

Technology-Related Factors Determining Electronic Requisition System Adoption Among Nurses at Coast General Teaching and Referral Hospital

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Abstract

Electronic Requisition Systems (ERS) are increasingly used by healthcare providers to enhance service delivery. Coast General Teaching and Referral Hospital (CGTRH) has embraced technology to promote efficiency. However, despite ERS availability, computer inadequacy and other factors have impeded full adoption. This study assessed technology-related factors determining ERS adoption among nurses at CGTRH and examined the moderating effect of user acceptance on the relationship between technology-related factors and ERS adoption. A mixed-methods research design was employed. The target population comprised 182 nurses, with a sample of 125 nurses selected through proportionate stratified sampling and 3 key informants purposively selected. Structured questionnaires and key informant interview guides were used for data collection. Quantitative data were analyzed using descriptive statistics, Pearson correlation, and hierarchical regression in SPSS version 26. Qualitative data were analyzed thematically. Before interacting technology factors with user acceptance, the relationship with ERS adoption was positive but insignificant ($\beta = 0.102$; $p = 0.421$). Upon introducing the interaction term (technology factors $\times$ user acceptance), the relationship became significant and positive ($\beta = 0.187$; $p < 0.001$), indicating a moderating effect. In the combined model, technology-related factors had a positive and significant relationship with ERS adoption ($\beta = 0.553$; $p < 0.01$). User acceptance also had a positive and significant relationship with ERS adoption ($\beta = 0.209$; $p < 0.01$). The study concludes that there was inconsistency in accessibility of high-speed internet, deficiency in necessary ERS hardware and software, and unavailability of functional computers for ERS purposes. The study recommends that reliable internet connectivity be provided through upgraded network infrastructure, routine network monitoring, and prompt technical support to minimize system downtime.

Keywords: *Electronic Requisition Systems, Technology-related factors, User acceptance, Nurses, Kenya*

1.0 Introduction

The dynamism in healthcare has compelled health providers to embrace digital technologies to improve service delivery. According to the World Health Organization (WHO, 2020), digitalization of healthcare has changed the roles and responsibilities of healthcare professionals through information and communication technology (ICT), e-health, telemedicine, telehealth, and electronic health records. Modern healthcare providers increasingly use digital technologies such as Electronic Requisition Systems (ERS) to promote efficient healthcare delivery (Olorunfemi et al., 2020).

Electronic Requisition System (ERS) is a computerized or digital platform used to initiate, submit, process, approve, track, and manage requisitions electronically, reducing reliance on manual paper-based processes. It enables users to submit requisitions for approval and tracking and ensures that requests follow appropriate authorization procedures before official orders are processed. Consequently, ERS can improve accountability, reduce errors, enhance efficiency, and facilitate timely processing of requisitions. Borges do Nascimento et al. (2023) found that digital health technologies enhanced the accuracy and efficiency of work processes and reduced time required to perform tasks. Similarly, technologies used in nursing can improve efficiency, reduce workload, and enhance communication (Tsai et al., 2020). However, effective use requires appropriate skills, training, technical support, organizational resources, and investment, while data privacy and system malfunction risks may remain (Ternyak, 2024).

A myriad of factors have contributed to the effective adoption of technology including ERS. These include users' computer skills, user-friendly easy-to-navigate system design, adequate technical support, and technological infrastructure (Tolera et al., 2022). Efficiency is increased by automation of processes and reduced manual paperwork, leading to faster processing times and minimization of errors associated with handwritten requisitions.

Computer skills involve the ability to use computer hardware and software and perform basic technical tasks. Adoption is facilitated by keyboard and mouse proficiency, internet navigation, basic software skills, and troubleshooting techniques (Weik et al., 2024). Nurses with higher computer literacy are more confident and comfortable using digital tools, resulting in greater engagement and utilization. System usability, including user-interface design and ease of navigation, is also critical to adoption. In Kenya, Chirchir et al. (2020) found that EHR systems were easy to navigate, requiring minimal effort from users and facilitating adoption.

The availability of computer experts to guide users during troubleshooting and implementation is critical, while technical assistance and timely maintenance facilitate successful adoption (Rodrigues et al., 2024). Technological infrastructure, including computers, hardware, software, network infrastructure, and reliable power supply, also plays a critical role (Oumer et al., 2021). Adequate infrastructure and fundamental resources are necessary for effective adoption.

Failure to use electronic requisition systems may slow the timely provision of healthcare services (Heibel & Cockerell, 2020). In nursing practice, failure to use ERS may reduce time available for patient care, decrease nurse-patient contact time, and increase paperwork associated with requisitioning non-pharmaceutical supplies.

Coast General Teaching and Referral Hospital (CGTRH) installed an electronic requisition system in 2016 to replace the manual requisition system. Nurses, as primary providers of patient care, were expected to integrate ERS into their daily work processes to improve patient care. However, despite its existence, the system remains underutilized by nurses. This is a concern given future strategic plans to introduce electronic documentation for nurses. Therefore, this study assessed technology-related factors determining ERS adoption among nurses at CGTRH.

Theoretical Framework

This study is guided by the Technology Acceptance Model (TAM), developed by Davis (1989). TAM posits that technology adoption is influenced by two primary factors: perceived usefulness and perceived ease of use. Perceived usefulness refers to the degree to which a person believes that using a particular system would enhance their job performance, while perceived ease of use refers to the degree to which a person believes that using a particular system would be free of effort. In the context of this study, TAM provides a framework for understanding how technology-related factors (such as hardware availability, internet connectivity, and technical support) and user acceptance factors (such as perceived ease of use and peer influence) influence ERS adoption among nurses.

“The study concluded that there was inconsistency in the accessibility of high-speed internet, deficiency in the necessary ERS hardware and software”

2.0 Materials and Methods

Study Design

The study employed a mixed-methods research design integrating quantitative and qualitative approaches to provide a comprehensive understanding of Electronic Requisition System (ERS) adoption among nurses at Coast General Teaching and Referral Hospital (CGTRH). The quantitative component was the primary approach, while the qualitative component complemented the quantitative findings by providing in-depth explanations and contextual information. Quantitative data were collected using a structured, self-administered questionnaire, while qualitative data were obtained through semi-structured in-depth interviews with purposively selected key informants. The interviews provided detailed

information that complemented the quantitative findings and facilitated a deeper understanding of factors influencing ERS adoption among nurses. The qualitative findings were used to explain and provide deeper context to the quantitative results, giving a more comprehensive understanding of adoption factors.

Study Setting

The study was conducted at Coast General Teaching and Referral Hospital, a Level 5 government teaching and referral hospital located in Mvita Sub-County, Mombasa County.

Target Population

The target population comprised 182 permanently employed nurses working at CGTRH authorized by the institution to use the electronic requisition system through unique identifiers such as passwords.

Sample Size and Sampling Technique

Sample size was calculated using Taro Yamane's formula (Yamane, 1967), yielding a minimum sample of 125 nurses. Proportionate sampling allocated participants across eight strata, while simple random sampling was employed to select participants from across the eight strata. Purposive sampling selected the 3 key informants.

Inclusion and Exclusion Criteria

Permanently employed CGTRH nurses with more than one year of experience and authorized ERS access were included in the study, while those absent during data collection were excluded.

Data Collection

Structured self-administered questionnaires were administered to 125 nurses. Returned questionnaires were 118, giving a response rate of 94.4%. The instruments were pretested at Jaramogi Oginga Odinga Hospital in Kisumu County among 13 respondents not included in the final study.

Data Analysis

Completed questionnaires were coded, entered into the Statistical Package for the Social Sciences (SPSS), Version 26, for processing and analysis. Descriptive statistics summarized respondents' characteristics and responses to the study variables.

Inferential analysis included the Pearson correlation coefficient (r) and hierarchical regression analysis. Pearson correlation was used to determine the direction and strength of associations between the study variables. Hierarchical regression analysis examined the relationships between the independent variables, the moderating variable, and ERS adoption.

Regression Model 1: Direct Effects

$$Y = \alpha_0 + \beta_1 X_1 + \beta_2 X_2 + \varepsilon$$

Where:

- Y = ERS Adoption
- α_0 = Constant
- X_1 = Technology-related factors
- X_2 = User acceptance
- β_1, β_2 = Coefficients
- ε = Residual error term

Regression Model 2: Moderating Effects

$$Y = \alpha + \beta_1 \text{TRF} + \beta_2 \text{TRF} * Z + \varepsilon$$

Where:

- Y = Dependent variable (ERS adoption)
- TRF = Technology-related factors
- Z = Moderating variable (user acceptance)
- $\text{TRF} * Z$ = Interaction term
- α = Constant
- β = Coefficients
- ε = Error term

Ethical Considerations

Ethical approval was obtained from the Kenya Methodist University Institutional Scientific and Ethics Review Committee (ISERC), the National Commission for Science, Technology and Innovation (NACOSTI), and the hospital research committee. Informed consent was

obtained, and confidentiality and anonymity were maintained throughout the study.

3.0 Results and Discussion

Descriptive Statistics

Technology-Related Factors Determining ERS Adoption

Table 1 indicates dissatisfaction with consistency of access to high-speed internet, as shown by 33 (28.0%) and 25 (21.2%) of the respondents who disagreed and strongly disagreed, respectively, whereas 26 (22.0%) remained undecided (mean = 2.69). Ayamolowo et al. (2023) found that good internet connection or Wi-Fi manpower enhances technology adoption. Further, disagreement (28, 23.7%) and strong disagreement (25, 21.2%) were registered on accessibility to the hardware and software for ERS (mean = 2.79). Essuman et al. (2020) cited low EMR utilization, attributing this to lack of available software and high costs. Additionally, 43 (36.4%) nurses strongly disagreed while 19 (16.1%) disagreed that functional computers were available for requisition purposes.

The study found that the ERS interface is user-friendly, as reported by 48 (40.7%) and 20 (16.9%) of the respondents who agreed and strongly agreed, respectively, with a mean score of 3.46. Tsai et al. (2020) found that usability, such as the design of the user interface and navigation, were critical to adoption. Again, 37 (31.4%) agreed and 22 (18.6%) strongly agreed that the hospital provided uninterrupted power or power backup systems (mean = 3.25). In corroborating these findings, Fraser et al. (2022) indicated that access to reliable power sources and backup systems are crucial for successful EMR adoption. The IT support team was also available and provided timely support, as agreed by 41 (34.7%) and strongly agreed by 15 (12.7%), while 29 (24.6%) nurses remained non-committal (mean = 3.25). De Leeuw et al. (2020) found that lack of support and maintenance services are key obstacles to EMR adoption.

Table 1

Descriptive Statistics for Technology-Related Factors

Statement	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)	Mean
Functional computers available	43 (36.4)	19 (16.1)	10 (8.5)	0 (0.0)	46 (39.0)	2.89
ERS interface user-friendly	11 (9.3)	12 (10.2)	27 (22.9)	48 (40.7)	20 (16.9)	3.46
Consistent access to high-speed internet	25 (21.2)	33 (28.0)	26 (22.0)	21 (17.8)	13 (11.0)	2.69
Hospital provides uninterrupted power	11 (9.3)	30 (25.4)	18 (15.3)	37 (31.4)	22 (18.6)	3.25
IT support available	9 (7.6)	24 (20.3)	29 (24.6)	41 (34.7)	15 (12.7)	3.25
Access to necessary hardware/software	25 (21.2)	28 (23.7)	24 (20.3)	29 (24.6)	12 (10.2)	2.79
Composite mean						3.05

User Acceptance of the Electronic Requisition System

As shown in Table 2, 49 (41.5%) of the nurses disagreed while 28 (23.7%) strongly disagreed that nurses feel supported by the workplace to overcome challenges of ERS (mean = 2.28). Aranda et al. (2025) revealed that institutional support for resolving system-use challenges is crucial, emphasizing the need for training, support, proper interoperability, and patient satisfaction. Meanwhile, the highest-rated item was willingness to recommend the ERS to others, as strongly agreed by 54 (45.8%) and agreed by 42 (35.6%) (mean = 4.18). Yuan et al. (2020) revealed that shared peer beliefs were

positively associated with an individual's system use and interest for adoption. Furthermore, nurses reported that peers were encouraging using ERS, as indicated by 41 (34.7%) respondents who agreed whilst 37 (31.4%) strongly agreed (mean = 3.80). Similarly, Yuan et al. (2020) revealed that shared peer beliefs were positively associated with an individual's system use. ERS was revealed to be easy to learn and use with minimal effort, as reported by 51 (43.2%) who agreed and 25 (21.2%) nurses who strongly agreed (mean = 3.68). A study by Alanazi et al. (2020) revealed that perceived ease of use and perceived usefulness were associated with positive perceptions of electronic information systems.

Table 2

Descriptive Statistics for User Acceptance

Statement	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)	Mean
ERS easy to learn and use	5 (4.2)	11 (9.3)	26 (22.0)	51 (43.2)	25 (21.2)	3.68
ERS enhances job performance	6 (5.1)	15 (12.7)	20 (16.9)	46 (39.0)	31 (26.3)	3.69
Continuity in using ERS in daily tasks	6 (5.1)	9 (7.6)	24 (20.3)	40 (33.9)	39 (33.1)	3.82
Recommendation of ERS to colleagues	2 (1.7)	7 (5.9)	13 (11.0)	42 (35.6)	54 (45.8)	4.18
Peers encourage using ERS	4 (3.4)	13 (11.0)	23 (19.5)	41 (34.7)	37 (31.4)	3.80
Feel supported by workplace	28 (23.7)	49 (41.5)	22 (18.6)	18 (15.3)	1 (0.8)	2.28
Composite mean						3.57

ERS Adoption

Regarding the dependent variable, 83 (70.3%) of the respondents strongly agreed that training on ERS has improved its work effectiveness (mean = 4.64). In corroborating this finding,

Ngugi et al. (2021) reported that initial training along with on-the-job training (OJT) gave workmates the skills they needed to use the EMRs. Further, 68 (57.6%) nurses reported that ERS adoption has improved work efficiency at

the hospital. These results align with the finding that nurses were satisfied with the ERS adopted by the hospital, as reported by 72 (61.0%) nurses who agreed (mean = 4.11). In support, Jaber et al. (2021) demonstrated that EMR increased efficiency by streamlining workflow, reduced time and effort, improved the quality of treatment, and increased nurses' satisfaction.

The majority of nurses were also certain that the level of ERS acceptance at the hospital is high, as reported by 71 (60.2%) who were in agreement (mean = 3.90). These findings align with the TAM model by Davis (1989), which champions perceived usefulness and perceived ease of use.

Table 3

ERS Adoption

Statement	SD n(%)	D n(%)	N n(%)	A n(%)	SA n(%)	Mean
Training on ERS has improved work effectiveness	2 (1.7)	3 (2.5)	8 (6.8)	22 (18.6)	83 (70.3)	4.64
ERS adoption has improved work efficiency	3 (2.5)	5 (4.2)	15 (12.7)	68 (57.6)	27 (22.9)	3.94
Nurses are satisfied with ERS	2 (1.7)	4 (3.4)	12 (10.2)	72 (61.0)	28 (23.7)	4.11
Level of ERS acceptance at the hospital is high	3 (2.5)	6 (5.1)	18 (15.3)	71 (60.2)	20 (16.9)	3.90
Composite mean						4.15

Pearson Correlation Analysis

Table 4 shows that technology-related factors had a weak positive but insignificant correlation with ERS adoption ($r = 0.075$; $p = 0.421 > 0.01$). Chirchir et al. (2020) demonstrated a statistically significant correlation between

technical infrastructure and EMR adoption. Meanwhile, user acceptance factors had the highest moderate positive correlation with ERS adoption ($r = 0.504$; $p < 0.001$). Alhur (2023) found that acceptance of EMRs had a positive link with their adoption, thus increasing performance, productivity, and job efficiency.

Table 4

Pearson Correlation Matrix

Variable	Technology-related factors	User acceptance factors	ERS adoption
Technology-related factors	1		
User acceptance factors	-0.474**	1	
ERS adoption	0.075	0.504**	1

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

Regression Analysis for Moderating Effect of User Acceptance

The study tested the moderating effect of user acceptance on the relationship between technology-related factors and ERS adoption. Results are shown in the following tables. In Table 5, Model 1 explains 0.6% of the variation

in ERS adoption without the moderating effect of user acceptance. Meanwhile, upon introducing the interaction term (technology-related factors $\times$ user acceptance) in Model 2, the explanatory power increases to 38.0%, indicating that user acceptance has a moderating effect on the relationship between technology-related factors and ERS adoption.

Table 5

Model Summary for Moderating Effects

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.075a	0.006	-0.003	1.69021
2	0.617b	0.380	0.370	1.34006

a. Predictors: (Constant), Technology-related factors

b. Predictors: (Constant), Technology-related factors, User acceptance factors

In Table 6 below, without the interaction term, $F(1, 116) = 0.653$, which is insignificant ($p = 0.421 > 0.01$). However, when the interaction term is included, the model becomes

significantly reliable, $F(2, 115) = 35.290$, $p < 0.001$, indicating that user acceptance has a moderating effect on the relationship between technology-related factors and ERS adoption.

Table 6

ANOVA for Moderating Effects

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.864	1	1.864	0.653	0.421b
	Residual	331.390	116	2.857		
	Total	333.254	117			
2	Regression	126.743	2	63.372	35.290	<0.001c
	Residual	206.511	115	1.796		
	Total	333.254	117			

a. Dependent Variable: ERS adoption

b. Predictors: (Constant), Technology-related factors

c. Predictors: (Constant), Technology-related factors, User acceptance factors (moderating effects)

In Table 7, technology-related factors had a positive but insignificant relationship with ERS adoption ($\beta = 0.102$; $p = 0.421 > 0.01$). Meanwhile, upon introducing the interaction term, the relationship becomes significant and positive ($\beta = 0.187$; $p < 0.001$). These findings

are consistent with a study by Sibiya et al. (2023). Furthermore, Essuman et al. (2020) revealed that inefficient technology use negatively impacted EMR utilization among health professionals.

Table 7

Coefficients for Moderating Effects

Model	Variable	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
1	(Constant)	15.276	2.328		6.562	0.000
	Technology-related factors	0.102	0.127	0.075	0.808	0.421
2	(Constant)	2.524	2.397		1.053	0.295
	Technology-related factors	0.553	0.114	0.404	4.848	0.000
	User acceptance factors	0.209	0.025	0.695	8.339	0.000
	Technology-related factors × User acceptance factors	0.187	0.250	0.568	7.423	0.000

a. Dependent Variable: ERS adoption

Multiple Regression Analysis for All Variables

Multiple regression analysis was conducted to establish the combined relationship between independent, moderating, and dependent

variables. Findings are shown in Tables 8, 9, and 10 below.

As shown in Table 8, the combined model accounted for about 38.0% of the variation in ERS adoption ($R^2 = 0.380$). Therefore, despite

these variables (user acceptance and technology-related factors) representing a

moderate effect, they have affirmed the robustness of the model as a predictor of ERS.

Table 8

Model Summary for All Variables

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.617a	0.380	0.370	1.34006

a. Predictors: (Constant), User acceptance, Technology-related factors

As illustrated in Table 9, the overall ANOVA's $F(2, 115) = 35.290$ is significant; $p < 0.001$.

These results imply that the overall regression model is significantly reliable.

Table 9

ANOVA for All Variables

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	126.743	2	63.372	35.290	<0.001b
	Residual	206.511	115	1.796		
	Total	333.254	117			

a. Dependent Variable: ERS adoption

b. Predictors: (Constant), User acceptance, Technology-related factors

In Table 10, technology-related factors had a positive and significant relationship with ERS adoption ($\beta = 0.553$; $p < 0.01$). Therefore, from these findings, an increase in technology-related factors by any unit will lead to an increase in ERS adoption. Bekele et al. (2024) identified a lack of skilled onsite IT technicians as a major

obstacle to EMR adoption, thereby leading to a negative influence on EMR adoption. Meanwhile, user acceptance possessed a positive and significant relationship with ERS ($\beta = 0.209$; $p < 0.01$). Therefore, by improving user acceptance, ERS adoption will equally increase at the hospital.

Table 10

Regression Coefficients for All Variables

Model	Variable	Unstandardized B	Std. Error	Standardized Beta	t	Sig.
1	(Constant)	2.524	2.397		1.053	0.295
	Technology-related factors	0.553	0.114	0.404	4.848	0.000
	User acceptance factors	0.209	0.025	0.695	8.339	0.000

a. Dependent Variable: ERS adoption

Qualitative Results

Technology-Related Factors

The interviewer asked the interviewees how they would describe the design, usability, and friendliness of the ERS. One informant stated that the "ERS interface is simple, intuitively designed with clear labels and workflow-compatible menus." This is broadly consistent with the relatively higher user-friendliness score of 67.6% in quantitative findings. A study by Chirchir et al. (2020) identified user-friendly design and intuitive navigation to be crucial for

the adoption of digital health technologies across varying economic contexts.

Regarding the extent to which the hospital provided technological infrastructure, one informant said, "The medical ward has only one computer, Surgical ward has two, and the Maternity department one." Another informant further stated, "Network connectivity is unstable in several departments; system downtime and slow response times during peak hours further discourage adoption of the ERS." A study by Essuman et al. (2020) cited lack of available

software, and Bisrat et al. (2021) revealed poor network infrastructure.

4.0 Conclusion

The study concluded that there was inconsistency in the accessibility of high-speed internet, deficiency in the necessary ERS hardware and software, and unavailability of functional computers for ERS purposes. However, the ERS interface was user-friendly, with the presence of uninterrupted power alongside the availability of a timely IT support team.

Further, despite the challenges, nurses demonstrated moderate user acceptance and strong willingness to adopt the digital requisition system, representing a significant opportunity to accelerate the transition from the manual system. However, this can only happen through management support, availability of resources, and regular training on ERS use.

5.0 Recommendations

Regarding technology-related factors, the hospital, through the IT department, should improve ICT infrastructure and system accessibility. This can be achieved in collaboration with the Procurement and ICT Departments to ensure modern adequate technologies, including computers, are procured and deployed in all clinical departments to ensure timely access to the ERS. In addition, reliable internet connectivity should be provided

through upgraded network infrastructure, routine network monitoring, and prompt technical support to minimize system downtime.

On implications, this research will help the hospital upgrade its ERS by ensuring adequate resources (equipment, technicians, and finances) are available to promote the full implementation of the technology. Additionally, the findings will facilitate the introduction of training and continuous professional development programs to equip nurses with relevant digital competencies and skills.

Research Contribution

This study is valuable to nurses at CGTRH since it highlights how crucial it is to comprehend the technological factors associated with ERS adoption and the necessity of providing efficient support to improve nurses' technological experiences, knowledge, and competency in healthcare settings to enhance patient outcomes. Therefore, utilization of ERS by nurses enhances quicker request processing, increased traceability and accountability, decrease in errors in requisitions, increased accessibility to supplies and medications, and more effective use of nurses' time. Consequently, through this research, nurses' ERS adoption will likely increase as a result of improved user knowledge, thereby promoting holistic healthcare delivery at the hospital.

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