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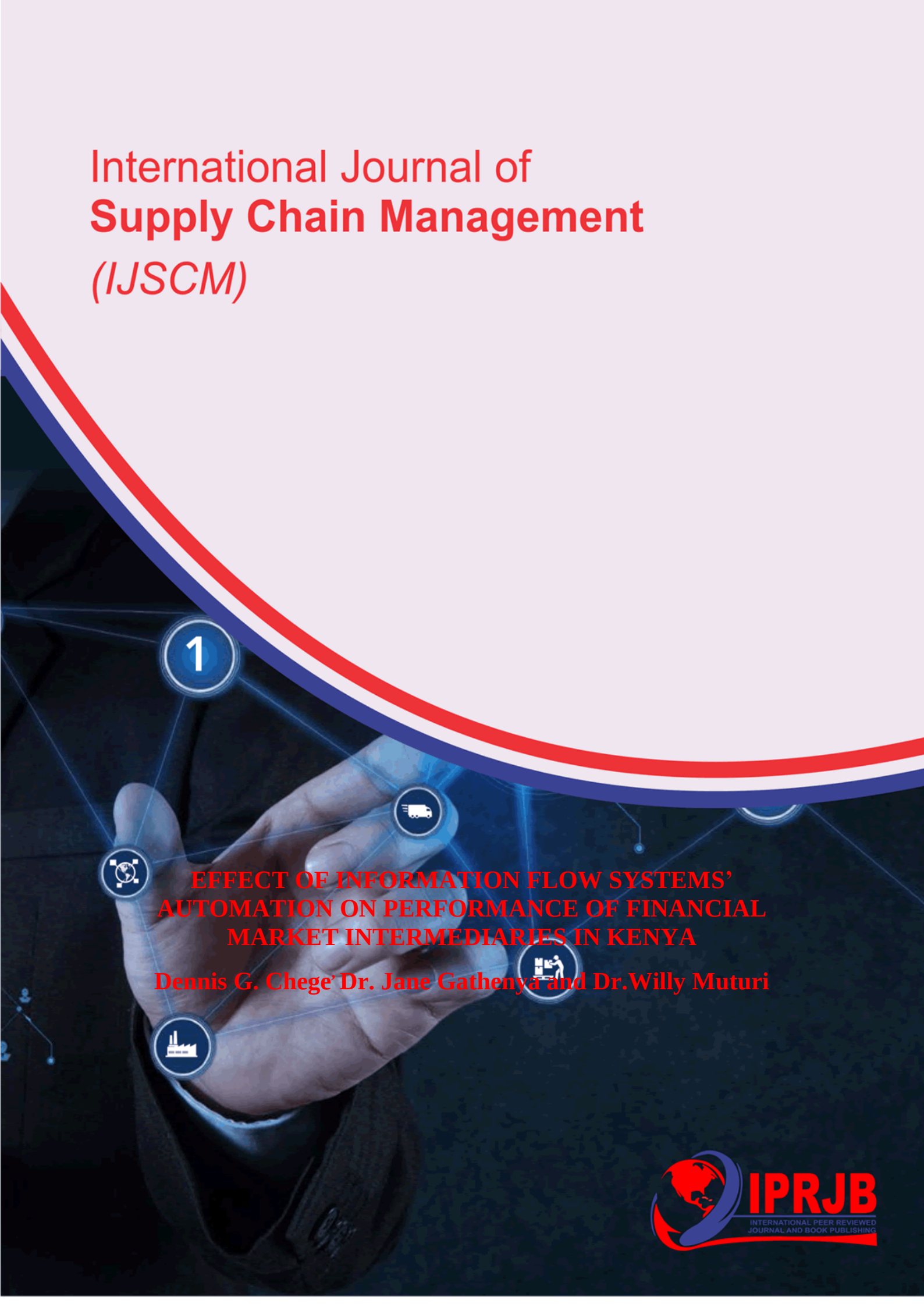

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EFFECT OF INFORMATION FLOW SYSTEMS' AUTOMATION ON PERFORMANCE OF FINANCIAL MARKET INTERMEDIARIES IN KENYA

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Abstract

Purpose*:* To determine the effect of information flow systems' automation on performance of financial market intermediaries in Kenya.

Methodology*:* The study adopted a longitudinal approach, with study population being 218 employees in 109 financial market intermediary firms. The study used a census approach which greatly helps deal with the sampling errors involved in most studies of this kind. Additionally the study employed both primary and secondary data. Primary data was collected through questionnaire while secondary data was obtained from the firm's financial records. A pilot study was conducted to measure the research instruments reliability and validity. Descriptive and inferential analysis was conducted to analyze the data while multiple and simple regression analysis was used to measure firms' performance as influenced by supply chain automation. The data was presented using tables, graphs and charts.

Results*:* Based on the findings the study concluded that information flow processes influenced the performance of financial market intermediaries in Kenya. This can be explained by the regression results which showed that the influence was positive and also showed the magnitude by which information flow processes influenced the performance of financial market intermediaries. The regression results showed that information flow processes influenced the performance of financial market intermediaries by 0.169units.

Unique contribution to theory, practice and policy: The study recommended for complete automation of information flow systems in the financial intermediaries. This will enhance making of informed decisions based which largely depends on the quality of information given. Also, information flow coordination among the trading partners is essential.

Keywords: information flow systems, *automation, performance, financial market intermediaries*

INTRODUCTION

Background of the Study

Harland (2010) defines supply chain management as the "design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally". According to Becker (2000), supply-chain problems cost companies between 9 and 20 percent of their value over a six-month period. Despite this, attempts to automate solutions to majority of these problems are complicated by the need for the different players in a supply chain to maintain the integrity and confidentiality of their information systems and operations. However, for companies to achieve their supply chain management objectives, they must fully integrate and automate all departments and partners, rather than certain areas. Towards this end, technology becomes an indispensable "enabler" for supply chain automation (Nash, 2010).

Like other commercial entities, financial intermediaries - institutions that facilitate the channeling of funds between lenders and borrowers indirectly (Pierre, 2011) - need to automate their supply chain processes in order to increase operating efficiencies, improve profitability, and enhance overall performance. Halachimi (2012) defines performance in stock brokerage firms as being the achievement of business, financial, effectiveness, and organizational objectives. Armstrong (2011) adds that such performance is indicated by market share, sales growth, and development of new products while financial performance is indicated by profit margin, total assets and equity multiplier. Indicators of effectiveness include quality of service, degree of social responsibility, positive work culture, and good image of the company and level of customer satisfaction. Chavan (2009) argues that performance focuses not only on what people achieve, but also how they achieve it. Boatright (2012) adds that financial performance is a subjective measure of how well a firm can use assets from its primary mode of business and generate revenues. This term is also used as a general measure of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation.

According to Wangai and Ngugi (2014), the performance of a stock market of an economy is of interest to various parties including investors, capital markets, the stock exchange and government among others. Stock market performance is influenced by a number of factors, key among them being government activities, and the general performance of the economy. Other factors that affect the stock market's performance include, availability of other investments assets, change in composition of investors, and markets sentiments among other factors (Mendelson & Robbins, 2003).

Kenneth (2009) postulates that brokerage services industry is cyclical and performance is tied most closely to that of the stock market, which tends to lead economic performance. Christopher (2012) links the stock market cycle to economic cycle and argued that the relationship is far from perfect; with stock market downturns leading recessions by approximately nine months, and market upswings preceding expansions by about five months. Adjasi (2010) attributes the brokerage industry's cyclical nature to two factors. First, most of its business lines (commissions, trading, investment banking, etc.) have a tendency to move in tandem expanding during bull market runs and contracting during corrections. Second, employment numbers increase during bull markets and are significantly cut during bear markets, thus amplifying the effect of the next boom or bust on brokerage firms' bottom

lines. This notwithstanding, argues Christopher (2009), the role of supply chain automation is to create a major source of competitive advantage for the enterprise to differentiate itself in the eyes of the customers from its competitors by operating at a lower cost and hence at a greater profit.

Performance of stock markets differs significantly among countries in the developed, developing, and in the third world due to a myriad of factors. In the US, for instance, rapid technology has led to use of online brokerage, which has significantly changed the dynamics of the marketplace, causing one of the biggest shifts in individual investors' relationships with their brokers since the invention of the telephone. According to Franklin (2012) the percentage of equity trades conducted online has grown tremendously, signaling better performance in the brokerage firms in the US.

Japan, on the other hand, has experienced mixed results in the performance of their brokerage firms. The brokerage firm's traditional main source of revenues, commission fees for undertaking trade, has been threatened by the rise of online discount brokerage firms. The revenues of securities firms that depended on commissions deteriorated. As a result, leading online brokers in Japan have made intensive investment in their internet-based trading systems to offer a variety of advanced trading tools for individual traders. Among the middle to small firms, some select mergers and some enter a partnership with nationwide banks while others are forced out of business (Ministry of Internal Affairs and Communications, 2008).

Performance of the stock market in emerging markets has had mixed results. For instance, August of 2015 saw the Shanghai Composite Index (SCI) fall by more than 20%. The losses, concentrated at the end of the month, represented the second significant market drop in less than two months, following a similar plunge in July (Bendini, 2015). The rout was dramatic, but so had the gains; given that backlash had come after a remarkable growth of the Shanghai stock market by more than 150 % between June 2014 and June 2015. According to Bendini (*ibid*), this plunge saw Chinese investors lose close to EUR 5 trillion - a sum higher than China's entire market capitalization in 2012. In the weeks since the SCI reached its 12 June peak, the index has lost more than 40 % of its capitalization. The smaller and technologically-oriented Shenzhen Stock Exchange (STE) suffered even higher losses, nullifying all the gains that it had made in 2015.

Sumra *et al* (2011), in their study of the impact of internet trading on the profitability of investment banks and brokerage firms in Pakistan ascertained that the proliferation and penetration of internet opened new horizons and scenarios for the retail banking industry. As the scholars found out, banks provided their products and services through the electronic medium; where internet banking was considered to have substantial impact on banks' performance. They concluded that internet trading had increased the profitability of investment banks and brokerage firms; it had enabled them to meet their costs and earn profits even in the short span of time.

In Kenya, a third world country, dealing in stocks and shares started in the 1920s when the country was still under British colony (Wangai & Ngugi, 2014). There was however no formal market, no rules and no regulations to govern stock brokerage activities. Trading took place on gentlemen's agreement in which standard commissions were charged with clients being obligated to honor their contractual agreements of making good delivery and settling relevant costs. In 1951 Francis Drummond established the first professional stock brokerage firm and other stock brokerage firms were later established (Wangui & Ngugi, *ibid*2014). The

Nairobi Stock Exchange was constituted as a voluntary association of stockbrokers registered under the societies Act in 1954 and in 1991 the Nairobi Stock Exchange was incorporated under the companies Act of Kenya as a company limited by guarantee and without a share capital. Subsequent development of the market has seen an increase in the number of stockbrokers, introduction of investment banks, establishment of custodial institutions and credit rating agencies and the number of listed companies have increased over time. Securities traded include, equities, bonds and preference shares (NSE, 2014).

Kibuthu (2005) notes that the period preceding the 2002 general election saw the NSE experience decline in market performance. The uncertainty of the business environment resulted in the decline in the confidence and subsequently poor performance of the stock market. After the new government came into power, the market infrastructure was improved by installation of a computerized central depository system (CDS) introduced on November 2004 and whose operations included, keeping the share registry, clearing and settlement arrangement hence assuring faster, safer and easier trading insecurities *(*Kibuthu, 2005). Despite the measures taken, several firms such as Nyaga Stock Brokers and Thuo Stock Brokers were declared bankrupt back in the year 2007. Discount Securities Limited was also placed under receivership and several other companies continue to face solvency challenges.

Problem Statement

According to Nairobi Stock Exchange (2014) cases of financial market intermediaries having performance problems has been on the rise since the 2006.This is the same year that the stock market was automated in Kenya. The collapse of stockbrokerage firms has resulted to market decline as whole, investors lose money and cut back on their consumption leading to low economic development. Recessions witness the loss of jobs, and again a decline in consumption (Wangai & Ngugi, *ibid*). The rate at which the financial intermediaries have been performing poorly and collapsing is alarming and it begs the question whether automation had something to do with it. Over the past few years, Kenyans have watched desperately as brokerage firms such as Nyaga and Thuo Stockbrokers either collapsed or went under receivership, taking with them about Ksh3 billion of investors' money (Daily Nation, Oct 28, 2009). Much of this poor performance has been blamed on the macro environment such as the cyclical nature of the financial markets industry, with performance tied most closely to that of the stock market. This, in turn, is related to economic performance and the relationship between the stock market and economic cycle. The imperfections in the macro-economy lead to stock market downturns consequently leading to poor performance of brokerage firms (Kenneth, 2009).

However, trading at the NSE involves stockbrokers and other intermediaries, who control the investor's orders running in the supply chain through the Automated Trading Systems (ATS), (Otuke, 2006). There have been complaints raised by investors' touching on certain intermediaries, with the money at various levels of the supply chain not adding up in the clearing accounts (Ngigi, 2011). Concerns of supply chain fraud have also been raised with some brokers living off their clients' investment with shares being traded without permission. Other market players will fail to pay promptly the proceeds as required by law under NSE regulations (Bonyop, 2009).

However, a report by the World Bank shows automation of the supply chain through introduction of information technology had contributed to improved performance of financial market intermediaries in the developed world (World Bank, 2013). Based on these findings, the study set out to establish whether the same would hold for the financial market players in

developing countries a case in Kenya. Specifically, the study sought to determine the effect of information flow systems' automation on performance of financial market intermediaries in Kenya

Research Objective

To determine the effect of information flow system's automation on performance of financial market intermediaries in Kenya

LITERATURE REVIEW

Theoretical Framework

Supply Chain Management/Systems Theory

This theory has been widely used by scholars in trying to explain issues surrounding supply chains and the enhancing systems. Some scholars such as Sushil (2012) emphasized the need for a 'flexible system theory', relating to several systems based approaches and techniques as a means of effectively catering to problem situations. According to Siau (2010) new insights are gained by abstracting the view of the information systems field. In a similar vein, new and crucial insights may emerge out of the application of general systems theory to supply chains and supply chain management.

As suggested by Caddy (2010) the purpose of developing a Generic Supply Chain Model (GSCM) is to provide a deeper understanding of supply chains, in terms of their development, operation and management. A representative literature review of supply chain and supply chain management frameworks and models reveal that there is not an already developed and generally accepted comprehensive model of supply chain as revealed by (Helou, 2009). According to Moon (2009) models of supply chain seem to concentrate on only one particular aspect or dimension of the supply chain, viz. organization structure/strategy while negating on other aspects such as information technology and human factors as was proposed by (Calantone, 2010). If views by Sushil (2012) are anything to go by, each of these dimensions should be considered crucial by their own, as each factor by itself does not provide a complete and comprehensive view of supply chains and their management. Combining the above mentioned three dimensions result in the development of a generic supply chain model, in which each of the dimensions provides a separate as well as a related conjoint contribution. The generic model shown below allows for the diversity of real world situations by incorporating into the model the interactions among the three dimensions. Different outcomes are generated given the nature of the type and level of interaction. In addition, the type and level of interactions it would be contingent upon organizational culture, the environment in which the organization operates, and the characteristics of the supply chains utilized in the exchanges that occur among organizations.

Process theory

The application of process theory on information technology and business value was initially proposed by Soh & Markus (2012). Their process theory model suggests that investments in IT projects, applications, and skill base represent creation of IT assets in an organization. Successful deployment of IT assets leads to redesigned processes, improved decision-making, and improved coordination. The model further argues that IT infrastructure, rather than directly impacting aggregate firm performance, may instead support critical processes that improve firm performance. The process theory view of IT payoff is that firms derive business value from intermediate operational and management processes. As IT continues to permeate

the organization, the authors argue, automation has a greater impact on the processes and eventually on the organization.

Complementing the process theory models were the findings of Barua (1996) who presented a theory of business value complementarity. Using the process model the authors argue that the value of having more of one factor increases by having more of another complementary factor. The authors suggest that organizational payoff is maximized when several factors relating to IT, organizational structure, business processes, and incentives are changed in a coordinated manner in the right directions by the right magnitude to move toward an ideal design configuration.

Applying the process theory to the notion that IT exerts indirect effects on firm performance via process variables, the current study proposes that automation of security market compliments organizational characteristics and processes, and that the adoption of IT and business process optimization cannot succeed if done in isolation. Thus, even with automation of the security market performance of firms may differ depending on other factors such as organizational structure, human resource among others.

Empirical Review

The design of information flow in supply chains has traditionally followed the physical flow along the chain (Lewis & Talalayevski, 2004). Sub-optimal supply chain performance, in many cases, has been the result of poor information sharing. Adopting advanced information systems, which enable efficient information sharing between the members of supply chains and over supply chain phases, may however change the situation. A main purpose of automating the information flow process is to achieve collective goals that individual actors cannot reach. The need for such coordination is evident in supply chains, as companies forming a supply chain are dependent on the performance of other organizations. Supply chain coordination is however achieved when a decision maker, acting rationally, and basing decisions on accurate information, makes decisions that are efficient for the supply chain as a whole (Gupta & Weerawat, 2006).

Information flow in supply chains has been studied before, for example by Sahin & Robinson (2002; 2005), who state that incomplete understanding on the interaction between information sharing and physical flow hinder attempts to achieve higher levels of supply chain integration. In many cases information sharing alone does not improve supply chain performance. They argued that physical flow coordination among the trading partners is essential. The key to enhanced supply chain operations does not lie solely in efficient information transfer and sharing, but also in information availability and timeliness (Kehoe & Boughton, 2001, English, 2001).

The quality of shared information has a clear impact on the planning outcome (Petersen, 1999, p. 69-88) and is critical to the effectiveness of decision-making (Petersen , 2005). Furthermore, Simchi-Levi et al. (2003, p. 11) saw supply chain management as being concerned with utilizing the data and the sophisticated analyses of this data. The primary issue is what data should be transferred and what part of the data can be ignored. There are, however, few research results that relate to how the quality of shared information affects the performance of supply chains. Information quality is defined as the degree to which the information meets the needs of the organization. This includes such aspects as accuracy, timeliness, adequacy, completeness, credibility, ease of access, and compatibility across users (Monczka et al., 1998). English (2001) described information quality according to the needs

of the decision maker, and argued that the right data in a complete form and in the right context is needed. The data need to be accurate and objective, and the decision maker should have a single version of the information. The data should be in such a form that it can be used efficiently and effectively, and at the right time and place for the right purpose.

Some writers have pointed out a new challenge, which arises from frequent and wide information sharing practices: companies may face difficulties surviving the overabundance of data (Malhotra, 2000).

A few studies have examined how offering information from various sources and in a frequent manner may harm decision-making. One example is the study by Disney *et al*. (2004), who based their work on the earlier study by Hong-Minh *et al*. (2000), and studied decision making in the Beer Game. They noticed that the decision maker could not improve decisions when he/she had a wide range of data; it confused the player and ended up in worse decisions and higher inventories in the chain. It was concluded that, particularly when human intervention is needed, decision-making becomes more complex in a transparent environment.

The design of information flow in supply chains has traditionally followed the physical flow along the chain (Lewis & Talalayevski, 2004). Sub-optimal supply chain performance, in many cases, has been the result of poor information sharing. Adopting advanced information systems, which enable efficient information sharing between the members of supply chains and over supply chain phases, may however change the situation. Instead of suffering from scarcity of data, the challenge for companies is to achieve good quality information (Wagner, 2002) and to decide which data can be utilized in decision making to improve supply chain performance and which data can be ignored. Information flow is described as volume of information shared, which describes the existence, extent, and availability of data and also includes three features of information flow: speed, frequency, and abundance of information. This follows the suggestions and definitions derived from the literature, especially by Samaddar et al. (2006), Petersen et al. (1999), and English (2001). Volume of information shared is selected because advances in information technology have made it possible to communicate demand between supply chain partners and also over supply chain echelons. In some cases a company may suffer from overabundance of information, or from scarcity of data, . Traditionally companies have suffered from inadequate or asymmetric information and had to base their decisions on local and often sparse information, which lead to many supply chain inefficiencies (Patnayakuni 2006). It has become imperative for firms to receive and share information to align supply and demand and to cope with changes in the environment. The term ‘volume of information shared’ is related to the term ‘information quality’, when it is understood broadly, in a meaning how well information supports the needs of a decision maker. However, information quality is realized only when information is used.

A huge literature does exist concerning developments in information technology that have provided new opportunities through electronic commerce, where transactions are competed through a variety of electronic media, including electronic data interchange (EDI), electronic fund transfer (EFT), bar codes, point of sale systems (POS), fax, automated voice mail, CD-ROM catalogues, and a variety of others (Croom, 1999). These issues are dealt with not only at a dyadic level: information technologies are supply chain “enablers” in that they can help managers in developing information systems not visualizing information as a set of repetitive transaction between entities such as buyers and suppliers, or distributors and retailers. Rather

they should help them in developing ideal systems spanning all functions and organizations throughout the entire supply chain (Handfield & Nichols, 1999)

Conceptual Framework

Independent Variables **dependent Variable**

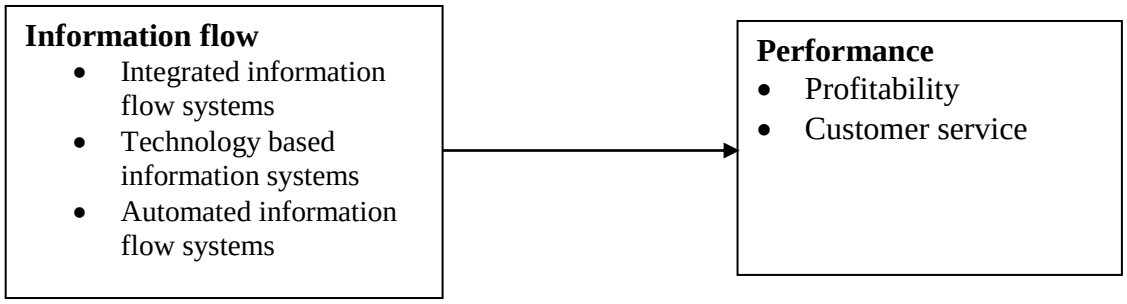

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

The study employed a longitudinal approach. The study used the standard population list of all approved intermediaries in Kenya. The study used the investment analyst or supply chain officers under the licensed financial market intermediary and thus used the entire population as a sample by selecting 2 employees under each organization as respondents. The total target population was 218 respondents. The study assimilated a census approach. The study used both secondary and primary data. Descriptive statistics such as mean scores, standard deviations, percentages, and frequency distribution were computed to describe the characteristics of the variables of interest in the study. Statistical package for social sciences (SPSS) computer software was used. Microsoft excel was used to complement SPSS especially in production of diagrams and tables. Inferential statistics such as correlation and regression analysis as suggested by Muthen and Muthen (2007) was used to establish the nature and magnitude of the relationships between the variables and to test the hypothesized relationships. Specifically, the study adopted a linear regression model for the test of the effect of the above model on performance of the stock brokerage firm.

RESULTS AND DISCUSSIONS

Response Rate

The number of questionnaires that were administered was 218. A total of 170 questionnaires were properly filled and returned. This represented an overall successful response rate of 78% as shown on Table 1. This agrees with Babbie (2004) who asserted that return rates of 50% are acceptable to analyze and publish, 60% is good and 70% is very good. Based on these assertion 78% response rate is adequate for the study.

Table 1: Response Rate

Response	Frequency	Percent
Returned	170	78%
Unreturned	48	22%
Total	**218**	**100**

Demographic Characteristics

This section analyzes the demographic characteristics of the respondents. This section presents the descriptions of the respondents in terms of the number of years worked; type of organization; and period of existence.

Number of years worked

The respondents were asked to state the number of years they had worked in their respective firms. Results in table 2 reveal that 36% of the respondents indicated less than 5 years, 32% indicated 11-15 years, 25% indicated 6-10 years while 7% of the respondents indicated more than 15 years. This implies that a large number of the employees working in the financial intermediaries were recently employed. This implies that the new employees have the potential and energy to improve the performance of the firms. At the same the time, the firms have a good percentage of employees who have worked for more than 10 years. These findings agree with those of Nyajom (2013) who in his study found out that 36.6% of the respondents had served in the state corporations for 21 years and above, 26.8% of the respondents had served for 16–20 years, 19.5% had worked in state corporations for 11–15 years, 12.2% had worked for 6–10 years while 4.9% had worked for 1–5 years.

This implies that the firms' have skilled and experienced employees who have the capacity to improve the performance of the firms.

Table 2: Number of years worked

Number of Years Worked	Frequency	Percent
Less than 5 years	61	35.9
6-10 years	42	24.7
11-15 years	55	32.4
more than 15 years	12	7.1
Total	**170**	**100**

Organization Type

The respondents were asked to indicate the type of financial organization they represent. Results in table 3 reveal that majority (62%) of the respondents indicated fund management firms, 15% indicated brokerage firms, 12% indicated investment banker firms while 10% indicated other financial intermediary firms. This implies that there are more fund management firms compared to other financial intermediaries combined. This agrees with Jan and Stoeldraijer (2010) who asserted that the type of organization directly proportional to the performance of the organization. This implies that the fund management firms offer services that are highly attractive to the customers. This should boost their performance.

Table 3: Organization Type

Organization Type	Frequency	Percent
Broker	21	15.3
Investment Banker	17	12.4
Fund management firm	106	62.4
Other	26	10
Total	**170**	**100**

Period of Existence

The respondents were asked to indicate the number of years their organization has been in existence. Results in table 4 reveal that majority (95%) of the respondents indicated over 10 years, 3% indicated 6-10 years while 1% indicated 1-5 years and less than 1 year respectively. Brown and Duguid (2003) found that highly skilled personnel enhance production of high quality outcomes and effective quality improvement in an enterprise. This implies that majority of the financial intermediaries have been in operation for more than a decade. This implies that the organizations have sufficient experience in the financial market.

Table 4: Period of Existence

Period of Existence	Frequency	Percent
Less than 1 year	2	1.2
1-5 Years	2	1.2
6 – 10 years	4	2.4
over 10 years	162	95.3
Total	**170**	**100**

Descriptive Statistics

The objective of the study was to determine the effect of information flow system's automation on performance of financial market intermediaries in Kenya. The respondents were asked to respond to statements on information flow. The responses were rated on a five likert scale as presented in Table 5 Majority of 68% (54.10+14.10) of the respondents agreed with the statement that their organizations have automated systems of information flow, 95% agreed with the statement that getting access to information first as a source of strategic edge, 87% of the respondents agreed on fast ordering processes with minimal down time, 85% of the respondents agreed on technology based information systems while 90% of the respondents agreed that we have information integration systems with our partners On a five point scale, the average mean of the responses was 4.05 which means that majority of the respondents were agreeing with most of the statements; however the answers were varied as shown by a standard deviation of 0.62.

These findings concur with that of Sahin and Robinson (2002; 2005), who studied Information flow in supply chains. The study concluded that incomplete understanding on the interaction between information sharing and physical flow hinder attempts to achieve higher levels of supply chain integration. The key to enhanced supply chain operations does not lie solely in efficient information transfer and sharing, but also in information availability and timeliness (Kehoe & Boughton, 2001, English, 2001).

Table 5: Information Flow

Statement	Strongly disagreed	Disagree	moderately agree	Agree	Strongly agree	Mean	Std. Dev
Automated systems of flow	0.00%	5.90%	25.90%	54.10%	14.10%	3.76	0.76
Getting access to information first as a source of strategic edge	0.00%	0.00%	5.30%	58.80%	35.90%	4.31	0.57
Fast ordering processes with minimal down time	0.00%	0.00%	13.50%	54.70%	31.80%	4.18	0.65
Technology based information systems	0.00%	0.00%	15.30%	71.20%	13.50%	3.98	0.54
Information integration systems with our partners	1.20%	0.00%	8.80%	75.90%	14.10%	4.02	0.58
Average						4.05	0.62

The respondents were asked to indicate whether information flow has an influence on firm's performance. Results in table 6 reveal that 92% of the respondents indicated yes while 8% indicated no. This implies that most of the respondents are convinced that information flow systems affect their firms' performance.

Table 6: Information flow influence on performance

Response	Frequency	Percent
No	11	7.5
Yes	156	91.8
Total	170	100

The respondents who said yes to the above question were asked to explain why they felt that information flow influence their firm's performance. The best responses were as follows, "It is faster than before; the access to information is very fast and it saves time; less time taken in ordering processes".

The respondents were further asked to indicate whether automation and ICT capabilities influence information flow. Results in table 7 reveal that 91% of the respondents indicated yes while 9% of the respondents indicated no. This implies that most of the respondents believe that automation affects information flow in their organization.

Table 7: Automation influence on information flow

Response	Frequency	Percent
No	11	9.5
Yes	156	90.5
Total	170	100

The respondents who said yes to the question above were further asked to give reasons why they felt that automation influences information flow. The best responses were as follows, "It's faster and cost effective; information stored is very safe; it's faster compared to other systems".

Inferential Statistics

Correlation Analysis

Correlation analysis was conducted between information flow (independent variable) and financial intermediaries' performance (dependent variable). Results in Table 8 indicated that there was a positive and a significant association between information flow and performance of financial intermediaries (r=0.320, p=0.000). This implies that information flow and performance of financial market intermediaries change in the same direction. However, the correlation value (r=0.320) reveals a weak association between information flow and performance of financial intermediaries.

Table 8: Correlation Matrix

		Performance	Information Flow
Performance	Pearson Correlation	1.000	
	Sig. (2-tailed)		
Information Flow	Pearson Correlation	.320**	1.000
	Sig. (2-tailed)	0.000	

** Correlation is significant at the 0.01 level (2-tailed).

Regression Analysis

Relationship between Information Flow Constructs and Performance of Financial Market Intermediaries

The results presented in table 4.9 present the regression model used in explaining the study phenomena. The results indicate that integrated information flow systems (X_{21}) explained 12.8% of variations in performance of Financial Market Intermediaries in Kenya. Additionally, results showed that Technology based information systems (X_{22}) explained 14% of the variations in performance of Financial Market Intermediaries in Kenya. Lastly, results indicated that automated information flow systems (X_{23}) explained 13.4% of the variations in performance of Financial Market Intermediaries in Kenya. The findings are supported by a coefficient of determination (R^2) of 12.8%, 14% and13.4% respectively.

Further, results indicate that the three models are statistically significant as supported by a p value of 0.000. This implies that integrated information flow systems (X_{21}), technology based information systems (X_{22}) and automated information flow systems (X_{23}) are good predictors of performance. The results were supported by F statistics of 24.763 (X_{21}), 27.446 (X_{22}) and 26.036 (X_{23}).

Lastly, results indicate a positive and significant relationship between integrated information flow systems (X_{21}) and performance of Financial Market Intermediaries in Kenya as supported by a p value of 0.000 and a beta coefficient of (0.334). Further, results reveal a positive and significant relationship between technology based information systems (X_{22}) and performance of Financial Market Intermediaries in Kenya as supported by a p value of 0.000 and a beta coefficient of (0.377). Finally, results show a positive and significant relationship

between automated information flow systems (X_{23}) and performance of Financial Market Intermediaries in Kenya as supported by a p value of 0.000 and a beta coefficient of (0.260).

Based on the R squared and F statistics of the three constructs, it possible to rank the constructs as to which best explains the performance of Financial Market Intermediaries in Kenya. The findings indicate the R squared and F statistics of the three constructs as integrated information flow systems (R2=12.8%, F statistics=24.763); technology based information systems (R2=14%, F statistics=27.446); and automated information flow systems (R2=13.4%, F statistics=26.036). This implies that (X_{22}) best explains performance, followed by (X_{23}) and then (X_{21}).

Table 9: Regression Results

	Model 1 Integrated information flow systems (X_{21})	**Model 2** Technology based information systems (X_{22})	**Model 3** Automated information flow systems (X_{23})
(Constant)	2.954	2.795	3.320
β1	0.334	0.377	0.260
R^2	0.128	0.140	0.134
F-statistics	24.763	27.446	26.036
P-value	**0.000**	**0.000**	**0.000**

Relationship between Joint Information Flow Constructs and Performance of Financial Market Intermediaries

The results presented in table 10 present the fitness of model used of the regression model in explaining the study phenomena. The findings reveal that jointly, information flow constructs explained 21% of the performance of financial market intermediaries in Kenya. This is supported by coefficient of determination also known as the R square of 21%. This means that information flow explain 21% of the total variations in the dependent variable (financial market intermediaries performance).

Table 10: Model Fitness

Indicator	**Coefficient**
R	0.455
R Square	**0.207**
Adjusted R Square	0.193
Std. Error of the Estimate	0.48669

Table 11below provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant as supported by a p value of 0.000.

This was supported by an F statistic of 14.457 and the reported p value (0.000) which was less than the conventional probability of 0.05 significance level. The results imply that information flow is a good predictor of firm performance.

Table 11: Analysis of Variance

Indicator	Sum of Squares	Df	Mean Square	F	Sig.
Regression	10.273	3	3.424	14.457	0.000
Residual	39.320	166	0.237		
Total	49.593	169			

The table 12 presents the regression of coefficients results. The findings show that there is a positive and significant relationship between information flow processes and performance of financial market intermediaries in Kenya as supported by a p value of 0.000 and a beta coefficient of (0.169). This implies that an increase in information flow processes by 1 unit would increase the performance of financial market intermediaries by 0.169units.

These findings agree with those of Sahin and Robinson (2005), who states that incomplete understanding on the interaction between information sharing and physical flow hinder attempts to achieve higher levels of supply chain integration. In many cases information sharing alone does not improve supply chain performance. They argued that physical flow coordination among the trading partners is essential. The key to enhanced supply chain operations does not lie solely in efficient information transfer and sharing, but also in information availability and timeliness. Further, Disney *et al*. (2004), who based their work on the earlier study by Hong-Minh *et al*. (2000), and studied decision making in the Beer Game. They noticed that the decision maker could not improve decisions when he/she had a wide range of data; it confused the player and ended up in worse decisions and higher inventories in the chain. It was concluded that, particularly when human intervention is needed, decision-making becomes more complex in a transparent environment.

Table 12: Regression of Coefficients

	B	Std. Error	t	Sig.
(Constant)	2.299	0.324	7.100	0.000
Information integration systems with our partners	0.203	0.072	2.817	0.005
Technology based information systems	0.190	0.091	2.088	0.038
Automated systems of flow	0.113	0.034	3.324	0.001
	0.169	0.066	2.743	**0.000**

The optimal model;

$Y= \beta_0+ \beta_1 X_{21} +\beta_2 X_{22} +\beta_3 X_{23} +e$

Firm Performance = $2.299+0.203 X_{21} +0.190X_{22} + 0.113 X_{23}$

DISCUSSION CONCLUSIONS AND RECOMMENDATIONS

Discussion

The objective of the study was to determine the effect of information flow on performance of financial market intermediaries in Kenya. Results revealed that the financial market intermediaries have automated their information flow systems. In addition, results revealed that the firms perceive getting access to information first as a source of strategic edge. Further, the study findings showed that the firms have technology based information systems and that they have integrated information systems with their partners.

Further, based on F statistics and R squared, Technology based information systems(X_{22}) was ranked first, automated information flow systems (X_{23}) second and Integrated information flow systems (X_{21}) third. This implied that Technology based information systems(X_{22}) best explains firm performance, followed by automated information flow systems (X_{23}) and lastly integrated information flow systems (X_{21})

Correlation analysis showed that information flow and performance of financial market intermediaries are positively and significantly associated. Regression analysis indicated information flow has a positive and significant effect on performance of financial market intermediaries. The hypothesis results indicated that there is a significant relationship between information flow and performance of financial market intermediaries in Kenya.

Conclusions

Based on the findings the study concluded that information flow processes influenced the performance of financial market intermediaries in Kenya. This can be explained by the regression results which showed that the influence was positive and also showed the magnitude by which information flow processes influenced the performance of financial market intermediaries. The regression results showed that information flow processes influenced the performance of financial market intermediaries by 0.169units.

Recommendations

The study recommended for complete automation of information flow systems in the financial intermediaries. This will enhance making of informed decisions based which largly depends on the quality of information given. Also, information flow coordination among the trading partners is essential. The key to enhanced supply chain operations does not lie solely in efficient information transfer and sharing, but also in information availability and timeliness. Additionally, the quality of shared information has a clear impact on the planning outcome and is critical to the effectiveness of decision-making. The study also recommended that data should be accurate and objective and the decision maker should have a single version of the information. The data should be in such a form that it can be used efficiently and effectively, and at the right time and place for the right purpose. Some of the information flow models that can be used include electronic data interchange (EDI), electronic fund transfer (EFT), bar codes, point of sale systems (POS), fax, automated voice mail, CD-ROM catalogues, and a variety of others.

Areas for Further Studies

The study recommends that a similar study should be conducted in the private sector for comparison purposes. The study also recommends that a study seeking to establish the effect of automating other processes on firm performance should be conducted. This would help to

give insight to the financial intermediaries and other organizations on what other processes they should automate in order to improve their performance.

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