STRATEGIC VALUE OF AUTOMATION AT THE NAIROBI STOCK EXCHANGE

BY

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DECLARATION

This Research Project is my original work and has not been presented in any other University.

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D61/70138/2007

This research project has been submitted for examination with my approval as University Supervisor.

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DEDICATION

I dedicate this work to my family and those who supported me throughout the completion of this project.

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This Research Project would not have been possible without the cooperation and support of a number of people, who in one way or the other steered me towards my ultimate goal. I would like to express my appreciation to them and especially to the following:-

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ABSTRACT

Automated power industries not only focus on production efficiency but also strive to strike a balance between production and consumption. Automation boosts individual and team efficiency, which enables organizations to deliver results faster and with greater predictability; better decision making. Automation at the NSE took place in 2006 when the live trading on the automated trading systems of the Nairobi Stock Exchange was implemented which brought about increased trading hours (12 hours a day) at the NSE. The objective of this study was to determine the strategic value of automation at the Nairobi Stock Exchange. The study adopted a case study design seince the unit of analysis is one organization. The respondents comprised of senior managers at NSE. The data obtained from the interviewguides was analyzed using qualitative analysis and then presented in prose format. The study conludes that the progress was good especially considering the fact that new system was more that 95% operational. All departments were now operating from the system and the progress was generally good. The study also concludes that automation strategy affected the turnaround time as it made it easy for staff to retrieve, share and use information online from any computer connected to the network. The study also conludes that NSE faced several challenges in implementing automation strategy.These included inadequate resources to finance the implementation of the automation strategy; Inadequate office equipment including servers with huge capacity hampered the implementation process of automation strategy at NSE; high resistance from were meant to the implementing agents; and limited training on the new Automated Trading System software system. the study recommends that in order for NSE to realize full potential of automation,it needs to create awareness among the public especially on the benefits of automation to the convenience and efficiency on their operations especially in the bond market to boost bond market activities. The study further recommends that in order to continue enjoying the advantages of automation, NSE need to be the look out for the developments.In formation technology is evolving very fast and the advantages will only accrue to those firms that keep pace with thase developments.

CHAPTER ONE

INTRODUCTION

1.1: Background of the Study

Stock exchanges around the world have automated to varying degrees with some eliminating floor trading altogether. The Toronto Stock Exchange (TSE) for instance, has automated its operations through the use of an electronic trading system (referred to as the Computer-Assisted Trading System, or CATS). Advocates of automation suggest that execution of trades is faster and less costly under computerized trading systems. Traders have access to broader information including bid and ask prices, trades sizes, and volume, at lower costs, due to the existence of a limit order book than under systems that restrict access to information about standing orders above and below the market (Youssef, 2011). That would attract more investors, improve volume and liquidity, and generate better price discovery.

The study is found on two theories which include open systems and organizational development theories. Open systems theory has been selected because of its explanation regarding the symbiotic relationship between organizations and their environment. Organizations get their resources from the environment and at the same time, release their outputs to the environment hence the importance of environment to any organization's operations. Organizational development theory was selected because for any organization to adapt to the changes in the operating environment, it has to be in line with the changes in the operating environment.

1.1.1 Concept of Strategy

Strategy refers to the machinery of the resources and activities of an organization to the environment in which it operates (Johnson and Scholes, 2002). According to Ansoff and McDonnell (1990), it is through strategic management that a firm will be able to position and relate itself to the environment to ensure its continued success and also secure itself from surprises brought about by the changing environment. He further argues that this can be done by firstly, positioning of the firm through strategy and capability planning in its rightful competitiveness, and secondly, use of real time response through issue management and thirdly, systematic management of resistance during strategic implementation strategic responses are concerned with decisions and actions meant to achieve business objectives and purpose, it answers the question on where does an organization want to go, where it is now and how to get to where it wants to go (Denis, Lamothe and Langley, 2001).

Coping with the increasingly competitive environment has called on firms to rethink their strategies in order to improve the levels of efficiency and effectiveness in operations. Firms respond to competition in different ways. Some may opt to product improvement, divestiture, and diversification, entry into new markets or even merging or buying out competitors. Some of these organizations have undertaken their transformation efforts quite successfully. Others have experienced disappointing results with new strategies not well implemented, acquisitions that have not achieved expected synergies, reengineering and downsizing that have largely failed and quality programs that have not delivered the hope for.

1.1.2 Automation strategy

Automation is a business strategy where firms attempt to gain a competitive advantage by ensuring organization activities are being performed in the best way possible and focus on excellence in whatever the organization does to ensure efficiency in the operations (Hammer and Champy, 1993). Business Process Automation (BPA) solutions provide the tools, technologies, and infrastructure to automate complex business processes end to end in order to help increase competitive advantage and deliver tremendous value and visibility to your business, customers, and trading partners. This enables increased personal and organizational productivity by automating business policies and best practices, removing manual tasks, and eliminating error-prone reentry of information. BPA boosts individual and team efficiency which enables organizations to deliver results faster and with greater predictability. It also leads to better decision making by providing real-time insight into key business metrics and providing proactive alerts and notifications and gives broader insight into essential business processes critical to a business and provides real-time analytics that enable you to make better decisions faster. BPA further leads to enhanced operational excellence (Lucey, 2005).

Before automation, various services organizations normally experience problems in service quality such as delay in service, lack of accuracy in the data due to manual transfer, lack of consistency in handling data as a result of lack of standard and more so there is the problem of lack of completeness of data in many instances, (Lucey, 2005). Automation improves the staff productivity thereby improving customer satisfaction as the inefficiencies in the processes are eliminated or minimized. Winning strategies do not just reduce operational costs, but do so while taking actions to create value, such as

improving customer service, adding new revenue sources with new products and services or alternate channels, lowering the price of goods and services rendered, or increasing decision-making abilities (Ortiz, Cabello, and Jesus, 2007). Too often, companies focus on what they are doing today, instead of looking at the potential of what new things they can do tomorrow. Automation can also extend an organization's ability to service new markets in cost-effective ways and to deliver new products and services before their competitors can establish a foothold (Dragota and Mirtica, 2006).

1.1.3 The Nairobi Stock Exchange

Automation at the Nairobi Stock Exchange started in earnest in 1994 with the setting up and the implementation of the computerized delivery and settlement system (DASS). It is the same year that the NSE 20-Share Index recorded an all-record high of 5030 points, which made it to be rated by the International Finance Corporation (IFC) as the best performing market in the world with a return of 179% in dollar terms (Frino, McInish, and Toner, 2008). Further, because of such rating, the NSE attracted more clients with the licensing of eight new stockbrokers, thus requiring more space. Subsequently, the NSE moved to more spacious premises at the Nation Centre in July 1994 (Ngugi, 2003).

In 2008, the NSE All Share Index (NASI) was introduced as an alternative index. Its measure is an overall indicator of market performance. The Index incorporates all the traded shares of the day. Its attention is therefore on the overall market capitalization rather than the price movements of select counters (Ngugi, 2003). In April 2008, NSE launched the NSE Smart Youth Investment Challenge to promote stock market investments among Kenyan Youths. The Complaints Handling Unit (CHU) was launched in August 2009 to bridge the confidence gap with NSE retail investors. CHU provides a

hassle free and convenient way to have any concerns processed and resolved. Investors, both local and in the diaspora can forward their issues via e-mail, telephone, fax, or SMS and have the ability to track progress online (Ngugi, 2003).

1.2 Research Problem

Automated power industries not only focus on production efficiency but also strive to strike a balance between production and consumption. While automation is known to enhance safety and system reliability, such systems are more vulnerable to intrusion and thus, elimination of one risk yields a newer form of risk. Automation solutions provide the tools, technologies, and infrastructure to automate complex business processes end to end in order to help increase competitive advantage and deliver tremendous value and visibility to business, customers, and trading partners (Lucey, 2005). Automation enables increased personal and organizational productivity by automating business policies and best practices, removing manual tasks, and eliminating error-prone reentry of information. Automation boosts individual and team efficiency, which enables organizations to deliver results faster and with greater predictability; better decision making. By providing real-time insight into key business metrics and providing proactive alerts and notifications, Automation gives broader insight into essential business processes critical to your business and provides real-time analytics that enable you to make better decisions faster; and Enhanced operational excellence: Business processes in

financial institutions are mission critical, demanding the utmost levels of reliability. Automation provides a rock-solid foundation that delivers the security, performance, scalability, and reliability demanded by the distributed, mission-critical systems of modern financial businesses (Lucey, 2005).

Aautomation at the NSE took place in 2006 when the live trading on the automated trading systems of the Nairobi Stock Exchange was implemented. NSE is increased trading hours (12 hours a day). Other innovations included the removal of the block trades board and introduction of the functionality for the trading of rights in the same manner as equities. In February 2007, NSE upgraded its website to enhance easy and faster access of accurate, factual, and timely trading information. The upgraded website is used to boost data vending business. In July 2007, NSE reviewed the Index and announced the companies that would constitute the NSE Share Index. The review of the

NSE 20-share index was aimed at ensuring it is a true barometer of the market. A Wide

Area Network (WAN) platform was implemented in 2007 and this eradicated the need for brokers to send their staff (dealers) to the trading floor to conduct business. Trading is now mainly conducted from the brokers' offices through the WAN. However, brokers under certain circumstances can still conduct trading from the floor of the NSE (Ngugi, 2003).

Several studies have been conducted on strategic value of automation to organizations. For instance, Kihanya (2008) did a survey on the challenges facing the users of automated teller machines in the banking industry in Nairobi where the challenges facing the users of the ATMs: queuing for long on the ATMs outlets, frequent system breakdowns, poor communication between the user and the machine, inability to question the machine, retention of cards by the machine and lack of enough knowledge on the use of the machines were identified. Wandera (2012) did a study on the challenges facing Kenya Medical Research Institute in the implementation of the automation strategy. Adongo (2012) did a study on the automated multiagent-based interoperator billing and payment system where it was established that automatic billing and payment processing made the process faster due to reduction of human errors. Kirema (2012) assessed the perceived benefits and limitations of the automated trading system at the NSE using a survey of mba students at the university of Nairobi. Adongo (2012) established that most of the investors agreed that the introduction of the ATS at the NSE had brought with it several benefits advantages e.g. increased market liquidity, reduction of the time taken to execute a trade, lower trading costs and also making the NSE to be a world class standards stock market, among others. From the above discussion, it is evident that there is no known study that has reviewed the strategic value of automation at the Nairobi Stock Exchange. This study therefore seeks to fill this research gap by evaluating the strategic value of automation at the Nairobi Stock Exchange. To achieve this, the study will seek to answer one research question: What is the strategic value of automation at the Nairobi Stock Exchange?

1.3 Research Objective

To determine the strategic value of automation at the Nairobi Stock Exchange.

1.4 Value of the Study

The findings of this study will be valuable to different stakeholders:

The findings of this study will be valuable to future researchers and academicians in the area of strategic management as it will act as a source of reference material besides suggesting areas for further research where they can carry out.

The study will also be valuable to the policy makers in Government especially the Capital markets Authority as regards the operations of NSE. The study fingings will inform the policy formulation and implementation as regards system automation in organizations.

The study will also be valuable to the management team at NSE in that it will inform them of the various strategic valued gained since the process of automation was started way back in 2006. Through the findings of this study, the management will be able to see the milestones achieved following automation of their operating systems.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the related literature on the subject under study presented by various researchers, scholars, analysts and authors. It starts off with a discussion on the theoretical framework on which the study is built. It specifically discusses three theories: open systems theory, resource based view theory and organizational development theory. It then proceeds to value from automation of stock exchanges and the factors affecting the automation process.

2.2 Theoretical Perspective

This study is anchored by three main theories include Open system theory, Resource Based View Theory and Organizational Development Theory. Though organizational adaptation and organizational adaptability are critical for an organization's success and survival, under either title it is not possible to recognize any "broader" theory.

2.2.1 Open System Theory

Open System Theory (OST) maintains that people and their organisations must have an open and actively adaptive relationship with the contextual environment over time to ensure viability (Aughton and Neville, 1999). The version of open systems theory developed primarily by Fred Emery, OST has two main purposes. The first is to promote and create change toward a world that is consciously designed by people, and for people, living harmoniously within their ecological systems, both physical and social. "Socio ecology" captures the notion of people-in-environments. Included within this is the

concept of open, jointly optimized, socio technical (and socio psychological) systems, optimizing human purposefulness and creativity, and the best options afforded by changing technologies. Again, these organizational systems are designed by the people themselves. The second purpose is to develop an internally consistent conceptual framework or social science, within which each component is operationally defined and hypotheses are testable so that the knowledge required to support the first purpose is created. OST develops from integrated theory and practice where the practice involves important human concerns, societal and organizational (Merrelyn, 2000).

2.2.2 Resource-Based View Theory

The resource-based view (RBV) emphasizes the firm's resources as the fundamental determinants of competitive advantage and performance. Theoretically, the central premise of RBV addresses the fundamental question of why firms are different and how firms achieve and sustain competitive advantage by deploying their resources. It is an efficiency-based explanation of performance differences (Peteraf and Barney, 2003). It adopts two assumptions in analyzing sources of competitive advantage. First, this model assumes that firms within an industry may be heterogeneous with respect to the bundle of resources that they control. Second, it assumes that resource heterogeneity may persist over time because the resources used to implement firms' strategies are not perfectly mobile across firms. Resource heterogeneity is considered a necessary condition for a resource bundle to contribute to a competitive advantage. Cool, Almeida Costa and Dierickx (2002) argues that if all firms in a market have the same stock of resources, no strategy is available to one firm that would not also be available to all other firms in the market. According to Barney (1991), a firm resource must, in addition, be valuable, rare,

and imperfectly imitable and substitutable in order to be source of a sustained competitive advantage. Peteraf (1993) presents four conditions underlying sustained competitive advantage: superior resources , ex post limit to competition, imperfect resource mobility and ex ante limits to competition. Recently, much resource-based research has focused on intangible assets, which include information, knowledge, and dynamic capabilities.

2.2.3 Organizational Development Theory

March & Sutton (1997) notes that organizational development is critical to the performance of any organization because it brings key skills and perspectives that effectively facilitate changes in culture and shifts in strategy to address the complex challenges facing organizations. In view of this, organization development theory is used to inform better organizational development practice aimed at performance improvement (Lynham, 2002). Without integrating OD theory and interventions with specific impact on performance improvement and increased production and financial performance, the field of OD will likely become less relevant to organizations seeking performance improvement through deliberate and planned change interventions (Beer *et al.,* 1990). Also noted is the importance for scholars and practitioners alike to appreciate the business, intervention, and change process perspectives in their inquiry and practice of OD (Garud & Van de Ven, 2000).

There are other theories related to organizational adaptation to changes in the operational environment. Contingency theories from Thompson (2004) and Lawrence and Lorsch (1967), resource dependency theory from Pfeffer and Salancik (1978), and institutional

theory related arguments from Meyer and Rowan (1983) explain the motives for organizational adaptation and describe some of the structures an organization may produce as responses to adaptation pressures. The theories do not describe the processes of organizational adaptation or the capabilities required to carry out the processes. March and Simon's theory (1958) on organizational behavior and Cyert and March's theory (1992) on organizational decision making describe specific parts of organizational adaptation process, but not the whole process. Through the notion that an organization adapts iteratively based on feedback, the theories relate the concept of organizational learning to organizational adaptation.

2.3 Value of Automation to Stock Markets

The automation of stock markets has been found to offer a number of benefits (Ngugi, 2004). For instance, Frino (2008) explained that automation leads to Operational excellence. Within a single company, core processes often cross different organizational silos and often extend to external partners or suppliers, as well as engaging the customer directly. Higher return on investment strategies can be uncovered by focused process orchestration and automation of end-to-end processes. The human cost of manually orchestrating all of the status-related activity of an end-to-end process is staggering, not to mention the quality and cycle-time implications that affect customer satisfaction (Picot, Bortenlaenger, and Roehrl, 1994).

Process-automation initiatives need to first eliminate non-value-add tasks across the end-to-end process and then achieve the highest rate of straight-through processing that is feasible, without compromising the quality of the outcome or customer experience . These initiatives also need to ensure that action items are completed when they should be,

or escalated for resolution if they are late. In order to truly achieve sustainable process efficiency, there must be an ability to link a process to other processes and thus provide an orchestration of effort that results in the successful completion of the end objective (Freund and Pagano, 2007). Many financial institutions and insurance organizations are achieving operational excellence through automation and orchestration. In the insurance industry, improving the one-and-done rate for handling claims ensures that claims are automatically directed to the right claims processors with the right skill and experience (Dragota and Mirtica, 2006).

Automation has also been linked to personalized customer experience (Freund and Pagano, 2007). Although some organizations feel that automation has the potential to reduce the personalized customer experience, automation facilitated by business services that are driven by policies and business rules that can be changed dynamically or by business users in real-time can bring tremendous competitive advantage (Gatuita, 2012). Offers and services can be tailored to unique and varying customer sets based on contextual or contractual agreements. New markets can be entered in new geographies by taking into consideration the variation for regional policies and laws, without disrupting the underlying core process.

According to Dragota and Mirtica (2006), the process automation can allow an organization to achieve its overarching goal: to be able to use what exists, extend its value to any line of business, and dynamically adapt behavior by channel for a personalized experience- all with speed to market, low risk, and lower cost. Banks are deploying automation in many of their core processes but doing it in a way that delivers a unique customer experience. Insurance, Telco, and many other industries and sectors

(including government) are beginning to understand and deploy process automation solutions that allow great efficiency but do not compromise the customer experience (Dragota and Mirtica, 2006).

Another value of automation is the Organizational design flexibility. According to Kabaka (2009), as more processes involve outsourcers, temporary workforce alternatives for peaks, and external partners and suppliers, process orchestration is as important as process automation in ensuring flexibility and process agility. Electronic firms often outsource different parts of manufacturing and services portfolio. Many firms turn to specialty providers that have expertise in the target technologies, and scale efficiencies that they cannot achieve alone (Kabaka, 2009). Having the ability to automatically redirect workloads based on the availability and expertise of external and internal providers is key to expanding into new product areas and to supporting organic growth (Dragota and Mirtica, 2006). For internal processes such as employee on-boarding, the automation of key process activities not only reduces the cost of the process, but also helps ensure that the employee is quickly integrated into the organization and is productive before competitive offers are made (Kabaka, 2009).

Ortiz, Cabello, and Jesus (2007) argued that the size, structure, and maturity of a nation's financial sector measure financial deepening, which is an essential factor in promoting economic growth. They further asserted that this can only be achieved in a free market environment characterized by Market intermediaries such as stock exchanges. There are basically three main functions of a stock exchange. These functions are risk amelioration, monitoring managers, exerting corporate control, and mobilizing savings (Levine, 1997). Therefore, a stock exchange exists to ensure that the risks associated with a firm are

spread further as shareholding spreads, send signals to managers concerning their performance through trading and asset pricing trends, and promote savings and channeling them to productive investments (Ortiz, Cabello, and Jesus, 2007).

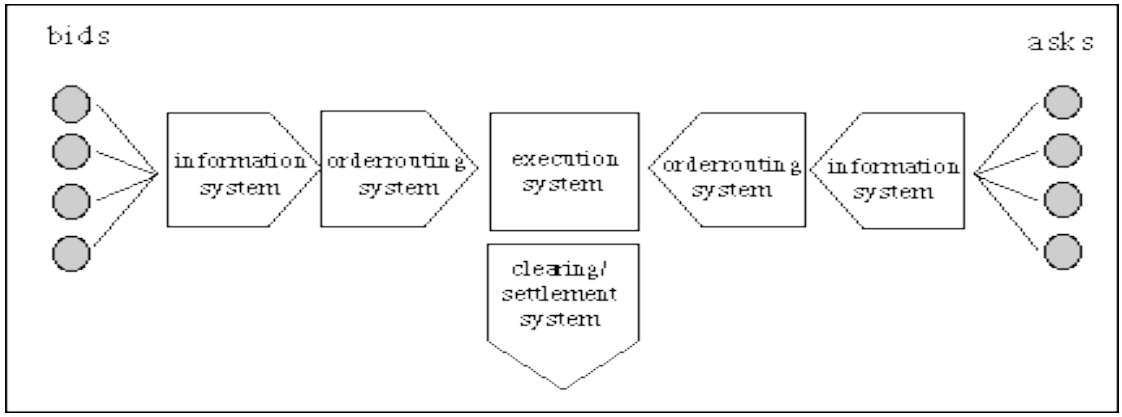
The stock exchange allows people to pool their savings together and invest in huge projects that would not have ordinarily been possible individually. These functions are a pre-requisite to the establishment of Kenya as a financial hub, which is a pillar of vision 2030, Kenya's strategic development plan. The plan details the deepening of Capital Markets as a flagship project. The plan further lists the automation of bond trading as an objective of the flagship project (Levine, 1997). Adjasi, (2007) explains that automation is expected to reduce the cost associated with manual systems and inefficiencies in African stock markets thereby increasing trading activity and liquidity. He further argues that automated trading eliminates the need for trade intermediation since investors can log onto systems to monitor markets and to trade in the markets, and thus bypass the use of brokers.

Garbade and Silber (1978) examined the inter market price differences between several US exchanges before and after the installation of the telegraph between major eastern cities in the US in 1840 . They also examined changes after the laying of the transatlantic cable between London and New York in 1866, which reduced the time lag of a transatlantic transaction from six weeks to one day. They found that inter market price differences equaled the costs of transportation plus a risk surcharge in case of an alteration in prices during transportation. They concluded that introduction of information technology reduced the inter market price differences according to the new transmitting time of information. Blume and Goldstein, (1995) note that with the reduction of

communication costs, the tendency towards the centralization of exchanges began at the turn of the century.

A classification of the automation of exchanges can be based on the conversion level of the classical transaction chain over to a computerized one. In conformance with the phases of a capital market transaction (information, order routing, execution, clearing, and settlement phases) the systems can be classified as follows (see figure 2.1); information systems, order routing systems, execution systems and clearing and settlement systems. (United States General Accounting Office, 1991).

Figure 2.1: A Theoretical Model on Automation of a Security Transaction



Source: (Picot et al, 1994)

First, information systems were supported by information technology. The impulse for the development of an electronic information system came from the Securities and Exchange Commission in the United States. They demanded in 1970 that NASD replace the quotation by "pink sheets" with an electronic information system (Pieseler, 1990). The pink sheets were inefficient because the papers had to be printed and distributed after every trading day. Timely price information was impossible. When NASDAQ was introduced in 1971, the quotation from the different market makers could be observed in

real time on the screen. Therefore, transparency, reaction time, and efficiency of the market increased greatly (Hamilton, 1978).

Order routing systems are responsible for the electronic transmission of an order to the relevant receiver. First, the order transmission was rationalized through the substitution of a runner by a pager or by hand signals from a handy. In a further rationalization step, order routing systems were connected to an execution system, which allows for the automatic or partly automatic execution of small orders (Hamilton, 1978). Clearing and settlement systems are prime applications for information technology since these procedures are very time consuming and error-prone. Therefore, all the major exchanges have invested large sums in the automation of their clearing and settlement systems. The shorter the clearing and settlement process is, the less interest has to be paid by the investors until their transactions are fully completed (Dragota and Mirtica, 2006). A further classification of execution systems can be made in reference to the automation of the price discovery process. This criterion emphasizes the most important function of the market as a coordination system, the price discovery. The price discovery process adjusts the transaction plans of the investors (Hamilton, 1978).

2.4 Factors that Hinder Automation of Stock Exchanges

There are several factors influencing automation process in an organization. Some of these include: poor customer support from the system administrators;

2.4.1 Poor Customer Support

Poor Customer Support or lack of Customer Support from the system to the user makes it difficult for the user to understand how the automated system is functioning. One reason automated systems administrators fail to adequately inform the users of their actions is

that the automated systems place an additional layer of complexity (data processing, data fusion, and intelligent control) between the actual system processes and sensory data the user is controlling (Coury & Semmel, 1996). Woods (1996) discusses the problem of poor Customer Support in automated systems and states that the amount of data available to the human is increasing. However, the effectiveness of that data depends on the cognitive work required for the human to turn it into a coherent interpretation in context. Even though systems may present all of the necessary data, they exhibit "low observability" in that the data is presented in such a way that too much cognitive work is required to interpret it. Woods indicates that this is especially problematic when systems also exhibit a high degree of autonomy and authority; that is, "strong but silent" automated systems may have latent dangers. This behavior is not made apparent to the pilot and, thus, results in surprises for the pilot (Sarter, 1994).

Complex automated systems often operate in a number of different modes in which the behavior of the system is slightly different for each mode. Users often find themselves, unaware of the current mode of the system and, as a consequence, surprised by the system behavior (Sarter& Woods, 1997). Andre &Degani (1997) discuss mode awareness and describe problems of mode awareness. Just as too much trust can lead to complacency in the monitoring of failures, too little trust or mis-trust may lead to a failure to use automation when it is appropriate to do so. Therefore, operators may miss out on beneficial reductions in workload that may be provided by automation.

2.4.2 Bureaucracy

The structure of the organization needs to be consistent with the strategy to be implemented. Moreover the nature of the organizations structure to be used in implementing strategy is influenced by the environment stability and the interdependence of the different units (Daft, 2000). Failure to address issues of the broad structural design of roles, responsibilities and lines of reporting can at a minimum, constrain strategies development and performance (Johnson & Scholes, 2002; Koske, 2003). Disorder, friction, malfunctions or reduced performance results when managers use the wrong structure for the environment (Reuter, 1991).

The structure of the organization should therefore be compatible with the chosen strategy and if there is incongruence adjustment will be necessary either for the structure or the strategy itself (Koske, 2003). Chandler (1962) pointed out this important relationship by arguing that 'structure followed strategy'. Hax&Majluf (1991) stated that strategy and structure interact, strategy does influence structure but structure also constraints strategy alternatives. Learned et al. (1969) states that structure of organizations in certain circumstances are unimportant e.g. small companies where an individual direct planning and execution of activities structure therefore applies I large organization where they have many people (Koske, 2003). Symptoms of an ineffective organizational structure include: too many levels of management, too many meetings attended by too many people, too much attention being directed toward solving interdepartmental conflicts, too large span of control and too many unachieved objectives (David, 1997).

2.4.3 Poor Management Involvement

Successful automation plan implementation requires a large commitment from executives and senior managers. Therefore, planning requirement which may be done even at departmental levels requires executive support. Executives must lead, support, follow-up and live the results of automation planning and implementation process. According to Healthfield (2009), without commitment of senior executives, participants feel fooled and mislead. This complements what Rap (2004) claims that the commitment to the strategic direction is a prerequisite for strategy implementation, so top managers have to show their dedication to the effort.

To implement a plan successfully, senior executives must not assume that lower level managers have the same perceptions of the strategic plan and its implementation, its underlying rationale, and its urgency. Instead, they must assume they don't, so executives must persuade employees of the validity of their ideas. This notwithstanding what Ahoy (1998) argues; that upfront commitment by leaders include an adherence to the full and thorough process of strategic planning which must culminate in implementing programs and services and commit allocations to meet the objectives of the strategic plan at a level that is doable for the organization and the level of activity.

2.4.4 Inadequacy of Resources

As companies change and as skills expertise become recognized as a major asset of the firm, the heightened efforts in cultivating and enhancing them becomes significant part of development strategy (Saunders, 1994). During the process of automation implementation, how relationships and beyond the organization are fostered and

maintained will influence performance further while organizations and groups may be assumed as taking strategic actions, it is individuals who ultimately, in practical terms take action and are responsible for driving an organization or a group towards objective. Perhaps the most important resource of an organization is its people (Johnson & Scholes, 2003). Furthermore, organization is a social system relationship (formal and informal) among the people who individually and jointly subscribe to same goal(s) and to which they direct their actions. Where the needs of the individual and the demands of an organization are incompatible transactions and conflict are bound to occur and strategy implementation cannot be achieved (Mullins, 2005).

Recruitment and staff development strategy need to support the other factors. In addition aspects of job design, reward package and conditions of the labor market and the hopes and expectations of people (Saunders, 1994). Audits to assess human resources requirements to support strategies identify goal setting and performance appraisals, reward systems, competence based recruitment, training and development as key human resources activities known to help liable successful strategy implementation. Performance management is not only essential but as processes should be adjusted to support changing strategies. Yasemin&Hussen (2005) found out that systems process and routines for organizing, allocating and developing new programs during implementation directly depend on human resources. A number of factors commonly prohibit effective resource allocation. These include an overprotection of resources too great an emphasis on short run financial criteria, organizational politics, vague strategy targets, a reluctance to take risks and a lack of sufficient knowledge (David, 1997).

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

This chapter defines the various stages and phases that will be followed in completing the study. This section is an overall plan or structure conceived to aid the researcher in answering the raised research question. In this stage, most decisions about how research will be executed and how respondents will be approached, as well as when, where and how the research will be completed. Specifically the following subsections are included; research design, data collection and finally data analysis.

3.2 Research Design

This study will adopt a case study since the unit of analysis is one organisation. A case study is an in-depth investigation of an individual, institution or phenomenon (Mugenda and Mugenda, 2003). The primary purpose of a case study is to determine factors and relationships among the factors that have resulted in the behavior under study. Since this study seeks to gather in-depth information regarding the strategic value of automation at the Nairobi Stock Exchange, a case study design is deemed the best design to fulfill the objectives of the study. Several scholars have successfully used case study research design. Situma (2006) used case study research design to study the turnaround strategies adopted by KCB while Muguni (2007) used case study research design to investigate the role of executive development in strategy implementation.

3.3 Data Collection

In this study, emphasis will be given to primary data which will be collected using an interview guide. An interview guide is a set of questions that the interviewer asks when interviewing (Mugenda and Mugenda, 2003). It makes it possible to obtain data required to meet specific objectives of the study. The interviewees are the top managers including: Information Communications and Technology Manager, Human Resource manager, Chief Finance Officer, since they are more versed with strategic value of automation issues for it is them that formulate and oversee the implementation of strategic decisions in the organization. The researcher will administer the interview guides through personal interviews.

Given that those who will be interviewed are not so many and the researcher will be required to get in-depth information on issues surrounding the strategic value of automation at the Nairobi Stock Exchange, interviews are regarded as the best method and the interview guide gives a clear guidance on what questions to ask.

3.4 Data Analysis

The data obtained from the interview guide will be analyzed using qualitative analysis. Qualitative data analysis makes general statements on how categories or themes of data are related (Mugenda and Mugenda, 2003). The qualitative analysis will be done using content analysis. Content analysis is the systematic qualitative description of the composition of the objects or materials of the study (Mugenda and Mugenda, 2003). It involves observation and detailed description of objects, items or things that comprise the object of study. The variables that are to be used in the analysis are broadly classified into

two: strategic value of automation and factors affecting the automation strategy implementation. Several researchers have successfully used content analysis in their studies. For example, Kiraithe (2011) used it in explaining the strategic change management at Kenya Police.

CHAPTER FOUR

DATA ANALYSIS, RESULTS AND DISCUSSIONS

4.1 Introduction

This chapter presents data collected from the field, its analysis, and finally the interpretation of the findings on the strategic value of automation at the Nairobi Stock Exchange.

4.2 Data Analysis

The study targeted a total of four senior managers all of whom responded by scheduling an interview with the researcher thus giving a response rate of 100%. This reasonable response rate was made a reality after the researcher made personal calls and visits to remind the respondent to fill-in and return the questionnaires. This response rate is excellent and conforms to Mugenda and Mugenda (2003) that a response rate of above 80 percent is excellent for generalization of findings to the whole population. The data obtained from the interview guide was analyzed using content analysis, a technique used to make inferences through systematic and objective identification of specified characteristics of messages.

4.3 Automation Implementation Progress

The respondents were requested to indicate the progress made in the implementation of automation at NSE. From the interviews, the respondents indicated that the progress was good especially considering the fact that the new system was more than 95% operational. The respondents indicated that all departments were now operating from the system and the progress was generally good. They attributed good automation implementation

performance to good coordination and support from top management including the directors who wanted to see the automation process succeed.

The respondents were further asked to indicate the main drivers of automation process at NSE. From the findings, the respondents identified several key drivers. These included: the need to improve efficiency in the various NSE work processes, reduce costs in communication and to improve the work environment for staff. Specific drivers for automation strategy as indicated by the interviewees' included cumbersome filing system, cumbersome retrieval and tracking of records, save the organization some costs like on stationery, delayed and inefficient communication within the organization through hard copies, easing the reconciliation processes, increase the accuracy levels among staff in their work, and reduce the lead time thereby improve market performance. Another rdriver was the need to create more confidence in the country's capital markets and enable the government and the private sector to access long-term financial resources. The respondents indicated that another key driver for automation of the trading system was to make it easier for Kenyans and foreigners to invest through the stock exchange and increase the capacity of the markets to absorb larger issues. NSE management also wanted to see increased market liquidity, reduction in the time taken to execute a trade, lower trading costs and also moving the NSE to be a world class standards stock market.

Following successful automation, the respondents were requested to indicate the manner in which automation strategy affected the turnaround time. From the findings, it was noted that as a result of automation, it was easier for staff to retrieve, share and use information stored. This made their work easier as they could access most of the

information online from any computer connected to the network. This also introduced flexibility in the way the employees worked hence promoting employee productivity.

Respondents also indicated that following automation at the NSE, the levels of accuracy of staff increased. This was attributed to ease of access to archived data which facilitated quality decision making. This also improved information management at the organization as most information was readily available among staff. This improved time management of staff as they did not need to move about manually to archives to retrieve any information.

4.4 Challenges of strategy implementation

The study sought to establish from the interviewees' the challenges that NSE faced in the implementation of automation strategy. From the research findings, the interviewees indicated that NSE faced several challenges. On whether there had been some challenges during the implementation of automation strategy, the interviewees' indicated that the organization faced a fair share of challenges in the implementation of the automation strategy.

4.4.1 Inadequate resources

First, a major challenge included inadequate resources to finance the implementation of the automation strategy. The automation strategy required both software and hardware infrastructures and employee training which were quite expensive and the position was even made worse by the depreciation of Kenyan currency against the United States Dollar and high inflation in the country. Due to currency depreciation, the infrastructure became more expensive than had been budgeted earlier.

The interviewees also indicated that inadequate office equipment including servers with huge capacity hampered the implementation process of automation strategy at NSE. The existing hardware in some offices were very old and incompatible with the new ERP system. This meant that the employees had to share some equipment at some time or the other.

4.4.2 Staff Challenges

Another challenge faced in the implementation of the automation strategy at NSE as indicated by the interviewees included high resistance from staff who were meant to be the implementing agents. The interviewees indicated that staff were resistant to the automation strategy as they feared they would be laid off following the successful implementation of automation strategy. This led to some staff not actively participating in the automation strategy implementation process. However, to help fast track the implementation process, the interviewees indicated that NSE had to incorporate the automation strategy in the job descriptions and other performance indicators forming part of the employees' day to day duties.

The interviewees' indicated that another challenge facing automation strategy implementation at NSE involved limited training on the new Enterprise Resource Planning software system. This was partly attributed to limited financial resources and high resistance among employees. Many employees working with NSE were not conversant with the functioning of such software and as such it was necessary to train and update them on the usage of the software.

The interviewees also indicated that NSE faced the challenge of high consultancy costs. The implementation of automation system required hiring of special services of the software development expert to help in the roll out process. This cost continued to grow following the slow speed of roll out especially caused by slow internet speeds and in some instances lack of it. This has led to the organization spending more than it had budgeted for the project.

4.5 Response to Challenges by NSE

The interviewees' were asked to name a few strategies that NSE had employed to reduce the effects of the identified challenges on automation strategy implementation. Some of the responses were as follows:

4.4.1 Creation of awareness

First, the interviewees indicated that NSE leadership had tried to create awareness of the automation of NSE business processes so as to foster positive attitude towards the planned change in work processes so as to reduce resistance from employees. To achieve this, the organization enhanced its communication process by involving departmental heads in the implementation process who held meetings in their departments to communicate information from strategy formulation team to other employees. In addition, the organization employed use of Memos and emails to pass on information to all staff in the organization.

The respondents also indicated that another way that the management responded to challenges of automation strategy implementation was through facilitation of resources availability. The management enhanced resources available for the automation strategy

implementation from other sources despite the diminishing funding from the Exchequer. These included the required hardware and software for the smooth roll out of the automation strategy. This ensured that resources required for the implementation were availed as and when required to reduce chances of strategy failure.

The management also responded by establishing an implementation committee which comprised of members from different departments who were in charge of monitoring progress of the automation strategy and ensuring that the activities progressed as scheduled. This ensured that the automation strategy was not derailed and stayed on course. This also promoted the level of accountability and responsiveness of the deferent departments since they had been represented on this committee.

4.4.2 Training, awareness and promotion of change process ownership

The interviewees also indicated that the management through the ICT department had facilitated the implementation of the automation strategy through training and awareness by ICT staff for all employees at all levels. The training equipped employees with knowledge on how the ERP shall be operating and helping out with any challenges experienced when using the system. This helped in acquiring the goodwill of the employees and commitment in the implementation process. This further played a big role in the reduction of employee resistance to the automation strategy.

To respond to challenges experienced in the automation strategy implementation, NSEmanagement moved to assure all staff that the automation strategy was meant to improve efficiencies and effectiveness of the operations at the Organization and was not meant to declare anybody redundant. This motivated staff to work extra hard to ensure

successful automation strategy implementation. NSE also put in place control by allocating user names and passwords to staff to help track the contribution and work done by each staff in the automation strategy.

4.6 Effects of Automation Strategy at NSE

Respondents were asked to indicate the effects of automation strategy at NSE on service delivery, organizational competitiveness, innovativeness, information intelligence and relationship with other stakeholders. From the responses, the interviewees indicated that the implementation of automation strategy improved so many things in the organization. First, the respondents indicated that automation improved service delivery in the organization as employees' turnaround time improved their by increasing the amount of work they could handle at any one given moment compared to earlier performance.

Automation also improved the competitiveness of the NSE not just locally but internationnaly. As envisioned, the respondents indicated that automated trading system delivered the promise of much more efficient trading and transaction processing, and shone the path for a modernized exchange ready for even greater growth. The system allowed for many changes and improvements that were not possible before, not least being longer trading hours per day and more options for transactions and trades. Besides trading equities, the Alternative Trading System is also fully capable of trading immobilized corporate bonds and treasury bonds. automation of the bond market led to an increase in the bond market turnover, prices, and bond market deals. The bond market automation significantly led to an increase in bond turnover, prices, and deals. Given the increased number of deals due to automation, those wishing to invest in the bond market

were offered an opportunity to do so because the market is able to capture as many deals per day as possible with the automation.

The main benefits that automated trading system at NSE brought to the participants in the stock market as indicated by the respondents included the reduction of fraud, overall market efficiency and reduction in transaction cost. The efficiency of the stock market is based on fraud detection, efficiency in price reporting and regulation of market. Following the significance relationship between electronic trading and stock market efficiency, the respondents indicated that automated trading improved the efficiency of the stock market in general. These findings confirm that automation had improved the competitiveness of the NSE.

4.7 Discussion of Findings

From the findings of the study, the main drivers of automation process at NSE include:the need to improve efficiency in the various NSE work processe,reduce cost in communication and to improve the work environment for the staff;cumbersome filling system, cumbersome retrieval and tracking of records, save the organization some come cost like on stationery, delayed and inefficient communication within the organization through like on stationery,delayed and inefficient communication within the organization through hard copies, easing the reconciliation processes, increase the accuracy level among staff in their work, and reduce the lead time thereby improve market performance; the need to create more confidence in the country's capital markets and enable the government and the private sector to access long-term financial resources.These findings are consistent with the argument of Frino (2008) who explained that automation leads to operational excellence.The human cost of manually orchestrating all of the status-related

activity of an end to end process is staggering, not to mention the quality and cycle-timeimplications that affect customer satisfaction(picot, Bortenlaenger, and Roehrl,1994). It can be inferred that NSE wanted to improve its. Efficiency, accuracy and reduce operational cost through automation.

The findings are also consistenty with the argument of Dragota and Mirtica (2006) that the process automation can allow an organization to achieve its overarching goal:to be able to use what exists, extend its value to any line of business and dynamically adapt behavior by channel for a personalized experience-all with spees to market,low risk, and low cost. Banks are deploying automation in many of their core processes but doing itin a way that delivers a unique customer experience. Through automation, NSE was able to unlock the potential of its staff and increase their productivity.

The findings also indicate that the management of NSE were fully involved in automation strategy.As Healthfield (2009) argued, without commitment of senior executives, participants feel fooled and mislead. This complements what Rap (2004) claims that the commitment to the strategic direction is a prerequisite for strategy implementation, so top managers have to show their dedication to the effort.This not withstanding what Ahoy (1998) argues; that upfront commitment by leaders include ian adherence to the full and thorough process of strategic planning which must culminate in the implementing programs and services and commit allocations to meet the objectives of the strategic plan at a level that is doable for the organization and level of activity.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 Introduction

This chapter provides the summary of the findings from chapter four, and also it gives the conclusions and recommendations of the study based on the objectives of the study. The conclusions and recommendations are drawn in quest of addressing the research question or achieving at the research objectives which was to determine the strategic value of automation at the Nairobi Stock Exchange.

5.2 Summary Of The Findings

The study established that the progress was especially considering the fact that the new system was more than 95% operational. All department were now operating from the system and the progress was generally good.The main drivers of the automation process at NSE included: the need to improve efficiency in the various NSE work processes,reduce cost in communication and to improve the work environment for staff; cumbersome filing system , cumbersome retrieval and tracking of records, save the organization some costs like on stationery,delayed and inefficient communication with organization some cost like on stationery,delayed and inefficient communication within the organization through hard copies, easing the reconciliation processes, increase the accuracy levels among staff in their work, and reduce the time there by improve market performance; the need to create more confidence in the country's capical markets and enble the government and the private ssector to access long term financial resource to

make it easier for Kenyans and foreigners to invest through the stock exchange and increase the capacity of the markets to absorb lager issues.

On the manner in which automation strategy affected the turnaround time, it was noted that as a result of automation, it was easier for staff to retrieve, share and use information online from any computer connected to the network. The level of accuracy of staff increased thereby easing of access to archived data facilitated quality decision making. This also improved information management at the orgazation as most information was readily available among staff.

NSE faced many challenges in the implementation of automation strategy, first, a major challenge included inadequate resources to finance the implementation of the automation strategy.The automation strategy required both software and hardware infrastrutures and employee training which were quite expensive and position was even made worse by the depreciation of Kenyan currency against the United States Dollar and high inflation in the country.Inadequaate office equipment including servers with huge capacity hampered the implementation process of automation strategy at NSE. The existing hardware in some office were very old and incompatible with the new ERP system. Another challenge faced in the implementation of the automation strategy at NSE included high resistance from staff who were meant to be the implementing agents. This led to some staff not actively participating in the automation strategy implementation process. Another challenge facing automation strategy implementation at NSE involved limited training on the Enterprice Resource Planning software system.

Many employees working with NSE were not conversant with the functioning of such software and as such it was necessary to train and update them on the usage of the software.NSE faced the challenge of high consultancy cost. The implementation of automation system required hiring of special services of the software development expert to help in the roll out process. This cost continued to grow following the slow speed of roll out especially caused by slow internet speeds and in some instances lack of it.This lead to the organization spending more than it had budgeted for the project.

5.3 Conclusion of the Study

The study conludes that the progress was good especially considering the fact that new system was more that 95% operational. All departments were now operating from the system and the progress was generally good. The main driver of automation process at NSE included: the need to improve eddiciency in the various NSE work processes, reduce cost in communication and to improve the environment for staff; cumbersome filing system, cumbersome retrieval and tracting of records, save the organization some cost on stationery, delayed and inefficient communication within the organization through hard copies, easing the reconciliation processes, increase the accuracy levels among staff in their work, and reduce the time thereby improve market performance; the need to create more confidence in the country's capital markets and enable the government and the private sector to access long-term financial resources.

The study also concludes that automation strategy affected the turnaround time as it made it easy ffor staff to retrieve, share and use information online from any computer

connected to the network. The levels of accuracy of staff increased thereby easing of access to archived which facilitated quality decision making.

The study also conludes that NSE faced several challenges in implementing automation strategy.These included inadequate resources to finance the implementation of the automation strategy; Inadequate office equipment including servers with huge capacity hampered the implementation process of automation strategy at NSE; high resistance from were meant to the implementing agents; and limited training on the new Automated Trading System software system.

5.4 Recommendations of the Study

From the findings and concusion, the study recommends that in order for NSE to realize full potential of automation,it needs to create awareness among the public especially on the benefits of automation to the convenience and efficiency on their operations especially in the bond market to boost bond market activities.

The study further recommends that in order to continue enjoying the advantages of automation, NSE need to be the look out for the developments.In formation technology is evolving very fast and the advantages will only accrue to those firms that keep pace with thase developments.

5.5 Limitations of the Study

A limitation in this study was defined as any condition that was present and affected and the achievements of the objectives of the study. The study faced a limitation as regards achievement of the objective of the study. The study faced a limitation as regards

respondents confidence that the information provided would not be misused but used for the purpose for which it was meant. To overcome this challenge, the researcher assured the respondents the informantion they provided would be trrated with confidentiality and used for academic purposes only.

Being that this was a case study on one institution the data gathered might differ from value of automation in other institutions.This is because different instutions derive different values from automation in and hence may not be fully applicable to all organizations.

The study also faced both time and financial limitations. The duration that the study was to be conducted was limited hence extremely comprehensive research could not be carried out. However,the researcher countered this limitation by carrying out the research across different sections heads in the organization to enable a generalization of the study findings.

5.6 Reccomendations for further Research

The study recommends that further research should be done on challenges of automation strategy in the organizations to establish the kind of challenges faced by the organization in their quest to automate their process.This will help organizations in planning efforts so as to deal with the challenges in good time and enhance full value derivation from automation.

The study further recommends that future studies be done on strategies adopted by NSE response to changes in the operating environment. Change is a constant thing and as time time lapses,many organizations are operating environment different from those

experienced in the past. NSE on the functioning of NSE.In the same way, several legislations have also come into force with the intention of increasing investor confidence in the market.Future strategies should look into strategies adopted by NSE to attract and retain more investors especially foreign investors.

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APPENDICES

APPENDIXI: INTERVIEW GUIDE

STRATEGIC VALUE OF AUTOMATION AT THE NAIROBI STOCK EXCHANGE

Section A: Automation Strategy implementation

1. NSE has been implementing automation in its operations. What is the progress like?
2. What were the main drivers of automation process at NSE?
3. How has automation strategy affected staff turnaround time at the NSE?
4. How has automation strategy affected the accuracy levels of staff of NSE?
5. How has automation strategy affected information management at NSE?
6. How has automation strategy affected overall service delivery of the organization?
7. Has there been some challenges during the implementation of automation strategy? What are some of these challenges that came up during automation strategy implementation that had not been anticipated?
8. How has NSE dealt with these challenges to ensure successful automation strategy implementation
9. How has automation affected service delivery at NSE?
10. How has automation strategy contributed to the competitiveness of NSE?
11. How had automation strategy affected the competency levels in the organization?
12. How has automation strategy contributed to innovativeness in the organization?
13. How has automation affected the relationship between NSE and other stakeholders?
14. How has automation contributed to information intelligence at NSE?
15. To what extent has automation strategy affected operations at the NSE?

APPENDIX 2: LIST OF LICENSED STOCKBROKERS

1.ABC Capital Limited

2. AIB Capital Limited

3. ApexAfrica Capital Limited

4. Genghis Capital Limited

5. Francis Drummond and Company Limited

6. Kestrel Capital (E.A) Limited

7. Kingdom Securities Limited

8. NIC Securities Limited

9. Old Mutual Securities Limited

10. Sterling Capital Limited+

11. Suntra Investment Bank Limited*