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Original Article

A Framework for Implementation of Telemedicine

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ABSTRACT

While there is wide implementation of telemedicine in developed economies, other countries lag behind. However, for more than a decade, some of these countries have recognized the potential benefits of information and communication technology (ICT) in the delivery of health care. There is an urgent need for an understanding of telemedicine implementation issues affecting various nations, as Telemedicine systems innovations and implementation initiatives are still in their early stages, albeit with a lot of struggles in these countries. The purpose of this study is to develop a framework for implementation of Telemedicine systems. The study considered both qualitative and quantitative data that was collected from hospitals in three counties within Kenya, and then finally, a framework for the implementation of telemedicine was proposed. The study provides some key insights into the implementation of Telemedicine systems in public hospitals and, to some extent, in private hospitals in Developing Countries. Having contextualized the implementation of telemedicine, the study concluded from the findings that Telemedicine implementation is an all-encompassing process that is predicated on policy and legislation issues, organizational issues, social and technological factors, and as such, for successful implementation, careful consideration of all these is fundamental.

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INTRODUCTION

The health sector is one of the major sectors in any economy of the world, and it is one of the fastest growing sectors in any country, whether developing, developed or third world. This has been occasioned by the fact that we have new diseases coming up due to population and climate change; apart from that, the growth has been occasioned by the fact that each country of the world is working or striving to give the best medical services to its populace.

As the world works towards giving better medical services to its population, the use of information and communication Technology (ICT) has emerged not only as a panacea to achieving this but also as a force to reckon with as an alternative to giving better medical attention to the old ways.

Many countries, especially the low-income ones, are facing various problems in delivering health care and medical services to their population – lack of funds and constrained resources as well as a dramatic shortage of trained and experienced doctors and nurses are but a few of the factors that have accessioned this. Norish (2002) defines telemedicine as the use of telecommunication to provide medical information and services. The definition by Norish limits telemedicine to the provision of medical information and services using Telecommunication. However, Basshur (1997) goes further in the definition, and gives more details; he posits that "Telemedicine involves the use of modern information technology, especially two-way interactive audio/video communications, computers, and telemetry, to deliver health services to remote patients and to facilitate information exchange between primary care physicians and specialists at some distances from each other."

The WHO (1997) defines it as "the delivery of health-care service, whereby distance is a critical factor, by health care professionals using information and communication technologies for the exchange of valid information for diagnosis, treatment and prevention of disease and injuries, and for continuing education of health care providers as well as research, all in the interest of individuals and their communities." Telemedicine encompasses a broad range of applications and services. Such services include Specialist referral services, primary patient monitoring between a patient and a primary caregiver or specialist physician, remote patient monitoring, which involves the collection of data using devices remotely to a monitoring station for interpretation, medical education, which includes giving of medical education and sharing of information, patient support services which include reminders for taking medication, supervision and even scheduling of appointments and consumer health information.

In most of the developed countries, both in Europe, the West, and Asia have made significant steps as far as delivery of quality medical services is concerned with initiatives such as those of telemedicine; however in most developing countries, especially in Africa, there is still much to be done. Many developing countries are facing various problems in delivering health care and medical services to their population – lack of funds and constrained resources as well as a dramatic shortage of trained and experienced doctors and nurses.

Study Objective

The main objective was to examine factors that affect the implementation of telemedicine in public hospitals with a view to developing a framework for the implementation of telemedicine.

LITERATURE REVIEW

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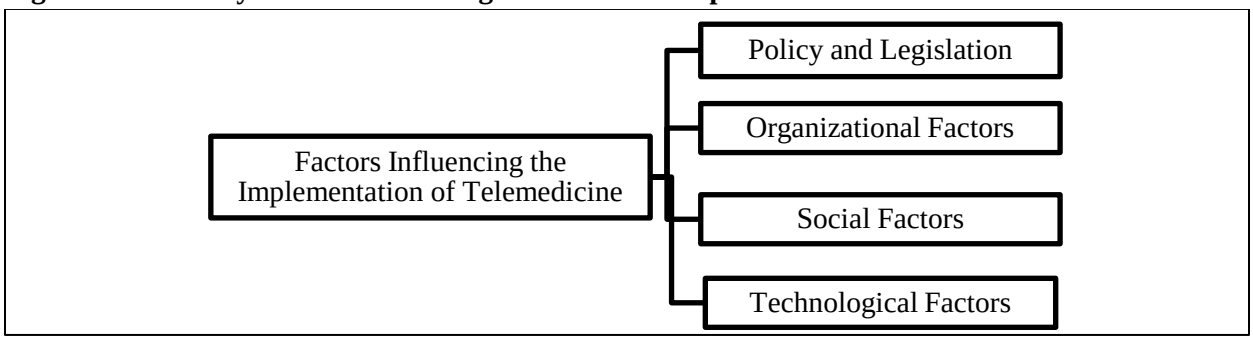
This study considered factors influencing the implementation of telemedicine. We grouped the factors into four main themes: Policy and Legislation, Organizational, Social issues and technical issues, as shown in the figure below. However, these are not the only issues that are available regarding Telemedicine implementation; there are many and various that have not been highlighted probably in most studies because factors are brought about based on the context of the study; this is to say, what could be an issue in one context will not necessarily be an issue in another context.

Figure 1: Summary of factors affecting Telemedicine Implementation



Source: (Author, 2023)

Mort and Finch (2005) argue that wide-scale deployment of telemedicine implementation is hard without suiting legislation and policy; Scalvini et al. (2005) supports this notion. Policy issues range from Standardization, ICT policies and specific Telemedicine and eHealth policies, while legislation revolves around issues to do with security and privacy of data.

The majority of IS implementation research agrees that an organization's culture is key to implementation success (Poston and Grabski, 2001). Some of the issues at the organizational level that determine the successful implementation of innovations include top management support, training (Bingi et al., 1999; O'Leary, 2000), and Organizational culture. Besides economic and technological impediments, a frequently cited challenge to the survival of telemedicine is that complex human and social factors hinder the diffusion of telemedicine services (WHO, 2010). Sharifi et al. (2013) posit that social factors are among other issues that affect telemedicine implementation.

Technological factors play a critical role in the implementation of telemedicine. "Some factors such as availability of technology that is software, hardware and infrastructure and Technology culturation – which represents a person's exposure to a relatively technology-intense culture and then the characteristics of technology" (Straub & Loch, 2002). Issues such as availability of technology, usability, and quality are among the Technological factors.

There are other issues revolving around corruption and integrity. Khan (1996) defines corruption as an act that deviates from the formal rules of conduct governing the actions of someone in a position of public authority because of private –- motives such as wealth, power or status. "Corruption's roots are grounded in a country's social and cultural history, political and economic development, bureaucratic traditions and policies." Tanzi and Davoodi (1997). Tanzi and Davoodi (1997) continue to argue that "there are direct and indirect factors that promote corruption. Direct factors include regulations and authorizations, taxation, spending decisions, provision of goods and services at below-market prices, and financing of political parties. Corruption and integrity issues include Conflict of Interest, Bureaucratic Corruption/Bribery, and theft.

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Telemedicine Frameworks and Models

The layered Telemedicine implementation model was a result of a systematic literature review conducted by Broens et al. (2007) to answer the question of why it is so difficult (to implement Telemedicine services) and what goes wrong. Broens et al. (2007) explain that maturity is gained as one moves from one successful implementation layer to another. Broens et al. (2007) postulate that different determinants such as Technology acceptance, Financing and Organization, policy and legislation apply throughout the implementation lifecycle, and their Layered Implementation Model was developed accordingly.

The implementation framework by Adenuga et al. (2020) came up with four factors issues that affect implementation of Telemedicine in Nigeria: Technological factor, human factor, financial factor and social factor. Internet connectivity, infrastructure, power supply, training and technical support were issues considered under the technology factor, while under the human factor, issues to do with privacy and confidentiality, platform security, policy and guidelines and legal issues were considered.

Framework for Assessing Health Systems Challenges to scaling up of mHealth in South Africa was proposed by Lean et al. (2012), where they defined four dimensions, namely government stewardship, financial, technological and organizational. These dimensions mirror those of Tanriverdi & Iacono (1999), although they do not make reference to them. For each of the four dimensions, they apportion two or more elements that are important to consider when making decisions about the implementation of telemedicine.

The Telemedicine “hat” model was suggested by (Francesc et al., 2016) in a book published by the Pan American Health Organization. In their work, Francesc et al. (2016) argue that the implementation of technology-telemedicine in this case--to solve health problems should be addressed from a perspective that encompasses a large set of interactions. Francesc et al. (2016) model addresses the implementation of a telemedicine service by starting from the multidimensional and complex concept of competitiveness, which, in essence, suggests that a model on technological innovation should be addressed from a holistic perspective; that is, it should consider a range of dimensions beyond technology (personal, educational, economic, organizational, social, cultural, and institutional) which do not follow a homogeneous or sequential path.

Ouma and Herselman (2008) also suggested a model for e-Health implementation that focuses on rural areas of developing countries. The model highlighted training, infrastructure, cross-sector linkages, ICT expertise and government policies as key dimensions to successful Telemedicine implementation in developing countries. The Ouma & Herselman model is, however silent on social dimensions, which is a key contributing factor to successful telemedicine implementation.

Fanta and Pretorius's Framework for Sustainable eHealth implementation is another model that was proposed by G.B Fanta & L. Pretorius (2018) and is anchored on the theory of sustainable eHealth. Fanta and Pretorius address key dimensions as input: technological (System quality, Information quality, Service quality), Social (usefulness, Ease of use and social influence), economic (Affordability, Funding and profitability), then organizational (organizational structure, information culture, resources, leadership, management support, workflow process). All these are tied up to a dimension that they refer to as process implementation, which has (Training, Data management, change management, stakeholders’ engagement, communication and project management). The framework looks detailed; however the framework is not as all-encompassing as it looks, just like the other frameworks; this one fails to address cogent issues like ethics/corruption and governance and politics.

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Figure 2:

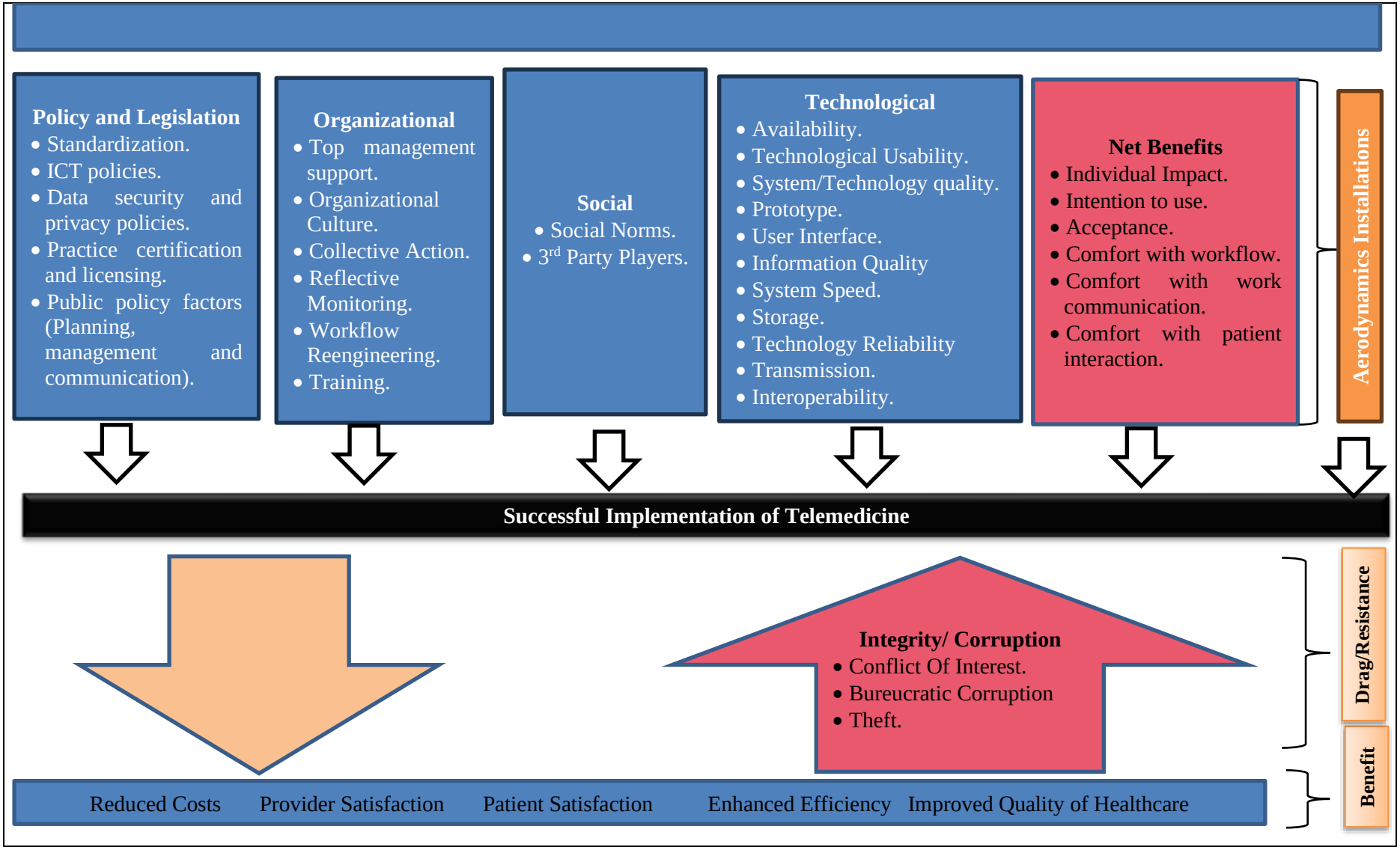

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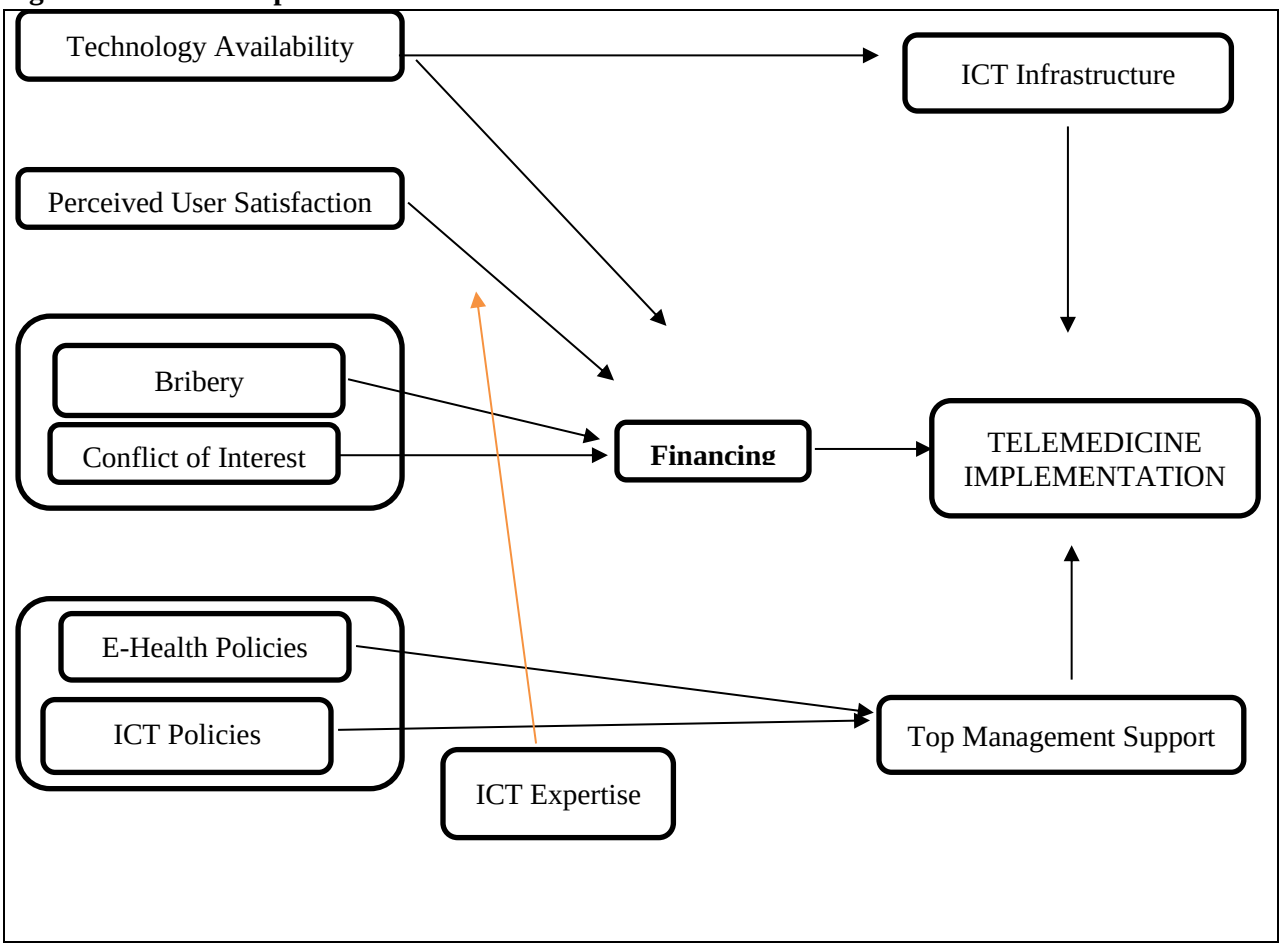
Figure 3: V. Conceptual Framework



METHODOLOGY

Nine public hospitals within Kenya were considered from three counties: Nairobi, Machakos and Busia. This study adopted a stratified random sampling procedure. The medical workers were stratified into nine hospitals that were picked based on purposive sampling from the THREE counties. Then, in each stratum, a systematic random sampling procedure is applied. The sample size was determined by the formula proposed by Cochran (1963).

$$n_o = \frac{z^2 pq}{e^2}$$

Where n_0 is the sample size, e is the desired level of precision (i.e. the margin of error) assumed at plus or minus 5% (0.05). A 95% confidence level will give us a Z value of 1.96 as per the Z table. Assuming that half of the population will give a positive response to the attributes being studied, p will 0.5. q is calculated as 1-p. Hence, our sample size is;

$$n_o = \frac{1.96^2 * 0.5 * 0.5}{0.05^2} = 385$$

Using the n_0 value of 385 obtained above, the adjusting formula below was used to get the desired sample size, as shown in Table 1 below.

$$n = \frac{n_o}{1 + \frac{(n_0 - 1)}{N}}$$

Where n is the adjusted sample size, n 0 is the sample size (385) calculated using the Cochran formula above, and N is the finite population.

The target population comprised doctors, medical officers, nurses, records officers and lab

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technicians. The selection was informed by the fact that these are the workers in hospitals who will access or use ICT in their jobs and are better placed to answer questions regarding ICT and health.

Table 1: Sample size

Hospital	No. Of workers (n)	Sample size (n)
Mbagathi Hospital	285	164
Mama Lucy Hospital	209	135
Mukuru Kwa Njenga Health Center	30	27
Machakos Level 5 Hospital	367	187
Kathiani Sub County Hospital	33	30
Kangundo Sub County Hospital	45	40
Alupe Sub County Hospital	71	60
Kochia Sub County Hospital	43	38
Khunyungu Sub County Hospital	55	48
Total	1138	729

Data Analysis

The response rate of this study was 87.0% (computed by response/sample size, 634 respondents out of a sampled population of 729), which is good for analysis and reporting and is adequately representative of the entire population. “A response rate of 50% is adequate for analysis and reporting, whereas a rate of 60% is good and a rate of 70% and over is very good” (Mugenda & Mugenda, 2003).

FINDINGS AND DISCUSSION

Demographic characteristics of respondents

The demographic analysis of the study considered the situation of the facility, gender, age bracket, exposure to telemedicine and duration of exposure. The results are shown in the table below.

Table 2: Demographic of respondents

Demographic		Frequency	Percentage
Situation	Urban	433	68.3
	Rural	201	31.7
	Total	634	100
Gender	Male	345	54.4
	Female	289	45.6
	Total	634	100
Age	Below 25 years	32	5.1
	25-34 years	156	24.6
	35-44 years	331	52.2
	44-55 years	115	18.1
	Total	634	100
Exposed to Telemedicine	Yes	634	100
	No	0	0
	Total	634	100
Duration Exposed	Below 2 years	56	8.8
	2-5 years	213	33.6
	5-10 years	267	42.1
	Over 10 years	98	15.5
	Total	634	100

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As shown in *Table 2* above, the majority of the respondents came from urban centers, as indicated by 68.3% (433) of the respondents, while 31.7% (201) were from rural areas. This implies that most of the facilities were located in urban areas, which have improved ICT infrastructure development. In regards to gender, 54.4% (345) were male, while 45.6% (289) were female. It is evident that most of the respondents in these facilities were male, although the two third gender rule has been realized. In terms of age, only 5.1% (32) of the respondents were less than 25 years, while 24.6% (156) were between 25 and 34 years. The results also revealed that 52.2% (331) of the respondents were between 35 and 44 years and 18.1% (115) were between 45 and 55 years old. It is evident that most of the sampled respondents were between 25 and 44 years old, which is an active age for telemedicine utilization.

Model Validation

The main Objective of this study was to develop a framework for the implementation of telemedicine in developing countries; a comprehensive framework was developed from which a conceptual model for validation was also generated. In this section, we validated the model using regression analyses.

Table 3: Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.664[a]	.441	.435	4.13215

a. Predictors: (Constant), perceived user satisfaction, bribery, ICT policy, technology availability, e-health policies, conflict of interest

ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	8436.354	6	1406.059	82.348	.000[b]
	Residual	10705.804	627	17.075		
	Total	19142.158	633			

a. Dependent Variable: Telemedicine implementation
b. Predictors: (Constant), perceived user satisfaction, bribery, ICT policy, technology availability, e-health policies, conflict of interest

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	1.773	1.172		1.513	.131		
	ICT policy	.193	.037	.180	5.153	.000	.732	1.366
	e-health policy	-.023	.052	-.018	-.443	.658	.535	1.868
	Bribery	.491	.045	.413	10.789	.000	.607	1.647
	Conflict of interest	.237	.056	.177	4.245	.000	.511	1.957
	Technology availability	-.290	.056	-.201	-5.216	.000	.603	1.658
	Perceived user satisfaction	.295	.053	.241	5.581	.000	.478	2.092

a. Dependent Variable: Telemedicine Implementation

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The results in *Table 3* give information on the summary of the model. From the result, we deduce that the R square is .441, meaning it indicates that all the latent variables account for 44.1% significance variance in the Implementation of Telemedicine. This is to say, therefore, that the factors used here are significant predictors of Telemedicine implementation considering the measure of strength of association.

The study sought to know the effect of each factor on the implementation of telemedicine, and all the variables were entered into the model. Results were presented as is in Table 2 using unstandardized coefficients, standardized coefficients, and significant values. This table presents findings on the significance of each of the variables in the implementation of telemedicine. The beta coefficient column shows results that compare the strength of the effect of each independent variable to the dependent variable, and the effect is stronger when the absolute value of the beta coefficient is higher.

According to the results, the largest beta coefficient was 0.491 for bribery. This is significant (sig=.000) and also positive, meaning bribery has the strongest contribution to the Implementation of Telemedicine. Perceived user satisfaction had the second-largest beta coefficient of 0.295. This makes Perceived user satisfaction the second strongest. From the result presented, e-health policy is seen as not having a significant effect on Telemedicine implementation (P>0.05).

Moderating Effect of ICT Expertise on Telemedicine Implementation

The study sought to test the moderating effect of ICT expertise on Telemedicine implementation. The results are presented in *Table 4.*

Table 4: The moderating effect of ICT expertise on Telemedicine implementation

Model Summary[c]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				Durbin-Watson
					R^2 Change	F Change	df1	df2	Sig. F Change	
3	.695[b]	.483	.478	3.97421	.043	51.825	1	626	.000	1.924

a. Predictors: (Constant), perceived use, Bribery, ICT policy, Technology Availability, e-health policy, conflict, moderator1

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
2	Regression	9254.901	7	1322.129	83.709	.000[c]
	Residual	9887.256	626	15.794		
	Total	19142.158	633			

a. Dependent Variable: Telemedicine Implementation

c. Predictors: (Constant), perceived user satisfaction, Bribery, ICT policy, Technology Availability, e-health policy, conflict of interest, moderator1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
2	(Constant)	8.071	1.427		5.658	.000
	ICT policy	.119	.037	.111	3.175	.002
	e-health policy	-.083	.051	-.065	-1.624	.105
	Bribery	.380	.046	.321	8.206	.000

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Conflict	.223	.054	.166	4.134	.000
Technology availability	-.247	.054	-.171	-4.582	.000
Perceived user satisfaction	-.019	.067	-.015	-.278	.781
moderator1	.013	.002	.412	7.199	.000

a. Dependent Variable: Telemedicine Implementation

Looking at R squared column in the model summary, we deduce that latent variables jointly account for 48.3% significant variance in the Implementation of Telemedicine systems in developing countries (R square= 0.483); this is after the introduction of ICT expertise as a moderating variable on perceived user satisfaction, there is an increase from the previous 43.5% without the influence of ICT expertise as a moderating variable on Perceived user satisfaction. Significance change still remains at .000. Therefore, we make a conclusion that the variables are jointly significant predictors of the Implementation of Telemedicine systems in Developing countries.

The sum of squares identifies the dispersion of data as well as how well the data can fit the model in regression analysis. From Table 4, after considering the variables in relation to the moderating effect of ICT expertise, two of them had insignificant influence on the implementation of telemedicine in developing countries. Bribery had the largest beta coefficient of .380 with p=.000. This signified that bribery at this stage had the strongest contribution to the implementation of telemedicine when we controlled the variance explained by all the other variables in this model. Conflict of interest seemed to have the second largest beta coefficient of .223 with p=.000 in the implementation of Telemedicine systems in developing countries, meaning the values indicate good positivity and significance followed by ICT policy.

Other variables that had significant contributions to the model were ICT policies (β= .119, p=.000) in third position and Technology availability. However, e-health policy (p= .105) and perceived user satisfaction (p= .781) could not make a significant contribution statistically to the model. With the introduction of the moderating effect of ICT expertise, perceived user satisfaction and e-health policy do not have a significant influence on Telemedicine implementation (P>0.05).

The mediating effect of Financing, Top Management Support and ICT Infrastructure on Telemedicine Implementation.

The mediating effect of financing was introduced, Top management support and ICT infrastructure. The results are presented in *Table 5* below.

Table 5: The Mediating Effect of Financing, Top Management Support and ICT Infrastructure on Telemedicine Implementation.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics			
					R Square Change	F Change	df1	df2	Sig. F Change
3	.743[c]	.552	.540	3.72901	.023	4.464	7	615	.000

a. *Predictors: (Constant), perceived user satisfaction, bribery, ICT policy, e-health policy, finance, Technology Availability, ICT expertise, Top Management Support, ICT infrastructure, mediating7, mediating4, mediating2, mediating5, mediating6, mediating3, mediating1*

ANOVA[a]

Model	Sum of Squares	Df	Mean Square	F	Sig.

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3	Regression	10556.610	17	620.977	44.657	.000[d]
	Residual	8551.876	615	13.905		
	Total	19108.487	632			

a. Dependent Variable: Telemedicine Implementation

b. Predictors: (Constant), perceived user satisfaction, bribery, ICT policy, Conflict of Interest, e-health policy, finance, Technology Availability, ICT expertise, Top Management Support, ICT infrastructure, mediating7, mediating4, mediating2, mediating5, mediating6, mediating3, mediating1

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-10.323	5.576		-1.851	.065
	ICT policy	.832	.228	.775	3.648	.000
	e-health policy	.008	.212	.006	.036	.971
	Bribery	-.105	.203	-.088	-.514	.607
	Conflict of Interest	.747	.192	.559	3.898	.000
	Finance	-.382	.205	-.366	-1.864	.063
	perceived user satisfaction	.112	.169	.092	.661	.509
	Top Management Support	.843	.246	.656	3.426	.001
	Technology Availability	-.633	.245	-.438	-2.583	.010
	Top Management Support	.067	.187	.057	.359	.719
	ICT expertise	.375	.048	.331	7.862	.000
	mediating1	-.033	.009	-1.222	-3.532	.000
	mediating2	.000	.008	.007	.026	.979
	mediating3	-.016	.011	-.387	-1.367	.172
	mediating4	.038	.011	.973	3.494	.001
	mediating5	.004	.007	.149	.582	.561
	mediating6	.024	.009	.813	2.677	.008
	mediating7	-.033	.009	-.978	-3.850	.000

a. Dependent Variable: Telemedicine implementation

From the results in *Table 5*, we deduced that all the constructs jointly accounted for 52.2% significant variance for the implementation of Telemedicine systems in developing countries (R square= 52.2%, F= 4.464 and P= .000), meaning all the variables were together predictors of Telemedicine Implementation in developing countries.

The study, however was interested in knowing the effect of each of all the factors that determine the implementation of Telemedicine systems in developing countries after the introduction of the mediating effect of Financing, Top management support and ICT infrastructure. All of these were incorporated into the model as a block, one-way multivariate analysis of variance was conducted and the results were presented in the table using unstandardized coefficients, standardized coefficients, t statistics and significant values. Weights closest to absolute 1 reflect the strongest paths, while weights closest to 0 reflect the weakest paths (Garson, 2016). Further from the table, Top management support was found to have the strongest effect on Telemedicine implementation in developing countries (0.843), followed by ICT policy (0.832). Conflict of Interest and ICT expertise come as the third and fourth latent variables having the strongest effect on

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Telemedicine implementation (0.747) and (0.375), respectively. Further, based on the findings, the influence of ICT policy, Conflict of Interest, Technology availability, and ICT expertise on Telemedicine implementation was significant, as indicated by P<0.05. The mediating effect of financing, top management support and ICT infrastructure on the implementation of telemedicine is also seen as being significant on some independent variables while not on others. From the above analysis, we came up with the overall regression equation that captures all the significant variables, as shown below;

Y=-10.323+0.832*X1+0.747* X2+0.843* X3-0.633*

where;

Y = *telemedicine* implimentation

$X1$ = ICT POLICY

$X2$ = Conflict of interest

$X3$ = top management suppor

$X4$ = technology availability

$X5$ = ICT expertise

$Z1$ = top manegement*e-health policy

Z2=topmanagement*ICT policy

$Z3$ = *ICT* Infrustructure*technology availability

Z4=financing*perceived usersatisfaction

From the results, it was observed that the coefficient of ICT policy was 0.832 with a T-value = 3.648, p-value = 0.000, which is less than 0.05 significant level. This means that ICT policy positively influences telemedicine. The results indicate that the coefficient of conflict of interest was 0.747 with a T-value = 3.898, p-value = 0.000, which is less than 0.05 significant level. This means that conflict of interest positively influences telemedicine. The results indicate that the coefficient of top management support was 0.843 with a T-value = 3.426, p-value = 0.001, which is less than 0.05 significant level. This means that top management support positively influences telemedicine.

The results indicate that the coefficient of technology availability was -0.633 with a T-value = -2.583, p-value = 0.010, which is less than 0.05 significant level. This means that technology availability positively influences telemedicine. The results indicate that the coefficient of ICT expertise was 0.375 with a T-value = 7.862, p-value = 0.000, which is less than 0.05 significant level. This means that ICT expertise positively influences telemedicine.

The interpretation of the results on mediating variables indicates that the moderating variables top management support and the E-health policy and ICT policies are significantly contributing to the influence of telemedicine. The results also indicate that the moderating variable financing significantly influences the moderating effect of ICT policy on the influence of telemedicine. From the analysis, e-health policy is not significant; the thinking is that there is a convergence in ICT policies and e-health policies, meaning that whatever e-health policies are to achieve can be achieved through e-health policies.

CONCLUSION

In line with the objectives and findings of the study, the following conclusions have been drawn based on the results of data analysis with comparison from other results from the literature review: Telemedicine implementation is an all-encompassing process that is predicated on policy and legislation issues, organizational issues, social and technological factors, and as such, for successful implementation, a careful consideration of all these is fundamental. Besides, a pragmatic, context-based approach is critical to successful implementation. Based on this, the study came up with a complex framework that is holistic, detailed and grounded on data. The framework has five themes that are highlighted in most of the literature that was considered and three that make up the gap in the previous study, and these are Policy and legislation, organizational factors, social factors, technological factors, net benefits,

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integrity/corruption, governance and politics and climate issues. This study came up with a model that described these factors and their interrelationships, and these are; Technology availability, perceived user satisfaction, bribery, conflict of interest, e-health policies, ICT policies, ICT expertise, Top management support, Financing and ICT infrastructure.

The issue of successful implementation needs to be considered in a broad spectrum way so that all that hinder or determine the implementation and the stakeholders are engaged in the process. The issues that are grounded from the data are intertwined and interrelated; thus, there is a need to address them holistically for telemedicine implementation to be effective.

Recommendations

Financing is key to telemedicine implementation as it ensures that available ICT infrastructures and platforms are in place for effective implementation. The availability of adequate finance is vital for the acquisition of infrastructure, which is expensive, and the supporting technologies. Further, financing is needed to acquire requisite ICT experts during the initial stage of implementation. Therefore, the study recommended that there is a need for government policies that would ensure public hospitals in developing countries are adequately funded by the ex-chequer so as to effectively implement telemedicine. Further, hospital management should diversify the source of funds needed for the implementation of telemedicine. This can be done by charging premium prices for services supported by telemedicine. In the framework, top management has been proven to be vital in terms of mediating between ICT as well e-health policies and telemedicine implementation. For policies to be implemented in regard to telemedicine, top management needs to provide required resources such as finance, time and human resources. Secondly, top management support is instrumental in regard to staff resistance during implementation. Therefore, the study recommended that there is a need for hospital management to collaborate with hospitals in developed countries so as to ensure that appropriate technologies and expertise are shared among them. Top management should also participate in the formulation of policies, especially e-health policies, that are vital for the implementation of telemedicine. ICT Expertise was found to be a significant moderating factor between perceived user satisfaction and telemedicine implementation. However, because of the shortage of appropriate expertise in telemedicine among developing countries, the study recommended that hospital management should deliberately facilitate ICT expertise sharing across its different departments to facilitate the implementation of telemedicine. This would ensure there is seamless connection and ubiquitous telemedicine implementation in hospitals. ICT Infrastructure was a significant mediating factor between technology availability and telemedicine implementation. This implies that the availability of technology without required ICT infrastructure would not impact telemedicine implementation. However, the acquisition of ICT infrastructure requires adequate funds since most telemedicine infrastructure is expensive for hospitals in developing countries to afford. In this regard, there is a need for hospitals to link technology availability, financing, ICT infrastructure and telemedicine implementation.

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