

**INFORMATION TECHNOLOGY AND SUPPLY CHAIN INTEGRATION STRATEGY**

**AT**

**BRITISH AMERICAN TOBACCO KENYA LTD**

**BY**

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## DECLARATION

This is my original work and has not been submitted for any degree or diploma in any other Institution.

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**D61/70586/2008**

This project has been submitted with my approval as the candidate's supervisor.

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## **DEDICATION**

This work is dedicated to my late mother Winnie Achieng Fwaya who has been a true source of inspiration even in death. Thanks for always believing in me Mum and shaping me for who I'm today.

To Almasi my awesome friend and critic without whom I'll not be where I'm today thanks very much.

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## **ABBREVIATIONS AND ACRONYMS**

<b>APO</b>	Advanced Planning Optimisers
<b>BAT</b>	British American Tobacco
<b>ERP</b>	Enterprise Resource Planning
<b>ICT's</b>	Information and Communication Technologies
<b>IT</b>	Information Technology
<b>RBV</b>	Resource Based View
<b>SC</b>	Supply Chain
<b>SCM</b>	Supply Chain Management

## ABSTRACT

To stay competitive, companies have strived to achieve greater coordination and collaboration among supply chain partners in an approach called supply chain integration. B.A.T (Kenya) has undergone tremendous changes in the past in an effort to leverage its presence globally and also benefit from synergies within its factories. Some of the changes included initiating and implementing Above Market Business Model in Africa in this Model SCM is a critical performance indicator. Therefore the overall objective of this study was to examine information technology and supply chain integration strategy at British American Tobacco Kenya Limited. This study will be important to the manufacturing industry players in Kenya as it will enable them to assess their supply chain management strategies and realign them with the emerging IT trends to be able to benefit and identify areas of opportunities especially those relating to, cost reduction and efficiencies within SC. Chapter two looked at theories around SCM, detailing past studies on supply chain management strategy, IT and integration in the manufacturing sector.

The research design adopted the case study approach as its research design, in this case British American Tobacco Ltd. Primary data was collected by conducting focused interviews with middle level management from Supply Chain, Finance, IT and Manufacturing who are currently directly involved in Supply Chain process. While the primary data was analysed qualitatively, secondary data provided additional information that was not practically to obtain from the primary sources due to the time frame within which this research has to be carried out. Content analysis was used to analyse the data since the study seeks to solicit for data that is qualitative in nature. The findings support the RBV theory which attributes improvement in firm performance to valuable resources or resource bundles. From the RBV, one lens through which to look at IT value creation is “an indirect role for IT in firm performance.

The basic logic is that IT affects other resources or processes which, in turn, lead to competitive advantage this is why British American Tobacco Kenya Ltd investment in ICT is 56% and above. From the responses the study was able to document at least 13 technologies used by British American Tobacco Kenya Ltd under supply management information system. In conclusion the adoption of ICT at British American Tobacco Kenya Ltd has increased the information processing capabilities of suppliers, thereby enabling or supporting greater relationship in addition to reducing uncertainty. ICT has enabled British American Tobacco Kenya Ltd to more quickly institute EDI information programs with her customers. One of the recommendations is that BAT ltd should employ industry standards – this will be towards common methods of communicating business transactions and data sharing reduces cost for the entire supply chain. Just as we have standardized logistics such as pallet size, truck dimensions from a supply chain perspective, automating business transactions will also drive down costs of the manufacturer/supplier relationship.



# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

Over the past decade a combination of economic, technology and market forces has forced companies to examine, review and reinvent their supply chain strategies. Some of these forces include the globalization of businesses, the proliferation of product variety, increasing complexity of supply networks and the shortening of the product life cycles. To stay competitive, companies have strived to achieve greater coordination and collaboration among supply chain partners in an approach called *supply chain integration*.

Since the inception of supply chain management, the primary objective has been the integration of the varied internal and external components (Lambert & Cooper 2000; Min & Zhou, 2002). Due to the global span and impact of the supply chain, firms instinctively understood that the synchronized flow of materials and services, information, knowledge, and finance had the potential to produce desirable outcomes. Unfortunately, obtaining supply chain integration has been an elusive quest unlike other endeavours that a firm undertakes there is no blueprint for integration.

### **1.1.1 Supply Chain Management Strategy**

This is the management of a network of interconnected businesses involved in the ultimate provision of product and service packages required by end customers (Harland, 1996). Supply chain management spans all movement and storage of raw materials, work-in-process inventory, and finished goods from point of origin to point of consumption.

Supply chain management (SCM) is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer. Supply chain management involves coordinating and integrating these flows both within and among companies. It is said that the ultimate goal of any effective supply chain management system is to reduce inventory with the assumption that products are available when needed.

According to the Global Supply Chain Forum, SCM is ‘the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for customer and other stakeholder’ (Chan & Qi, 2003). We can only talk about SCM if there is a proactive relationship between a buyer and supplier and the integration is across the whole Supply Chain (SC), not just first-tier suppliers (Cox, 2004). Most SCM related-problems stem either from uncertainties or an inability to co-ordinate several activities and partners (Turban, McLean, & Wetherbe, 2004).

One of the most common problems in SC is the so-called bullwhip effect. Even small fluctuations in demand or inventory levels of the final company in the chain are propagated and enlarged throughout the chain. Because each company in the chain has incomplete information about the needs of others, it has to respond with a disproportional increase in inventory levels and consequently an even larger fluctuation in its demand relative to others down the chain (Forrester, 1958, 1961).

Several authors (Forrester, 1961; Holweg & Bicheno, 2002) have shown that the production peak can be significantly reduced by transmitting the information directly from the customer to the manufacturer. Another problem is that the companies often tend to optimise their own performance, in so doing disregarding the benefits of the SC as a whole (local instead of global optimisation).

The maximum efficiency of each chain however does not, necessarily lead to global optimisation (Gunasekaran, Patel, & McGaughey, 2004). In addition, human factors should also be taken into consideration: decision-makers at various points along the SC do not usually make perfect decisions (due to the lack of information or their personal hindrances); their decisions are also influenced by employee reward systems. (McGuffog & Wadsley, 1999). Regardless of the number of difficulties and problems in SC, the core concept of successful SCM is efficient information.

### **1.1.2 Supply Chain Integration Strategy**

There are various existing definitions for supply chain integration (Narasimhan & Das, 2001; Pagell, 2004). Most commonly, this term is used to describe the degree to which organizations have eliminated boundaries from internal processes, and the extent to which information is shared between supply chain members. This definition, however, lacks a strategic focus.

From a strategic perspective, supply chain integration is defined as the dynamic assimilation of enterprises and their customers and suppliers to determine, create, fulfil, and communicate customer value in the global environment. Firms that responded to this call learned that this strategic direction also provided them with sustainable competitive advantage (Li et al., 2006). Thus began the cycle of offering higher and higher levels of service, as customers became more sophisticated and demanding (Rich and Hines, 1997).

In addition to being less willing to condone service, customers have also grown accustomed to customized products and services (Treacy & Wiersema, 1995). The ensuing proliferation of product and service offerings for a global market has created a tremendous amount of complexity for key supply chain activities, such as demand management, production planning, inventory management and order fulfilment (Lee, 2000; Wu et al., 2006). The effective and efficient management of customer requirements in an environment of product and service explosion and shortening product life cycles necessitates that firms and their respective supply chains be capable of operating as a virtual, single entity (Wisner et al., 2005).

Furthermore, this “integrated” supply chain must have the ability to seamlessly respond to changing demand and customer requirements with minimal disruptions and costs (Lambert & Cooper, 2000; Lee, 2000; Simatupang et al., 2002). Both theory and practice suggest that a truly integrated supply chain has the potential to assist a firm in achieving significant cost savings, while at the same time creating value for supply chain members and their respective stakeholders. Reaching the goal of an integrated supply chain is difficult, due to the fact that there are multiple definitions for this concept. Much of the previous research has primarily addressed either the upstream (supplier domain) or the downstream (customer domain) portion of the supply chain.

### **1.1.3 Information Technology**

Information technology is the acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by a microelectronics-based combination of computing and telecommunications. Information Technology (IT) is the study, design, creation, utilization, support, and management of computer-based information systems, especially software applications and computer hardware. IT is not limited solely to computers though.

With technologies quickly developing in the fields of cell phones, PDAs and other handheld devices, the field of IT is quickly moving from compartmentalized computer-focused areas to other forms of mobile technology. According to Anyakoha (1991), information technology is “the use of man-made tools for the collection, generation, communication, recording, re-management and exploitation of information.

It includes those applications and commodities, by which information is transferred, recorded, edited, stored, manipulated or disseminated". Hawk ridge (1983) describes information technology as a revolution which has penetrated almost all fields of human activity, thus transforming economic and social life.

There is widespread research interest in information and communication technologies (ICTs). According to Crede & Mansell (1998), ICTs are crucially important for sustainable development in developing countries. Thioune (2003) notes that for the past two decades most developed countries have witnessed significant changes that can be traced to ICTs. These multi-dimensional changes have been observed in almost all aspects of life: economics, education, communication, and travel.

In a technology- driven society, getting information quickly is important for both sender and receiver. ICTs have made it possible to quickly find and distribute information. Helmut (1998), cited by Akpore (1999), states that of the technological changes that have influenced our lives in recent years, information technology (IT) has had the greatest impact. This will continue at least until the end of the first half of the century, when other major technological breakthroughs in the area of new materials, biotechnology, or energy, may provide entirely new ways of living.

### **1.1.4 Manufacturing Sector in Kenya**

Kenya has a large manufacturing sector serving both the local market and exports to the East African region. The sector, which is dominated by subsidiaries of multinational corporations, contributed approximately 13% of the Gross Domestic Product (GDP) in 2004. Improved power supply, increased supply of agricultural products for agro processing, favourable tax reforms and tax incentives, more vigorous export promotion and liberal trade incentives to take advantage of the expanded market outlets through AGOA, COMESA and East African Community (EAC) arrangements, have all resulted in a modest expansion in the sector. In 2004 the growth was 1.4% as compared to 1.2% in 2003 (www. PricewaterhouseCoopers).

The rising levels of poverty coupled with the general slowdown of the economy has continued to inhibit growth in the demand of locally manufactured goods, as effective demand continues to shift more in favour of relatively cheaper imported manufactured items. In addition, the high cost of inputs as a result of poor infrastructure has led to high prices of locally manufactured products thereby limiting their competitiveness in the regional markets and hampering the sector's capacity utilisation. However, the recent introduction of the EAC Customs Union provides Kenya's manufacturing sector, the most developed within the region, and a greater opportunity for growth by taking advantage of the enlarged market size, economies of scale, and increased intraregional trade.

### **1.1.5 British American Tobacco Kenya LTD**

British American Tobacco was formed in 1902, as a joint venture between the UK's Imperial Tobacco Company and the American Tobacco Company founded by James 'Buck' Duke. Despite its name, derived from the home bases of its two founding companies, British American Tobacco was established to trade outside both the UK and the USA, and grew from its roots in dozens of countries across Africa, Asia, Latin America and continental Europe. It is the world's second largest quoted tobacco group by global market share, with brands sold in more than 180 markets.

With more than 200 brands in its portfolio, B.A.T makes the cigarette chosen by one in eight of the world's one billion adult smokers. It holds robust market positions in each of its regions and has leadership in more than 50 markets. In 2010, its subsidiary companies sold 708 billion cigarettes. In the same year, the subsidiaries enabled governments worldwide to gather more than £30 billion in taxes; including excise duty on their products, almost ten times the Group's profit after tax. B.A.T has sustained a significant global presence for over 100 years. The business was founded in 1902 and by 1912 it had become one of the world's top dozen companies by market capitalisation.

British American Tobacco has been in business for more than 100 years, trading through the turbulence of wars, revolutions and ever changing regulation Tobacco Control legislation. BAT has 45 cigarette factories in 39 countries. Seven of this plus one separate plant also make either cigarillo, roll your own or pipe tobacco. B.A.T also has a factory making smokeless snus. It employs more than 60,000 people worldwide.



The workforce is strongly multi-cultural and it has a devolved structure, with each local company having wide freedom of action and responsibility for its operations ([www.britishamerican.com](http://www.britishamerican.com)). Decisions are made as close as possible to the local stakeholders of each business, within a framework of principles, standards, policies, and strategies.

British American Tobacco Kenya, Ltd. engages in the manufacture and sale of cigarettes both locally in Kenya and also Exports. It primarily offers its products under various brands, such as Dunhill, Benson & Hedges, Pall Mall, Royals and Rothmans, Embassy, Sportsman, Sweet Menthol, Safari & Rooster. The company also offers contract manufacturing services for tobacco related products like cut rag which is used for cigarette making. It was formerly known as BAT Kenya Limited and changed its name to British American Tobacco Kenya, Ltd. in 1998. The company has its headquarters in Nairobi, Kenya. British American Tobacco Kenya, Ltd. is a part of the British American Tobacco Group ([www.bateac.com](http://www.bateac.com)).

## **1.2 Research Problem**

Supply chain management approach involves integration, coordination and collaboration across organisations and throughout the supply chain (Towill, 1997; Handfield and Nichols, 1999). Supply chain management requires internal (intra organisational) and external (inter organisational) integration (Stevens, 1989). The empirical context of this study is supply chain integration strategy. Specifically, it is focused on the technology selection and technology integration issues in supply chains within manufacturing firms. Investments in IT in the manufacturing industry in Kenya have grown by more than three times ([www.pricewaterhouseCoopers](http://www.pricewaterhouseCoopers)).

Given the growing significance of technologies in manufacturing industry supply chains and the potential of technologies in improving manufacturing product delivery, it is crucial for researchers to focus attention on the adoption, integration, and implementation issues in this context. This research serves to address this need by examining information technology and supply chain integration strategy at British American Tobacco Kenya Limited.

B.A.T (Kenya) has undergone tremendous changes in the past in an effort to leverage its presence globally and also benefit from synergies within its factories. Some of the changes included initiating and implementing Above Market Business Model in Africa .Above –Market Business Model incorporates diverse reporting structures where Areas (Several operating companies) and regions (several Areas) report to the Global headquarters in the United Kingdom. This resulted in specialization and greater division of activity within multiple locations which is contrary to the norm where operating companies could concentrate on vast activities as stand-alone.

The new operating model resulted in end markets i.e. customers relying on supply hubs for product delivery. Locally, various studies have been conducted on strategies adopted by various companies. Emmanuel (2011) studied supply chain relationships in Kenyan banks, Oyugi (2010), studied effects of outsourcing on corporate performance at British American Tobacco Kenya LTD; Mukasa (2010) Studied Impact of Supply Chain Management practices on Performance-The case of Safaricom.

Munuve (2010), studied response strategies of British American Tobacco Kenya LTD to Macro environmental changes. Wambua (2009) looked at Strategic responses of British American Tobacco Kenya LTD to the challenges of illegal cigarettes in Kenya. Wasike (2008) studied application of Just-In Time Technique in supply chain Management-Case of Newspaper industry in Kenya.

All this studies focussed on SC management practises and response strategies employed by organisations. This indicates a knowledge gap on the application of information technology in supply chain management. The study will seek to answer is there a relationship between Information technology and supply chain integration strategy?

### **1.3 Research Objective**

The objective of this study was to examine information technology and supply chain integration strategy at British American Tobacco Kenya Limited.

### **1.4 Value of the Study**

This study will be important to the manufacturing industry players in Kenya as it will enable them to assess their supply chain management strategies and realign them with the emerging IT trends to be able to benefit and identify areas of opportunities especially those relating to, cost reduction and efficiencies within SC.

The study will highlight the inter-dependence between integration technologies, logistics, and partnerships, a strategic view of supply chain systems, and implementation approach. All three need to inform and underpin each other in order for management of supply chains to be able to deliver on the promise of benefits for all trading partners.

The study will act as information pot for other industries that are adopting information technology in supply chain management on its practicality, success and challenges which arise with its use. Scholars/researchers will find it important as the study will increase to the body of knowledge in this area as the findings will act as basis for further research.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter looks at theories around SCM, details past studies on supply chain management strategy, IT and integration in the manufacturing sector.

#### **2.2 Theoretical Framework**

This section employs two theories to inform the study on information technology and supply chain integration strategy as commented by different authors worldwide. The study looks at The RBV on Supply Chain Integration and Transaction Cost Economics.

##### **2.2.1 The Resource Based View on Supply Chain Integration**

The study seeks to assess information technology and supply chain integration strategy at British American Tobacco Kenya Ltd, the study is informed by the RBV theory on how technology creates value (Zhu and Kraemer 2002, 2005). The RBV theory attributes improvement in firm performance to valuable resources or resource bundles (Barney 1991, Peteraf 1993). From the RBV, one lens through which to look at IT value creation is “an indirect role for IT in firm performance.

The basic logic is that IT affects other resources or processes which, in turn, lead to competitive advantage. Therefore, researchers may find it particularly beneficial to use intermediate-level dependent variables at the business process, department, or project level” (Wade and Hulland 2004, pp. 129–130). In light of this logic, the study pays particular attention to the relationship of IT enabled supply chain integration to a firm’s process performance. Revenue generation and cost reduction are the two major dimensions of process performance improvements through supply chain integration (Mukhopadhyay and Kekre 2002).

Such improvements, seen from the RBV, stem from resource synergy along the supply chain. Effective SCM aims to synchronize supply, production, and delivery (Lee et al. 2000). For this to happen, firms need to leverage the connectivity of the Internet to create an inter-firm digital platform, enabling real-time information sharing, and improving coordination of allocated resources across the supply chain (Lee, 2004). The digital platform helps establish connections among separate resources owned by supply chain partners, thus translating them into bundles of coexisting resources responsive to each other (Zhu and Kraemer 2002). This is consistent with the notion of creating resource synergy as advocated by the RBV (Conner, 1991).

The value, in our supply chain contexts, may be manifested in revenue generation and cost reduction. A case in point is the practice by Cisco. Although the contract manufacturers and partners are not owned by Cisco, the digitally enabled integration enables Cisco to take advantage of their manufacturing equipment’s, distribution channels, and service networks.

This allows it to concentrate on developing new products to cope with changing market demand, while outsourcing physical production. The outcome is an advantage of agile supply chain, leading to revenue growth and market expansion (Kraemer et al. 2006). More broadly, integration across separate stages of a supply chain allows each supply chain partner to focus on the operation at its own stage. This may eliminate the burden of acquiring duplicate resources (which are required by operations at other stages), thus increasing resource utilization and decreasing operational costs.

Cost reduction can be further achieved through resource synergy among horizontal partners (Lee 2002). For instance, because of the risks of supply disruption, firms often keep safety stocks for key components. Holding excess inventory, however, reduces asset productivity. Alternatively and more effectively, firms can share safety stocks with other firms that also need the component (Lee 2002). As illustrated by Cisco's e-hub through which Cisco's suppliers share safety inventories, not only are the risks of supply disruption shared through inventory pooling, but also the costs of maintaining the safety stocks are spread over partners. In order for this to happen, the supply chain must be digitally integrated.

### **2.2.2 Transaction Cost Economics in Supply Chain Context**

While the RBV suggests value creation through resource synergy, performance improvement in a supply chain can also be achieved by efficient coordination. This can be understood through the lens of transaction cost economics (TCE). Explicitly recognizing the costs of coordination among economic entities in markets, TCE stresses that a firm's central task is to coordinate transactions efficiently (Williamson 1985). IT can lower coordination costs, and in supply chain contexts, digitally enabled integration capability can substantially improve transactional efficiencies through increased information sharing and communications capabilities, resulting in improved supply chain performance (Zhu and Kraemer 2005). Furthermore, TCE sheds light on the role of the digitally enabled SCM in competitive environments.

An important feature of a competitive environment is the extensive competitive actions in the markets, such as competitive entry, price change, supplier alliances, and new product introduction (Ferrier 2001). To improve performance or even survive in competitive environments, a firm needs to adapt its businesses to respond to competitive actions (Sambamurthy et al. 2003). If a manufacturer's operation is frequently affected by competitors' actions, it may face greater needs to coordinate with supply chain partners. For example, a manufacturer that needs to modify the design of its product, because of market entry or new products launched by competitors, also needs to modify the design of upstream components that constitute the product; it may also need to rearrange downstream channels for new product distribution. These may induce considerable coordination tasks (Bensaou 1997). Accordingly, technologies that help reduce coordination costs are more valuable in intensely competitive markets.



## **2.3 Information Technology**

In recent years numerous studies have emphasised the importance of information sharing within the SC Barrat (2004) derives a mathematical model that shows how different changes in ordering costs as a result of using e-business can affect the optimal ordering intervals and quantity, average stock level and consequently total inventory-related costs. While there is no doubt about the fact that IT can greatly reduce the costs, business model formation and utilization of information is crucial. Information should be readily available to all companies in the SC and the business processes should be structured in a way to allow full use of this information. Additionally ICT has an important influence on coordination structure between companies. The use of ICT may have a positive effect on coordination, can lower coordination costs and enables more effective and more efficient coordination processes, more coordination processes, and new coordination structures (Hengst & Sol, 2001).

It should be noted that the mere use of IT applications is insufficient to realise the benefits. It has been found that adoption of the Internet by itself demonstrates no benefits in terms of reduced transaction costs or improved SC efficiency in Scottish small- and medium-sized enterprises (Wagner, Fillis, & Johnasson, 2003), and has not led to a decrease in the inventory level in Slovenian enterprises (Trkman, 2000). Further, the co-ordination of activities is also crucial (Disney, Naim & Potter, 2004).

The Internet reduces much of the costs of information sharing, but it does not solve information receivers' reading and interpretation limitations. Strategic utilization of the information is of the utmost importance and business process modelling and renovation can be of great help in achieving this desired coordination. However, other studies have showed that information transfer brings little benefits and that most of the benefits from IT are due to shorter lead times and smaller batches (Cachon, & Fisher, 2000). Cottrill (1997) states that the evolution of the concept of integration has moved over time to one in which the supply chain operates as a corporate entity, spans a virtual enterprise without reference to traditional company boundaries, and can be driven directly by customer demand via access to electronic storefronts.

He states that this trend will create major changes in many companies, eventually leading to greater use of outsourced services. He also believes that the key to implementation lies in focusing initially on introducing changes within the company, and then extending the process to include suppliers and customers. The primary benefits resulting could include cost and cycle time reductions.

Wood (1997) focuses on the importance of aligning goals across functions through cooperation and collaboration, and cites the traditionally poor alignment of goals between manufacturing and sales/distribution functions as an example of opportunities for better alignment as a pre-condition for improvement in supply chain management practices. Parnell (1998) stated that supply chain integration really occurs when customers and suppliers establish tight partnerships with the objectives and probable outcomes of reduced inventory, shorter lead times and better service to the customer.

### **2.3.1 Innovation and Information Communication Technologies**

Innovations enabled by information technology (IT) are creating new ways for firm's to manage supply chain relationships (Sambamurthy et al. 2003). Firms such as Cisco, General Electric, Wal-Mart, and Dell are using IT to coordinate processes along their supply chains, including upstream procurement, internal production, and downstream sales and customer services, as well as overall information sharing along the supply chain (Lee 2002).

The use of IT has received significant attention in the supply chain context, which “involves the flows of material, information, and finance in a network consisting of customers, suppliers, manufacturers, and distributors” (Lee 2000, p. 31). Accordingly, recent research has viewed supply chain management (SCM) as “a digitally enabled interfirm process capability” (Rai et al. 2006, p. 226). Internet platform, with the integration spanning the entire scope of the supply chain that extends both upstream and downstream operations (Lee 2000). The digitally enabled SCM differs significantly from vertical integration in traditional organizations in that supply chain partners are integrated via information flows rather than ownership.

It also differs from the traditional approach to supply chain coordination that directly relied on the linkage of physical processes such as shipment, inventory, and warehousing (Barua et al. 2004). Thus, a key feature of digitized SCM is the shift from connection of physical processes to information-based integration across upstream and downstream operations (Zhu 2004). How does such a shift to digitally enabled integration affect the efficiency of a supply chain? This is a critical question for firms investing in IT to improve supply chains (Rai et al. 2006, Zhu et al. 2006).

Organizations are not in a vacuum. In recent years, the issue of competitive advantage in companies has been considered specially (Gilaninia & et al, 2011). Any organization, including corporations, public companies or small businesses will have to make various demands of customers and shareholders. Thus, they need materials, equipment, facilities and supplies Participants from other organizations and a performance is affected by the activities of other organizations that make up the supply chain.

Organizational efficiency and effectiveness of each organization is obtained of performance of management and its supply chain structure (Rahman Seresht and Afsar, 87). Supply chain management means to integrate these activities through improving chain relationship in order to access stable competitive advantage (Gilaninia & et al, 2011). Supply chain consists of a network of partners and various channels operating throughout the organization with effect on the utility of supply chain headquarters.

The main purpose of supply chain management activities related to satisfy customers demand. (Amid et al, 2007). Nowadays a potential way to maintain competitive advantage and improving organizational performance; is labor supply chain (Amid et al, 2007). As an application of the Internet, e-commerce depends on information infrastructures and telecommunications for its development (Gilaninia& et al, 2011) one capability that is essential for achieving competitiveness and supply, is sharing of information. The information sharing is referred to ability of company in order to knowledge systems of supply chain partners in effective and efficient way (Rajab Zadeh et al, 2010).

On the other hand, the role of information systems in organizational performance is changed effectively, and nowadays information systems for organizations are creator of value (Choo & Oh, 2001). Information systems play the role of integration coordination between different parts of the supply chain and the performance of this system has a direct impact on the efficiency of supply chain performance. (Amid et al, 86). Jiang and his colleagues believed that the creation and deployment of information systems requires a variety of information technologies. Information technology can also support cooperation between companies and their internal operations in supply chain and effective use of technology is a key factor in the success of the company.

Major cause of uncertainty is, poor information flow, which can include inaccurate, being premature or incorrect information management. Information technology with ability of managing information flow effect on dimensions of supply chain, Such as cost, quality, flexibility and timely delivery of goods and services and ultimately profit of organization (Droodchi & Nikmehr, 2007) Systems supported by Information technology are applicable in major field of supply chain management. Major Fields in supply chain management products and services are including design, production, marketing and sales, customer service and logistics (Droodchi & Nikmehr, 2007).

On the other hand Chan & Ouchi in 2001, stressed that the role of information systems to organizational performance is changed effectively and nowadays information systems for organizations, are the creator of value information systems play the role of integration and coordination between different parts of the supply chain and the performance of this system has a direct impact on the efficiency of supply chain performance (Amid et al, 2007).

Applicable and efficient supply chain management is formed according to accurate information and transfers it into the correct distribution of high quality. Supply chain management is stressed on long-term and overall profitability for all supply chain partners by the transmission and distribution of accurate and strong information. In our era, information is a key factor in deciding making for the firm to survive and develop. The other two pillars of supply chain management, integration of firms network and synchronization of material flow, information and financial. (Droodchi & Nikmehr, 86). Robinson and Mlohra affirmed in 2005.

Supply chain management is faced with challenges such as building trust and collaboration among supply chain partners (sc), determine the best actions that can facilitate theoretical convergence and the integration of supply chain process.(Manian et al,89). In 2005 Newkirk & Lederer concluded that in the competitive market and today's complex economy, strategic planning of information systems is a critical factor for many organizations and no wonder if IT managers and information systems have ranking that as highest management options. (Amid et al, 2007).

### **2.3.2 Technology Integration and Performance**

Studies that have investigated impact of technology on performance focused mostly on a specific technology (Hill & Scudder 2002, Mukhopadhyay et al. 1995). While this approach may be necessary, it is not sufficient because it misses the opportunity of understanding the relationship between multiple technologies.

Researchers studying relationship between multiple technologies and performance in manufacturing supply chains have often considered the number of technologies as the measure of technological capability (Dunne & Schultz 1995, Doms et al. 1994), ignoring the performance impacts of specific technology combinations. One exception is the Beede & Young (1998) paper that studied the relationships between specific technologies and technological combinations and the various measures of operational performance in an effort to investigate the impact of advanced manufacturing technologies on operational performance.

Based on a study of 7000 US manufacturing plants, they found that plants with integrated operations that adopted a complex technology combination (involving seven or more technologies) generally had higher labor productivity and production worker earning levels as compared to plants that failed to do so. Ward & Zhou (2006) found internal IT integration aimed at generating information and facilitating information sharing, has a positive influence on customer lead time when mediated with lean and JIT practices. Review of the extant literature shows that the impact of information systems on performance has been investigated from different theoretical perspectives such as transaction cost economics theory (Subramani 2004, Amit & Zott 2001), information processing model (Cooper & Wolfe 2005), and the resource-based view (Bharadwaj 2000, Mata et al. 1995).

Huber (1990) while studying the effects of advanced information technologies posited that use of computer assisted decision support and communication technologies enables increased information accessibility leading to higher quality decisions and reduction in time required to make such decisions.

These improvements in quality and timeliness of “organizational intelligence and decision making” directly increase the efficiency with which goods and services are produced. Melville et al. (2004) suggested that any one of the technology applications can be sourced as a package or service but when all of these heterogeneous applications are selected and adapted to business processes of the focal organization in a supply chain, then the ultimate result is often valuable.

Technology integration, which refers to integration of multiple technology applications each with unique functionalities, thus provides economic value. For this research, with specifics to British American Tobacco Ltd we extend Huber’s (1990) proposed theory by introducing technology integration and argue that integration of multiple advanced information technologies in SCM will significantly reduce the time necessary to make decisions and also guide managers and technology users to take higher quality decisions. And improvements in decision making will translate in superior operational performance.

Manufacturer supply chains are particularly information intensive supply chains where the need for information sharing and coordination is very high. Hence, manufacturer supply chains are likely to benefit from improved information processing and sharing capabilities enabled by the availability and integration of the different SCM information technologies. When SCM information technologies (like decision support systems) enable sharing of information with storage technologies (like warehouse imaging) and logistic technologies not only repetitive and routine processes in a factory supply chain are automated but also line manager’s judgment and decision-making are enhanced.



## **2.4 Supply Chain Integration**

Supply chain management (SCM) executives face unique challenges, with respect to integrating supply chain-specific strategies with the overall corporate business strategy. In recent years, given changing business realities related to globalization, the supply chain has moved up on the chief executive officer's (CEO's) list of priorities. But it's not always for the right reasons. In many cases, CEOs only pay attention to the supply chain when they want to cut costs or when something is wrong. Since the supply chain essentially moves the lifeblood of the organization, process efficiency on a global scale is essential to optimized business operations.

The importance of global integration lies in the differential advantage to be gained from the ability to exploit differences in capital and product markets, to transfer learning and innovation throughout the firm, and manage uncertainty in the economic or political environment in different countries or regions Morten (2003). However, the general understanding of the business environment in most industries is that competition has increased and the conditions under which business is made are more turbulent.

The supply chain logistics problems facing multi-site companies can be complex, involving multiple stakeholders and constraints across the entire enterprise. The complex the supply chain, the more difficult it becomes for companies to answer basic questions, such as which crude should they purchase and how should they transport it? Which facilities should process it? What will the best product slate be?

Which components should they buy and which should they make? In many cases, different departments or divisions within a company trade, supply chain planning, operations and blending to name a few have a hand in these decisions, but communication among these entities is not always clear or consistent, and each may optimize to their own objectives without regard for others. The results can drastically affect profitability Craft (2006). A firm gains flexibility to quickly realign the supply/demand mix to satisfy changing global demand.

Switching costs and coordination costs are a barrier to operating flexibility. Switching costs can be reduced if all SC partners standardizing their products and processes globally which is seems to be challenge. Coordination costs can be significant for global integration of cross-functional supply processes. A well-structured global demand forecasting and planning process is an important mechanism for global coordination across functions Lesley (2007). Regional representation to ensure all relevant input is considered is also important. A globally integrated process with regional representation requires costly resources, information infrastructure, and travel.

Globally integrated information systems are critical to reduce the cost of communications and to make relevant information readily accessible or to reduce coordination costs. The forces of globalization and commoditization in today's business world are unstoppable. Globalization and commoditization have created a challenge for companies that are as tough as it is clear how to cut costs and grow simultaneously. During the industrial revolution, companies looked for new markets, new sources of raw material and new sources of labour.

The revolution was fuelled by globalization and companies thrived by taking advantage of economies of scale. Senior executives now understand that they can't just focus on supply chain operations to create efficiencies Hewlett-Packard (2004). The challenge is to integrate supply chain execution with the overall corporate business strategy, and to use the supply chain as a catalyst for business transformation or business reinvention.

Information integration refers to the sharing of information among members of the supply chain. The ability to seamlessly connect with customers, partners, and co-workers is vital for success; yet most enterprises store and exchange data in dissimilar formats, such as databases, EDI systems, text files, and increasingly XML-based applications. The ability to map between these different formats is mission-critical. This includes any type of data that could influence the actions and performance of other members of the supply chain (Lee, and Wang 2001). The meaning of all data items must be understood and the same data item must have the same definition across multiple applications both within outside the firm.

To make the integration process worth the effort, the data must be of high quality - timely, accurate and relevant (Jaffer, and Khatib 2004). From inside the organization the decision to outsource business processes and create a supply chain outside of the organization is clearly one that requires an assessment of where the boundary of the organization should reside. As such, an economic assessment is required of the various supply/demand mix to satisfy changing global demand.

Thus, decision is based on a transaction costs approach where there is an “examination of the comparative costs of planning, adapting and monitoring task completion under alternative governance structures” Williamson(1981).The outsourcing decision focused primarily on the management of recurrent transactions; the key dimensions of this context are the uncertainty and asset specificity germane to the transaction. Since these dimensions will vary, this creates a variety contexts and the result will be diversity within governance structures.

If supply chain management is to be considered an essential component of long-term business competitiveness, it is sensible to consider how it relates to strategy concepts. An effective supply chain must be able to cope with uncertainty; it follows that it must also be flexible (McDermott and Chan1996).Therefore supply chain management will be one of the organizational processes, or functions, that are a key to strategic success if an organization is to achieve its mission in an adaptive and changing environment. Customers are becoming more demanding. Their expectations are evolving toward greater levels of service and response with higher degrees of product and service customization.

Value chain partner’s suppliers, service providers integrated to provide differentiated segment product/service bundling and superior customer service levels. Increased profitability revenue and reduced cost is the top driver of customer order management performance. This centered attention on profitability is probably resulting from the economic market conditions of the past few years, but may be a short-term view. Customer responsiveness leads to customer retention and revenue growth. In the longer term view, concentration customer-facing initiatives and improvement will be significant to profitability achievement Boxall (1991).

## **2.5 Supply Chain Management Strategy**

A supply chain management approach involves integration, coordination and collaboration across organisations and throughout the supply chain. Supply chain management requires internal and external (inter - organisational) integration (Stevens, 1989). The role of supplier and supply management practices is relevant in this context.

However, the integration of supplier in supply chain has not run the same course in all industries, and notable differences are observed among automotive or aerospace industries and other industries like fashion, consumer electronics, personal computer, manufacturing etc. (Ponce and Prida 2006). According to Christopher (2000), the type of supply chain that companies should choose depends on three factors i.e. product variety, product variability and demanded volume. This author sustains that supply chains are to be agile in unpredictable environments, characterised by a volatile demand and high variability of product demand (as is the case of Personal computers). Van Hoek et al. (2001) measures agile capabilities in the supply chain, and more recently, Pujawan (2004) presented a model for assessing supply chain flexibility.

There are certain conditions where a lean approach makes sense, in particular where demand is predictable and the requirement for variety is low and volume is high conditions in which Toyota developed the lean philosophy. The problems arise when attempting to implement that philosophy into situations where demand is not that predictable the requirement for variety is high and, consequently, volume at the individual Stock Keeping Unit (SKU) level is low.

One of the most common problems in SC is the so-called bullwhip effect. Even small fluctuations in demand or inventory levels of the final company in the chain are propagated and enlarged throughout the chain. Because each company in the chain has incomplete information about the needs of others, it has to respond with a disproportional increase in inventory levels and consequently an even larger fluctuation in its demand relative to others down the chain (Forrester, 1958).

Several authors (Forrester, 1961; Holweg & Bicheno, 2002) have shown that the production peak can be significantly reduced by transmitting the information directly from the customer to the manufacturer. Another problem is that the companies often tend to optimise their own performance, in so doing disregarding the benefits of the SC as a whole (local instead of global optimisation). The maximum efficiency of each chain however does not, however, necessarily lead to global optimisation (Gunasekaran, Patel, & McGaughey, 2004). In addition, human factors should also be taken into consideration, decision-makers at various points along the SC do not usually make perfect decisions due to the lack of information or their personal hindrances, their decisions are also influenced by employee reward systems. (McGuffog & Wadsley, 1999). Regardless of the number of difficulties and problems in SCM, the core concept of successful SCM is efficient information transfer/information sharing.

## **2.6 Chapter Summary**

This chapter has reviewed literature pertaining to supply chain management and the role of IT in enabling the integrated supply chain. The literature has demonstrated how the configuration and operation of supply chain activities and resources can be a source of sustainable competitive advantage. The integration of supply chain processes can provide an effective means by which costs can be reduced and customer service levels improved (Damien, 2005). In the context of a highly volatile global business environment, dynamic supply chain planning is essential in building agility into supply chain operations and ensuring visibility across the entire supply chain. This can be achieved using standardised technology platforms and integration of systems and data.

It has also been demonstrated that the implementation of Enterprise Resource Planning systems and the resultant standardisation of business processes and information across the organisation enables supply chain integration through automation and streamlining of planning, scheduling and execution at every link in the supply chain. Electronic commerce has not only created new distribution channels for consumers but also revolutionized the industrial marketplace by facilitating inter-firm communication and by creating efficient markets through trading communities. Moreover, combination of enterprise information infrastructure and the internet has paved the way for a variety of supply chain optimization technologies.

There are a number of possible frameworks which can be used in evaluating the effectiveness of enterprise systems. The literature review has demonstrated that organisations implement enterprise systems for different reasons and consequently this research explores the link between the information technology and supply chain management. Chapter three will discuss how this research was undertaken and, following the outcomes of the literature review, the objectives and purpose of the investigation.



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

The research methodology describes the procedure that will be used during the research. It will explain the research design, data collection and analysis method to be implored during the research.

#### **3.2 Research Design**

Kothari (2004) defines research design as an arrangement of conditions for collection and analysis of data, with an aim of combining the relevance to the research purpose with economy procedure. It provides structure in which research is carried out and entails a process in which data collection, measurement and analysis will be carried out. The research adopted the case study approach as its research design, in this case British American Tobacco Ltd.

The case study approach is particularly appropriate for individual researchers because it gives an opportunity for one aspect of a problem to be studied in some depth within a limited time scale. A case study design provides focussed and valuable to phenomena that may be vaguely known or understood.

Robson (2002) defined case study as a strategy for doing research that involves an empirical investigation of a particular phenomenon within its real life context using multiple source of evidence. It's a method of study that focuses on depth rather than breadth and is used to determine the relationship amongst the variables influencing current behaviours or status/unit of study. Kiboi (2006), Koigi (2006) and Situma (2006) have done case studies in their respective field successfully.

### **3.3 Data Collection**

Mugenda and Mugenda, (2003) discussed various methods of data assembly applied in research such as interview guide and observation schedule. Trochim (2001) was able to describe interviews instruments as useful if the respondents are actually involved in the area of study as they shade more light on other areas that could provide more insight.

The primary data was collected by conducting focused interviews with Heads of departments and middle level management from Supply Chain, Finance, IT and Manufacturing who are currently directly involved in Supply Chain process. Secondary data was collected through reviewing internal publications and reports on British American Tobacco that relates to Supply chain integration strategy.

### **3.4 Data Analysis**

While the primary data was analysed qualitatively, secondary data provided additional information that was not practically to obtain from the primary sources due to the time frame within which this research has to be carried out. Content analysis was used to analyse the data since the study seeks to solicit for data that is qualitative in nature. Being a case study this technique was ideal in getting areas of consensus and disagreements from various interviewees.

The analysis disseminated who says what, why, to what extent and with what effect to build up knowledge in the research. Key factors to be considered will be objectivity, reliability, validity, generalizability and reliability. Content analysis is described as ‘any technique for making inferences by systematically and objectively identifying specific characteristics of messages (Nachamias & Nachamias, 1996) According to Cooper & Schindler (2003), content analysis measures the semantic content or ‘what’ aspect of the message. Its breadth makes it a flexible and wide ranging tool that may be used as a methodology or problem specific technique. It guard against selective perception of the content, provides for rigorous application of reliability and validity criteria.

## **CHAPTER FOUR**

### **DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF RESULTS**

#### **4.1 Introduction**

The primary purpose of this paper was to assess the integration of supply chain and technology adoption at British American Tobacco Kenya Ltd. Accordingly, an interview guide instrument was developed, the guide consisted of open ended question with a series of percentage scaled questions typically anchored from “Below 25%” to “66% and Above” measuring various responses in line with study objectives. In this section focus is on the analysis and report of the results of the study. The main issues covered are response rate based on the study context via the interview guide.

#### **4.1 Information Technology & Supply Chain Management**

This section aims to establish the relationship between multiple technologies and performance in manufacturing supply by assessing respondent comments on the company’s percentage investment in ICT, comments on the percentages, supply chain management systems, innovation in ICT and impact on the company and staff training.

#### **4.1.1 Investment in ICT**

To assess the degree to which British American Tobacco Kenya Ltd has adopted towards supply chain technology, respondent were asked to what percentage has the company invested in management of supply chain information system. The outcomes indicated that majority of the respondent approximately at 69% agreed that the level of ICT investment was 56% & above at British American Tobacco Kenya Ltd and only 31% indicated it was between 46% - 55%. The findings support the RBV theory which attributes improvement in firm performance to valuable resources or resource bundles. From the RBV, one lens through which to look at IT value creation is “an indirect role for IT in firm performance. The basic logic is that IT affects other resources or processes which, in turn, lead to competitive advantage this is why British American Tobacco Kenya Ltd investment in ICT is 56% and above.

Revenue generation and cost reduction are the two major dimensions of process performance improvements through supply chain integration at British American Tobacco Kenya Ltd focuses. The greater investment in IT as observed has lower coordination costs, and in supply chain contexts of British American Tobacco Kenya Ltd, the findings support Ferrier (2001) who observed that an important feature of a competitive environment is the extensive competitive actions in the markets, such as competitive entry, price change, supplier alliances, and new product introduction To improve performance or even survive in competitive environments, a firm needs to adapt its businesses to respond to competitive actions. If a manufacturer’s operation is frequently affected by competitors’ actions, it may face greater needs to coordinate with supply chain partners.

#### **4.1.2 Comments on the ICT Investment levels**

The following comments were collected based on the interaction with respondents and cross references with the company ICT department documents: - With brands sold in 180 markets around the world, British American Tobacco, the world's most international tobacco company, was looking for a way to access and analyse data to improve supply-chain performance. The IT department was charged with finding a new approach that would provide significant improvements over the traditional approach of gathering and storing data, transforming it into information, and generating reports whilst at the same time reducing complexity. Critical supply-chain information at British American Tobacco was stored in applications from SAP and i2 Technologies.

The problem that the company faced was that the data and information contained in the enterprise was difficult to access. Conventional wisdom suggested traditional business intelligence tools on top of a standard data warehouse were the only option to effectively access the data and run complex, technically administered reports. However, building a data warehouse would take months, and British American Tobacco wanted to demonstrate business results in a much shorter timescale.

With the dawn of Web services, there had to be an innovative new technology concern that was applying the principles of "distribution" to that of intelligence or data for large global corporations. British American Tobacco identified CXO Systems, a two-year-old start up that had applied the same principles of distribution to business intelligence that leading technology companies such as Cisco and Sun had applied to the network and computing before them.

The technology standards movement brought on by Web services has enabled organizations to attain new levels of business visibility that allowed the company ability to react to market and business changes, and more profitably serve their employees, customers, and shareholders. Having recently embarked on a Web services initiative, which included Librados Enterprise Integration Component Server and Infravio's Web service management tool, IT managers at British American Tobacco were compelled by the idea of implementing a Web services-based dashboard that would extract and integrate information from operational and analytical systems, providing executives with direct access to the information they need to make important business decisions.

Working with executive dashboard specialists CXO Systems as its partner in executing the next step in the company's Web services strategy, the company created a pilot dashboard for a major part of British American Tobacco's business that extracts information from legacy SAP systems and i2 supply planning applications to create interactive reports that show metrics on average lead time for product delivery, forecasting metrics, and other manufacturing capabilities that help to ensure demand can be met. The product, CXO System, consumes Web services and processes the data, which is displayed as a dashboard interface. Now the supply-chain team within that part of the business can view one portal screen with a series of tabs, each showing metrics for different groups.

### **4.1.3 Supply Chain Management Systems**

From the responses the study was able to document at least 13 technologies used by British American Tobacco Kenya Ltd under supply management information system: Product Data Management, Customer Relationship Management, Automated Quality Control Systems, Computer Aided Design Systems, Warehouse Management Systems, Manufacturing Execution Systems, Transportation Management Systems, Radio Frequency Systems, Geo-coded Tracking Systems, Bar Coding Technology, Electronic Commerce Technologies, Supply Chain Event Management, and Demand Forecasting Management. The two integrative technologies were Advanced Planning Optimizer (APO) and Supply Chain Planning Systems (SCP).

The findings are in line with a study of 7000 US manufacturing plants (2010), where it was discovered that plants with integrated operations that adopted a complex technology combination (involving seven or more technologies) generally had higher labour productivity and production worker earning levels as compared to plants that failed to do so. For this research, with specifics to British American Tobacco Ltd we extend the findings supports Huber's (1990) proposed theory by introducing technology integration and the integration of multiple advanced information technologies in SCM will significantly reduce the time necessary to make decisions and also guide managers and technology users to take higher quality decisions. And improvements in decision making will translate in superior operational performance.



#### **4.1.4 Innovation in ICT and Impact on the Company**

The adoption of ICT at British American Tobacco Kenya Ltd has increased the information processing capabilities of suppliers, thereby enabling or supporting greater relationship in addition to reducing uncertainty. ICT has reduced transaction costs between buyers and suppliers and created a more relational/cooperative governance structure, which has led to closer buyer-supplier relationships hence decreasing trust-based inter-organizational partnerships and removes a human element in buyer-supplier interaction, while trust is built on human interaction between British American Tobacco Kenya Ltd, its customers and suppliers. ICT has enabled British American Tobacco Kenya Ltd to more quickly institute EDI information programs with her customers.

ICT at British American Tobacco Kenya Ltd has affected inventory management most dramatically in the ability of firm to be proactive in the management of inventory systems. This is demonstrated in the ability of British American Tobacco Kenya Ltd to notify customers of order shipping delays and inventory emergencies, in order to decrease the delivery lead time and inventory. Production scheduling at British American Tobacco Kenya Ltd has traditionally been the most difficult aspect of SCM. But with ICT this has enabled British American Tobacco Kenya Ltd to minimize the difficulty in their production scheduling by improving the communication between vendors, firms and customers.

#### **4.1.5 Staff Training**

At British American Tobacco Kenya Ltd supply chain management involves managing all the activities that go into putting commercial products in front of consumers. This includes procuring supplies from suppliers, transporting them to and supervising the means of production, and distributing finished products to end-buyers. At each phase there are important relationships that must be maintained, such as those between suppliers, intermediaries, service providers and customers.

Driven by the complexity of supply chain management, continuing education programs, such as the APICS certification programs, are a common requirement for key staff within the company. This has increased the demand for ICT & SCM training at British American Tobacco Kenya Ltd. Everyone in the organisation - starting with the top management receives a training annually since the two strategies are related in product fulfilment of the company.

#### **4.2 Supply Chain Management Activities Coordination**

The coordination of SCM activities has been improved by information technologies the study measured SCM activity coordination at BAT establish how IT supports decision and communication by looking at exchange of supply information, status of the company automation and supply chain integration.

### **4.2.1 Exchange of Supply Chain Information**

A purchase order at British American Tobacco Kenya Ltd is a commercial document issued or received by the company, indicating types, quantities, and agreed prices for products or services the seller will provide to the buyer. The company has embraced Automatic use of SAP to facilitate its purchase orders. On transport the company coordinates this operation manually.

The scope of inventory management at British American Tobacco Kenya Ltd concerns the fine lines between replenishment lead time, carrying costs of inventory, asset management, inventory forecasting, inventory valuation, inventory visibility, future inventory price forecasting, physical inventory, available physical space for inventory, quality management, replenishment, returns and defective goods, and demand forecasting. Balancing these competing requirements leads to optimal inventory levels, which is an on-going process as the business needs shift and react to the wider environment. All this is undertaken by the use of SAP and APO systems in the company.

British American Tobacco Kenya Ltd accomplish the exchange of supply chain information with suppliers via automatic emails linked with SAP while customers via emails and telephone. British American Tobacco Kenya Ltd managers have increasingly find themselves assigned the role of the rope in a very real tug of war-- pulled one way by customers' mounting demands and the opposite way by the company's need for growth and profitability. Many have discovered that they can keep the rope from snapping and, in fact, achieve profitable growth by treating supply chain management as a strategic variable within the ICT domain.

#### **4.2.2 Status of Process Automations**

The study also measured the level of process automation on various indicators. The status of process automations was measured by enlisting automated functions and the current manual functions. It was discovered that Managing Partner Information (account maintenance, credit approval), Managing Product Information (distribution of new product data, notification of product change), Order Management (checking order status, requesting price and availability, sending shipment notification), and Inventory Management (distributing inventory reports) are automated while Managing Manufacturing Information (work order notification, checking status of work progress) and Managing Marketing Information (distributing product list) are on manual.

Under the process of Managing Partner Information (account maintenance, credit approval) BAT Ltd has automated this process which is in line Bensaou (1997) observation that for transactions to take place over the digital platform, it is necessary that supply chain partners adopt interoperable information systems and provide compatible services for each other. Conversely, information sharing and automated transactions will be hampered if compatible systems are not installed along the supply chain. Moreover A higher degree of digital integration with partners along the supply chain increases a firm's ability to obtain real-time information about demand changes, supply variations, inventory build-up, and competitive moves (Barua et al. 2004).

Managing Product Information ( for example distribution of new product data, notification of product change) is automated as supports Manian (2010) study on SCM and product realization he commented that today's complex market requires constant, efficient and reply of all members of supply chain. Response indicators based on supply chain, including :maximizing percent of orders are being met, minimizing delays in product delivery, minimizing IT, minimizing duplication of tasks and minimizing response time to customer.

Order Management (for example checking order status, requesting price and availability, sending shipment notification) and Inventory Management (e.g. distributing inventory reports) the automation of these two process ensures information exchange and service efficiency in the concerned departments the company has established new relationships with customers in order to best identifying customer needs and market via order management and developed effective sales and marketing channels based on the inventory management and hence changing the composition of the supply chain and logistics to achieve unity of the flow of goods.

#### **4.3: Information Technology (Supply Chain Integration Activities)**

Respondent were asked to indicate the percentage to which electronic supply chain integration has increased productivity to fulfil business interactions with customers and suppliers. The outcomes showed an increased productivity via ICT on customers where majority of the respondent 69% agreed that productivity is 56% and above that electronic supply chain integration has increased productivity.

This outcomes supports the Global Supply Chain Forum statement (2010), SCM is ‘the integration of key business processes from end user through original suppliers that provide products, services, and information that add value for customer and other stakeholder’. The findings also are in line with Treacy & Wiersema, (1995) research where customers have also grown accustomed to customized products and services ensuing proliferation of product and service offerings for a global market has created a tremendous amount of complexity for key supply chain activities, such as demand management, production planning, inventory management and order fulfilment and the only way to manage this is integrating customers’ needs into your SCM operations via ICT.

The outcomes under suppliers are more similar to the customers above. Majority of the respondent 68% agreed that productivity is 56% and above. The findings support Cox (2004) study who commented that we can only talk about SCM if there is a proactive relationship between a buyer and supplier and the integration is across the whole Supply Chain (SC), not just first-tier suppliers. He also believes that the key to implementation lies in focusing initially on introducing changes within the company, and then extending the process to include suppliers and customers. The primary benefits resulting could include cost and cycle time reductions.

The study findings supports Parnell (1998) who stated that supply chain integration really occurs when customers and suppliers establish tight partnerships with the objectives and probable outcomes of reduced inventory, shorter lead times and better service to the customer. However the responses indicating less than 50% in the findings indicate that the integration of supplier in supply chain has not run the same course in all industries an observation by Ponce and Prida, (2006).

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

In this article, at first was presented the definition of IT and SCM; afterward, the impact of IT on SCM was illustrated in through various scholars. It is important that, the impact of IT on SCM is much larger as it facilitates inter-organizational communication and in turn reduces cycle times and develops collaborative work. IT provides opportunities for an organization to expand their markets worldwide. Also, IT enhanced teamwork and customer relationship management. To evaluate the impact of IT on SCM at British American Tobacco Kenya Ltd, it was agreed by at least 12 respondents where 90% were pleased with the obtained results. The current British American Tobacco Kenya Ltd framework support the huge area of IT based SCM and can be used as a controller to evaluate the SCM progress through use of IT.

#### **5.2 Summary and Findings**

Integration of supply chain activities and the technologies to accomplish it have become competitive necessities in most industries. For example, one respondent to the pre-test survey wrote, “our senior management have now come to realize that supply chain management will enhance our ability to be successful.” Another commented, “With almost daily technology advancement globally in ever-facet of the business, organizations need to synchronize by adopting and implementing new electronic commerce and supply chain technology in order to protect market share, not to mention improve market penetration”. Thus, we developed a model on the antecedents of supply chain technology adoption.

We theorize that firms like BAT limited with greater numbers of employees adopt more technologies perhaps to improve information management and activity coordination. Large organizations may have greater volumes of transactions, more geographically dispersed operations, more supply chain partners, and/or more information to manage and are thus would be more likely to adopt information technology systems to improve operational efficiency and very often lower cost.

Regarding decentralization, in supply chain management and technology adoption, we follow Grover and Goslar (1993) who suggested that a more decentralized organizational structure leads to greater boundary scanning, greater awareness of business opportunities, and thus greater levels of technology adoption. We believe that firms that allow decision-making to be located throughout the organization may engage in more environmental scanning, which leads to a greater awareness and appreciation of potential innovations. Previous research (Feitler et al., 1998; Audia et al., 2000) suggests that better performing firms have a tendency of integrating new operational systems. Considering information management systems have become essential components of firm supply chain management strategy, it is, therefore important to note that high performing firms would be more likely to adopt new technology.

The study agrees with Bowersox and Daugherty (1995) who suggested, as firms realize the advantages gained from efficient and effective supply chain operations, managers begin to incorporate supply chain strategy into their overall corporate strategy which then leads to greater technology adoption and electronic integration.



Organizations that understand the competitive benefits of efficient and effective supply chain operations incorporate supply chain strategy into organizational strategy. The elevation in importance of the supply chain in an organization then leads to the application of information technology to these operations. As previously reported (Bouchard, 1993; Truman, 2000) supply chain partners have a substantial impact on a firm's decision to adopt supply chain technologies. As organizations integrate operations and technology becomes more prevalent, firms coerce members of their supply chain to adopt new technologies to satisfy the need for fast and accurate information. The interview guide written comments on the study provide support for the notion that customers exert greater pressure than other partners in the supply chain. A typical comment was, "Most customers demand this technology or they will go someplace else".

The study finally, established that greater environmental uncertainty at BAT Limited supply chain management has led to greater technology adoption as uncertainty creates the need for more accurate information in order to respond as environmental conditions necessitate. Kwan (1999) explained organizations facing greater uncertainty employ supply chain technology to improve information management and exchange in order to be able to better respond to changing environmental conditions. Information technologies allow firms to more quickly and accurately share demand data, sales projections and production schedules which provides adopting organizations greater flexibility and responsiveness in the face of a constantly changing environment.

British American Tobacco Kenya Ltd should be aware that the philosophy of the technology has changed and is now focused on trying to understand nebulous concepts like customer life-time value the point is not to de-prioritise customers that are not necessarily the biggest spenders, but to who have future potential. SCM software's are not about having fancy technology but about how knowledge is leveraged to optimise a business and ensure long-term client relations to the benefit of all stakeholders.

Business value of IT continues to stimulate interest and debate among both academics and practitioners. In this study we assess IT value in the context of digitally enabled supply chains, which has emerged as one of the major areas for companies to leverage IT to improve firm performance in global operations. This study attempts to present a theoretical viewpoint, supported by empirical evidence, on understanding IT value creation through digitally enabled supply chain integration. In doing so, this work makes an incremental but significant extension to a prior study by Zhu and Kraemer (2005). More broadly, this paper contributes to the literature on the digitally enabled SCM by developing a resource-based model of what resources are important to create value in supply chain contexts.

The role of tangible IT has been extensively studied and the literature has called for research on value drivers of SCM that go beyond the technology (Rai et al. 2006). This paper identifies intangible resources, especially managerial skills and partner support, as key value drivers that work together with backend integration to improve firm performance, highlighting that integrational, managerial, and relational resources are critical in the global supply chain contexts.

Furthermore, this paper contributes to the IT value literature by addressing the role of competition in IT value creation, which to date remains an open issue. We find differential relationships of IT enabled resources to performance improvements, contingent on competition. Under competitive regimes, the resource-performance relationships can be better understood in light of efficient coordination and organizational adaptations—theoretically anchored in the RBV and TCE. Accordingly, backend integration and managerial skills play a more significant role in value creation when competition is more intense. These results help to achieve knowledge accumulation and synergy about IT value, thus making an important contribution to a key research theme in the field.

These findings also add to the resource-based literature by linking resources to environments. This work highlights the fact that the role of resources needs to be situated within environmental contexts, such as competition. Therefore, RBV-based studies, when evaluating the value of resources, should condition the value on specific environmental factors. Our analysis provides some preliminary evidence for this general theoretical proposition.

### **5.3 Recommendations**

The BAT Limited Case study has provided important insight into the key factors leading to adoption of supply chain technology and has provided important managerial implications. Managers may use the findings to gain a better understanding of the different factors impacting technology adoption.

Extensive investigation of many recently developed supply chain technologies has not yet taken place. As such, the model and a case analysis it provides an initial starting point from which to develop more detailed analyses of many aspects of supply chain technology adoption. Based on this study several key lessons learned are summarized in the following for understanding the role that Information Technology can play in Supply Chain Management at British American Tobacco Kenya Ltd. Use Information Technology Resources: Information Technology (IT) resources can play a big role in the business. IT can provide technology solutions to link suppliers and retailers. Ensure proper staffing of these resources to drive volume and reduce cost.

Training at British American Tobacco Kenya Ltd should devoid from annual the company should inculcate a continuous training program for staff. The days of the business ignorant programmers are fading. IT professionals have to know the business perspectives. Focus on the consumer: Use data and technology to understand better the consumer's needs. Data can be information from retailer data which is typically used for quick decision support, British American Tobacco Kenya Ltd data is used for analytic decision support. When merged, this data create tremendous gains for both companies. Information Technology can also be used to sift through large amounts of data and provide exceptions or out of range business parameters. Employ Industry standards: Driving towards common methods of communicating business transactions and data sharing reduces cost for the entire supply chain. Just as we have standardized logistics such as pallet size, truck dimensions from a supply chain perspective, automating business transactions will also drive down costs of the manufacturer/supplier relationship.

## **5.4 Limitation of the Study**

Every study encounters its own fair of challenges driven by scarce resources with time been the most key in this study, getting respondents across the organisation was great challenge due busy schedules. The study also focussed on single firm that is BAT Ltd in Kenya, which could result in biases due to situational factors common to the Company.

While the study carefully assessed such possible biases by multiple literature reviews, it would have been desirable to obtain data from multiple firms. BAT Ltd as a manufacturing business unit is very busy and sensitive to interruptions. As a result, the researcher anticipated the major limitation being adequate time with the respondent this could have affected the in-depth of some of the responses.

## **5.5 Area for further Research**

During the course of the study certain areas were identified and might require further research. Further study may be undertaken on multiple manufacturing firms to measure IT and supply chain integration and understand the drivers behind implementation of ERP systems in the sector plus benefits accrued.

## **5.6 Implication of the study on Policy, Theory and Practice**

The government and other institutions with heavy procurement requirement in the country's can not overlook the role of information technology and supply chain integration strategy in their respective policy formulation. The findings from this study are therefore of importance because they provide the strategy direction towards policies which are relevant and sensitive to the supply chain management. Realization that SCM is one of the competitive strategies businesses can institute for improved performance need to be integrated with ICT for effective and efficient utilization. To all manufacturing firms small, medium and large in the country.

This study finding is of great importance because through SCM & ICT integration, these firms will be better positioned to gauge their performance and make improvements where necessary to boost their market performance and overall ranking in the industry in addition this is in line with the RBV theory which attributes improvement in firm performance to valuable resources or resource bundles. The basic logic is that IT affects other resources or processes which, in turn, lead to competitive advantage this is why British American Tobacco Kenya Ltd investment in ICT is 56% and above.

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**APPENDIX I**  
**INTERVIEW GUIDE**

**SECTION A**

Respondent's Job Title in the Company

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Department/Section of respondent

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Years of Experience with the Company

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**SECTION B: INFORMATION TECHNOLOGY & SUPPLY CHAIN MANAGEMENT**

1. To what percentage level has the company adopted information technology investment in the management of supply chain information?

Below 25%	<input type="checkbox"/>
26% - 35%	<input type="checkbox"/>
36% - 45%	<input type="checkbox"/>
46 % - 55%	<input type="checkbox"/>
56% & Above	<input type="checkbox"/>

Comments on the percentages above

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2. What systems / software's has the company instituted or integrated with management of supply chain information?

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Describe how ICT enabled resources has affected your company performance at the process level along the supply chain management?

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3. Comment on how innovation in ICT has created new ways for your company to manage supply chain relationships?

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4. Comment on the ICT training of staff in relations to software programs for supply chain activities?

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**SECTION C: SUPPLY CHAIN MANAGEMENT ACTIVITES COORDINATION**

5. Describe how the company plans and manages the exchange of Supply chain information under the following sub indicators:-

Purchase orders

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Transport

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Inventory levels

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6. Describe how you accomplish the exchange of supply chain information with your Suppliers

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Customers

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7. Indicate the operationalization (Automated or Manual) of the following six supply chain management processes as adopted by your company?

Process	Automated	Manual
Managing Partner Information (e.g. account maintenance, credit approval)		
Managing Product Information (e.g. distribution of new product data, notification of product change)		
Order Management (e.g. checking order status, requesting price and availability, sending shipment notification)		
Inventory Management (e.g. distributing inventory reports)		
Managing Manufacturing Information (e.g. work order notification, checking status of work progress)		
Managing Marketing Information (e.g. distributing product list)		

**SECTION D: INFORMATION TECHNOLOGY (SUPPLY CHAIN INTEGRATION ACTIVITIES)**

8. To what percentage has electronic supply chain integration increased productivity to fulfil business interactions with customers and suppliers? Please provide a percentage estimate based on your working knowledge.

Suppliers

Below 25%	<input type="checkbox"/>
26% - 35%	<input type="checkbox"/>
36% - 45%	<input type="checkbox"/>
46 % - 55%	<input type="checkbox"/>
56% & Above	<input type="checkbox"/>

Customers

Below 25%	<input type="checkbox"/>
26% - 35%	<input type="checkbox"/>
36% - 45%	<input type="checkbox"/>
46 % - 55%	<input type="checkbox"/>
56% & Above	<input type="checkbox"/>

9. How has IT usage in SC integration increased customer service within B.A.T?

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**THANK YOU VERY MUCH FOR YOUR RESPONSES**



## **APPENDIX II INTRODUCTION LETTER**

Judith Nagery

P.O. Box 35126-00100

Nairobi.

To Respondent,

I am a post graduate student at the University of Nairobi conducting a research on **Information Technology and Supply Chain Integration** *A Case Study of British American Kenya Limited* as partial fulfilment of the requirement of degree of master of Business Administration.

Declaration - *The information collected through this interview guide as well as your identity shall be treated as confidential and will only be used for research purposes only.* Your assistance in the completion of this interview guide will be highly appreciated.

## **APPENDIX III**

**Letter from BAT to be attached**