Big Data Analytics Capabilities and Performance of Private Hospitals in Nairobi City County, Kenya

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Abstract   This study explored how big data analytics and performance of private hospitals is related. Private hospitals in Kenya is very vital in provision of healthcare services. Kenya has established itself as a medical hub in East African nations due to the number of quality affordable hospitals facilities it has impressed. Growth and rise in economy in the region has also contributed on private hospitals expansion to cater for the high demand quality affordable healthcare services. Big data analytics has transformed conventional ways of business operations through its advanced analytic technological tools. Big data analytics, the process of identifying patterns, correlations, and trends in massive amounts of unstructured data to assist in the data-driven decision-making not only gathers and analyze data but also provide insights by efficiently utilizing available talent resources, technology, and data through firm's wide roles. While playing a vital role in enhancing healthcare and improving people's lives, most private hospitals have been experiencing performance bottlenecks. The general objective of the study was to establish the relationship of big data and performance of private hospitals in Nairobi County, Kenya. The specific objectives for the study were to establish how big data technology capability, service responsiveness, financial measures and services quality relates to performance of private hospitals. This study was guided by four theories namely, Adaptive Structuration Theory, Diffusion of Innovation Theory, Dynamic Capabilities Theory and Resource Based View. The study adopted descriptive research design. The target population for the study was 120 participants. A census survey was conducted, and all 120 staff members of private hospitals were required to participate. To gather primary data, both open-ended and closed-ended questionnaires were used. The study used the pick-and-drop approach to gather its data. While Cronbach's Alpha was used to assess reliability, content validity was used to assess the questionnaire's validity. Using SPSS Version 26, descriptive and inferential statistics were used to examine the quantitative data, while content analysis was used to study the qualitative data. Frequency distribution tables and percentages were used to display descriptive statistics. Regression and other inferential analysis were used to analyze the relationships between the independent and dependent variables. All ethical requirements, particularly secrecy, anonymity, permission, and avoiding prejudice, were followed. The study revealed that there was a strong significant correlation between big data capability and performance, a strong significant correlation between service responsiveness and performance, a strong significant correlation between financial measures and performance and a medium correlation between service quality and performance. The study concluded that big data analytics capabilities and performance of private hospitals was indeed related and this was attributed to patient satisfaction, high quality, and cost effective patient services. It was recommended that private hospitals should focus on financial measures and its KPIs, service quality delivery strategies and adoption of new technology that brings change to organizations through various organization investments. The researcher proposed conducting more research.

Keywords: *big data analytics technology, service responsiveness, financial measures, service quality*

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1. Introduction

In Kenya, the private hospital industry comprise of both for profit as well as nonprofit institutions. Profit hospitals are those that are owned by individuals, corporations, or non-profit organizations. They get funding through individuals ownership, from patients, insurers, or some accredited by governments through national health insurance programs, or foreign embassies who pay for medical services. These health institutions has been rapidly growing in Nairobi County, with the majority forming alliances with other businesses or forming consortium with the aim of dispersing throughout East Africa [1].

A major factor in the rise of hospitals has been the availability of high-quality services at reasonable prices

and Kenya government putting healthcare at the forefront [2]. Quality of the service delivery is evident not only in the finished items in the manufacture and distribution of the product but also in all sphere of business [3] thus it's critical for hospitals to reinvent development of the services and products and how they package themselves. Kenya has been established itself in East Africa as a hub of healthcare in recent years. These had been brought up by robust advertisement of its specialized medical services and completion among private hospital entities.

Investment in infrastructure, easy accessibility to various towns and cities has also encouraged industrialization which has led to the rise in numbers of workers who needs healthcare facilities. The growth in economy through industrialization directly translates to private hospitals rise since there is need for service which enables hospitals to expand and cater for high demand of the quality affordable healthcare services [4]. What has affected how well private organization performs is how well facilities can gather and analyze its data. Therefore Big data analytics is assumed to include applying cutting-edge analytical techniques to very large, diversified big data sets, which can contain organized, semi-structured, and unstructured data from numerous sources and range in size from terabytes to zettabytes [5].

The success of specific objectives, whether medical or managerial, was used to measure the performance of hospitals in Kenya. This was not only the quality of care but also other aspects like the cost of care, access to care, and the relationship between patient satisfaction and expectations and how this private hospitals manage its finances [5]. The WHO suggests that in relation to specific targets that reflect private hospitals organizations; values of different stakeholders such as patients, professionals, insurers, and regulators contribute also contribute to its performance [4] while scientific research argue that the best practice models has always improved hospital performance [6]

Private hospital facilities generate taxes and income for the government as they operate in vast market and have been controlling about 70% of doctors' in Kenya [7]. According to world bank report on decentralization of healthcare systems in urban areas, it indicates that only a small number of private hospitals are found in rural areas while this regions largest share being taken government facilities [7]. This gives an avenue for private hospital entity to explore untapped markets. The paper goes on to demonstrate that there is significant disparity in hospital numbers and this has been mostly attributed to increased infrastructure while increased technology spending has come in hand, similarly the ability to recruit qualified healthcare workers [1].

Notably about 47% of the poorest quintile of Kenyans household use a private facility whenever they are sick [8] this showed how important role private hospitals has played in the society especially after the COVIID-19 [9]. Government of Kenya has continued to make reforms its healthcare sector although with this reforms people still prefer private hospitals for services provision [10]. Due to steady rise and competitions there has been need to improve technology ,and mode of service delivery [4]. These has given a leeway for investing in data analytics tools to enhance quick decision making. Therefore to understand big data analytics pivotal role has improved quality in service provision, manage equity in organization and make good decision by tapping on an unexploited healthcare areas [11].

Dr Sam Ochola sees management and other important stakeholders in the healthcare system sector, particularly private hospitals, has a serious concern. He claimed that inadequate information resulting from unreliable data sources was a major cause of medical staff making poor decisions [12]. He also asserted that the healthcare industry in Nairobi County had faced challenges from government laws, medical institution regulations, other governing body regulations ,advanced technology, quality service delivery, financial management and customer satisfaction [3] Therefore hospitals must consequently consider systems that comply with the established standards and guidelines.

Big data analytic capabilities is defined as a company's capacity to gather and analyze data in order to produce insights [13]. This was accomplished by efficiently utilizing personnel, technology, and data across all firm-wide roles, processes, and structures [14]. According to a researcher it was discovered that patient perceptions on a private hospital facility was largely influenced by the quality of care they receive, the medical infrastructure especially diagnostic equipment's available and affordability of service [15]. Performance dimension was measured through financial & market outcomes and operational performance. Operational performance emphasized on metrics like customer happiness and loyalty, social capital of the company, competitive edge generated from resources and capabilities of the firm to thrive in the market. [16].

2. Literature Review

2.1. Theoretical Review

The study was anchored on adaptive structuration theory, dynamic capability theory, diffusion of innovation and resource based view.

Adaptive structuration theory -AST was developed in 1994 and was motivated by Anthony Giddens' structuration theories, which contend that society should be understood in terms of actions and structure [17]. Structuration model explains how technological changes influences organization design over time [18]. Service delivery automation has led to high return and low risk, hence increasing number of hospitals are looking for ways to reduce human participation in order to save costs and improve customer experience. Analytical tools has helped in identifying means in correcting, facilitating and offering a proper ways of capturing the complexities and levels of interactions operations [19].

In the past decade, sophisticated information technologies such as electronic messaging systems, executive information systems, collaborative systems, group decision support systems, and other technologies that leverage sophisticated information management have evolved [20]. Technology has aided in developing ways to correct, facilitate, and provide appropriate methods of recording the levels of complexity and relationships in

operations [19]. The two angles from which AST examined the process of change were: (1) the types of structures provided by advanced technologies, and (2) the structures that actually emerge through human interaction with these technologies [21].

The organization's definition of the service will determine how it is managed and what can be expected from its offerings. Hence, it is crucial to ensure that the company and its customer are constantly in agreement [22]. Information technology has been vital in avoiding over-communicating with customers since informed customers are always happier customers. A group decision support system is one type of advanced information technology that integrates computer, communication, and decision-making capabilities to help both individuals and groups come up with ideas, create strategies, solve problems, and make decisions more quickly which in turn improves performance.

Dynamic Capabilities Theory -was first introduced in 1997 as an addition to and response to the restrictions of the Resource Based View (RBV) [23]. These hypotheses was centered on senior management strategy development for firms capable of adapting to radical discontinuous change while upholding the absolute minimum criteria required to ensure competitive survival [24]. Administrators and decision-makers are always quite concerned about how efficiently they operate and resources they invest in [25]. Therefore failing to invest in one type of resource could lead to the value of the other resources collapsing [25], this is very important for private hospitals to allocate each resource fairly to each project.

Dynamic capability theory, appeared as an alternative strategy where authorities in various jurisdictions creates framework that makes evaluate organization performance [14]. It was ideal for private hospitals to have ideas of scorecard which determines how various departments and parameters [6]. To achieve a competitive performance in Nairobi County, the most crucial component should therefore be how to integrate systems within the company with the aid of BDA skills. This will enable these facilities to assess their adaptability, capacity for change, and willingness to accept such change [26].

Diffusion of Innovation theory In order to improve organizational performance, the Diffusion of Invention (DIT) theory was utilized to explain how, why, and how quickly a notion advances and spreads among a particular society. In the 1960s, Rogers developed DIT. DIT has demonstrated in great detail how private hospitals have embraced big data analytics by abandoning the traditional methods of data collection and analysis [27]. This model has helped hospitals better understand how big data analytics implements and interacts with new technologies throughout time. It also helps to explain how an idea might go through various stages of acceptance by various parties [28].

Customer satisfaction is a key area in every business venture. Private hospital institutions had to place more emphasis how its patients perceive the service and other products that come with it [29]. Understanding the information system and behavioral patterns in the market-Spending habits, product preferences among different demographics, and the evolution of brand perception in connection to various variables gives additional significance to how a firm operates [30]. Therefore big data analytics capabilities serve as a pivot in the exchange of information and the process of making decisions [29].

Resource Based View (RBV) was created by Penrose and advanced by Wernefelf to explain why some organizations perform better than others and how a business might raise its performance [24]. According to RBV, some firms have the capabilities to develop new goods, grow their market share, and enhance the customer value chain [17]. Resources are employed as an input in the operations of this private hospital, but competency has always been the capacity to use these resources skillfully in order to improve the process [31]. Businesses may have a competitive advantage if they can successfully combine organizational resources with IT-based one [32].

For the private hospital facilities in Nairobi County, in-depth resource analysis, resource allocation, and cross-functional resource use are constantly required. When a company completely engages its workforce in creating more productive and market-leading paths its performance increases [33]. There is a clear indicator that human resources effectiveness and achievement create a good organization environment [34]. Therefore with good environment organizations attracts more clients in this atmosphere, and targets and goals are achieved with ease [35].

2.2. Empirical Literature Review

The competitive environment in hospitals is consistently characterized by a high level of change and uncertainty [36]. Technological capability of organization allows shift upgrade of organization and support of information system [6]. Current hospital business marketplaces in the world are characterized by rapid technology advancements [37]. By focusing more on cutting-edge technology domains, Kenyan hospitals have tried to avoid and stop repeating past mistakes. The majority of private hospitals have been continuously investing in technology with the hope that technological innovation incorporated into diverse advancements [4].

The inherent danger that comes with changes that hospitals embrace has decreased because of technological improvements. More experienced staff and the introduction of super specialized facilities in these private hospitals have made it possible for the hospital and those working in various departments to respond to problems more successfully. [2] The ability of the firm to spend more in talent and its leadership are crucial [4]. The use of particular soft skills has made service delivery enjoyable and worthwhile [38]. Businesses make judgments when it is appropriate, which results in considerable gains depending on available information [30].

It is critical to respond rapidly to client inquiries and concerns in the present, constantly changing marketplaces. The ability of hospital staff to be available to help clients while also providing quick, high-quality care is known as service responsiveness [31] A smooth process flow from major operations, such as registration, consultation, admission, and discharge of the patient, determines how satisfied the patient will be with the hospital [39] therefor according to [38] suggested that information technology was seen as a key enabler of organizational growth

capabilities from a larger perspective of business and how service will be delivered to patient in private hospitals.

Financial barriers to healthcare are frequent in private hospitals, particularly user fees and investment costs [1]. In-pocket costs for patients in Africa are greater for private non-profit hospitals, cheaper for public hospitals, and intermediate for private self-financed providers, according to a World Bank study. Hospital efficiency is now increasingly essential because of people have increasingly involved in medical awareness hence a growing need to lower healthcare expenses has emerged [40].

Hospitals are in a better position to evaluate their company's financial health when they are aware of financial measures and key performance indicators [37]. Then, managers have the authority to change the departments' or teams' goals in order to support significant long-term strategic goals. On the other hand, in order to prevent additional costs in private hospitals, especially when dealing with a packaged bills, it is necessary to look into the length of payment or typical patient stay [38]. So, an evaluation of hospital characteristics and their impact on performance was required, and this innovative architectural design, leveraging on technological process progress during implementation process [37].

3. Research Methodology

The research design used in this study was descriptive. The top and middle managers were the population of interest. The study focused on the best performing, 25 level 3b, level 4, level 5 and level 6 private hospitals in Nairobi County to form a total population of 120. The study used a probabilistic data sampling technique with specific target in twenty five private hospitals within Nairobi being identified for research questionnaire. With the use of both open-ended and closed-ended questionnaires, primary data was gathered. The drop-and-pick technique was used. Six components made up the questionnaires. The closed-ended questions were scored using a Likert scale. The questionnaire's validity was evaluated using its content validity, and to evaluate its face validity, Cronbach's Alpha was applied. Using SPSS Version 24, descriptive and inferential statistics were used to evaluate quantitative data, while content analysis was used to assess qualitative data. Tables and percentages with frequency distributions were used to present descriptive statistics. Regression and correlation were used as inferential statistics to analyze the relationship between the independent and dependent variables. Five people, or 6% of the sample total, were chosen at random by the researcher for the pilot test.

4. Findings and Discussion

The Statistical Package for Social Sciences (SPSS) Version 24 was used to code the acquired data and input it into a computer for analysis. Moreover, data cleaning was done. Using SPSS Version 24, descriptive and inferential statistics were used to examine the quantitative data, while content analysis was used to study the qualitative data. To analyze the perception that the respondent had raised, descriptive statistics were presented in frequency distributions, tables, and percentages. Inferential statistics like correlation and regression were used to analyze the relationships between the independent and dependent variables. The confidence level for each test's significance was 97%. Using Cronbach's alpha, the questionnaire's reliability was examined to gauge its internal consistency.

Reliability of the questionnaire was tested to measure its internal consistency using Cronbach's alpha. Big data technology capability, service responsiveness, financial measures, service quality had alpha values of 0.976, 0.987, 0.973 and 0.985 respectively. Private hospitals performance had an alpha value of 0.941. The results of the pilot study demonstrated that all four scales were trustworthy because their reliability values were higher than the required cutoff point of 0.7. as shown in Table 1.

Table 1. Reliability Coefficient

Scale	Cronbach's Alpha	Number of Items
Big Data Technology Capability	0.976	10
Service Responsiveness	0.987	11
Financial Measures	0.973	11
Service Quality	0.985	11
Performance of private hospitals in Nairobi	0.941	

4.1. Inferential Statistics

According to the result indicated in Table 2, There was a significant statistical link between the performance of private hospitals and big data analytics capability (r=0.939; p0.01). As shown by the findings in (r=0.939; p0.01). Strong statistical correlation between service responsiveness and private hospital performance (r= 0.980; p0.01), strong link between financial measures and private hospital performance in Nairobi County (r=0.981; p0.01) and medium correlation between private hospital performance and service quality (r=0.967; p0.01).

The finding concurs with [41] that optimization of service responsiveness improved the performance of private hospitals. It also concurs with [38] that big data analytics significantly affect private hospitals performance. The findings also agree with [42] that financial measures affects private hospital performance and improve on financial measures improves service quality and performance of private hospitals in Nairobi County [3].

4.2. Results of the Coefficient of Determination

To determine how effectively the statistical model was predicted to predict future outcomes, the coefficient of determination was calculated. The Model Summary is shown in Table 3.

According to Table 2's results, the four independent variables that were examined (big data analytic technology capability, service responsiveness, financial measures, and service quality) contribute to 97.0% of the performance of private hospitals in Nairobi, as indicated by the adjusted (r2) at a 97.2% confidence level. This shows the variety in the independent variable due to changes in the dependent variables. This also indicates that 2.8% of the performance of private hospitals is influenced by other factors that were not the subject of this investigation.

Table 2. Correlation Matrix

		Performance of Private hospitals in Nairobi	Big data analytics technology	Service Responsiveness	Financial measures	Quality Of service
Big data technology capability	Pearson Correlation	.939**	1			
	Sig. (2-tailed)	.000				
	N	86	86			
Service Responsiveness	Pearson Correlation	.980**	.919**	1		
	Sig. (2-tailed)	.000	.000			
	N	86	86	86		
Financial Measures	Pearson Correlation	.981**	.938**	.990**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	8	86	86	86	
Quality of Service	Pearson Correlation	.967**	.895**	.990**	980**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	86	86	86	86	86

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

Table 3. Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.986[a]	.972	.970	1.02883

a. Predictors: (Constant) big data technology capability, financial measures, service responsiveness and quality service.

4.3. Multiple Regression

Understanding the relationship between big data analytics and the performance of private hospitals is the major goal of multiple regression in this study. To help in calculating the degree to which a unit change in a specific independent variable causes a change to the dependent variable, the study entered and coded respondent responses using SPSS. Table 4 displays the multiple regression results.

Table 4. coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.307	.641		5.155	.000
	Big data analytic technology capability	.097	.030	.191	3.282	.002
	Service responsiveness	.285	.089	.582	3.192	.002
	Financial measure	.154	.084	.281	1.834	.070
	Quality Service	-.027	.068	-.055	-.397	.693

a. Dependent Variable: performance of private hospital

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

$$Y = 3.307 + 0.097 X_1 + 0.285 X_2 + 0.154 X_3 + (-0.027) X4 + 0.641$$

The performance of private hospitals was 3.307 when all factors (big data technological competence, services responsiveness, financial measurements, and service quality) were held constant at zero. Furthermore, it was shown that a unit change in big data analytics technology will result in a factor of 0.641 change in the performance of private hospitals. A unit change in financial measures would change the performance of private hospitals by a factor of 0.154, a unit change in service responsiveness would change the performance of private hospitals by a factor of 0.285, and a unit change in service quality would change the performance of private hospitals by a factor of -0.027. Overall, the performance of private hospitals was most impacted by big data technology capability, whereas service quality was least impacted.

5. Conclusion, Recommendation, Future Research

5.1. Conclusion

The study's goals were met, and the researcher was able to demonstrate a link between private hospitals' performance and big data capabilities in Nairobi County. These links were established to varying degrees, though, in certain respects. The study's findings revealed that private hospitals in Nairobi used the big data analytic tool to identify creditors, debtors, customer trends, cost reductions, and improved service delivery that enhanced performance and efficiency. This was done by evaluating how big data analytic technology related to performance in various private hospitals.

5.2. Recommendations

The study also found out that most of the private hospitals have financial obstacles. This came about as a result of lack of standardized financial metrics which has adverse impact on hospital performance. It was viewed that when private hospitals needed to establish new or expand existing facility that would aid in service delivery the costs incurred were much higher thus forcing this organization to increase the prices of specialized service to accommodate extra operation costs.

The researcher observed that creation of private hospital policy and identifying the patterns through which new concepts will be adopted and contribution to commercial value was key for its growth. It was also important to focus on financial measures and its KPIs, service quality delivery strategies and how it was to be delivered to patients [16].

Additionally modern ICT infrastructure, technology advancement and investing trainings on available resources would improve performance. The study concludes that, service quality in private hospitals facilitates reliability, responsiveness, and guarantee of service delivery to customers; as a result, hospitals needed to incorporate consumer and competitor analysis. Product quality and customer loyalty both have an impact on how calculative commitment to performance will be measured in future [37].

5.3. Future Research

A closely analogous or comparable study in other healthcare industries and governmental hospitals should be done for comparison purposes in order to ascertain how well big data analytics capability and private hospitals performance are related. It is important to research how other relevant factors, such as financial stability, impact the operation of private hospitals. Reaching respondents for the study proved to be particularly challenging because the majority of private hospitals don't disclose their data. Several of the management level personnel were very difficult to reach due to their hectic schedules, and others were reluctant to complete the questionnaire.

References

[1] World Bank, "Delivering Primary Health Services in Devolved Health Systems of Kenya. September 2014. Challenges and opportunities Final Report," no. September, pp. 1–10, 2014.

[2] The East Africa, "East Africa boosts its hospitals, staff, services to attract medical tourists," 2015.

[3] N. CAROLINE, "Service Quality and Performance of Private Hospitals in," no. September, 2016.

[4] C. A. Brand *et al.*, "A review of hospital characteristics associated with improved performance," *Int. J. Qual. Heal. Care*, vol. 24, no. 5, pp. 483-494, 2012.

[5] S. Misra and S. Bera, "Introduction to Big Data Analytics," *Smart Grid Technol.*, pp. 38-48, 2018.

[6] P. Davis *et al.*, "Efficiency, effectiveness, equity (E3). Evaluating hospital performance in three dimensions," *Health Policy (New. York).*, vol. 112, no. 1-2, pp. 19-27, 2013.

[7] P. Kioi, S. W., Cowden, R., & Karodia, A. M., "An evaluation on in- patient satisfaction at meridian equator hospital (Nairobi, kenya)," *Arab. J. Bus. Manag. Rev.*, p. 32, 2015.

[8] W. H. Organization, "Shaping Primary Health Care.," *Prim. Heal. Care Improv. Glob. Stakehold. Meet.*, 2015.

[9] MOPHS, "Public Health and Sanitation Strategic Plan, 2008-2012.," *Minist. Public Heal. Sanit.*, no. Nairobi, 2008.

[10] K. Ministry Of Health, "Kenya Standards and Guidelines for mHealth Systems," *Report*, 2017.

[11] P. Mikalef, M. Boura, G. Lekakos, and J. Krogstie, "Big data analytics and firm performance: Findings from a mixed-method approach," *J. Bus. Res.*, vol. 98, pp. 261-276, May 2019.

[12] Dr. Sam Ochola, "NAIROBI CITY COUNTY HEALTH SECTOR (Revised 2017)," vol. 2019, no. Revised 2017, 2019.

[13] W. Z. xiaofeng su, "big data analytics capabilities and organization performance," *Eur. J. Innov. Manag.*, 2021.

[14] S. Ali, P. Poulova, F. Yasmin, M. Danish, W. Akhtar, and H. M. U. Javed, "How big data analytics boosts organizational performance: The mediating role of the sustainable product development," *J. Open Innov. Technol. Mark. Complex.*, vol. 6, no. 4, pp. 1-30, 2020.

[15] M. N. Maina, "Effect of customer perception on performance of private hospitals in Nairobi," *Int. J. Bus. Commer.*, 2015.

[16] E. Knies, C. Jacobsen, and L. Tummers, "Leadership and organizational performance: State of the art and a research agenda," *Routledge Companion to Leadersh.*, no. January, pp. 404-418, 2016.

[17] M. Gupta and J. F. George, "Toward the development of a big data analytics capability," *Inf. Manag.*, vol. 53, no. 8, pp. 1049-1064, 2016.

[18] N. Muhammad, Imran. Wickramasinghe, "Using Structuration Theory to Assist in Understanding the Implementation and Adoption of Health Information Systems DO - 10.1007/978-3-319-72287-0_13," pp. 10.1007/978-3-319-72287-0_13, 2018.

[19] M. Q. Shabbir and S. B. W. Gardezi, "Application of big data analytics and organizational performance: the mediating role of knowledge management practices," *J. Big Data*, vol. 7, no. 1, 2020.

[20] R. Article, "Patient Satisfaction Survey as a Tool Towards Quality Improvement," vol. 29, no. 1, pp. 3-7, 2014.

[21] G. Desanctis and M. Scott, "Capturing the Complexity in Advanced Technology Use : Adaptive Structuration Theory," vol. 5, no. 2, pp. 121-147, 2015.

[22] J. W. Dearing and J. G. Cox, "Diffusion of innovations theory, principles, and practice," *Health Aff.*, vol. 37, no. 2, pp. 183-190, 2018.

[23] T.. Galvin, P., Rice, J. & Liao, "Applying a Darwinian model to the dynamic capabilities view," *Insights and issues.*, no. 20, 2014.

[24] T. Kolajo, O. Daramola, and A. Adebiyi, "Big data stream analysis: a systematic literature review," *J. Big Data*, vol. 6, no. 1, 2019.

[25] P. Mikalef, J. Krogstie, I. O. Pappas, and P. Pavlou, "Exploring the relationship between big data analytics capability and competitive performance: The mediating roles of dynamic and operational capabilities," *Inf. Manag.*, vol. 57, no. 2, p. 103169, 2020.

[26] K. Mckeon, N. Gitonga, and C. Decker, "Kenya private health sector assessment," no. August, 2009.

[27] J. Baumgarten, M. Dickstein, and N. Rizk, "beyond the hype Building a Big Data-Enabled Organization," 2013.

[28] P. Wayne W. LaMorte, MD, "Diffusion of Innovation Theory," *Behav. Chang. Model.*, no. 09.09.2019, 2019.

[29] E. A. K. Miriti, "UNIVERSITY OF NAIROBI SCHOOL OF COMPUTING AND INFORMATICS CONSUMER SEGMENTATION AND PROFILING USING DEMOGRAPHIC DATA AND SPENDING HABITS OBTAINED THROUGH DAILY MOBILE CONVERSATIONS By Wambui Samuel Kamande Supervisor," 2016.

[30] J. B. Barney and W. S. Hesterly, "Strategic management and competitive advantage : concepts and cases," 2012.

[31] K. J. Thomas Craig, M. M. McKillop, H. T. Huang, J. George, E. S. Punwani, and K. B. Rhee, "U.S. hospital performance methodologies: A scoping review to identify opportunities for crossing the quality chasm," *BMC Health Serv. Res.*, vol. 20, no. 1, pp. 1-13, 2020.

[32] MUTUKU, "ELECTRONIC COMMERCE CAPABILITY AND PERFORMANCE OF COMMERCIAL BANKS IN KENYA," 2019.

[33] O. K. D. Akinloye, "Prospects of Big Data Analytics in Africa Healthcare System," 2018.

[34] J. Blustein, W. B. Borden, and M. Valentine, "Hospital performance, the local economy, and the local workforce: Findings from a US national longitudinal study," *PLoS Med.*, vol. 7, no. 6, 2010.

[35] E. S. Pavlou P.A, "From IT leveraging competence to competitive advantage in turbulent environments," *Inf. Syst. Res.*, 2006.

[36] C. Cummings, T., & Worley, "Organization development and change," *Stanford, CA CENCAGE Learn.*, 2014.

[37] J. Davey and C. Grönroos, "Health service literacy: complementary actor roles for transformative value co-creation," *J. Serv. Mark.*, vol. 33, no. 6, pp. 687-701, 2019.

[38] S. Basu, J. Andrews, S. Kishore, R. Panjabi, and D. Stuckler, "Comparative performance of private and public healthcare systems in low- and middle-income countries: A systematic review," *PLoS Med.*, vol. 9, no. 6, p. 19, 2012.

[39] S. L. Buchan HA, Duggan A, Hargreaves J, Scott IA, "Health care variation: time to ac," *Med J Aust.*, vol. 205, no. s30, 2016.

[40] S. J. Maher D, Smeeth L, "Health transition in Africa," *Pract. policy Propos. Prim. care. Bull World Heal. Organ*, vol. 88, 2010.

[41] E. Vayena., J. Dzenowagis., J. S. Brownstein., and A. Sheikh, "Policy implications of big data in the health sector," *Bull World Heal. Organ*, vol. 1, pp. 66-68, 2018.

[42] G. health observatory. Geneva, "World Health Organization," *World Heal. Organ.*, 2011.