

# A Review of the Effects of Self-Service Technologies on Firm Performance in Kenya

Adhaya Zedekia Juma<sup>1, 2\*</sup>, Stephen Ochieng Odock<sup>2</sup>

<sup>1</sup>Registrar Academic Affairs Division, Technical University of Mombasa, P.O. Box 90420 – 80100, Mombasa, Kenya; <sup>2</sup>Department of Management Science, University of Nairobi, P.O. Box 30197, Nairobi, Kenya

\*Corresponding author's email: [zadhaya@gmail.com](mailto:zadhaya@gmail.com)

## Abstract

Self-service technology (SST) continues to create tremendous impact on the business environment globally. A technology that allows consumers to take on the traditional place of service agents in the provision of services. Business organizations are taking advantage of the advancement in technology to improve service delivery and performance. The advancement in technology particularly with respect to nanotechnology, genome sequencing and artificial intelligence are among the drivers of the 4<sup>th</sup> Industrial Revolution. Consequently, information technology advancement is changing the marketing landscape of goods and services such that service industry, notably hospitality and transport have increased the prevalence of SSTs, as critical drivers of an organization's industrial strength level. By a firm adopting technology-based strategy, this means higher clients' satisfaction, cost minimization, and faster accurate service delivery with higher consistency among other benefits. This paper therefore, assesses the impact of SSTs and emphasizes on actual adoption and usage of self-service as proposed by technology acceptance model. The study reviews theoretical and empirical literature on the subject of SSTs and firm performance, identifies the research gaps and puts forward a suitable conceptual framework that can investigate the link between SST and firm performance. This paper uses secondary data to establish research gaps and the determinant of the success of adoption of SST by a firm. From a total of 54 articles reviewed, almost all studies on SSTs are based on the service sector focusing least on the internal customers in Kenya. A few studies related directly to the performance of the firms to the adoption of SSTs. Agricultural and manufacturing sectors particularly in the rural areas are unexploited directly. This is due to infrastructural imbalances in the urban and rural areas. The outcome of this review would enlighten; administrators of firms in Kenya and the entire East African region on the importance of ICT infrastructure, the information resources and the strategies for optimizing electronic services to attain competitive advantage. It widens the frontiers of knowledge for the academic community in production and operation management and enhances the understanding of the customer SST interactions in different industries. It creates further valuable implications on the industrial sectors, principally to the managers who use the information in drafting service related strategies and hence become a yardstick to evaluate the present service initiatives appropriately. It allows the managers to have a basis to determine whether the massive investment in adoption of technology is justifiable. Finally, this paper contributes to the existing knowledge in self-service technology and customer satisfaction and serves as source of reference to future researchers and academicians in this field.

**Key Words:** Self-service technology, Firm performance, Technological expertise, Technological readiness, Perceived risks, Quality service, Competitive advantage

## Introduction

In the 21<sup>st</sup> Century globalized world, technology is an essential pillar to propel firms to attain competitive advantage and create more wealth. It has been projected in the next 20 years (from 2019) due to artificial intelligence technology, 45 % of the United States of American jobs shall be lost due to

technology. Human race may suffer from technological unemployment and the future goal is to come up with basic income to all human beings on Earth (Bruun & Duka, 2018). This looks farfetched, and the use of machines and technologies still remains rigid and do not meet all the socio- economic needs of man.

Undoubtedly, the advancement in technology particularly nanotechnology, genome sequencing, and artificial intelligence are the drivers of the 4<sup>th</sup> Industrial Revolution. It is clear that such conclusions are biased, as in some parts of the world especially Africa, where artificial intelligence technology is not fully utilized, just about 20 % of the population is having access to internet. Technological advancement leads in attracting firms and their clients, organization from all sectors that are commonly implementing them to increase production and reduce costs (World Economic Forum, 2016).

Self-service technologies (SSTs) provide a unique opportunity for firms to benefit financially by reducing expenses and lead to improved efficiency (Padgett & Mulvey, 2007). Many firms face many challenges in implementing and maintaining effective SSTs (Meuter, Bitner, Ostrom, & Brown, 2005). An array of contributing factors includes readiness of the firm, attitude of the customers and poor infrastructure have contributed to this. Fundamentally, it is vital for firms to analyze whether they are ready to prioritize areas of improvement in their SST operations in order to grow their market share. In light of this, information technology has grown rapidly and new business model has catalyzed the use of SSTs by firms. Good progress has been recorded in banks, air transport, retail shops and in some government agencies.

In financial institutions using SSTs, clients are able to transfer funds and read account balances on mobile phones. In the retail stores, consumers purchase valuable goods and in the transport industry, travelers check in their flights on the internet without any interaction with an employee of a firm (Ramasehan et al., 2015). In Austria and Australia, about 40 % of all retail transaction is done using self-scanners (Chieftech, 2014). Most countries in Europe are using SSTs compared to African countries with an exception of South Africa. In Kenya, the notable areas where SSTs have been used include; money transfer (*M-Pesa*), banking industry, E-government services, air ticketing and hotel industry. Kenya is a global leader in the *M-Pesa* money transfer technology. This is manifested in the Ministry of Information and Communication budgetary allocation, which had 131 % growth during the 2016/2017 financial

year (Kenya National Bureau of Statistics, 2016). More so, 38 million Kenyans using mobile phones and internet connectivity stands at 74 out of every 100 people (Kenya National Bureau of Statistics, 2016). However, this is mostly witnessed in urban areas due to infrastructural development. Manufacturing and agricultural firms in Kenya taking advantage of this infrastructural development to advance their competitive advantage in production are yet to be established.

Many firms of the 21<sup>st</sup> Century outsource services of marketing, distribution and after sale services of their products to the final consumers to enable them concentrate on their core businesses. This has faced many challenges some of which include agents over price, passing wrong information of the products; some even take control of the market (Massis, 2016). Hence, there is need for firms to reduce the proximity of the producers from the consumers while expanding the market share. This has necessitated the adoption of SSTs by many industries, air ticketing, supermarkets and library services; retail stores in the western world. SSTs have attracted the attention of many scholars (Lin & Hsieh, 2012) who have explored its use and evaluation. However, recent studies have confirmed that some SSTs employed by firms cause a lot of frustrations and difficulties to customers in the service industry (Robertson & Shaw, 2009). Consequently, firms may encounter resistance to SSTs innovation thereby reducing customers' satisfaction.

The immediate effect of SSTs is the reduction in interaction with employees of the firm. A chain of studies have poised that firms gain competitive advantage on cost and time savings and reachability while some hold that SSTs lead to declining social bonding, clients - employee rapport thereby reducing customer patronage (Selnes & Hansen, 2001). These authors also confirmed this when they established that changing from employee service to self-service was inversely related to social bonds in less complex relationships. When SSTs are used, and there is no involvement for a long period, satisfaction of clients may fade. While many scholars focus their studies on the western countries, it is unclear whether their results may be the same for sub-Saharan countries, particularly Kenya.

The extent of SSTs usage in Kenya is examined indirectly by focusing on the infrastructural development that has taken place overtime. The infrastructural developments facilitate the usage of SSTs in various sectors. National population currently standing at 45.4 million with 26.9 % of them staying in the urban areas (Kenya National Bureau of Statistics, 2019). The level of electricity connectivity stands at 35 %; the majority of the rural areas are still not connected to the main grid (Obel, 2016). In view of this, there is still a very big opportunity to extend the usage of SSTs in the rural areas by extending the infrastructural developments. Nearly 75 % of the Kenyan population stays in the rural areas where agricultural activity takes place. It is worth establishing whether the firms found in the regions utilize SSTs and compare their performances. This review therefore, aims at establishing the effect of SSTs on the firms' performance and seeks to: i) establish the theoretical and empirical literature on the subjects of SSTs and firm's performance; ii) identify research gaps from the available literature on SSTs and performance, and iii) determine the suitable conceptual framework that can investigate the link between SSTs and the firm performance.

## Methodology

This study employed a review and appraisal of secondary published journal articles and grey literature on self-service technologies on firm performance in Kenya. The review involved a thorough desktop search and selection of relevant information using free available search engine (Google Scholar), free and open repository of academic journal articles (Academia-edu), and a free available tool that empowers scientific exploration and discovery (Semantic Scholar). All reviewed literature sources were acknowledged and appropriately cited. In total, 54 relevant literature sources were reviewed and provided information for this paper.

## Results and Discussion

### *An Analysis on the Determinants of SSTs Adoption*

This paper contends that technological expertise entails a very high level of knowledge on some technology by the employees of a firm. For instance, to fix a computer related issue, a technician needs computer knowledge; it includes

the ability to handle firms' critical data in the right form and time among the internal and external clients and other entities (Ghemawat, 2002). Technological expertise consists of elements such as sourcing information, storing, processing, retrieval, editing, knowledge transmission, and ensuring security of the report. SSTs enable clients perform product creation using various kinds of technological advancement, like ATMs, the internet, touch screens and interactive kiosks among others without the indulgence of the employees of the firm. The general expertise of the internal clients therefore, influences the firm's rate of implementation of the SSTs (Charles, 2015).

The internal clients during any social interactions with external clients, if able to explain SSTs well to other customers; a good market penetration may be attained. The technological advancement that facilitates clients to access services without involving employee of an organization are significantly dictated by the technological expertise of both internal and external customers. The clientele of the organization increases resulting in a higher consumption of its products increasing its revenue and positively affecting firm performance. Similarly, the proximity of the firm to the macro environment improves, particularly legal environment, which reduces cost of operation between the two entities. The expertise of both internal and external clients enhances the accuracy of the processes of the organization, this reduces the processes cost. In a long term, the firm stages itself in the market place as offering quality services (Lepkova & Žūkaitė-Jefimovienė, 2012).

Technology readiness refers to the level of maturity with regard to the exploitation of a particular technology, this can be measured by the technology readiness levels (TRL), and it is a dimension of system used to determine the development height of a particular technology (Collier et al., 2015). Specifically, technology readiness enhances integration of various departments which is critical in ensuring that a firm maximizes their synchronized energies within the supply chain while presenting value to the clients and other stakeholders (Ganesan et al., 2009). The internal customers' satisfaction largely depends on the state of technology used and external customer's readiness level (Kim et al., 2004).

There is a perception of client's technological readiness and service quality being correlated. The relationship between technology readiness and quality of service are very crucial in the determination of satisfaction of customers (Collier et al., 2015). The TRL influences the amalgamation of possessions within and without the organizational capacity, by embracing the socio-technical system, which maintains the firm at the performance level (Xu et al., 2014)

SSTs perceived risks are threats emanating from the use of technology with regard to various actions or occasions that compromise the use of the knowledge in some areas and therefore, causes severe effect to firms' business practices or goals, varying from inconsequential to reduction in smooth service provisions. Li & Huang (2009) holds that it is the degree of loss and subjective feeling of unfavorable consequences in financial, physical, social and performance areas. Firms are highly influenced by this during the implementation of any new technology.

The clients have closely related perceived risk during the buying process. Many studies have been done on internet shopping in different context of shopping; air ticketing, clothing and hotel booking. The focus has been on the buying process of consumers on e-commerce. Internet shopping risks also have been researched on varied contexts: clothes shopping (Cunningham et al., 2005) and general online shopping. Kim et al., (2009) explored risk perceived, risk reduction in the process of online buying of flight-tickets indicated security risk which contributed the largest ratio on the overall risk of the online ticket purchasing. Perceived risk relating to SSTs of the manufacturing and agricultural firms in Kenya has been least explored (Charles, 2015).

#### *An Analysis on the SSTs Adoption & Effectiveness*

The SSTs adopted by firms ensure right products and accurate information reach the stakeholders in a reliable way and at the right time while lowering the cost of operation in the end. This is essentially important to both the external and internal clients. The literature in this area indicates that the nature of interface rates highly to customers, it influences their technology and service encounter perceptions (Zeithaml et al., 2002). Prior studies have suggested that the characteristics of customers also influence

SSTs effectiveness (Langeard et al., 1981). Some users are more skillful at exploring SSTs to obtain desired services, while others interact with innovations only reluctantly or with limited ability. Consequently, it is recognized that the insertion of more features can overtax users, resulting paradoxically in a loss of SST effectiveness (Zhu et al., 2007). SSTs adoption is held by organizations as significant in cost monitoring and exceeding customers' expectations (Considine & Cormican, 2016). The SSTs provide what is just enough to the clients in the simplest way without subjecting the client to unnecessary decision making of choosing the product from an array of products in the market place.

The success of a firm in maintaining its customers to remain loyal to its products depends on the implementation of marketing strategies such as product innovation, the provision of user-friendliness, reliable and fast service realized through adoption of SSTs (Gelderman, 2011). Bruce (2005) established that the SSTs enable firms to offer superior products and gain value added services, as clients are increasingly demanding for higher quality service. It is through satisfaction of the needs of the customers in the current competitive period that firms thrive globally (Iberahim et al., 2016). In a study by Goel (2015), the impact of SSTs on the banking industry in Sri Lanka using exploratory factor analysis and structural equation model approach established that personalization was the major dimension of service quality with significant effect on customer loyalty. This enables the firm to offer reliable efficient services and wins the heart of many clients even if it charges a higher premium on its products. In the end, organization's revenue increases thereby increasing its corporate investment services and get more attached to the society while increasing market share.

#### *An Analysis on the SST Adoption & Firm Performance*

The employee-customer relationship and how businesses succeed, currently is pegged on computer and communications technologies (Kandampully et al., 2016). The motivation of organizations to use SST as a bridge to performance is catalyzed by the desire to achieve competitive rates for delivery of products and services. The organization focuses on the differentiated products while focusing on a specific market segment

(Ehrenfeld, 2017). That is, competitive advantage as a catalyst of performance is gained fully by deploying and using distinctive, precious and matchless possessions. SSTs expand firm knowledge beyond boundaries which enables them realize sustainable profit margin than firms that do not (Harrigan & DiGuardo, 2017).

SSTs enable firms to deliver differentiated products and services and the addition of unique features to the products and services that are attractive to the market and hence expanding customer base. Firms with mature SSTs easily gain competitive intelligence, which is integral to the sensing component of agility (Pant & Sheng, 2015). It helps a firm to accurately identify the changes in the competitive landscape (Zheng et al., 2012). The overall effect is that the SSTs provide foundation upon which the firm's adoptive capabilities and ultimately competitive advantage depends. This is in line with the transactions theory that holds that a firm can only expand if the market transaction cost is lower than the firms' transaction cost.

#### *An Analysis on the SST Effectiveness & Firm Performance*

SSTs' effectiveness as a factor affecting firm's performance has not caught the attention of most scholars in the academic world. The effectiveness can be looked at in terms of service quality rating. Most scholars have studied service quality based on SERVQUAL model, operationalized on; reliability, responsiveness, assurance, empathy, and tangibles (Parasuraman et al., 1988). The same parameter that the effectiveness of SSTs is founded on. Competitive position focusing on quality has a higher sustainability than one grounded on conventional strategies such as cost-leadership. The applicability of the model is a challenge; quality evaluations do not entirely depend on the outcome quality of the service but also involves evaluation of the processes of service delivery (Fitzgerald & Storbeck, 2003).

According to resource-based view, patented SSTs are unique resources to the organization. Therefore, unique SSTs enable firms to offer unique quality services, making it more effective to its clients. Reliable SSTs cover a wide area of operation while engaging low number of personnel. The benefits of providing superior service to customers include increased profitability, client's satisfaction, client's

loyalty, client's retention and positive word of mouth (Giese & Cote, 2000). Similarly, a descriptive research on the Ghana telecommunication services confirmed that provision of higher quality by use of SSTs to both clients creates a big impact on the performance and a firm easily gains competitive advantage hence has been recognized globally by most chief executive officers (Owusu & Duah, 2018).

#### *SST Adoption, Firm Characteristics & Firm Performance*

Grounded on the resource-based theory, firms that thrive well in the market must have resources that are valuable, scarce, and are non-imitable. The SSTs developed by firms mostly are patented and therefore may not be acquired by competitors easily unless they pay royalties. Firm's features like leverage level, position of liquidity, size, years of operation and type of ownership have influenced the firms' service quality and performance (Fitzgerald & Moon (1996).

Bigger firms have several layers of management, numerous departments, higher level of specialization of skills and functions, and higher level of bureaucracy than smaller firms (Fitzgerald & Storbeck, 2003). On the contrary, the size of the firm may be an impediment to the attainment of the competitive advantage as it determines the economic level of operations. The cost of implementing SSTs is based on the size of the company due to the organizational structure, the total cost increases if a firm is small. It is argued that large firms are more successful in implementing SSTs and total quality management compared to the small and medium sized firms due to economies of scale of operation, which leads to positive reputations (Hoang et al., 2010).

The ISO certification comes with many standards that guarantee quality to both internal and external clients. It is much easier to customize an SST to a company operating based on some standards than companies with none. Therefore, it takes a shorter time to attain many competitive advantages that come with the implementation of SSTs. ISO certified firms in the manufacturing sector create competitive advantage anchored on superior services compared to non-ISO certified (Mangiarotti & Riillo, 2014). On the contrary, some firms are ISO certified just to meet conditions for

doing business globally and may not translate to quality services and products. Government owned firms are ISO certified and still do not operate effectively and efficiently translating to poor performance (Charles, 2015).

Age variation is a feature commonly present in almost all the societal entities such as families, sport teams, and work groups. The conflicting conclusions of previous scholars hold that age diversity is not likely to have direct consequences on company performance; instead, age diversity is likely to influence delicate and couched processes and states within firms, consequently influencing performance results (Kunze et al., 2011). Firms with younger employees find it easier to implement SSTs than firms with older employees since younger employees are always eager to learn new ideas. This may vary from industry to industry.

Family-owned firms offer better remuneration to their CEOs compared to public firms. Thus, these firms attract highly skilled CEOs who can move such firms to top performance level (Kotlar et al., 2016). Decision making process, has been featured by many scholars as an impediment in public firms. Decision making takes a shorter duration in family firms compared to public firms. This is a key feature in firms that have to be re-configured to suit the need of the firm to operate effectively.

### Conclusion and Recommendations

In this paper, studies have been reviewed, explored the relationship established between SST and performance using various approaches. It has come out that most empirical models and theories such as resource-based view are related to a new generation of theories. Several empirical studies reviewed have not explored this relationship directly between SST and performance in the manufacturing or agricultural sectors. However, very few studies have focused on the specific role of SST with a particular attention to the endogenous link between the firm and the customers. This study contributes to the wealth of knowledge in two ways; revealed the high use of SST in the service industry at firm level and interaction with external and internal clients. Secondly, the study has moderating variables of firm characteristics such as age in operation, ownership of ISO certification, and size.

The study concludes that the relationship between SSTs and firm performance remained inconclusive in most literature. Most of the studies relate SSTs directly to quality, which further affects performance. Given the fact that quality is normally transcendent, it follows that we can never relate the effect of SSTs with performance using the quality approach. Studies have focused mostly on the cost reduction of the firm as one of the indicators of performance. As stipulated in the resource-based view, there are questions that have not been fully answered including the minimum resources that firms need to have to realize the benefits of implementing SSTs. Importantly, performance relation with SSTs, has not been fully understood universally as most studies have assumed constant environmental factors, and this is unlikely.

The study concludes that the capacity utilization rate relationship with the impact of the implementation is under focus. More studies are required to validate the impact of implementation of SSTs on the firms' performance. The current study focuses on technological expertise, technological readiness and perceived risks based on the customers as determinants of the SST adoption. Most scholars are yet to focus on the general mean age of the employees of the firm and the SSTs adoption. This is because older people tend to be adamant to new technologies. There is also need to analyze the direct effect of gender on the adoption of SSTs. The determinants of adoption of SSTs in firms have generally been studied.

Further, it was revealed that performance is pivotal in operation management research and repeatedly used as a dependent variable. In spite of this relevance, there is an inconsistent view on its description, dimensionality, and measurement. This has slowed the research advances as well as understanding of the concept. The effect of the SSTs on performance of the firm is exogenous. The type of hardware, network installed, and competency of the developer and legal restrictions of a particular country influences the effectiveness of the SSTs. Based on this, the direct link of SSTs to performance of a firm is only implied. Many other variables influence firm performance.

Most studies have focused on the hotel industry, air ticketing and library while ignoring the effect SSTs have on the performance in firms in the manufacturing and agricultural sectors.

Interestingly, some libraries are not profit-oriented institutions and therefore the findings may not be applicable to majority of profit-oriented libraries.

The study further established that most consumers believe that SSTs in a specific organization help them get their services completed in a short time. The study pointed out that Information Technology (IT) is becoming the backbone of banks' services regeneration in Nigeria. The study focused on the application of IT in the banks but did not specify how SST influences bank's performance. It has also been established that convenience has positive and significant impact on usage of self-service delivery.

The study therefore noted that survey approach has been mostly adopted. Critical incident technique has also been used to understand customer satisfaction with technology based service encounters in North America. The sample was randomly drawn from the internet users. Not all the users understand questions in the same manner, this reduces the consistency level of the study due to dishonesty when filling questionnaires. They both have different experience with SSTs due to difference in duration of interaction. There is need to investigate each category while maintaining the same contextual area and evaluate the results. Feeling and emotions of the users are not captured, this necessitates personal visit to each interviewee making the investigation more expensive.

The study was not clear if the other methods were used, the same results may still be applicable. The study therefore holds that a projected sample size of between 30 to 500 is suitable for most studies and most of the researchers suggest its appropriateness for conducting multivariate research analysis. There is need to adopt other methods like case studies, theoretical approach and compare the results for reliability.

SSTs innovation has been widely studied for its impact on firm performance and is considered a driving force behind international trade. The focus of this article is to synthesize the effect of SSTs on firm's performance in the manufacturing and agricultural sector compared to other sectors. There are many factors influencing the performance of a firm both internally and externally. Scholars have not come out clearly to indicate the level of

contribution of SSTs on the performance of the firm sectorally (Barney, 1991).

Most studies have been based on resource-based view and technical acceptance model. There is need to repeat the same studies using the institutional theory to test whether the same results may be obtained. It is unlikely that a study at any one given time can be grounded on single theory. The environment is always dynamic and keeps on changing. The state and the background of the researcher do influence the theory on which a study is grounded. Consequently, the reliability of an inquiry is enhanced by assuming that the researcher remains objective knowingly or unknowingly throughout the inquiry.

This paper therefore, recommends a conceptual framework depicting the relationship between variables in the study. The dependent variable is firm performance that is moderated by firm's characteristics, while the mediating variable is SST's effectiveness and SST adoption as the independent variable. The concept of SST revolves around the engagement of clients and the end users of products and services during the process of production.

The paper further recommends that customarily; customer engagement should be actualized in personal environments. The type of customers' engagement traditionally determines their view on total service quality of the firm. The study recommends that with the new innovative techniques, understanding of service has been expanded to include remote connectivity which are technology based. The study recommends that the types of customer contact including technology-less, technology-assisted, technology-facilitated, technology-mediated, and technology-generated should also be implemented.

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