Chapter 1: Introduction

In this first main chapter, the author will present the background for this thesis that leads to the research objectives. The research background takes the reader through the key theories of competitive advantages from Supply Chain Management way of thinking to the New Age Digital Economy. The rest of this section presents the structure of this whole thesis.

1.1 Research Background

Since the inception of Supply Chain Management (SCM) in the 1980s, there has been a plethora of research that has developed models and frameworks to depict the essence of SCM (e.g. Burgess et al., 2006; Chen and Paulraj, 2004; Mentzer et al., 2001).

Overall, all the various definitions and frameworks related to SCM converged into the common point of view that the goal of SCM is to integrate both information and material flows seamlessly across the supply chain as an effective competitive weapon (Childhouse, 2003).

To elaborate from a competitive advantage aspect, SCM involves efficient and effective management of resources viz., material, money, men, and information within and across the supply chain to maximize customer satisfaction and to get an edge over competitors.

Therefore, supply chain management has a significant role in firm's performance and has attracted serious research attention over the last few years. SCM is undoubtedly a source of performance improvement and competitive advantage for the members of the chain. Research has shown that supply chain orientation has the potential to shift mindsets from internal-focused operations to more diverse and collaborative schemes that result in a higher profit margin (Mentzer et al., 2001). As per Gunasekaran et al., (2004), performance measurement and metrics play a key role in objective setting, performance evaluation, and arriving at future courses of actions.

Re-iterating the famous maxim, ‘What you measure is what you get’, highlights the importance of performance measurement system. Conventionally, performance measurement is defined as the process of quantifying the effectiveness and efficiency of action (Neely et al., 1995). There has been several research done in the past in SCM performance measures focussing on areas such as cost and non-cost; strategic, tactical or operational focus (Gunasekaran et al., 2001); business process perspective and financial perspective (Beamon, 1999), information on what customers want and how competitors are performing (Kaplan and
Norton, 1992). Theory establishes that even well-conceived performance measurement system and competitive strategies cannot increase organizational success unless they are effectively implemented. But will merely implementing an effective performance measurement system lead a firm to success and give that competitive edge, in this digital age? What does it take to get that edge over competitors and sustain profits today?

To get answers to the above, the author further explored competitive advantage literature to understand how this area has evolved with changing times and what were the different competitive strategies suggested by various authors. The basic premise behind the concept of competitive advantage is how firms can develop a differential advantage over their competitors. Barney (1991, p. 102), in his research, defines competitive advantage as a ‘value creating’ strategy.

Porter (1985, 1996) provided a framework in which firms can be classified in generic strategies. This model which is viewed in three different strategic groups namely differentiation, cost leadership, and focus strategies. Each of these three generic competitive strategies offers a completely different way of creating a sustainable competitive advantage. A firm must evaluate and therefore decide on opting the right approach between cost-leadership and differentiation or both strategies, else it may get stuck-in-the-middle without a coherent strategy (Acquaah and Ardekani, 2006).

As per Stalk et al. (1992), successful firms are those that accurately anticipate market trends and quickly respond to changing customer needs. Towill and Christopher (2002) in their research attribute the success or failure of supply chains to end customer in the marketplace. They state “getting the right product, at the right price, at the right time to the consumer is not only the linchpin to competitive success but also the key to survival” (p. 299). Companies are forced to find flexible ways to meet customer demand in this global era, argue Chase et al. (2001). Most of the recent literature in the past decade focussed around knowing customers better and giving them the value that they expect. In addition to working on various competitive approaches, research has time and again emphasized that firms should constantly innovate to survive and remain profitable. It is evident in research that continuous innovation efforts provide sustainable growth and competitive advantage. On top of these basic strategies suggested by Porter (1985, 1996), companies can also adopt other competitive strategies facilitated by information systems to shape their competitive advantage.

Another highly important and highly debated topic in innovation strategy management is when organizations should be early adopter of new technologies. Martín-de Castro et al. (2013) say that developing successful technological innovations is essential for creating and
sustaining an organisation’s competitive advantage. Embracing technology and business information systems could be a critical enabler of these five competitive strategies. The next set of enablers considered in competitive advantage theory was information systems and technology adoption. Adopting information systems like Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) applications is inevitable in this current context as a source of competitive advantage. Exploring this area of competitive advantage further, the author further argues if merely implementing business information systems will suffice to survive in these times or does it take something more than that?

Enterprise Resource Planning (ERP) systems have been applied by many firms regardless of size around the world as a key part of the organizational infrastructure. ERP encompass a wide range of software products supporting day-to-day business operations and decision-making (Gattiker and Goodhue, 2005). ERP systems are expected to provide, seamless integration of processes across functional areas with improved workflow, standardization of various business practices, improved order management, accurate accounting of inventory, and better supply chain management (Mabert et al., 2003). CRM represents a system for creating value for both the firm and its customers through the appropriate use of technology, data and customer knowledge (Alshawi et al., 2011; Payne and Frow, 2006; Payne and Frow, 2005). Accordingly, with Day (2003), and Alshawi et al. (2011) CRM brings together people, other resources and organizational capabilities to ensure connectivity between the company, its customers and collaborating firms.

Many researchers have highlighted the benefits of ERP implementation in supply chain management that include: 1) integration of transaction data across the organization to enable SCM process collaboration and its associated performance improvements; 2) automation of critical business processes; and 3) real-time access of information to stakeholders (Willis & Willis-Brown, 2002). As ERP represents an area of significant financial investment and business activity (Schubert & Williams, 2011), successful implementation requires a high degree of planning and commitment and rather than dealing with technology alone (Ganesh & Mehta, 2010).

What plays the important role in any business information system is, **Information.** Information plays a great role in the enterprise (Kahraman, et al., 2011). For a firm, there is huge volumes flowing within and outside. In response to global competition, enterprises are increasingly employing information technology to conduct business electronically. Thus, various information systems, such as enterprise resource planning (ERP), and customer
relationship management (CRM), are increasingly used to gather business transaction, supplier and customer data.

These systems can deliver great rewards, but the risks of failure that they carry are equally great as these systems have many limitations (Davenport, 1998). Extant research shows that ERP and implementation have very little impact on the business analysis and decision support areas that emphasize the need for sophisticated manipulation of information rather than a simple extraction and reporting of transactional data (Granlund & Malmi, 2002). This is further validated by research findings of Granlund & Malmi (2002); Seethamraju (2007) that indicates that enhanced mass processing of transactions is done with limited decision support capability. To cover this gap, large organizations are increasingly making use of a decision support system on top of their existing ERP systems (Seethamraju, 2007). With the potential to gain competitive advantage when making important decisions, it is vital to integrate decision support into the environment of their enterprise and work systems. Business Intelligence (BI) can be embedded in these enterprise systems to obtain this competitive advantage (Jalonen and Lonnqvist, 2009; Sharma, R.S. and Djiaw, 2011). Literature proves while ERP and CRM systems are data rich, they fall short on decision support needs of Management. As we see, ERPs and CRMs have become a commonplace in most of the firms world-wide and have led to firms becoming very data-rich. If such business information systems have become a must-have and common across organizations, then where lies the competitive edge?

The thesis then explores the new age digital economy driven by Internet and studies how different firms are competing for their position, profitability and growth.

The Digital Economy- Unlocking the New Normal Competitive Advantage

This is the age of Internet and organizations are striving hard to align and transform themselves to this digital age. With the rise of Internet, the last decade has seen a transformation in the way consumers and businesses transact. Internet age has led to the rise of e-commerce that has dramatically changed the way products are bought and sold (Manyika et.al 2011).

No transformation is more challenging than meeting the expectations of digitally empowered customers. Digital technologies enable companies to better engage with their customers and offer superior experiences at affordable costs. But providing outstanding experiences to increasingly savvy, and demanding customers is getting harder.

The world is getting connected with information systems, Internet and mobile devices and there is enormous amount of data flowing into this global economy. In the McKinsey report,
(Manyika *et al* 2011) state, “Companies have access to a large amount of transactional data about their customers, suppliers, and operations. Millions of networked sensors are being embedded in the physical world in devices such as mobile phones, smart energy meters, automobiles, and industrial machines that sense, create, and communicate data in the age of the Internet of Things.”

Traditionally, in ERP and CRM systems, information travelled in organizations in their proprietary databases and analysed in reports that rises up the management chain (Chiu *et al*, 2010). In what’s called the ‘Internet of Things’, the information traverses through digital chips and sensors embedded in physical devices like different kinds of machines and mobile phones, has led to the physical world becoming a type of an information system in itself.

In other words, in this digital age, the amount of data in our world has been exploding. Companies capture trillions of bytes of information about their customers, suppliers, and operations, and millions of networked sensors are being embedded in the physical world in devices such as mobile phones and automobiles, sensing, creating, and communicating data. Multimedia and individuals with smartphones and on social network sites will continue to fuel exponential growth. **Big Data**—large pools of data that can be captured, communicated, aggregated, stored, and analysed—is now part of every sector and function of the global economy.

There exist multiple definitions of Big Data, but the most widely accepted definition lies in terms of 3 characteristics that it displays, **volume**, **velocity** and **variety** also referred to as 3 V’s—**Variety** refers to the heterogeneous nature (made up of structured and unstructured datasets), **Velocity** depicts the speed at which data is captured, and **Volume** refers to the size of data (usually in Petabytes, Exabyte and Terabytes) (Laney, 2001).

Laney (2001) considers Big Data as data whose volume, velocity, and variety makes it difficult for an organization to manage, analyze and extract value by conventional methods and systems. The term Business Analytics (BA) is defined as the “process that extracts value from data through creating and distributing reports, building and deploying statistical and data-mining models, exploring and visualizing data, sense-making, and other related techniques. Data may be internal or external to the organization; processing may be real-time, near real-time, or batch; and any combination of these is possible” (Grossman and Siegel, 2014, p.20).

Like other essential factors of production such as hard assets and human capital, it is increasingly the case that much of modern economic activity, innovation, and growth simply couldn’t take place without data. **“Data is the new oil”**, declared Clive Humby in 2006, a Sheffield mathematician who with his wife, Edwina Dunn, helped Tesco to create its Clubcard
system. Michael Palmer, of the Association of National Advertisers, expanded on this quote: "Data is just like crude. It's valuable, but if unrefined it cannot really be used. It has to be changed into gas, plastic, chemicals, etc. to create a valuable entity that drives profitable activity; so, data must be broken down, analyzed for it to have value." (Ch. Arthur, 2014).

In today’s complex business environment, the field of data analytics is growing in acceptance and importance. It is playing a critical role as a decision-making resource for executives, especially those managing large companies.

Davenport (2006) writes about becoming an analytics competitor, at a time when firms in many industries offer similar products and use comparable technologies, business processes are among the last remaining points of differentiation, and he recommends the use of sophisticated data-collection technology and analysis to wring every drop of value from all the business processes. Analytics can be classified into Descriptive, Predictive and Prescriptive Analytics and the value that can be extracted at each level is plenty. While descriptive analytics focusses on Exploratory Data Analysis using Data Visualization; Predictive Analytics (or Machine Learning) focusses on answering future outcomes.

A recent report from the McKinsey Global Institute asserts that machine learning (a.k.a. data mining or predictive analytics) will be the driver of the next big wave of innovation (Manyika et al., 2011). Customer orientation and increasing customer value has received increased attention with firms globally (Woodruff, 1997). Market orientation has become the new differentiator in today’s business world (Alvarez et al., 2006). However, the question is still open on how organizations should compete on customer value delivery (Woodruff, 1997). To deliver the value to the customer, Woodruff suggests that organizations first must gain knowledge about their markets and current customers and are then able to translate this knowledge into action. Analytics technology promises to deliver exactly this knowledge about a customer. Analytical packages help to discover patterns, find predictors and apply different statistical techniques on large amount of data. A third of the application of analytics are centred on marketing (Rexer, 2013). This involves activities such as customer segmentation and profiling, customer acquisition, customer churn, and customer lifetime value management.

While Data and Analytics have established itself as the key customer value delivery, but who has the access to the amount of data required to execute a successful customer-centric, market oriented strategy?

Big Data has largely been the domain of ‘Big’ companies because of its scope and need for extensive technical, manpower and financial resources. The companies that have web facing businesses(e-commerce) undoubtedly have access to more information on customers on
one side and the sellers on the other side. Extant research shows that most traditional businesses are intimidated by the level of expertise required to ‘manage Big Data’ and have, thus, become mute spectators in the digital revolution.

With the development of network economy, e-commerce platform has increasingly become a worldwide trading place of various kinds of products and services. This environment makes direct trading between producers and consumers through the Internet possible (Wei Rong, 2014). This has paved way for online intermediaries or e-marketplaces like Amazon, Flipkart etc. that provide an information driven platform for buyers and sellers to trade.

An early research by Bakos (2001) mentions how technology allows firms to identify and track individual consumers, because of digital transactions both within an online store and across different Websites that leads to the creation of consumer profiles through various collaborative and content filtering techniques. In the case of online retailing, every transaction like surfing, buying and selling, leaves a trail of digital “exhaust data”, created as a by-product of such activities (Manyika et al., 2011) that the e-commerce companies have access to. Such information is used by the Internet retailers for their competitive advantage which is also termed as information asymmetry driven advantage. Such advantages include, segmented and personalized offerings to customers (Cambini et al., 2011) and in addition deploying complex pricebots and algorithms, to determine prices to approach first degree price discrimination (Bailey 1998), search discrimination, meaning steering them towards different sets of products with their access to customer information (Mikians et al., 2012, 2013).

As we observe, research has proven that e-commerce companies make use of Business Analytics identify patterns in consumers’ shopping habit and hence can provide customized/democratized offers, advertisements and discounts to such consumers (Mosavi & Vaezipour, 2013).

While there is a lot of research around e-commerce and online intermediaries exploiting data to their advantage, in the traditional consumer products businesses in India, such as FMCG (fast moving consumer goods), Apparel etc., there is very little or no research done on their extent of usage of data and analytics around customer-centric processes.

The consumer products businesses in India sell their products primarily through the traditional trade, modern retail network (Mulky, 2013). The traditional distribution channel structure involves multiple levels in the network before the product reaches the end consumer. This includes the distributors, whole-salers, carrying and forwarding agents and retailers (kirana shops). The modern trade involves large format retailers like super-markets and hypermarkets. While some of the consumer product businesses have also selling of their products through e-
commerce channels, but that is not a significant part of their revenues. While e-commerce driven, sales are promising for several businesses in India, traditional trade still dominates followed by modern trade in the consumer products segment. In such a scenario, it is interesting to investigate where do consumer products businesses in India stand against their information driven competitors. Since there was a dearth of research in this area, the author set out on a research to investigate extent of customer knowledge and analytics capabilities at traditional consumer products businesses in India. This gap in the literature was taken further as the broad area of research and formed the basis for research questions and themes that are defined in the upcoming sections.

1.2 Research Aim and Objectives

Taking further from the earlier section that gave a background and motivation to this research, the central goal of this research is to understand and find answers to the following questions. It will do so in the specific context of Indian traditional businesses in the consumer products segment and online intermediaries.

**Research Objective 1:** Understand the extent of use of analytics as a source of competitive advantage by online intermediaries from theory.

**Research Objective 2:** Understand the extent of use of analytics as a source of competitive advantage by traditional businesses in the areas of Descriptive and Predictive Analytics.

The research objectives are further divided into two research questions and broad research themes viz. ‘Customer Knowledge Measure’ and ‘Customer Analytics’ measure and sub-themes that are detailed in section 3.1.

This research aims to gain insights from the above research questions through secondary and primary research and arrive at a framework for traditional businesses that will help them gain competitive advantage using data and analytics and address Big-Data powered information asymmetry driven advantage possessed by online intermediaries.

1.3 Thesis Outline

This thesis is structured into eight chapters as outlined in Figure 1.1. The introduction (Chapter 1.0) section lays the background for this research and states the research aim and objectives. Followed by this is the comprehensive literature review in the Chapter 2.0, that covers the
evolving drivers of competitive advantage right from SCM way of thinking, Performance Measures, Business Information Systems (ERP, CRM) to Big Data and Analytics. Sections 2.2.3 and 2.2.4, ‘Who are the players in the Big Data Game?’ and ‘Information Asymmetry- A source of competitive advantage’ answer research question 1 (RQ1).

Review of literature helps identify the gap and Chapter 3 presents the research questions and research themes. This study adopts the mixed method approach- triangulation design to answer the research questions and Chapter 4.0 presents the methodological choice of this thesis and justifies the rationale behind it as well. The research design and data gathering instruments are also explained in this chapter. Appendix A has the survey questionnaire administered to collect data for this research. Data Analysis in Chapter 5.0 covers the descriptive findings of survey data and qualitative insights from three case studies that are further triangulated for interpretation of results in Chapter 6.0. Chapter 7.0 presents the discussion, recommendations and contribution of this research, academic, managerial implications, limitations of this research and recommendations for future research. Finally, Chapter 8.0 summarizes the thesis with the conclusion. Figure 1.1 shown below presents the thesis outline structure.
Figure 1.1: Thesis outline structure

- **Chapter 1.0**
  - Introduction
    - (presents research motivation, aim and objectives)

- **Chapter 2.0**
  - Review of Literature
    - (comprehensive review of literature leading to the research questions)

- **Chapter 3.0**
  - Research Questions
    - (research questions, themes and sub-themes presented)

- **Chapter 4.0**
  - Research Methodology
    - (Justifies rationale for selection of Mixed Methods as the methodological choice for this thesis)
    - (Describes the profiles of the survey companies and case companies)

- **Chapter 5.0**
  - Data Analysis
    - (Analysis of Survey data)
    - (Analysis of Case companies)

- **Chapter 6.0**
  - Triangulation of Findings and Interpretation of Results

- **Chapter 7.0**
  - Discussions
    - (Recommendations, Contribution of this research)
    - (Academic and Managerial Implications)
    - (Limitation of the research and recommendations for future research)

- **Chapter 8.0**
  - Conclusion