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Information Integrity and Business Sustainability of Mobile Telecommunication Firms in Kenya

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*Information Integrity,
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The growth and sustainability of any business enterprise require that organisations get more contacts and information regarding their business processes into their database. However, having poor quality data can risk the firm frustrating its leads with inaccurate messaging and delivering bad experiences, which may end up discouraging customers from consuming the organisation's products, thus affecting the profitability and sustainability of the firm. From this background, the current paper sought to examine the influence of information integrity on the business sustainability of mobile telecommunication firms in Kenya. The paper was theoretically underpinned by the Unified Theory of Acceptance and Use of Technology. The target population was drawn from three mobile telecommunication firms with an accessible population of 1,177 employees. The study relied on stratified random sampling techniques to select 299 respondents. Primary data was obtained through a semi-structured questionnaire. Data were analysed by the use of descriptive and inferential analysis methods. The results revealed a significant positive relationship between information integrity and the sustainability of mobile telecommunication firms in Kenya. The study concluded that information integrity influenced the sustainability of mobile telecommunication firms in Kenya.

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INTRODUCTION

The concept of data integrity is widely used in a computerised system. It is defined as a process where firms maintain data to ensure consistency and accuracy throughout their life cycle (Hamband & Jacobs, 2016). According to Zhou et al. (2018), data integrity refers to the consistency and accuracy of data over its lifecycle. Compromised data is of no use to an organisation as it can lead to poor decision-making or sometimes the corruption of sensitive data. Therefore, maintaining data integrity is a core focus of many organisation security solutions. Information integrity can be explained as when data is being replicated or transferred to different platforms. Caution should be taken to ensure that data remains in its original form when it is being transferred. Organisations should rely on error-checking methods and validation procedures to ensure that data integrity is maintained when data is being reproduced (Ghuri *et al.* 2018). According to Shen et al. (2018), strengthening data integrity is essential for several reasons, such as ensuring data's recoverability and searchability to its origin. Protecting the validity of data also increases performance and stability while enhancing reusability and maintainability. Hartanto (2019) adds that information integrity enables an organisation to deliver a strong customer experience tailored or customised to individual needs, minimise wastage of resources in protecting or storing poor quality data, maximise return on investment through insights from relevant data, and make informed business decisions.

According to Shen et al. (2018), data integrity can relate to physical integrity and logical integrity. Physical integrity is concerned with how data is stored and transferred between apps. Thus, physical data integrity means that data cannot be compromised by physical threats such as power shortages, hackers or through natural disasters. Many organisations reduce the effects of information integrity through the adoption of cloud-based storage through the use of an efficient service provider. Logical integrity, on the other hand, refers to the correctness and rationality of the data in the organisation's database. Issues of concern with logical integrity include; design flows, software bugs, and human error.

Logical integrity can be enhanced through documentation of processes, the use of reliable systems, run-time sanity checks, and checking constraints that require data to be inputted in a specific format. Zhou *et al.* (2018) indicate that organisations can also use two-way data syncing to ensure reliable information is generated from each source. According to Thulare et al. (2020), data integrity can be enhanced by ensuring that the data lifecycle management system of data collection, storage, maintenance, usage, cleaning, and auditing is efficient.

Business Sustainability

The concept of business sustainability has attracted scholarly attention. Most studies have sought to identify a suitable sustainability index that can be used to measure sustainability, especially among mobile telecommunication firms. Among these

studies, Svensson et al. (2016) found that firm sustainability could be measured using three dimensions, namely, the social impact of the firm's business activities dimension, stakeholder consideration in terms of returns on investment, and the firm's influence on the economy in terms of balance between demand and supply. An assessment of firm sustainability and connectivity at Vodafone Group Limited identified three topical areas that address organisational sustainability in the telecommunications sector; this was the company's commitment to responsible operations, investment in people, and commitment to developing skills and building employee capacity (Vodafone, 2019).

In addition, Ratnajeewa and Hewage (2015) developed an integrated index to assess the sustainability of the Sri Lankan telecommunications industry and the sustainability of individual telecommunication enterprises in the country. In this index, economic sustainability was measured by the firm's productivity, sales revenue, cost management, and stock value and was one of the four elements of the sustainability index. Environmental sustainability was measured by environmental management, emission management, and environmental report. Finally, social sustainability was measured by corporate social responsibility, partner relationship management, and labour relations. From this dimension, the study established that most Sri Lankan mobile telecommunication companies lacked environmental sustainability apart from the e-billing system that many organisations had adopted. Based on the several suitability measures adopted by different studies, this paper used the Ratnajeewa and Hewage (2015) index to measure the business sustainability of mobile firms in Kenya.

Research Hypothesis

H₀₁: Information Integrity capability has-no-significant influence on the sustainability of mobile telecommunication firms in Kenya

LITERATURE REVIEW

The theoretical, empirical, and conceptual frameworks are presented in this section.

Theoretical Review

The study was anchored on the Unified Theory of Acceptance and Use of Technology. The theory was formulated by Venkatesh et al. (2003) and is a model for explaining technology acceptance and eventual use. The theoretical framework of this theory is used widely to predict and expound the behavioural intentions of the system technology adoption. Venkatesh et al. (2003) explain that four main components (primal factors), performance expectations, effort expectations, social impact, and facility conditions, are most probably predicted by a unified theory of technology acceptance and use. In addition, four different variations are adopted, including experience, willingness to use, age, and gender.

There are several research studies conducted by different researchers on UTAUT, testing its technological compatibility (Afonso et al., 2012; Sezer & Yilmaz, 2019). Mosweu et al. (2017) assessed factors influencing the intention of document workflow management systems of trade and industry in Botswana, anchored on the UTAUT model. It was found that social influence, effort expectancy, facilitating conditions, and performance expectancy explained a significant contribution of factors that influenced Document Workflow Management System adoption. Further, Kim et al. (2015) studied factors influencing users' intentions to adopt mobile electronic health record systems that combined UTAUT and TAM models. It was revealed that the primary factors of UTAUT can contribute to developing a positive attitude toward the use of the new system in the organisation.

The UTAUT model is important because it is blended with other theoretical models, such as Technology Acceptance Model developed by Davis

(1989). Therefore, many constructs offered by several theories allowed the researchers to opt for a favourable theoretical model and thus largely ignore others. Thus, the theory of UTAUT came in to solve concerns raised by other models, such as that of the user's behaviour, which is mostly measured through subjective means such as behavioural intention. On the other hand, the theory is faced with challenges limiting its use. These limitations include variance in behavioural intention and usage behaviour, cost of adopting the technology and personal innovativeness. The model may not be applicable universally, thus omitting the use of technology in critical processes in the organisation. The theory was relevant to this study because it highlights the importance of adapting the knowledge management system to achieve competitive advantage and foster sustainability. It also supported information integrity, application integration, and service automation variables under study.

Empirical Review

Past studies on the relationship between knowledge processing and firm sustainability from scholarly research, journals, and articles were reviewed.

Information Integrity Capability and Firm Sustainability

Several studies have been conducted to determine the link between data integrity and organisational success. Hartanto (2019) investigated the impact of knowledge management and data integrity on company performance. A sample size of 128 employees from the company was used to provide data for analysis. To obtain data, primary data was adopted, and the technique employed the use of open-ended and close-ended questionnaires. Path analysis was employed to analyse the data for interpretation and presentation. The results revealed that both knowledge management and integrity affect a firm's performance concurrently. The study further found that integrity variables partially influence firms' performance, and knowledge

management also partially influences performance. The study concluded that institutions need to implement both knowledge management and integrity concurrently because they both affect performance simultaneously than implementing them separately, which they influence partially.

Sayogo et al. (2015) carried out a study to examine the various challenges and requirements for developing data architecture that can sustain multiple supply chains. The study established that developing interoperable data architecture enables efficient integration of data regarding business sustainability practices from disparate sources in a sustainable supply chain as it enhances market transparency. The study further revealed that building interoperable data architecture creates awareness of several challenges such as difficulty collecting credible and accurate data, complex data ownership and disclosure policy, limited technological capabilities, confidentiality issues, cost of disclosing information, and the economic value of the information. The study concludes that for organisations to deal with these challenges, they should develop an architecture that ensures data quality, security, and integrity and design an information policy that can balance commercial interest and openness. This research was an empirical review of the literature; however, the current study will adopt mixed research techniques.

According to Zhou et al. (2018), who surveyed data integrity verification of big outsourced data in the cloud environment, big data management has gotten a lot of attention due to the rapid increase of data and the dynamic development of technology. According to the study, because of the benefits of cloud servers, such as securing data from illegal tampering, cloud computing has emerged as convenient storage and processing for big data. Before using the cloud computing method, consumers of big data should ensure that the servers correctly store the large outsourced data. It is also crucial to double-check the data's accuracy.

Many organisations prefer to store their data utilising cloud storage services, according to Shen et al. (2018). They conducted research on providing identity-based integrity auditing and data sharing with sensitive information masking for secure cloud storage. It was recommended that the use of remote data auditing integrity would guarantee and safeguard the integrity of data stored in the cloud. The researcher recommends encrypting sensitive information to avoid the manipulation of data from unauthorised users. Encrypting shared files can further hide some sensitive information, preventing other users from accessing and using the shared file.

Thulare et al. (2020) conducted a study review on aspects of data integrity in healthy information systems in South Africa. The study adopted a scoping literature review, and the secondary data collection technique was the most suitable for the study. The study relied on publications where out of 398 publications, only 28 were found to be most relevant and appropriate for the study. The reviewed literature established that data integrity negatively influenced reporting, health information exchange, and research in healthy information systems. The study findings indicated poor document standardisation guidelines, which led to data integrity problems because of incomplete information, inaccuracy, and inconsistency. The study recommended that security measures be put in place to ensure data integrity by authorising a specific person to charge health information. The study further suggested that integrated systems need to formulate techniques to create, transmit, and implement standardised data integrity policies and procedures.

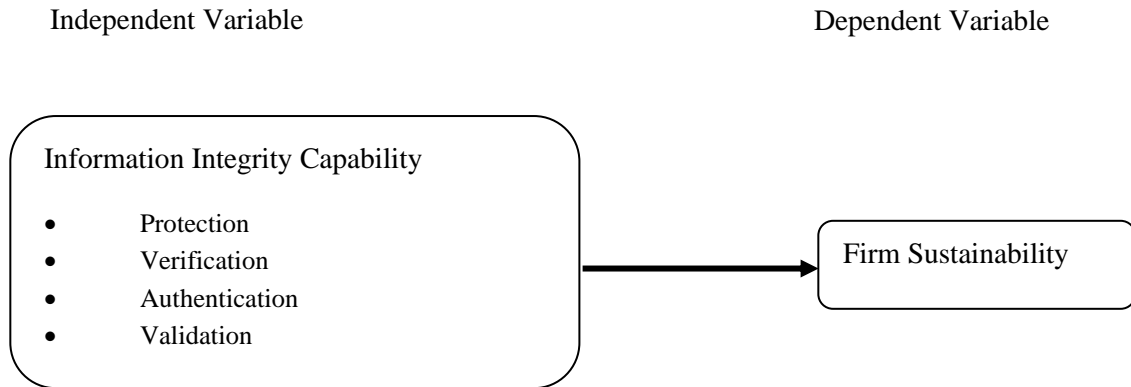
Msigwa (2018) sought to determine data integrity risks assessment of revenue collection information systems in the local authority in Tanzania. The study relied on a case study, and 95 workers from

the Iringa region formed the basis of the target population, which comprised ICT officers, revenue accountants, and revenue collector agents. Yamane's (1967) formula was adopted to get 75 respondents who made a sample size for the study. Primary data, as well as secondary data collection methods, were adopted to obtain data for analysis. Data were analysed using descriptive and inferential statistics with the help of Microsoft excel office and SPSS, where data was presented in the form of bar charts, tables, and pie charts. The findings showed that technological and human factors were the main threats that brought about data integrity mismatch. In conclusion, the study proposed that the national government involve mobile telecommunication firms to provide an efficient, effective, and most reliable high-speed connection to the internet, which could help safeguard the records and any local government authority's important information.

Kamau et al. (2016) conducted a research study on the impact of information integrity in sharing credit information on commercial banks' credit risk management in Nakuru town. The study adopted a descriptive survey research design. A stratified random sampling technique was employed to obtain 88 respondents, including credit staff and branch managers, from 28 Nakuru town bank branches. The study utilised a primary data collection technique where questionnaires were administered to the respondents. Data obtained was analysed using descriptive statistics and inferential statistics with the help of SPSS version 20.0. The study findings indicated that system integrity in sharing credit information significantly influenced credit risk management. The study recommended that a firm's information be protected and accessed by a specific authorised person, which could be achieved if system integrity is well managed.

Conceptual Framework

Figure 1: Conceptual Framework



METHODOLOGY

The study adopted a positivist research philosophy in order to have an objective view to describe the relationship between Information Integrity Capability and Firm Sustainability. The study adopted an explanatory and descriptive research design. Exploratory research design suits when interrogating a matter of which little is known. It is used to expose a high level of uncertainty regarding the relationship between the research variables. On the other hand, descriptive research design suits when getting and giving some accurate and valid representations of phenomena under study (Creswell & Creswell, 2017). A target population of 1,177 employees from 9 departments of three Mobile telecommunication companies was used. Yamane's (1967) formula was utilised to obtain a sample size of 299 participants. A stratified random sampling technique was applied to identify nine stratus representing different information technology-based departments. This ensured the proper representation of different categories to enhance the representation of variables. Respondents were picked randomly from the nine strati based on the proportional method. Data was collected using customised questionnaires regarding the Information Integrity, Capability and sustainability of the firm. The content, construct,

and face validity of the instrument was assessed and enhanced through a literature review and consultation with subject experts. The internal reliability of the instrument was assessed through piloting. A Chronbach alpha coefficient of 0.895 was obtained and considered ideal. Data was analysed using correlation and multiple regression analysis. All the ethical issues were considered during the study.

RESULTS AND DISCUSSION

The study sought to establish the influence of Information Integrity Capability and firm performance.

Demographic Characteristics

The researcher issued questionnaires to 299 respondents, of which 252 were duly filled and returned. This translated to a response rate of 84%, which was good enough, according to Mugenda and Mugenda (2013). The study sought to establish the department that the respondents were drawn from. The findings revealed that 43 (17.1%) of the respondents belonged to the corporate affairs department, 98 (38.9%) of the respondents belonged to customer experience, and 34 (13.5%) of the respondents indicated that they belonged to the technical department. Lastly, 77 (30.5%) of the

respondents indicated they belonged to the research and development department. Furthermore, in assessing the level of management of the employees, it was revealed that 116 (46.0%) of the respondents involved in this study were in middle-level management. 108(42.9%) respondents were in lower-level management, while 28(11.1%) belonged to top-level management. On the length of working in the organisation, the study established that most respondents, 135 (53.6%) indicated that they had worked in the firm for less than 5 years. This was followed by 77 (30.5%) respondents who had worked for 6 to 10 years. The respondents who had worked between 11 to 15 years were 22 (8.7%), and then 18 (7.1%) respondents indicated they had worked in the companies for more than 15 years.

Descriptive Statistics

The study assessed the relationship between Information Integrity Capability and Firm sustainability. The study used a 5-point capability Likert scale where the respondents were asked about their opinion on a set of provided statements concerning the variables under study. On the Likert scale, 1 = Strongly Agree, 2= Agree, 3=Moderately Agree, 4=Disagree, 5= Strongly Disagree. Frequencies, Standard deviation, and mean (measures) of central tendency were utilised to summarise the characteristics of the variables. These statistics are presented in *Tables 1* and *2*.

Table 1: Information Integrity Capability

Statement	N	Mean	Std. Dev
The firm has preventive systems to guard against inefficient and inappropriate knowledge applications.	252	3.956	0.991
The firm has firewalls that protect the server from external attacks.	252	4.218	0.834
Data verification is often done to ensure that information stored in the system is relevant to the firm.	252	4.131	0.721
The firm has controlled access to the main server, central library, and archives.	252	4.325	0.717
A tracking system in the organisation indicates how data flows from one user to another.	252	4.341	0.704
The firm checks for the accuracy and quality of obtained information before it is imported or stored in the database or server.	252	4.099	0.933
Information integrity of data within the organisation enhances profitability.	252	4.039	0.952
Aggregate Mean		4.18	

The firm's sustainability was measured using economic, environmental, and social aspects.

Table 2: Firm Sustainability

Statement	N	Mean	Std. Dev
The firm had sufficient sales revenue.	252	4.127	0.751
There is high employee productivity in the firm.	252	4.027	0.705
Cost management has improved the profitability of the firm.	252	4.099	0.784
The firm has conducted sufficient community projects that have had an impact on the environment.	252	3.952	0.771

Statement	N	Mean	Std. Dev
The firm has improved livelihoods in society through the provision of quality services.	252	3.833	0.938
The firm has enhanced business-to-business collaborations.	252	3.976	0.860
The firm has empowered its employees.	252	3.892	0.973
Aggregate Mean		3.986	

The findings presented in *Table 2* indicate that most respondents agreed with a mean of 4.127 and a standard deviation of 0.751 that their firm had sufficient sales revenue. On whether there is high employee productivity in the firm, most respondents agreed with a mean of 4.027 and a standard deviation of 0.705. The respondents also agreed that cost management had improved the firm’s profitability with a mean of 4.099 and a standard deviation of 0.784. In the statement about whether a firm had conducted sufficient community projects that could have impacted the environment, most of the respondents had a neutral view, with a mean of 3.952 and a standard deviation of 0.771. Equally, most respondents had a neutral opinion that the firm had improved livelihoods in society by providing quality services, with a mean of 3.833 and a standard deviation of 0.938. On whether the firm had enhanced business-to-business collaborations, the majority of the respondents had a neutral view with a mean of 3.976 and a standard deviation of 0.860. Lastly, most respondents also had a neutral opinion that their firm had empowered their employees, indicating a mean of 3.892 and a standard deviation of 0.973. An aggregate mean of

3.986. The study findings align with Ghauri *et al.* (2018). Their findings demonstrated that environmental, economic, and social sustainability contributed to the general firm’s sustainability to some extent.

Inferential Statistics

A linear regression model was used to examine the relationship between information integrity capability and the sustainability of mobile telecommunication firms in Kenya. This was because the study only used one independent variable.

The tested model was presented as follows;

$$Y = \beta_0 + \beta_1 X_1 + \epsilon$$

Where; Y represents the dependent variable (sustainability of mobile telecommunication firms in Kenya). X₁=independent variable (Information Integrity Capability).

B₁= Beta coefficient, B₀= Constant and ε is the error term.

Table 3: Model Summary for Sustainability of the Firm

Model	R	R Square	Adjusted R Square
1	0.795 ^a	0.632	0.626

a. Predictors: (Constant), Information Integrity Capability
b. Dependent Variable: Firm Sustainability

Table 4 reveals that Adjusted R=squared = 0.626, which implied that 62.6% of the variation in the sustainability of the firm was associated with Information Integrity Capability. However, 37.4%

of the variation in the firm’s sustainability was due to other factors that were not considered by the study

Table 4: ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	60.015	4	15.004	106.058	0.000 ^b
	Residual	34.942	247	0.141		
	Total	94.957	251			

a. Dependent Variable: SF-Sustainable of Firm

b. Predictors: (Constant), II- Information Integrity Capability

Source: Study Data (2021)

ANOVA findings in *table 4* indicated $F=106.058$ and $P=0.000$, revealing that the null hypotheses were accepted ($P<0.05$). This implies a significant relationship between the Information Integrity Capability and the firm's sustainability. Information Integrity Capability influenced the sustainability of firms in the mobile telecommunication industry.

CONCLUSION AND RECOMMENDATIONS OF THE STUDY

From the findings, the study concluded that information integrity had a significant positive influence on firm sustainability. The study also concluded that firms that had put preventive systems to guard their knowledge against inefficient and inappropriate use of knowledge were highly sustainable. Other elements, such as firewalls, data verification, controlled access, and effective tracking systems, enhanced data integrity in the firms' database. The study recommended that mobile telecommunication firms enhance information integrity by implementing effective preventive measures to prohibit inefficient and inappropriate access and use of knowledge in the firms. This should be done by having sophisticated passwords and firewalls that protect data from external attacks.

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