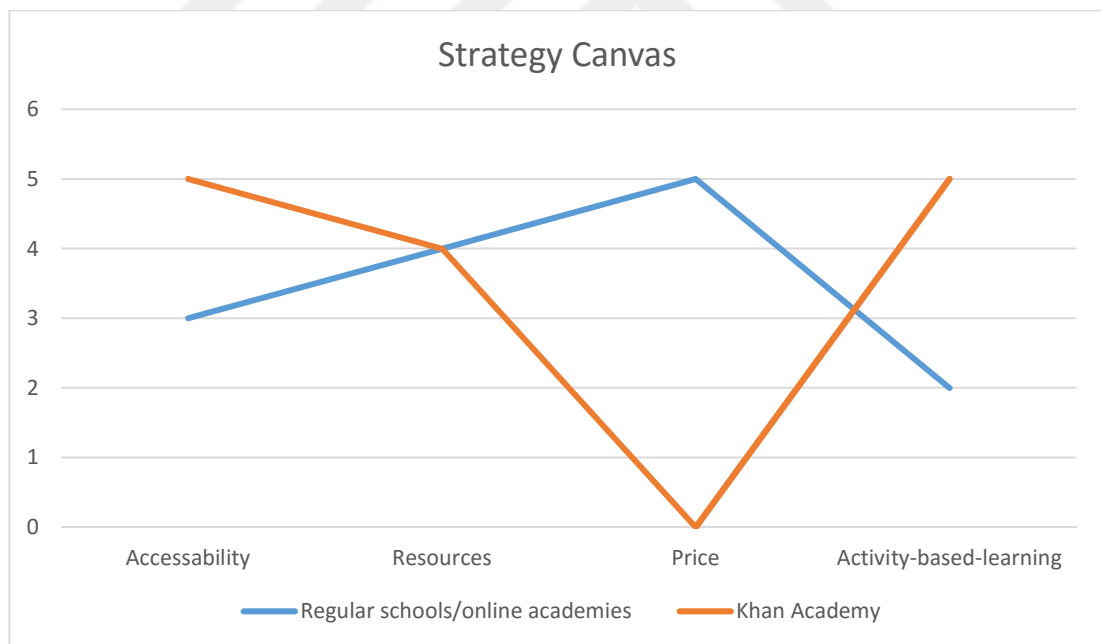
Although it is not included in the above-mentioned framework, marketing a blue ocean product is one of the main factors for its success. The marketing strategy needs to be designed such that it focuses on the product's strengths and value offerings and hides or disguises its weaknesses. As an example, when Apple introduced their iPod Shuffle, they knew that the product's biggest weakness was the lack of a display screen. The marketing tagline therefore, converted this weakness into a value adding feature with the tagline - '*Enjoy Uncertainty*'. Appealing to the customers' emotional needs has also proven to be effective in the marketing of blue ocean products. TATA Nano used an image of a family sitting peacefully and safely inside the car during rain while some families are traveling on motorbikes and getting drenched. This approach had an emotional appeal towards the lower middle class families who usually go through such experiences because they cannot afford a car.

Another example of a great marketing campaign that helped in the success of a blue ocean product was that of the Nintendo Wii. The gaming company released a number of advertisements highlighting families sitting together, playing the game and having fun. This was the first time a video game console was promising valuable family fun times and greatly appealed to the target market.

2.1.5. The Strategy Canvas

The strategy canvas outlines the company's value curve relative to other companies and highlights the key value adding areas in which it invests. (Kim, 2004). Figure 1 shows a graph that illustrates important value adding areas of a product or service and how it compares to those of potential rivals or similar products. For this illustrations, the example of Khan Academy is applied. Four important value-adding features of regular schools and online academies are compared with those of Khan Academy.

Figure 1. Strategy Canvas of Khan Academy



Source. Adopted from Kim and Mauborgne's (2005) Strategy Canvas Model

The Strategy Canvas highlights the difference in the priorities given to certain areas, which differentiate the product or service and make it unique. Khan Academy, for example created a blue ocean by focusing on those areas that the others were

ignoring; easy accessibility to free online resources and an inclusive/activity-based learning program.

2.2.Theoretical Background

2.2.1. Distinguishing Blue and Red Oceans

As it is mentioned in the previous section, Kim and Mauborgne first introduced the concept of BOS in 2004 to define as the creation of an un-contested market space that has no existing competition or demand. Demand, according to this strategy, does not exist until it is created. Furthermore, the BOS is implemented with the aim of making the competition irrelevant, rather than competing with it and while technological innovation may not always be a contributing factor in a successful BOS venture, cost differentiation and cost reduction certainly are. The red ocean, on the other hand is the ever competitive market where most strategists have put their focus on till date (Kim and Mauborgne, 2004).

Kim and Mauborgne (2005) analyzed the data of various organizations and their BOS within the past one hundred years to prove their idea of capturing uncontested market spaces. The data showcased that most of the times, BOS markets or products were created using or *modifying* existing technologies and fitting them according to customer needs. Another interesting inference was that it is not just the new entrants that create a blue ocean. In most cases, blue ocean products were created by incumbents (existing companies) that created new market spaces within their existing businesses (Kim and Mauborgne, 2005). Perhaps the most crucial concept that the BOS tries to promote is the simultaneous *creation of value* and *reduction of costs*. This does not mean that cost reduction has to be achieved through economies of scale or lowering product quality, but instead through a combination of the previously explained four-action framework and strategy canvas, as proposed by Kim and Mauborgne (2005).

The book, titled '*Blue Ocean Strategy; How to Create Uncontested Market Space and Make the Competition Irrelevant*', managed to garner much appreciation in the business world and was directly aimed at both entrepreneurs and incumbent firms seeking to reap maximum profits and growth. Since then there have been a number of studies that tried to integrate the BOS with existing strategies in attempts to propose

the perfect ingredients for sustainable profitability and growth. One such study was conducted by Lindic et al. (2012) in an effort to indicate how economic policies should be aimed at industry collaboration, supporting entrepreneurial activity and business model innovation in order to promote economic growth. Taking the case examples of two firms including the online shopping giant Amazon.com, the study used the basic framework of the BOS in order to propose actions for future economic policies that would result in higher growth for industries. These propositions focused around the idea of creating new markets; the possibility of finding blue oceans in all types of industries; the need to innovate value and not just technology and lastly, the fact that growth is independent of the size of companies (Lindic et al., 2012). The research results revealed that all four propositions proved to hold true when it came to growth and sustainability, however it is vital that instead of merely focusing on *exploring* new markets, firms should focus more on successfully *exploiting* these new markets. Similarly, the proposition that growth does not necessarily come from technological innovation rather value innovation, again reinforced the original notion of the BOS (Lindic et al., 2012).

Studies such as the ones mentioned above provide evidence that the BOS runs on principles that have existed since forever, yet their full potential has not been realized. The companies that Kim and Mauborgne studied in their work were all following similar pattern of strategies. The biggest differentiating factor for them was the fact that they focused on value creation and innovation; technological innovation was not the lone success factor in creating a new market (Kim and Mauborgne, 2004). As they deduced from their research, the maximum profits were reaped by the few ventures that set out to create new markets and then continued to exploit them (Kim and Mauborgne, 2004). This ascertains not only the primary premise of the BOS but also the idea of value creation. *But how do firms create value while simultaneously keeping costs low?* In order to understand the process of creating sustainable value by innovation, there is a need to scrutinize the fabric of innovation concept.

2.2.2. Achieving Creative Value

The Economist (2009) defined value creation as the ultimate measure by which it is judged by customers, employees, investors and shareholders. This value can be achieved through a number of strategies and frameworks that have been the focus of studies and researches in the business world throughout the years. Park (1998) and

Browning (2002) described value as being the derivative achieved by setting benefits against costs.

Yang and Yang (2011) presented a study in which they proposed the integration of Kano's refined value adding model (Yang, 2005) with the four-action framework of the BOS (Kim and Mauborgne, 2004). In order to capture value, it is important to understand the customers' satisfaction and retention levels first. Value, as highlighted in previous researches, is highly dependent on customers' perception and preferences (Yang and Yang, 2011). This value can be understood through attributes such as core attributes of a product, psychosocial attributes or economic attributes, as pointed out by Yang and Yang (2011). A more detailed look into the categories of value is provided by Gupta and Lehman (2005), who presented value as being either economic, functional or psychological. The fourth category of value, that Yang and Yang (2011) discuss can be traced to the BOS itself; creative value. As the BOS and the literature on it already suggests, creative value is the value resulting from an entirely new or radical innovation or product/service offering that offers new experiences and promises new demand (Yang and Yang, 2011). The BOS roots of creating customer value and developing new markets are evident in this proposition.

The study goes on to propose the integration of the four-action framework of the BOS with the refined Kano's model (Yang, 2005) and provides an innovative and clear way of achieving creative value. The paper further aligns each of the eight categories of the refined Kano model with one of the four strategies proposed by the BOS. In summary as proposed in the study, 'raising' (BOS) the 'critical attributes' (Kano) of a product would ensure that customer satisfaction and fulfillment levels are met (Yang and Yang, 2011). The paper goes on to provide even further detail and how each integration would lead to a rise in a specific category of value; for example, raising highly attractive attributes may result in a rise in creative and psychological value for the customers (Yang and Yang 2011). Perhaps the most crucial factor in understanding value, as Yang and Yang (2011) mentioned, is that value is not just given **to** customers but is also taken **from** them in terms of loyalty, repeat purchases and network strengthening.

2.2.3. The Disruptive Innovation Debate

As a new idea, application or artifact (Zaltman, Duncana, and Holbek, 1973), innovation is usually classified as *incremental* or *radical* in the literature (e.g. Dewar and Dutton, 1986; Ettlie, Bridges, and O’Keefe, 1984) by referring to the minor changes (Nelson and Winter, 1982; Munson and Pelz, 1979) to a shift over the scientific principles (Dewar and Dutton, 1986), respectively. The latter version of innovation can be termed as discontinuous (Ho and Lee, 2005) or, more commonly disruptive innovation. The concept of disruptive innovation (Christensen et al., 2015) has been recognized as a *disturbance* in the market by the entry of a radical innovation. The disturbance here refers to the inevitable problems incumbent firms or products would face with the emergence of this new innovation, problems such as losing market share or the emergence of new competitors. In the face of the intense global competition, the rising importance of local responses, the shortened the product life cycles, the changing demands across generations stimulate firms to continuously innovate. As the most extreme version of such activities, disruptive innovation is, therefore, is in the agenda of both practitioners and scholars during the last decade. In parallel to its rising popularity, there have been numerous researches in the area of disruptive innovations. For instance, in their study, Hardman et al. (2013) analyzed numerous case studies highlighting some major disruptive innovations in the past, while also emphasizing the various definitions of the term as presented by different experts. Through their research, they elaborately reviewed the literature to provide the major characteristics of the disruptive innovation process such as the incumbents’ denial of the possible threat of new entrants; the initial high costs associated with disruptors; their inferior quality yet the promise of some sort of added value; the initial filling up of niche markets by the disruptors and the fact that the incumbents are never completely wiped out, were mostly found common among the disruptive innovations of the past (Hardman et al., 2013).

On the other hand, in a case study research on disruptive technologies specifically on the technology sector, Hang and Yu (2011) underlined the importance of understanding the promising nature of potential disruptive innovations and the proposed different research and development (RandD) related strategies that could be applied for forming successful disruptors. Using various technological innovation

examples and the concept of fulfilling new value propositions of specific products, Hang and Yu (2011) proposed the following technology specific RandD strategies:

- *Miniaturization*: Making products more portable and convenient in terms of design, either a superior product through huge investments or a good-enough product through modest investment
- *Simplification*: Reducing or eliminating certain features in order to target a new market that does not require them
- *Augmentation*: Adding one or more disruptive features to an existing product which might appeal to a new market of consumers
- *Exploitation*: Sustaining the progress of well-established products or technologies

Perhaps the most significant point made in this research was the fact that it tried to fill a gap in the preceding literature on disruptive innovations, which tended to focus on its application in business models rather than specific industries or products.

Though most observations discussed above are in line with Christensen's description of disruptive innovations; for the sake of preventing further confusion over this hugely debated concept, this paper will treat Christensen et al.'s (2015) latest definition of disruptive innovation as the base, which states: '*A process whereby a smaller company with fewer resources is able to successfully challenge established incumbent businesses*' (Christensen et al, 2015: 3). The complexity of this topic however is further highlighted with a conflicting statement made by Christensen et al. (2015) in the same paper that contains the above mentioned description; the fact that the iPhone is a possible disruptor for personal computers. Does Apple really fall under the category of companies with fewer resources, considering that it itself manufactures personal computers? Though this definition might be considered vague and most would argue that it is not measurable, it clearly focuses on the major players involved in disruptive innovation; the entrant and the incumbent.

In the literature, the term of disruptive innovation is usually linked with Schumpeter's *creative destruction*, wherein new values are created and older ones are destroyed through the emergence of disruptive innovations (Ho and Lee, 2014). The problem, however, as identified by Christensen et al (2015) himself is that the essence of theory is fading away. It is being used in such general terms that the main idea of

the concept is largely distorted (Christensen et al., 2015). For instance, one major aspect of the disruptive innovation theory which is increasingly becoming extinct is the price factor. Disruptive innovations play a major role in bringing down prices in an industry, after customers start to accept the disruptive product/service at lower prices (Christensen et al., 2015). More and more references are being termed as disruptive innovations nowadays, which in reality run against the basic concept itself. For example, the taxi service Uber is considered to be a disruptive innovation when in fact, it negates the concept completely (Christensen et al., 2015). Christensen et al (2015) pointed out that Uber does not fit the basic criteria of a disruptive innovation; it was not targeted at either low-end or entirely new markets, and it did not start off a low-value or inferior me-too alternative to the existing taxi services. Uber was in fact a sustaining innovation (Christensen et al., 2015).

Recalling its original meaning, the concept of disruptive innovation can provide a ground to integrate the twofold aim of the BOS as the value creation at a minimum cost. The literature shows that this is usually achieved through the careful application of the strategy canvas (Kim and Mauborgne, 2005) and once demand increases, economies of scales kick in and help keep the costs at bay. However, there were occasions when blue ocean examples failed to sustain their positions and were the victims of either failed innovations or the failure to maintain their value propositions. It is therefore important that firms know the extent to which they can benefit from the BOS and delve into the roots of disruptive innovation and value in order to better understand the market and their own products. Therefore, crafting the BOS requires to capture creative value in unexplored markets.

For our integrated model, we will view disruptive innovation not as an individual but one component of the overall dimension of technological innovations as were presented by Henderson and Clark (1990) and Ho and Lee (2014).

2.2.4. Innovations in the Technology Sector

Having deduced from the literature that the BOS is primarily driven by innovation and value creation and its connection to the disruptive innovation phenomenon, the next step in determining the dimensions for an integrated model is to delve deeper into the roots of innovation itself. Focusing on the technology industry

for this study, the literature states that technological innovation is usually a result of factors that are both internal and external to a firm. Zheng (2013) analyzed the underlying reasons behind the technological innovation from perspectives of three main theories, (i) institutional theory, (ii) resource-based view (RBV), (iii) competency based strategic perspective (Zheng, 2013). The institutional theory, for example, argues that a firm's innovation is driven by external factors such as the industry and competitors; whereas the RBV states that innovation is driven by internal factors such as RandD and human resources. Zheng's (2013) research showed that both the companies in question emphasized the role played by both external (domestic and international markets) and internal (core competencies, management etc.) in successful technology innovation. Zheng (2013) also realized the highly crucial role that human resource management plays in driving technology innovation in a firm. His study reported both the firms as having employed fifty percent of their workforce in the RandD department with subsequent reward structures in place to motivate employees (Zheng, 2013).

To analyze the extent to which innovations have an effect on incumbents and new entrants, Henderson and Clark (1990) studied in depth the different types of technological innovations that surfaced in the era of innovation management research following Schumpeter's studies on creative destruction. Realizing that innovation cannot merely be characterized into two types as incremental and radical; the study was an effort to bring into focus *architectural* innovation as the middle lying category along with *modular* innovation. By analyzing the two stages of product development, component knowledge and architectural knowledge; the two categories can be understood in greater detail (Henderson and Clark, 1990). While incremental innovation involves subtle changes to the existing product that in turn reinforces and builds upon core competencies, radical innovation entails a complete reinvention of an idea or innovation that introduces a new system and a new architecture. In between these two lie the modular and architectural types. As the names suggest, a modular innovation focuses on changing the internal components or systems in an innovation whereas architectural tends to modify the overall structure or linking system of the innovation while the components remain unchanged (Henderson and Clark, 1990). The fact that many established firms fail when it comes to architectural innovation, which was a crucial phenomenon highlighted by Henderson and Clark (1990).

Incomplete knowledge or failure to recognize all aspects of an architectural innovation could lead to disasters; also referred to as unexpected architectural innovations.

In the case of radical innovations, component knowledge and system knowledge both undergo change. However, once a radical innovation reaches the stage of dominance in terms of design, component innovation becomes the deciding factor in an innovation's success or failure (Henderson and Clark, 1990; Cecere et al., 2014). In the case of the smartphones industry, dominant design plays a fundamental role, as underlined by Cecere et al. (2014). Utterback and Abernathy (1975) defined the dominant design as the single established architectural standard that is followed by the industry (Cecere et al., 2014). The automobile industry gives a good example of having established a dominant design over the years and as of recently, the smartphone industry (Cecere et al., 2014). Cecere's et al. paper also builds on the work of Koski and Kretschmer (2007), who identified the two product development strategies used by firms; vertical and horizontal innovation. Horizontal innovations usually include new product characteristics that may be useful to some but not appeal to the mass consumer whereas vertical innovations are usually targeted at the entire market or consumer base (Cecere et al., 2014). Even though the two innovation types do not necessarily lead to dominant designs, it can be established that certain horizontal innovations in the mobile telecommunications industry have become a part of dominant design in the present day smartphone industry (Cecere et al. 2015; Koski and Kretschmer, 2007).

The diffusion of innovation curve (Rogers, 1962) paved way for Lages and Jahanmir's (2015) study of late adopters of technological innovations. The study highlights the importance of analysing the behaviour of late adopters of technological innovations and how managers can use such data in order to better understand the complexity of unfulfilled customer needs and thereby increase the adoption of innovations (Lages and Jahanmir, 2015). Since late adopters are usually the most overlooked segment of a company's customers, these laggards (as termed in the diffusion of innovation curve) hold the key to understanding the weaknesses of an innovation and to what degree the innovation needs to be differentiated in order to appeal this tier of customers (Lages and Jahanmir, 2015).

Previous literature on technological innovation has shown the significance of architectural and component knowledge in technology industries, usually when a

dominant design has been accepted. In order to overcome the dominant design and avoid technological lockout, the right kind of innovation coupled with the network externalities effect can prove to be useful in providing us with the dimensions of our proposed integrated model, since this model entails the concept of value creation through the effects of network markets.

2.2.5. The Network Externalities Effect

Architectural and component innovations play a crucial role in establishing dominant designs in the technology industry. However, it is the network effect that ultimately determines the emergence and subsequent success of the dominant design, as studied by Schilling (2002). Schilling (2002) presents an overview of network externalities in her paper and combines it with learning orientation and market entry timings in order to present her findings. Hypothesizing that network externalities combined with a firm's learning orientation and its timing of market entry can all result in a technological lockout. She argues that due to compatibility pressures (software etc.) many users end up adopting a single platform which thus leads to a dominant design excelling in that market and ultimately locking out firms that fail to stand up to these requirements; firms however may reenter markets by conforming to the dominant design characteristics (Schilling, 2002). A large installed base, or in other words a large number of consumers using the product, usually attracts more attention from developers of complementary products that in turn help in even further increasing the network externalities; a perfect correlation example (Schilling, 2002; McIntyre and Chintakananda, 2013). Schilling also highlights the fact that it is not always the first mover advantage that works best in network markets and that preemption could lead to the firm spending too much on research and development while failing to set up a sizeable installed base.

While firms may be able to gain a competitive advantage through a combination of preemption, installed base and product complementarity; it is the absorptive capacity that the firm needs to improve through constant learning and research in order to avoid a technological lockout in the future (Schilling, 2002; Zheng, 2013). This is due to the fact that a firm needs continuous learning in order to be able to deal with any possible threats from new innovations and enable their innovations to be future-proof.

McIntyre and Chintakananda (2013) studied the factors that influence outcomes in network markets and highlighted the importance for not only new entrants but also incumbents to study and analyze them. Network effects can normally be divided into two types; direct and indirect (McIntyre and Chintakananda, 2013). In direct network effects, the presence of a large installed base influences the perceived value of a product to its consumers whereas the indirect effect entails the value consumers derive from complementary products that are available for the core product (McIntyre and Chintakananda, 2013). Network markets in the past have shown to be extremely beneficial for technological products such as online shopping, video games and mobile phones because most of these products are dependent upon a strong and wide customer base and the accompanying complementary services/products that make the user experience even more valuable (McIntyre and Chintakananda, 2013).

While on one hand these studies show us the influencing factors of network markets, they also highlight the importance of market knowledge in reaping the true benefits of the network effect. As Zheng (2013) also showcased in his study of the two Chinese tech firms, research and development constitute a major part of a successful tech firm's budget and helps keep the firm maintain a strong position.

The network effect reaps maximum benefit when it is coupled with continuous innovation, learning and complementarity as is evident from the literature. Many examples have emerged in recent history that prove the existence and significance of these types of markets. Taking the example of the smartphone industry, the installed base of a specific type of mobile phone not only compels other users in assigning value to it but also gives third party software and application developers in the chance to extend their complementary products to a wider market. Additionally, since this effect is correlated with, as Schilling (2002) discussed, the wider range of complementary goods and services in turn helps widen the installed base even more. The smartphone industry thus gives a perfect example of how a larger network in technological products leads to greater value. McIntyre and Chintakananda (2013) pointed out the following aspects as those driving network intensity:

1. The value that customers gain from a product's large installed base and the interactions within
2. The need and availability of complementary products

3. The way information flows within the installed base and network ties among customers

A social networking website would offer little value if the number of users are negligible; a smartphone would have little value if there a limited number of third-party applications on offer; and video game consoles would offer little value if the players are not able to interact with other players over an online network.

While network markets may seem to be lucrative opportunities for entrepreneurs and new entrants, it is also important that incumbents understand this effect and know how to deal with its growing influence. McIntyre and Chintakananda (2013) identified three factors that might help incumbents in overcoming the network effect and diverting it to their benefit;

1. Increasing core product and complementarity of the product
2. Increasing the interaction/networking among consumers
3. Promising/maintaining consumers' data privacy

These factors can thus prove to be highly beneficial when the firm is competing in markets that are new to the network effect and the threat of new entrants is high.

Schilling's paper presents reasonable evidence to the idea that a technological lockout is influenced not just by network externalities but also learning efforts and market entry timings. For the current research, we may be able to build on the concepts presented in these papers to assess the extent to which lockout can be overcome with the integrated model.

Depending on the previous literature and the logical line of inquiry, this paper introduces the integrated model of Blue Innovations Network (BIN) as the framework in assessing the sustainability of blue oceans. The model grounds the BOS on technological innovations and network externalities in order to identify their interconnectedness and individual roles in making the BIN a sustainable form of blue oceans. The following section will present the BIN model in depth and apply it on the case of Blackberry.

2.3. The Blue Innovations Network (BIN) Model

Kim and Mauborgne's BOS has proven to yield large profit margins and value creation for most of the examples that were studied over the years. Applying the BOS to a company or product is not a difficult task, thanks to the clearly defined frameworks and models presented in their book. While the BOS may seem to be an attractive and relatively easy model for entrepreneurs and new entrants, incumbents may not always have their questions answered regarding the strategy's sustainability.

Going by this paper's technology focused nature, Henderson and Clark's (1990) classification of technological innovations coupled with Christensen's disruptive innovation phenomenon; and Schilling's (2002) network externalities/technological lockout interpretation provide us with the necessary dimension. In order to extend on existing theory and research and to provide a more inclusive and holistic approach to the execution and sustainability of the BOS, this paper introduces the Blue Innovations Network (BIN) model. After carefully analysing the individual properties of each dimension based on secondary research and applying them individually and then collectively to the case of Blackberry, the BIN model provides an integrated approach towards developing a more sustainable BOS.

The BIN model comprises of three dimensions; the first dimension is the mapping of the BOS on the case in question (Blackberry for this study), the second dimension entails the identification of the type of technological innovation in question and the third dimension emphasises on the need and importance of network externalities for establishing sustainable BOS and avoiding technological lockouts.

Depending on the timeframe and stages of a product's lifecycle, the BIN model can provide a chronological outline of the events in relation to the three dimensions and help academics and practitioners in determining the individual and collective effect of each dimension on the product or company.

Each dimension of the BIN is equally significant in determining the overall success of the model. The first dimension, BOS, is the macro view. Going deeper into the details we arrive at the technological innovations dimension and finally the network externalities effect. Each dimension gives strength to the others and thus makes the sum greater than the individual significance. This support among the

dimensions can be further clarified by taking one framework from each dimension and presenting their interconnectedness. Creating value and reaching across markets and consumers is the premise of BOS's four-action framework; with the use of certain innovation types such as modular, architectural or disruptive, firms can create value for their consumers and consequently attract noncustomers. Ultimately, the network intensity of the product's market and factors such as complementarity and information security can further strengthen the existing and newly created demand, even adding more value as a result of the network markets effect.

On the other hand, for firms facing the technological lockout dilemma, a combination of the BOS and the appropriate type of innovation coupled with increasing the overall network strength of the product can be a possible solution to avoiding such a predicament.

3. Methodology

3.1. Methodological Approach and Research Goals

The paper is based on qualitative research using a case study approach. The research is built on the *process* model system, which is used to design an empirical research study followed by the subsequent testing of the theories included. Process models are used when there is a need to outline or narrate a series of events that took place over a specific time period and how those events developed and improved/worsened over time (Van de Ven, 2007). The main reason for using different empirical research models (variance and process) is to transform theory into an operational model that can be researched and analysed, since theory itself is not measurable. Variance and process models are also complementary to each other to some extent, where a process model identifies the events and issues over time and then the variance model comes into play for identifying the causal relationships (Van de Ven, 2007). Since the purpose of current study is to reveal the patterns of some business-level decisions and how they affect the business outcomes over time, it fits well into the former research model.

In the current study, the process approach is used to design the model for testing the effectiveness of the BOS in light of technological innovations and network externalities, with Blackberry smartphones being the example. This paper thus narrates Blackberry's strategic manoeuvres and significant events starting from its inception, in order to deduce how the smartphone pioneer went on to become an insignificant me-too brand in the contemporary smartphone market. The paper proceeds to test Blackberry's strategies in the light of the blue ocean, technological innovations and network externalities and consequently propose an integrated framework that would help justify the purpose of this research.

3.2. Selected Case: Blackberry

In 1984, two engineering students Mike Lazaridis and Douglas Fregin set up the company Research in Motion (RIM) in Waterloo, Canada (The Globe and Mail, 2013). Their initial products being wireless data technology, it was not long before the company started to enter the market of mobile communications with its two-way communication pager technology. With the introduction of the Blackberry smartphone

and its innovative technologies such as the ability to send emails and the signature keyboard that went on to become Blackberry's identity; RIM was riding high on the tides of success towards the beginning of the twenty-first century (Hill, 2013).

In the coming years, Blackberry was to become the preferred mobile communication solutions provider for majority of the corporations in North America and the rest of the world. One might even go on to say that with its durable and energy efficient handsets combined with the state of the art security enhancements that corporations demanded for their internal communications; Blackberry was perhaps a perfect example of a successfully incorporated blue ocean strategy. Later on, RIM also decided to move the Blackberry brand closer to regular consumers by offering feature-rich handsets such as the Curve, Pearl and Bold. By the end of 2007 and just when the iPhone and Android smartphones were entering the market, Blackberry had over 10 million subscribers and reported a worth of £49 billion (Hill, 2013). Considering its impact over the technology industry, exploring the case of Blackberry based on the proposed model can provide a useful insight and new lessons for the practitioners and researchers.

3.3. Data Collection

In order to answer the questions that were set out for the research, the data was derived largely from online sources relating to the concepts outlined in the literature review. Since the paper is mainly focused around presenting and critically analysing the BOS in light of technological innovations and network externalities and then applying it to the case of Blackberry smartphones; the data used herein is largely theoretical, while the paper aims to capture the essence of the strategies aforementioned.

The process model of empirical case study research requires the researcher to narrate the specific events that lead to a certain outcome; therefore, data was obtained from technology review websites to reveal the common sense and then consolidated in order to fulfil the requirements of the model. Using the information extracted from the case study on Blackberry, the paper goes on to apply the BOS to the smartphone company and then proceeds to present the framework that integrates the BOS with

technological innovations and network externalities to propose the BIN model that could be executed in order to avoid technological lockouts or failures in tech industries.

For the purpose of achieving practicality and to make the research more generalizable, the paper provides the analysis at both the organizational and industrial levels in order to present a more comparative picture. Industry and organization data were collected from online resources and restricted to the time-frame of 2001 to 2015.

3.4. Reliability and Validity of Data Sources

Reliability refers to the extent to which the data collection techniques or analysis procedures would yield consistent findings (Saunders et al. 2009: 156). A number of methods are used in secondary research studies in order to determine their reliability and validity. For this study, following Saunders et al. (2009), a three-step model is employed to evaluate the secondary data sources:

1. Assessing overall suitability of data to research questions
2. Evaluate precise suitability of the data for analyses needed to answer the research questions
3. Judging the costs and benefits of using the data as compared to alternative sources

While these selection criteria may help in determining the suitability of the data, it is also important to determine the validity and authenticity of the secondary data. For this study, theoretical data and literature was collected from reputable sources and online journals. These included the likes of Harvard Business Review, Elsevier and Taylor and Francis.

For data pertaining to the case study of Blackberry, it was comparatively more challenging to ascertain the validity of the sources. Dochartaigh (2002) suggests that we look also for a copyright statement and the existence of published documents relating to the data to help validation (Saunders et al. 2009:274). Copyrighted material was therefore analysed for this study, with links clearly leading up to reliable industry sources and online publications.

The main article used for analysing the case of Blackberry was published in 2013 in The Globe and Mail, a Canadian newspaper, and was an investigative report on the inside workings of Blackberry throughout its rise and fall. The investigation was carried out by The Globe and Mail itself, and revealed insider news from almost

two dozen past and present employees and stakeholders. Further data and statistics were retrieved from reliable technological websites such as Techradar.com, GSMarena.com and Statista.com. Techradar is a technology blog which is a part of Future plc, an international media group and leading digital publisher based in England. GSM Arena is one of the biggest and most reliable technology blogs with a specific focus on smartphones, and was reported to have an estimated website traffic worth \$12.5 million in 2016 (FreeWebsiteReport, 2016).

3.5. Findings

3.5.1. Case Snapshot: A Story of Success and Failure

In 1996, Research in Motion (RIM) launched their first innovative two-way pager device. Following its success and sporting the additional ability to send and receive emails, the 1998 RIM 950 went on to be the pioneer of Blackberry's trademark design and email services (Hill, 2013). This device, also known as the first Blackberry, landed the company with a number of telecommunication partnerships following glowing reviews about the device (Hill, 2013). The following decade saw RIM transform into a global communications technology giant, with corporations signing exclusive contracts with the company for supplies and solutions for their mobile communications. Perhaps the biggest strength RIM relied upon was the trademark Blackberry keyboard and the highly secure email and messaging solutions services provided by the company. The Blackberry keyboard was at times referred to as a revolution in mobile technologies, since the portability and comfort of the QWERTY computer keyboard was now available for corporates and professionals to use on the go. That, combined with wireless email services and data connections provided by RIM and its partners, made the Blackberry a truly revolutionary device; a smartphone.

Change was inevitable however, and RIM decided to bring some major changes to their Blackberry line of phones. Initially being the exclusive choice of corporations and professionals who required on-the-go communications at all times, the Blackberry was soon to become more than just an email device that it was famous for. RIM decided to compete with the fast rising feature-phones (spearheaded by Nokia) with devices that offered multimedia features such as cameras and messaging. The devices turned out to be quite a success and the new Blackberry devices (Curve and Bold) were slowly making their way into the mass mobile phone consumer market.

It was positioned as a premium device from the start, and Blackberry users believed they were getting the value with the price.

Even with the launch of the first iPhone in 2007, RIM showed no signs of concerns and the Blackberry was becoming more and more of a global brand. Perhaps the first error that came from the Canadian company was when its partner network in the United States, Verizon, persuaded RIM to produce a device that would deal with the mounting threat of the success of the iPhone in the consumer market (Hill, 2013; Silcoff, 2012).

In order to better understand the events that occurred during the rise and fall of Blackberry, the section will narrate and analyse them in the light of the theories being discussed in this paper; the BOS, technological innovation and network externalities; and consequently present the integrated model that may have helped Blackberry sustain a blue ocean for its products.

3.5.2. BIN Model on Blackberry

In the current study, the example of Blackberry is taken for the application of the BIN model. Table 1 outlines Blackberry's rise and fall into three different eras and sorts them according to how each dimension of the model can be applied to it. The eras are classified as follows:

1. The rise of Blackberry during 2001 to 2006
2. The era of constant growth and sustainability 2007 to 2011; a sustaining innovation
3. The downfall of Blackberry between 2012 to 2015; a fading technology

Table 1- Blackberry and the BIN Model

BIN	Blue Ocean Strategy	Technological Innovation	Network Externalities
<p>2001-2006 (A Rising Innovation)</p>	<ul style="list-style-type: none"> • Eliminated, • Raised, • Reduced and • Created; value and non-value adding attributes 	<ul style="list-style-type: none"> • Discontinuous (Disruptive) Innovation • Incremental Innovations • Modular Innovations 	<ul style="list-style-type: none"> • Networks and complementarity
<p>2007-2011 (A Sustaining Innovation)</p>	<ul style="list-style-type: none"> • Restructured Market boundaries • Reaching across customer tiers 	<ul style="list-style-type: none"> • Modular Innovation • Architectural Innovation 	<ul style="list-style-type: none"> • Information flow • Network of users • Security
<p>2012-2015 (A Fading Innovation)</p>	<ul style="list-style-type: none"> • Failure to understand the redefined market boundaries • Failure to retain the newly created blue ocean of previous noncustomers and ultimately lost the initial blue ocean of enterprise customers 	<ul style="list-style-type: none"> • Unexpected architectural innovations • No modular innovations 	<ul style="list-style-type: none"> • Technological lockout due to failure in realizing the full potential network markets • Delayed innovations leading to loss in core product value and thus reducing installed base

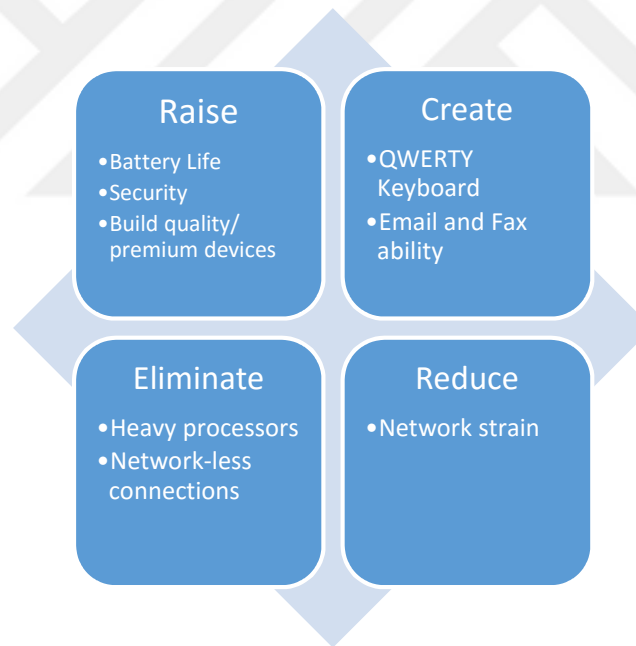
3.5.2.1. The Rise of Blackberry (2001-2006)

BOS and the Rise of Blackberry:

When RIM first entered the mobile communications market with its pager device, the cellular phone industry was still very young. The oligopolistic market was dominated by the companies like Motorola and Nokia; the devices having limited functionalities and the prices beyond the reach of most consumers. Following the introduction of its first Blackberry model, which brought email and fax support with it, RIM realized the potential in the market for reliable and multi-functional mobile communication devices (Hill, 2013).

The BOS's premise is that in order to break away from competition and create an entirely new market, a firm should follow some specific frameworks. The foremost of these is the four-action framework, as explained earlier in the study. For the purpose of this study, the four-action framework is applied on Blackberry in Figure 2 and then explained in detail.

Figure 2. The Four Actions Framework for Blackberry



Source: Adapted from the Four Actions Framework (Kim and Mauborgne, 2005: p.29)

Eliminate:

Considering the fact that the Blackberry was highly focused and differentiated in its choice of consumers, the devices eliminated non value-adding components such as heavy processors and memory that would otherwise consume battery and hinder performance. By

sticking to the basics, Blackberry delivered to its consumers the value they demanded. This stands in accordance with the first dimension of the BOS, which highlights the importance of eliminating some or all of those factors or product characteristics that have proven to provide no measurable value to customers (Kim and Mauborgne, 2005).

Raise:

Raising certain factors that would prove to be useful in contributing to the overall satisfaction level of customers is vital to the BOS framework (Kim and Mauborgne, 2004). This can be coupled with the elimination of those factors that have proven to not contribute to adding value for customers. RIM realized after the success of the first Blackberry that the major potential for mobile communications existed in the corporate sector. In order to appeal to their corporate clients, RIM brought forward devices that promised greater online security even when compared to computers. A secure connection and server were the things corporations valued the most, and Blackberry was their solution. Coupled with the bold and premium styling of the Blackberry, RIM was able to offer great value for those who were willing to pay the premium prices.

Create:

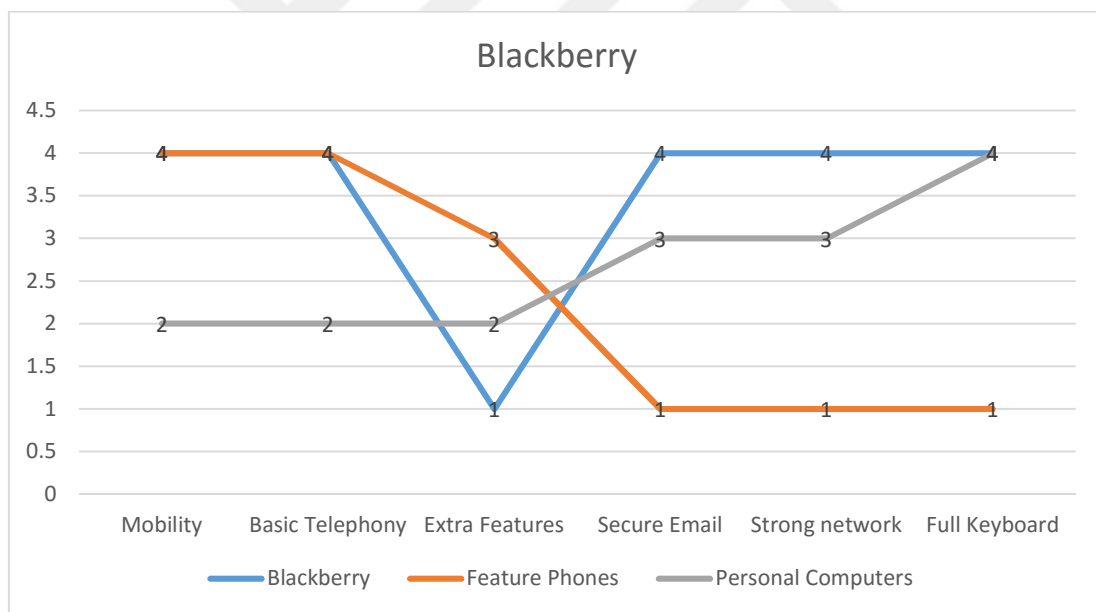
The dimension that defines the foundation of the BOS; creating factors that in turn create value for not only existing customers but also reaches out to non-customers, determines the viability and success of the strategy itself. One of the key defining features of the Blackberry phones was their physical keyboard which was a miniaturized version of the keyboards found on computers. The design and placement of the keys on the Blackberry was exactly what corporate customers needed in order to perfectly compliment the device's email and messaging services; convenience and comfort were offered in one package. Email functionality was also a first in mobile communications and Blackberry was able to create the demand for its email enabled handheld devices by specifically targeting the corporate clients.

Reduce:

By creating a closed network consisting of corporations and professionals and providing them with a secure and reliable communications solution, Blackberry reduced the amount of extra features that these target markets did not require, such as games that required higher processing power and consumed battery life. Kim and Mauborgne (2005) identified this dimension as another crucial factor in determining the successful implementation of a BOS. The foremost purpose of reducing those characteristics that offer little value and towards which customers are relatively indifferent (Yang and Yang, 2011) (Kim and Mauborgne, 2005), is to ensure that costs can be brought down while simultaneously offering the same or greater value.

Figure 3 shows a plotting of the Blackberry's entry into the mobile communications market, onto the strategy canvas of the BOS.

Figure 3. Strategy Canvas for Blackberry



Source: Adapted from The Strategy Canvas (Kim and Mauborgne, 2005: p.25)

Technological Innovation and the Rise of Blackberry

As discussed earlier in the literature, the disruptive innovation concept talks about a disturbance caused in the market by the entry of an innovation. Going into greater depth, we deduce that this disruption is usually caused by a firm with fewer resources as compared to the

incumbent and by targeting the neglected or overlooked population of the incumbent's market (Christensen et al., 2015). This is where most interpretation of disruptive innovation go wrong; many firms that are truly innovative yet do not fall in the criteria of having fewer resources neither starting off from an overlooked segment, are sometimes termed as disruptive innovations.

It is assumed here that since Blackberry was a new entrant in mobile handheld devices, its resources were limited as compared to incumbents in the technology sector. This assumption will be further clarified in the following paragraphs.

In relation to the theory of disruptive innovations, the fact that the disruptor offers higher value to a market that is underserved or ignored applies perfectly to the case of Blackberry. RIM's handheld devices did not target the mass consumers of Personal Digital Assistants (PDAs) and pagers; the Blackberry was in fact a PDA that was targeted at *executives* and *corporations* that needed an easy and simple solution to their mobile communication needs. The Blackberry incorporated the ability to send and receive emails in a completely remodelled version of a PDA. A device that was easy to use yet offered a plethora of features that were not seen before in handheld devices (such as high resolution displays) and enterprise solutions that kept corporations wirelessly connected, was the perfect ingredient for a revolution in the handheld communications industry. Even though it faced competition from the likes of the cellular giant Nokia, with their feature rich phones and a huge product portfolio catering to all kinds of consumers; Blackberry successfully held its niche market and continued to transform its disruptive technology into a sustaining technology with constant improvements and upgrades to its devices.

After establishing a firm base in the enterprise market and becoming the number one choice for its corporate consumers segment, Blackberry moved into the mass consumer market with its multimedia enabled phones (Pearl) and by the middle of 2009, it had 32 million subscribers (PC World, 2016).

In order to get to the roots of the causes behind Blackberry's downfall and establish the base for our argument, we need to analyse RIM's strategies in terms of the types of technological innovations that have been presented in the past literature. As presented in the literature review, this paper looks at the four major types of innovations (Ho and Lee, 2015) (Henderson and Clark, 1990); Incremental, Modular, Architectural and Discontinuous (disruptive).

Recalling the previous section, incremental innovations are those minor changes or modifications made to an existing technology in order to improve on the existing component and architectural knowledge (Henderson and Clark, 1990). Whereas, modular innovations refer to the way component knowledge is modified or completely changed, without effecting the overall architecture of the technology. Changing the components, adding or removing components or introducing an entirely new technology in the component base are considered as modular innovations (Henderson and Clark, 1990). Architectural innovation, in contrast to modular innovation, refers to the modification or completely changing the overall architecture of the technology. This means that while the components may remain unchanged inside, the way those components are put together in some specific form or shape undergoes a significant change (Henderson and Clark, 1990). Radical/Discontinuous Innovations are quite simply the combined result of modular and architectural innovations. When a product or technology undergoes a significant change in both component and architectural knowledge, it is said to be a radical or discontinuous innovation (Ho and Lee, 2015; Henderson and Clark, 1990). These innovations are usually also related to disruptive innovation (Ho and Lee, 2015), if they offer entirely new value to a smaller and underserved market segment of the incumbents' non-customers.

Making waves in the enterprise market with its innovate handheld devices, RIM's Blackberry was without a doubt a discontinuous/disruptive innovation. It not only revolutionized the way people looked at and used handheld devices but also introduced component innovations (integrating email and telephone in a PDA) along with architectural innovation (higher resolution screens and QWERTY keyboards). Furthermore, it was meant to serve a market that was previously overlooked by most technological innovations of that time; the individual executives and enterprises that wanted easy and convenient solutions to their wireless communication needs.

Following its burgeoning success in the handheld communications market, especially in enterprises, it continued to provide incremental innovations to its devices. Increasing the built-in features and improving on its unique selling points (USPs) such as data security, RIM ensured that its customers were never dissatisfied with their Blackberry devices. After all, it was termed the hottest gadget in 2001 by Forbes.

In the years leading up to the end of the first decade of the twenty-first century, Blackberry brought forward a number of modular and architectural innovations that would

revolutionize the way people used mobile phones. By providing constant software updates, improving user security characteristics and introducing attractive features such as multimedia support and cameras, this era was marked with modular innovations that looked sure to be able to tackle any oncoming threats from new entrants.

Network Externalities

Pre-emption, installed user base and product complementarity are all factors that can give a company a sizeable advantage in directing the network externalities effect in its favour (Schilling, 2002). Similarly, McIntyre and Chintakananda (2013) described network intensity with the help of the following, which we also discussed in the literature review:

1. The value that customers gain from a product's large installed base and the interactions within
2. The need and availability of complementary products
3. The way information flows within the installed base and network ties among customers

Blackberry, being the first in its category for providing corporate mobile solutions to enterprises, made all the right moves of establishing a network of Blackberry users in order to facilitate the information flow and thus tip the network effects scale in its favour. Though Blackberry's installed user base was not large, the company made sure to provide enough complementarity and information flow within its network in order to fortify its hold on the enterprise market.

Providing network solutions through partnerships with cellular companies, Blackberry's marketing strategy was far different than those of other mobile phone manufacturers. By choosing to market through the existing installed base of the well-established cellular network providers, Blackberry devices promised superior networking capabilities and connectivity plans that enterprises were actively seeking.

Going by McIntyre and Chintakananda's (2013) identification of the importance of indirect network effects, the service complementarity provided by cellular companies to the Blackberry devices proved to be extremely beneficial to the company's overall network

externalities effect. And as the company grew over the years, this effect would prove to be a decisive element in the rise and fall of the smartphone pioneer.

3.5.2.2.A Sustaining Innovation (2007-2011)

The BOS: Across the three-tiers of non-customers

Blackberry had established a reputable position in the mobile communications industry by the year 2006. Sales were strong and so was the brand value that came with the Blackberry devices. This was perhaps the perfect moment for the company to reach across a more diverse market by creating value for those consumers who were not Blackberry's customers at the time.

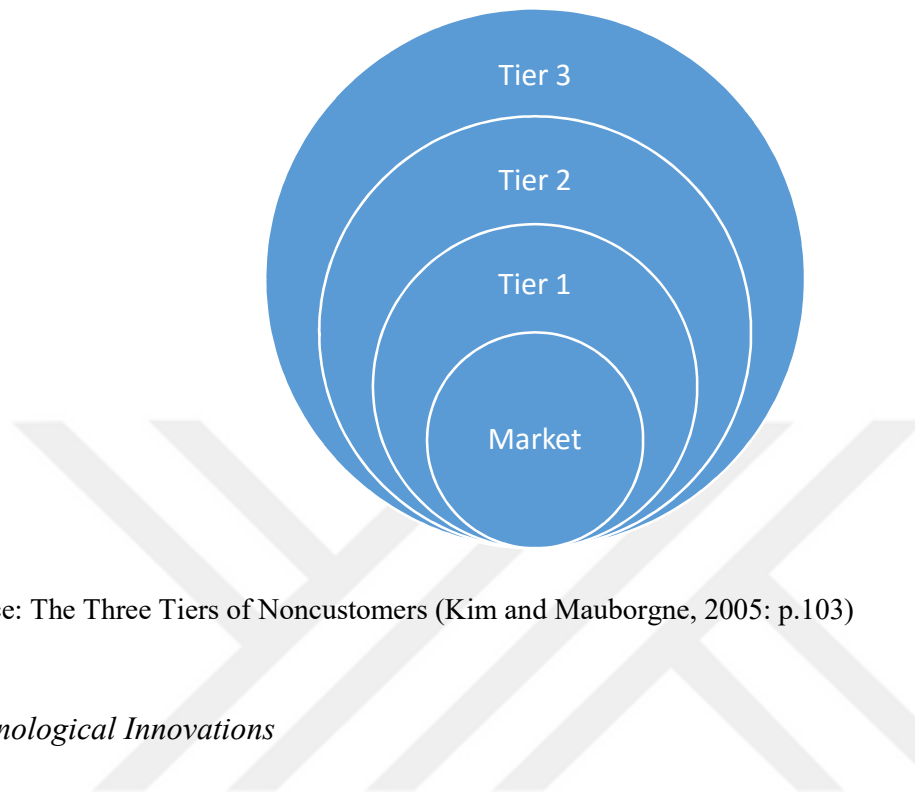
Kim and Mauborgne (2005) identified a model comprising of different clusters that represent three different tiers of non-customers. As Figure-4 suggests, the first tier of noncustomers outside the existing market is the easiest to reach out to. These are the consumers who are on the edge of the product's market and would be willing to become customers if offered the right kind of value (Kim and Mauborgne, 2005). They might be using the product at times to fulfil certain needs but are not regular customers. They might also easily switch depending on where they get the best product offering from.

Following immense growth and recognition in the market, Blackberry was quickly becoming a brand known to provide premium products and services specially designed for corporate customers and organizations. However, the company had finally decided to go out of its comfort zone and reach out to a new market of noncustomers. These were the non-corporate consumers who used mobile phones but did not require the enterprising and corporate networking services, even if they had the money to pay for it. Instead, they wanted a device that would offer more than just email capabilities and a practical keyboard; they wanted a multimedia enabled phone. In an effort to reach out to this blue ocean of noncustomers, Blackberry launched the feature-rich and multimedia enabled Blackberry Pearl in 2007. This was a device that added on to the dull corporate image of the device and brought in a more fun and entertaining side to the customers.

Blackberry continued with its successful penetration of consumer markets well into 2010 and 2011, with devices such as the budget conscious Blackberry Curve and the premium flagship device, Blackberry Bold spearheading the Canadian company into the smartphone arena. Their increasing popularity among young users especially earned the devices the title of

‘Crackberry’, due to their addictive nature (Hill, 2013). The full QWERTY and chat-friendly keyboard was the ideal wireless connectivity choice for Blackberry’s new market.

Figure 4. The Three Tiers of a Blue Ocean



Source: The Three Tiers of Noncustomers (Kim and Mauborgne, 2005: p.103)

Technological Innovations

The Blackberry Pearl carried the same DNA of its predecessors but introduced some major additions such as a camera and full multimedia support; the corporate device was now a hot seller among non-corporate customers as well. RIM modified and added on to its component knowledge by integrating added features into the existing architecture of the Blackberry devices. Familiar and much loved devices but with a different software and internal hardware; an example of a modular innovation.

Modular innovations were not alone in leading Blackberry’s sustainability in the years between 2007 and 2011. Between 2007 and 2009, Blackberry had established a strong enough non-corporate consumer base so as to be able to retain their customers through regular architectural innovations. In fact, it was architectural innovations that spearheaded Blackberry’s peak era. With models ranging from the premium leather-finished Blackberry Bold series to the budget yet trendy Blackberry Curve series, consumers’ and corporates’ distinctive requirements were sure to be addressed by the Canadian smartphone manufacturer. And though the designs varied, each model came with the same set of services and operating system that gave Blackberry its unique selling point in the wireless communications market.

One of Blackberry's most innovative architectural innovation to date has been its QWERTY style full-size keyboard. The Blackberry name itself was taken from the shape of the keys, which resembled berries (Techradar, 2016) and their extremely practical design and layout allowed for quick and easy typing for professionals and chatters on the go. If there was one thing that Blackberry loyalists would not want to compromise on, it would be the keyboard. Henderson and Clark (1990) identified a phenomenon known as unexpected architectural innovation, wherein incomplete knowledge or failure to recognize certain aspects of the design due to external market pressures may lead to disasters for technological companies. Blackberry fell prey to such a phenomenon in 2008, with the introduction of its new model, the Blackberry Storm. Heading to pressures from its network partners and the newly expanding smartphone market for touchscreen devices (Silcoff, 2012) (Hill, 2013), Blackberry made the mistake of diverting their focus from their classic design and decided to take on Apple's iPhone. Trying to incorporate existing component knowledge with a completely new architectural design did not bode well with the device, which thus turned out to be the company's first complete failure. Once a clearly differentiated product that ensured customer loyalty, the Blackberry had fallen victim to the bandwagon effect created by Apple's touchscreen device. As Blackberry's then CEO Mr. Lazaridis himself realized, the Blackberry was a simple yet practical handheld device that ran on mediocre processing power and memory (Silcoff, 2012). The iPhone, in contrast was a miniaturized version of a Mac computer. Head-on competition was certainly not the best idea, especially since it would require a complete re-configuration of component and architectural knowledge both; or in other words a discontinuous/disruptive innovation.

Network Externalities

McIntyre and Chintakananda (2013) identified three factors that are significant in taking full advantage of the network externalities effect;

1. Increasing core product value and complementarity of the product
2. Increasing the interaction/networking among consumers
3. Maintaining consumers' online/data privacy

Blackberry had taken advantage of network externalities from the start and the peak era was no different. In fact, one of the biggest contributors to the company's success in the consumer

market and especially the enterprise market was its maximum attention towards the network effect.

Blackberry did not just provide networking solutions for corporations to stay connected with their employees, it was also a network of its own. Each device was as unique as the person using it; with a special pin code that allowed users to take full advantage of networking and email solutions along with the ability to securely connect with other Blackberry users, without paying hefty network charges. With the introduction of the specialized Blackberry Enterprise Service (BES), corporate users were able to quickly share information among their networks with a monthly subscription. Perhaps the most attractive feature of the BES was its secure networking capability. Blackberry tackled the need for improve security among its network of users by providing extremely secure connections that did not allow for any sensitive information leaks and data theft from external sources was no longer a threat.

Following the expansion of Blackberry's market, the consumers found the devices perfect for staying connected to friends and family. The Blackberry Messenger (BBM) was an instant hit among the young users who were now able to send unlimited text messages in the form of a chatting software. The addictive nature of the BBM was the reason it came to be known as 'Crackberry' (Hill, 2013) (PC World, 2016). Owing to the fact that one had to be a Blackberry subscriber in order to benefit from these services, the network effect scale, owing to the large installed base and smooth information flow was tipping hugely in favour of Blackberry.

3.5.2.3. The Decline (2012-2015)

The years 2012 through 2015 witnessed the once towering giant of the smartphone industry stumble and collapse to conceivably the bottom of the market.

The Jump from Blue to Red Ocean

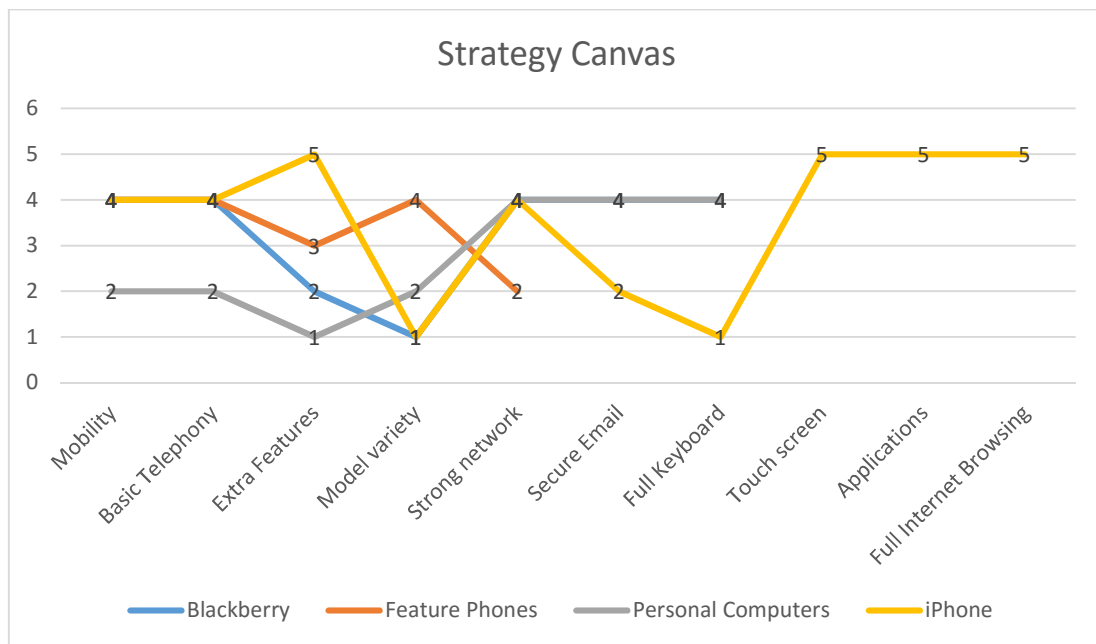
What may seem like a complicated matter at first sight, the company's foremost and fatal mistake was its decision to jump out from its blue ocean into the red ocean of the ever growing smartphone industry. Though it is true that innovative devices such as the iPhone and Android phones had redefined the wireless communications industry, it was Blackberry's internal factors and decisions that lead to the downfall of the Canadian company. The Globe and Mail investigative report by Silcoff (2012) revealed the internal conflicts of the organization and proved how conflicting decision-making was a key factor in sealing the fate of Blackberry.

Though Mr. Lazaridis, co-founder and director until 2013, was himself against the idea of Blackberry trying to compete with the likes of the iPhone; the latter being a far superior device in terms of processing power but having a relatively different market as compared to Blackberry (Silcoff, 2012), the board at the company thought otherwise.

Blackberry had gained a sizeable share in the consumer market by the time the iPhone and Android phones started entering the market. The company had managed to branch out from its enterprise market into the consumer market by offering both personal and professional services in its devices. However, it was this new market of previous noncustomers that ultimately started to brew trouble for the company. With the iPhone and Android devices offering feature-rich phones with unlimited internet browsing capabilities and a plethora of applications ready to be downloaded from their online stores, Blackberry was left bidding farewell to its consumer market. With the restructuring of the smartphone consumer market boundaries, the company was unable to satisfy its non-corporate consumers. Following delayed innovations and a failure to understand its consumer, Blackberry's perception that they knew better of what the consumers wanted, ultimately brought the company down (Silcoff, 2012).

Figure 5 uses the BOS Strategy Canvas to highlight the restructuring of the smartphone industry with the entrance of the iPhone. The canvas shows how iPhone raised a number of value adding features that were not present in either the Blackberry or other phones at that time.

Figure 5. The Strategy Canvas; Post iPhone



Source: Adapted from The Strategy Canvas (Kim and Mauborgne, 2005: p.25)

Technological Innovations

Initially, it did seem that Blackberry was on the right track of turning their disruption into a sustaining innovation. However, following pressure from external partners and the increasing popularity of the iPhone, the very first mistake came from their unexpected architectural innovation. Identified by Henderson and Clark (1990) as a phenomenon wherein incomplete knowledge of architectural innovation leads to a disaster; Blackberry proved the disastrous consequences of such a phenomenon with its device, Blackberry Storm. The board at Blackberry thought that this would be the edge that the company needed in order to retain its newly conquered market of smartphone consumers but what was meant to be an answer to the rising popularity of the iPhone, the Storm was nowhere close to competing with Apple's device (Silcoff, 2012) (Hill, 2013). Blackberry was unable to provide a satisfactory user experience with the Storm's unusual touchscreen and furthermore, it was a disappointment to those consumers who were loyal to the Blackberry for its easy to use and extremely convenient keyboard (Silcoff, 2012). Moreover, Blackberry failed to make the necessary modular/component changes that should have accompanied the complete change of architecture.

Network Externalities and the Dominant Design

As discussed earlier in the review of past literature, Henderson and Clark (1990) and Cecere et al (2014) deduced through their findings that once an industry reaches the peak of architectural innovation and once that specific architectural design has been accepted as the dominant design, the focus shifts to modular innovation if a technology is to survive and continue innovating.

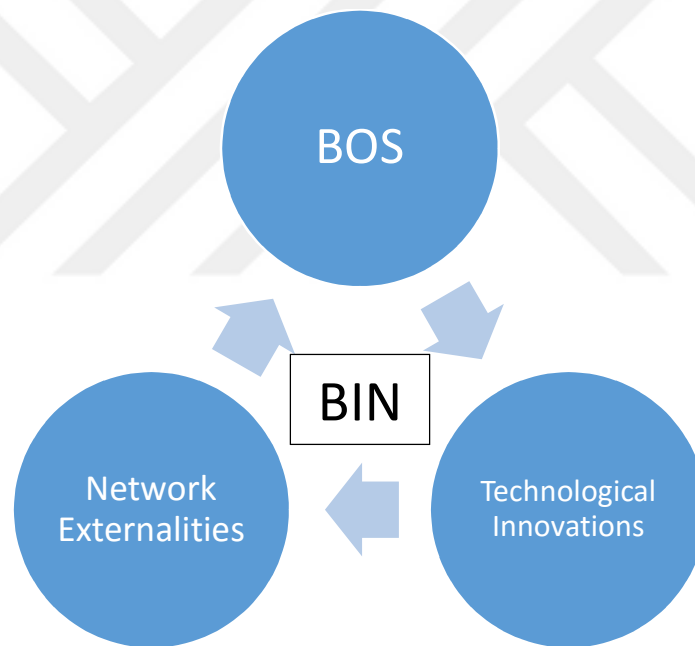
Blackberry started off with all the right moves. Its product development strategies were in tune with the market demands and its differentiation strategy made sure that it offered the best value for money to its niche market. In the years following the iPhone's launch in 2007 and the subsequent follow up by Android phones, the smartphone market started experiencing tremendous momentum. The iPhone and Android phones were targeting the mass consumer market; Blackberry's blue ocean of the enterprise market was still safe but its newly acquired consumer market was swiftly jumping ship. It was not long before all handheld device manufacturers started conforming to the touchscreen design that was made famous by Apple's iPhone. Additionally, consumers now having the option to choose from devices that offered not only connectivity but were practically mini computers in their hands, Blackberry was no more an intriguing device. After the Blackberry Storm failed to compete with iPhone's design and technological prowess, cellular network companies focused their attention to Google's android. The Android smartphones were a success, not in diverting sales from the iPhone but from Blackberry and other smartphone manufacturers such as Nokia, Palm and Microsoft (Hill, 2013).

When Blackberry did finally conform to the dominant design and came up with full touchscreen device powered by completely new hardware and software, the device was too late to cause any change in the market. Moreover, the full touchscreen did not cope well with Blackberry's enterprise users who were disappointed with the lack of a physical keyboard. Mike Lazaridis himself disapproved of the device, calling it a deviation from Blackberry's clearly differentiated keyboard phones (Silcoff, 2012).

3.5.3. Application of the BIN Model

In principle, the BIN model presents the three dimensions in an interconnected manner. Each dimension has the ability to have either a positive or negative effect on the other, depending on how it is applied. There is no specific direction, however, so the model can be used in any direction. For example, the application of the network externalities effect can precede the BOS and technological innovations can precede both. Figure 6 represents the three dimensions of the BIN model in an interconnected manner. Each dimension fuels and strengthens the other and thus leads to a more sustainable BOS. Using Blackberry's example on the model, we can deduce how, through the application of technological innovations could have led to a stronger network and thus a more sustainable blue ocean.

Figure 6. The BIN Model Cycle



Achieving the BIN model requires scholars and practitioners to realize the connection among each dimension before proceeding with their application onto the product or company. In the case of Blackberry, the downfall era can be explained with the BIN model using a step by step approach.

Realizing that Blackberry's network externalities effect was strong leading up to the year 2012, with a large number of subscribers and a premium brand image of the devices, this

dimension can be considered as the forerunner. Schilling (2002) identified in her study on network externalities that perhaps the most crucial factors in avoiding a technological lockout are the timing of market entry and a constant learning orientation of firms. McIntyre and Chintakananda (2013) stated that in order to divert the network effect to their benefit, firms need to increase their core product value and the interaction/network between consumers.

Blackberry was a *first-mover* in its category of handheld devices and was able to quickly garner a sizeable installed base of the enterprise market and later on the consumer market. However, apart from its initial innovations on certain components and architecture of the devices, there were hardly any in the years following 2009. The company continued using an outdated operating system based on the Java program (Silcoff, 2012) and kept on believing that they knew better of what customers wanted.

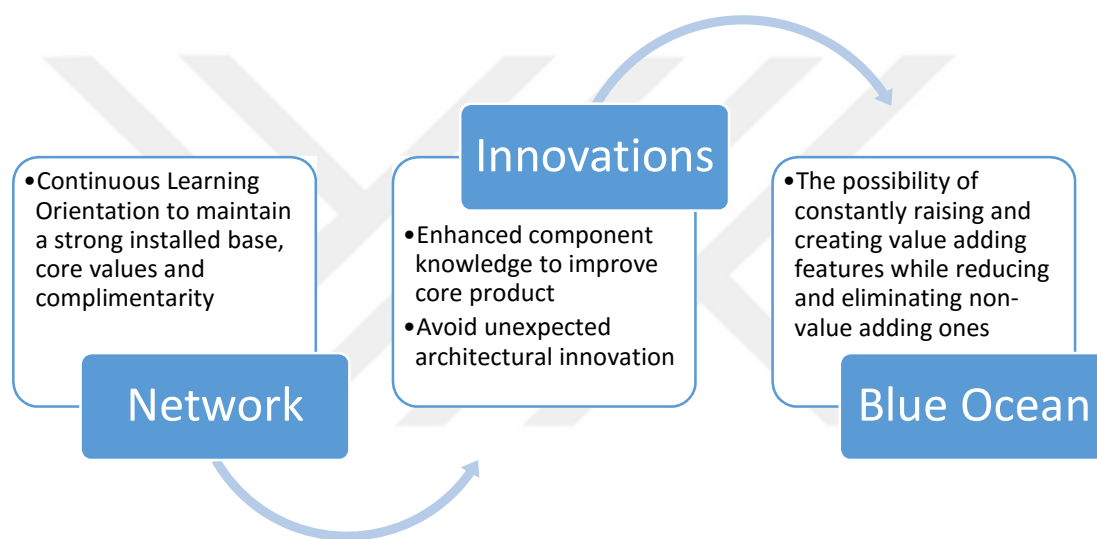
Constant innovation and learning can help a firm in strengthening its network effect (Schilling, 2002). This is where the network externalities effect connects with the dimension of technological innovations. By continuously coming up with modular and architectural innovations, firms can take advantage of complementary product and service developers who might show interest in their products. Complementarity thus leads to a stronger network effect and attracts more customers. With a strong network like that of Blackberry, a shift towards attracting developers may have given the company the edge they needed in the smartphone market. Apple beat them however, by connecting application and software developers directly with consumers through their futuristic iPhone and the revolutionary App Store. Even at this point nonetheless, Blackberry's enterprise services were unparalleled and it offered its corporate customers unmatched security in terms of email and information flow.

Various other smartphone manufacturers quickly caught on and conformed to the design that was made popular by the iPhone. Soon enough, the full touchscreen bar-shaped phones became the industry standard for smartphones. Blackberry initially did not conform to the rising dominant design; this led to a decrease in their devices' compatibility with complementary product and service developers, who were now focusing on the growing networks of Apple and Android. Ultimately, the lack of complementarity for Blackberry devices and the growing installed base of these two new entrants stripped Blackberry of its valuable consumer base, landing the Canadian smartphone manufacturer in a technological lockout.

As a result of their initial rigidity and divergence from continuous learning, Blackberry was unable to understand and cope with the changing market boundaries of the smartphone industry. Though it had created a blue ocean in the first two eras, the third era questioned its sustainability.

The following Figure 7 illustrates how connecting all three dimensions could help firms like Blackberry in sustaining a blue ocean.

Figure 7. Achieving the BIN



In practical terms, a continuous learning and Research and Development orientation (Schilling, 2002) (Zheng, 2013) would have ensured greater component innovation, thus avoiding failed innovations and thereby enhancing the core brand value among both the new and old customers.

4. Conclusion and Implications

This study was set out to conduct an exploratory research for grounding the BOS on two crucial technology management dimensions; technological innovations and network externalities. It also sought to draw a connection between these three dimensions and ultimately propose an integrated model for strengthening the sustainability and strength of blue oceans. The literature brings forward a number of examples and integrated models for successfully identifying and creating blue oceans but the idea of a sustainability strategy for maintaining them remains rather inconclusive. This study therefore sought to answer the following questions:

1. Can the BOS be linked to technological innovations and network externalities in the technology industry?
2. Can an integrated model be proposed to provide a sustainability strategy for blue oceans and if so, how can the model be applied?
3. Can the smartphone company, Blackberry, be used as an example from the technology industry to ground the BOS on and how does the integrated model for sustainable blue oceans apply to it?

The empirical evidence derived from past literature and industry specific secondary data helped meet the objectives of the study by sequentially answering the research questions.

1. Judging by past literature, we saw to what extent the concept of disruptive innovation is rooted in the BOS. Innovation and value creation being the central notion, it can be deduced how Henderson and Clark's (1990) classification of technological changes along with Christensen's disruptive innovation concept can be used to represent different stages in the application of the BOS. Moreover, the effects that network markets have on the creation of value for incumbents and new entrants further strengthen the possibility of a connection between the three dimensions.
2. Having determined a viable connection between the three concepts in the theoretical background section, the study consolidates the findings in the methodology section to prove the possibility of an integrated model. The BIN model thus summarizes and illustrates the BOS, technological innovations and network externalities into a continuous loop which reiterates their interconnectedness. The model works in the following manner:

- a. Determining the forerunner dimension, based either the product's lifecycle or in a chronological order (either BOS, innovation or network externalities) and mapping it on the product/firm in question
 - b. Mapping the remaining two dimensions onto the product (again chronologically) and determining the direction of the path that needs to be followed. For example, using modular innovations to improve the network effect and thus strengthen the blue ocean.
 - c. Formulating the connection that each dimension has and how they strengthen one another to reach a sustainable level of innovation
3. Blackberry proved to be a suitable case for this study owing to the fact that all three dimensions can be mapped onto the company. Though it has not been considered as a blue ocean company in the past, the evidence and application of the BOS onto it proves otherwise. It had all the elements of a blue ocean company while also displaying clearly defined examples of technological innovations and network markets. Moreover, its remarkable rise as a smartphone pioneer followed by a sudden and unexpected fall raises the question about the sustainability of blue oceans and how they can be strengthened. The paper thus applies BIN onto Blackberry in an effort to deduce where the company went wrong and how an integrated model could help similar companies in the future.

4.1. Implications

The ever changing business environment in the contemporary world and the strategies that follow, also raise the need for sustainable models and frameworks and questions the sustainability of existing models. The BIN model's ease of generalizability can make it a good option for scholars studying the sustainability aspect of strategies that seek to create new value and new markets. Since it elaborates on how a weakness in one dimension can be addressed by the strength of another, the integrated model can provide a worthy prototype upon which future research can be built.

In terms of practitioners, the BIN can help fill specific gaps in the technology industry which may not be addressed through the application of a single strategy alone. Moreover, applying it to non-technological industries is also a possibility. For instance, Guttentag (2015) analysed the rise of AirBnB at the tourism and hospitality industry as a disruptive innovation

and its subsequent advantages and problems. Taking into view the network market AirBnB has created with its worldwide presence and ease of information flow connecting tourists with locals, the BIN model can be applied to help the company turn its disruptive model into a sustainable blue ocean.

4.2. Limitations

The BOS is a relatively new concept. Though it has garnered considerable attention from strategists, academics and practitioners, it has yet to gain a strong foothold in the world of strategic management. Gathering relevant data regarding the BOS and its applications, therefore, was a majorly limiting factor. Moreover, the qualitative scope of this study did not allow for the collection and analysis of practical or real-time data and thus relied heavily on secondary data and the understanding and application of conventional theories and concepts.

The current study analysed the smartphone industry by means of the case of Blackberry. Therefore, the scope of study is limited to a single case. However, future researches may be targeted at more in-depth analyses of the smartphone industry and how the framework presented in this study could be further refined and applied to cross-industry examples. Testing the framework proposed in this study and analysing further cases could help refine it and perhaps be modified to include additional concepts or strategies for greater generalizability.

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