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RESEARCH ARTICLE

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ELECTRONIC CUSTOMER RELATIONSHIP MANAGEMENT ADOPTION FRAMEWORK IN HIGHER EDUCATION INSTITUTIONS: “A CASE STUDY OF UNIVERSITIES IN MOGADISHU – SOMALIA”

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ABSTRACT

The increasing demand for personalized student services and efficient data management has led Higher Education Institutions (HEIs) worldwide to adopt Electronic Customer Relationship Management (E-CRM) systems. In Somalia, where digital transformation in education is still emerging, understanding the factors influencing the adoption of E-CRM is crucial for enhancing institutional efficiency, competitiveness, and stakeholder engagement. This study aims to examine the technological, organizational, and environmental factors that significantly influence the adoption of E-CRM systems in Somali HEIs using the Technology-Organization-Environment (TOE) framework. A quantitative research approach was employed. A purposive sampling technique was used to ensure that only respondents with relevant experience or involvement with E-CRM systems were included in the study. Data were collected using a structured questionnaire. A pilot study was conducted with 45 participants to test the reliability of the instrument. A total of 230 valid responses were collected for the final analysis. Structural Equation Modeling (SEM) was used to test twelve hypotheses derived from the TOE framework, focusing on factors such as service quality, cost saving, scalability, task complexity, and top management support. The findings reveal that technological factors—including service quality, relative advantage, cost saving, perceived security, scalability, task complexity, and time saving—positively and significantly impact E-CRM adoption. Organizational factors such as institutional size, top management support, and training availability also emerged as critical drivers. Moreover, environmental influences like competitive pressure and provider competence were found to significantly predict adoption decisions. Among these, top management support and competitive pressure showed the strongest effects. This research contributes to the limited body of literature on digital system adoption in post-conflict educational contexts and extends the application of the TOE framework to Somali HEIs. The study offers practical implications for institutional leaders, ICT decision-makers, and policymakers aiming to promote technology-enabled education. It also highlights the importance of aligning institutional capacity, leadership support, and external ecosystem readiness to ensure successful digital transformation in higher education.

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INTRODUCTION

Digital transformation has become increasingly essential for improving administrative efficiency, student services, and institutional competitiveness. The adoption of Electronic Customer Relationship Management (E-CRM) systems in Higher Education Institutions (HEIs) presents an opportunity to enhance student engagement, streamline communication, and foster long-term institutional sustainability. The adoption of Customer Relationship Management (CRM) in higher education institutions has gained attention as a strategy to enhance student satisfaction, retention, and overall service quality.

Studies have shown that technology plays a crucial role in implementing effective CRM systems in universities (Kosch *et al.*, 2012; Mayanja & Tibaingana, 2020). By adopting CRM principles, universities can better address student needs, improve communication, and ultimately increase enrollment and retention in the competitive education sector. The adoption of Electronic Customer Relationship Management (E-CRM) frameworks in higher education institutions (HEIs) is crucial for enhancing student satisfaction and loyalty. Given the fragmented nature of Somali HEIs and their growing student populations, E-CRM offers a scalable solution to address the challenges of student data management, admissions, advising, and alumni relations (Ali *et al.*, 2021).

Moreover, with the Somali government's commitment to improving ICT infrastructure across public services, including education, understanding the key determinants of E-CRM adoption is both timely and critical for digital development (World Bank, 2023). This study investigates the factors influencing the adoption of E-CRM in Somali HEIs using the Technology-Organization-Environment (TOE) framework. From a technological context, factors such as service quality, relative advantage, cost saving, perceived security, scalability, task complexity, and time saving are explored. The organizational context includes size of the institution, top management support, and availability of training, while the environmental context examines competitive pressure and the competence of E-CRM providers. These variables are examined for their collective and individual impacts on E-CRM adoption. Prior studies have shown that these factors significantly affect system adoption across various domains (Abubakar & Bello, 2020; Osman *et al.*, 2022), but limited research has integrated them holistically within higher education—particularly in post-conflict or developing environments like Somalia. While extensive research exists on CRM adoption in business and health sectors globally, there is a paucity of research addressing how HEIs in fragile contexts such as Somalia navigate technological adoption decisions. Existing models often overlook context-specific constraints like low digital literacy, limited ICT budgets, and infrastructural instability. Moreover, few empirical studies have applied the TOE framework comprehensively to E-CRM adoption in Sub-Saharan African HEIs. Therefore, this study addresses a key research gap by investigating E-CRM adoption through a multi-dimensional lens, drawing on recent data from Somali universities. The findings are expected to extend the theoretical application of the TOE framework to under-researched educational settings while also providing practical recommendations for university administrators and policymakers working to modernize higher education in Somalia.

Theoretical framework and hypotheses

This study integrates two well-established models—Technology–Organization–Environment (TOE) framework (Tornatzky & Fleischer, 1990) and Diffusion of Innovation (DOI) theory (Rogers, 2003)—to examine the determinants influencing the adoption of Electronic Customer Relationship Management (E-CRM) in Higher Education Institutions (HEIs). These frameworks provide complementary perspectives on how internal and external organizational factors, as well as individual perceptions of innovation characteristics, shape technology adoption behavior.

Technological Context: Service quality refers to users' overall judgment of the excellence and effectiveness of IT services offered by an institution, particularly how well those services meet or exceed user expectations (Parasuraman *et al.*, 1988). In the context of E-CRM systems in higher education, service quality encompasses technical support, responsiveness, system availability, user interface performance, and post-implementation assistance. In the evolving digital landscape, service quality is recognized as a critical factor for user satisfaction, trust-building, and system adoption. According to Rahman *et al.* (2021), high-quality IT services directly enhance the user experience and perception of system usefulness, leading to a greater likelihood of adoption. This is particularly important in HEIs, where diverse users (students, faculty, administrators) rely on digital systems for academic management, communication, and personalized services. Recent studies have extended traditional models such as SERVQUAL into digital settings. For instance, Wamba *et al.* (2023) found that reliable and responsive E-CRM platforms in universities led to increased trust and engagement among students. This trust, in turn, fosters a more favorable attitude toward technology adoption. They also argue that institutions offering 24/7 support, intuitive interfaces, and fast issue resolution are more likely to succeed in their digital transformation efforts. Furthermore, perceived service quality is closely tied to trust in system capabilities and institutional reputation. El-Baz and Haddad (2023) emphasize that institutions perceived to provide high service quality are considered more competent and future-ready, especially by digitally savvy students.

Additionally, Almahamid *et al.* (2021) highlight the interdependence between service quality and organizational readiness. Even the most advanced systems fail if users feel unsupported or overwhelmed by technical challenges. As such, maintaining high service standards before, during, and after E-CRM implementation is essential. Service quality remains critical for E-CRM adoption, as recent studies emphasize the importance of reliable IT services in building user trust and satisfaction (Rahman *et al.*, 2021; Wamba *et al.*, 2023). Therefore, the study proposed the hypothesis:

H1: Service quality has a significant positive effect on the adoption of E-CRM in HEIs.

Relative advantage—a core construct of the Diffusion of Innovations Theory (Rogers, 2003)—refers to the degree to which a new system or innovation is perceived as being better than the system it replaces. In this context, it involves the belief that adopting an E-CRM system will lead to improved performance, enhanced efficiency, better student engagement, and overall superior institutional outcomes compared to traditional or manual systems. In Higher Education Institutions (HEIs), E-CRM systems promise streamlined communication, automated student services, enhanced personalization, and data-driven decision-making, which constitute significant perceived benefits. Recent studies emphasize that when these benefits are clearly visible to decision-makers and users, the likelihood of E-CRM adoption increases substantially (Ahmed *et al.*, 2022; Lin *et al.*, 2021). Ahmed *et al.* (2022) found that institutions perceived E-CRM as offering strategic advantages such as improved student retention and satisfaction through better relationship management. The more the institution perceived a strategic gain (e.g., performance improvement or competitive positioning), the more they were inclined to adopt the system. Lin *et al.* (2021) argue that relative advantage remains one of the strongest predictors of IT innovation adoption across educational institutions.

Their study in Taiwanese universities revealed that the perception of E-CRM as an enabler of administrative efficiency and personalized communication significantly influenced its adoption rate. Moreover, relative advantage is strongly associated with organizational culture and digital maturity. Institutions with a growth mindset and digital-first strategies are more responsive to innovations that offer tangible and immediate benefits (Kaba & Idowu, 2020). These benefits can include reduced paperwork, automation of student queries, integration of analytics, and improved service delivery. Recent literature also ties relative advantage to user satisfaction and behavioral intention, especially among students and faculty members who directly interact with the system. For example, Tran *et al.* (2023) concluded that perceived usefulness (a proxy for relative advantage) had a direct influence on continued use intention among faculty and admin staff in Vietnamese universities. In developing countries, where resources may be limited, institutions tend to prioritize technologies that offer high impact with minimal cost—further amplifying the role of relative advantage (Abdullahi & Musa, 2021). Relative advantage, or perceived benefits over existing methods, strongly motivates adoption (Almahamid *et al.*, 2021; Rajput & Singh, 2023). Hence, the study proposed the hypothesis:

H2: Relative advantage has a significant positive effect on the adoption of E-CRM in HEIs.

Cost saving is particularly important for budget-constrained HEIs, with studies confirming its influence on adoption decisions (Chen & Li, 2022; Ahmad *et al.*, 2024). Moreover, Cost saving is a critical factor influencing technology adoption, particularly in resource-constrained environments such as many higher education institutions. It refers to the extent to which adopting a system—like E-CRM—can reduce operational, administrative, or service delivery costs (Tornatzky & Fleischer, 1990). In recent studies, cost saving has consistently emerged as a strong motivator for E-CRM adoption. According to Musa and Ibrahim (2021), HEIs are more likely to implement E-CRM systems when the perceived reduction in manual processing and paper-based communication leads to long-term

savings. These savings may arise from automation of student services, centralized data management, and reduction of redundant staff tasks. Similarly, Omar *et al.* (2020) found that institutions facing budgetary constraints are more attracted to cloud-based E-CRM systems, which require lower upfront infrastructure investment and offer flexible pricing models. This is particularly relevant in the post-pandemic context, where many universities seek digital solutions to improve efficiency while minimizing cost. Al-Hasani *et al.* (2023) also confirmed that institutions evaluating new systems prioritize return on investment (ROI), with E-CRM adoption being strongly correlated with projected cost savings over a three- to five-year span.

H3: Cost saving has a significant positive effect on the adoption of E-CRM in HEIs.

Perceived security refers to the belief that using an information system—such as E-CRM—is free from threats to confidentiality, integrity, and availability of data. It is especially critical in educational contexts where student records, academic performance, and communication logs are highly sensitive (Pavlou, 2003). Recent literature underscores the increasing importance of data security in driving or impeding E-CRM adoption. According to Abdullah *et al.* (2020), higher education institutions are hesitant to adopt customer relationship technologies unless they are confident in the system's ability to prevent unauthorized access and protect personal data. Their study showed a strong positive relationship between perceived security and system trust, which in turn influences adoption intention. Similarly, Shahrabaki and Moshiri (2022) emphasize that security concerns are amplified in cloud-based E-CRM systems. Institutions fear potential data breaches, service outages, or misuse of student data. However, when institutions are assured of compliance with standards such as GDPR or ISO/IEC 27001, the perceived security increases and adoption likelihood rises. Moreover, Asif and Malik (2021) report that perceived security is not only a technical requirement but also a psychological factor—institutions with a strong security culture and awareness are more proactive in adopting digital technologies like E-CRM. Perceived security has gained prominence amid increasing data privacy concerns; it significantly affects trust and adoption of CRM technologies (Hassan & Ghoneim, 2020; Al-Sharafi & Al-Najjar, 2024). Therefore, the study proposes the hypothesis:

H4: Perceived security has a significant positive effect on the adoption of E-CRM in HEIs.

Scalability refers to the ability of a system—such as an E-CRM platform—to efficiently handle growing amounts of data, users, and operational complexity without performance degradation. In the context of HEIs, scalability is particularly crucial due to fluctuating student enrollments, expanding administrative needs, and the demand for integrating diverse academic services (Oliveira & Martins, 2010). Recent studies reinforce the role of scalability as a pivotal factor in the adoption of cloud-based and enterprise systems. For instance, Khan *et al.* (2021) found that universities are more inclined to adopt E-CRM solutions when they perceive the system can grow with institutional demands and remain stable during peak usage periods such as registration or examinations. Similarly, Nair and Saeed (2020) emphasized that scalable platforms offer HEIs the flexibility to start small and expand system capacity over time without excessive reinvestment. This modular growth aligns with budgetary constraints while supporting digital transformation goals. Moreover, Chen *et al.* (2023) pointed out that system scalability enhances user satisfaction, reduces maintenance efforts, and allows seamless integration with learning management systems (LMS) and student information systems (SIS), which collectively improves overall digital service delivery. Scalability is critical as institutions require systems that can grow with their expanding needs (Nguyen & Simkin, 2021; Zhang *et al.*, 2023). Hence, the study proposed the hypothesis.

H5: Scalability has a significant positive effect on the adoption of E-CRM in HEIs.

Task complexity refers to the degree of difficulty users perceive in understanding and operating a new system, such as an Electronic Customer Relationship Management (E-CRM) platform. In the context of higher education, the complexity of tasks associated with E-CRM—such as data entry, managing student interactions, and generating reports—can either hinder or delay adoption, particularly if end users lack technical skills or proper training (Ifinedo, 2019). According to Lai and Tang (2021), task complexity is one of the main cognitive barriers that influence technology adoption in universities. When systems are perceived as overly technical or complicated, faculty and administrative staff may resist their use, even if the systems offer significant advantages. On the other hand, Rahman *et al.* (2022) argue that task complexity does not always deter adoption. In fact, when users recognize the potential long-term benefits of a complex system—such as automation and improved efficiency—they may be more willing to accept the initial learning curve, especially if proper support and training are provided. Additionally, Alzahrani and Elshaer (2020) emphasize that the impact of task complexity can be mitigated by strong leadership and change management practices. In institutions where digital literacy is high and training is accessible, the negative impact of complexity on system adoption tends to be reduced. Task complexity continues to be a barrier, but its impact may be mitigated by user training and system design improvements (Khan *et al.*, 2020; Silva & Martins, 2024). Therefore, the study proposed the hypothesis.

H6: Task complexity has a significant effect on the adoption of E-CRM in HEIs.

Time saving is one of the key perceived benefits that influences the adoption of electronic systems, including Electronic Customer Relationship Management (E-CRM) platforms. In the context of HEIs, time efficiency in administrative processes, communication with students, and data retrieval plays a critical role in determining whether institutions adopt new digital solutions. According to Ahmed and Hussain (2020), HEIs are more likely to adopt E-CRM systems when users perceive that the platform significantly reduces the time required to complete routine tasks such as student tracking, communication, and academic advising. This efficiency allows staff to focus more on strategic decision-making and personalized student engagement. Chen *et al.* (2021) highlight that the automation capabilities of E-CRM—such as bulk messaging, automated reminders, and streamlined data access—are major contributors to time-saving. Their study found a direct correlation between time-saving features and user satisfaction, which in turn drives system usage and institutional commitment. Moreover, Yousef and Abdallah (2023) argue that perceived time-saving is not only a motivator for adoption but also enhances the perceived ease of use and usefulness of the technology, which are core components of the Technology Acceptance Model (TAM). When faculty and administrators experience faster turnaround and reduced manual work, they are more likely to support sustained use of the system. Time saving remains a major driver of IT adoption, improving operational efficiency and user satisfaction (Patel & Tripathi, 2022; Mahmoud & El-Masry, 2023). Hence, the study proposed the hypothesis

H7: Time saving has a significant positive effect on the adoption of E-CRM in HEIs.

Organizational Context: The size of a higher education institution plays a pivotal role in determining its readiness and ability to adopt technological innovations such as E-CRM systems. Larger institutions often have more financial resources, greater human capacity, and more complex administrative needs, all of which can drive the necessity and capability to implement sophisticated digital tools (Alshamaila *et al.*, 2020). Komba and Ngowi (2021) found that institutional size positively correlates with technology adoption, as larger HEIs typically possess the infrastructure and strategic vision needed to support system-wide implementation. They noted that with a larger student body and staff base, the need for streamlined communication and centralized data management makes E-CRM particularly beneficial. Moreover, Okonkwo and Iwuchukwu (2022)

reported that large universities often lead in digital transformation initiatives due to competitive pressures and stakeholder expectations. These institutions prioritize E-CRM adoption to manage growing volumes of student inquiries, engagement data, and academic services efficiently. Conversely, Zewdie and Tilahun (2019) noted that smaller institutions may face constraints such as limited budgets or insufficient IT support, which can hinder their ability to implement and sustain E-CRM systems despite recognizing their potential benefits. In sum, institutional size often acts as an enabler in the adoption of E-CRM by enhancing capacity, urgency, and perceived return on investment. The size of the institution correlates with technology adoption, as larger HEIs typically have more resources and complex needs (Liu *et al.*, 2022; Farooq *et al.*, 2024). Hence, the study proposed the hypothesis:

H8: *The size of the HEI has a significant positive effect on the adoption of E-CRM.*

Top management support is consistently identified as one of the most influential factors in the successful adoption and implementation of information systems, including E-CRM, in higher education institutions. The commitment of institutional leaders—such as presidents, vice-chancellors, deans, and IT directors—provides strategic direction, allocates necessary resources, and helps overcome organizational resistance to change (Ifinedo, 2020). According to Ali and Osman (2021), when top management is actively involved in IT initiatives, there is a higher likelihood of project success because they serve as role models and decision-makers who align new technologies with institutional goals. Their study of Malaysian universities showed that managerial support significantly influenced staff acceptance and use of E-CRM platforms. Gebregziabher and Yitbarek (2023) also emphasized that without senior leadership endorsement, even technically sound projects can fail due to a lack of institutional alignment and inadequate resource allocation. Their empirical study in Ethiopian public universities confirmed that strong executive sponsorship improves adoption outcomes and user engagement. Additionally, Hamid *et al.* (2022) highlighted that in contexts with limited digital maturity, top-level champions act as change agents who facilitate the cultural and structural transformation needed for successful system integration. Therefore, leadership support not only legitimizes the change but also ensures that necessary funding, training, and policy alignment are available for sustained E-CRM implementation. Top management support is consistently critical for IT adoption success, enabling resource allocation and strategic alignment (Alshehri *et al.*, 2019; Chen *et al.*, 2023). Therefore, the research posits the hypothesis.

H9: *Top management support has a significant positive effect on the adoption of E-CRM in HEIs.*

Training availability plays a crucial role in facilitating the adoption and effective use of Electronic Customer Relationship Management (E-CRM) systems in higher education. Comprehensive training programs equip faculty, administrative staff, and IT personnel with the necessary skills and confidence to utilize the system efficiently, thereby reducing resistance and enhancing user acceptance (Alalwan *et al.*, 2020). According to Nair and Rajashekar (2021), training reduces the complexity associated with new technologies by familiarizing users with system functionalities, which results in improved performance and satisfaction. Their study on Indian universities found a positive relationship between training quality and the extent of E-CRM utilization. Similarly, Mansor *et al.* (2023) highlighted that ongoing training and technical support from vendors and internal trainers are pivotal in addressing user challenges and adapting to system updates. They noted that institutions providing structured training sessions observed higher rates of adoption and lower dropout rates in E-CRM projects. Moreover, Saleem and Hussain (2022) emphasized the importance of context-specific training tailored to the roles of different users in HEIs, such as admissions officers, counselors, and IT staff, which facilitates smoother integration and maximizes system benefits. In addition to initial training, continuous learning opportunities help keep users

updated with evolving E-CRM features and ensure sustained system usage over time. Training availability reduces resistance and enhances user competency, thus facilitating adoption (Mustafa & Alnajjar, 2021; Singh & Saini, 2025). Therefore, the present research posits the hypothesis.

H10: *Training availability has a significant positive effect on the adoption of E-CRM in HEIs.*

Environmental Context: Competitive pressure refers to the external forces exerted by rival institutions and market dynamics that compel organizations, including Higher Education Institutions (HEIs), to adopt innovative technologies like Electronic Customer Relationship Management (E-CRM) systems. In the increasingly competitive landscape of higher education, institutions strive to enhance student recruitment, retention, and overall service quality to maintain or improve their market position (Khan *et al.*, 2021). Recent studies emphasize that HEIs adopt E-CRM systems to keep pace with competitors who have already integrated such technologies, thus avoiding being left behind in terms of operational efficiency and student engagement (Gopalakrishnan & Rathakrishnan, 2020). This competitive urgency drives innovation diffusion within the sector, promoting quicker decision-making for technology adoption. According to Liu *et al.* (2022), competitive pressure influences not only the initial decision to adopt but also the intensity of system use and investment in complementary resources, such as staff training and system customization. HEIs facing stronger competitive threats are more proactive in leveraging E-CRM to improve communication channels, personalize services, and enhance responsiveness to student needs. Additionally, Muhammad and Tahir (2023) found that regulatory changes and increased demand for digital transformation in the education sector intensify competitive pressures, pushing institutions toward adopting advanced customer management systems to comply and remain attractive to prospective students. Overall, the literature indicates that competitive pressure acts as a significant driver of E-CRM adoption, encouraging HEIs to innovate and improve their service offerings to stay relevant in a fast-evolving educational marketplace. Competitive pressure pushes HEIs to innovate and adopt technologies like E-CRM to stay relevant and attractive (Al-khasawneh & Al-Shraideh, 2020; Jaber & Al-Zubaidi, 2024). Hence, it is hypothesized that:

H11: *Competitive pressure has a significant positive effect on the adoption of E-CRM in HEIs.*

Competence of E-CRM providers encompasses the technical expertise, service quality, reliability, and ability to customize solutions according to the specific needs of Higher Education Institutions (HEIs). This factor is critical because the quality and trustworthiness of technology vendors influence the successful adoption and sustained use of E-CRM systems (Wang & Zhang, 2020). Recent research highlights that HEIs rely heavily on providers' competence not only for the initial deployment of E-CRM but also for ongoing support, upgrades, and training. Skilled providers can reduce perceived risks and uncertainties associated with adopting complex IT systems, thereby enhancing institutional confidence (Javed *et al.*, 2022). Moreover, providers with a strong track record and robust customer service foster long-term partnerships that facilitate continuous improvement and adaptation of the system. According to Singh and Dhira (2021), the ability of providers to offer tailored solutions that align with the unique administrative and communication requirements of HEIs significantly affects adoption decisions. Institutions prefer vendors who understand the education sector's complexities and can provide scalable, interoperable, and secure E-CRM platforms. Furthermore, Chen *et al.* (2023) note that provider competence also includes proactive innovation, where providers anticipate future needs and introduce advanced functionalities, such as AI-driven analytics and automation, which further motivate HEIs to invest in E-CRM technologies. Competence of providers shapes trust and adoption, with well-qualified vendors facilitating smoother implementation (Wang *et al.*, 2021; El-Baz & Haddad, 2023). Therefore, the research posits the hypothesis:

H12: The competence of E-CRM providers has a significant positive effect on the adoption of E-CRM in HEIs.

RESEARCH METHODOLOGY

Research Design: This study employed a quantitative research approach using a descriptive and explanatory survey design to investigate the key factors influencing the adoption of Electronic Customer Relationship Management (E-CRM) systems in Higher Education Institutions (HEIs). This design enabled the identification of relationships among variables and provided empirical evidence to test the proposed hypotheses using structural equation modeling (SEM).

Population and Sample: The target population consisted of academic and administrative staff members from public and private HEIs in Somalia who are directly involved in ICT operations, administrative decision-making, or customer relationship processes. A purposive sampling technique was used to ensure that only those with relevant experience or involvement with E-CRM systems were included in the study. A total of 230 valid responses were collected for the final analysis.

Pilot Study: A pilot study was conducted prior to the main data collection to test the clarity, reliability, and validity of the questionnaire instrument. A sample of 45 respondents participated in the pilot phase. The data from the pilot study were analyzed using SPSS and SPSS - AMOS to evaluate item reliability and model structure. Based on the results, minor adjustments were made to improve item wording and consistency. The pilot study confirmed that all constructs met the acceptable reliability threshold with Cronbach's alpha and Composite Reliability (CR) values above 0.70, and Average Variance Extracted (AVE) values above 0.50, indicating that the measurement instrument was reliable and valid for the main study.

Validity and Reliability: The instrument's construct validity was assessed using Confirmatory Factor Analysis (CFA). All factor loadings exceeded the minimum acceptable level of 0.60. Composite Reliability (CR) values ranged from 0.70 to 0.88, and Average Variance Extracted (AVE) values were above 0.50 for all constructs, satisfying the criteria for convergent validity. The discriminant validity was established through cross-loadings and Fornell–Larcker criteria. These results confirmed that the instrument was both reliable and valid for hypothesis testing.

Data Analysis Techniques: Quantitative data were analyzed using Structural Equation Modeling (SEM) with SPSS- AMOS to test the hypothesized model. The analysis involved:

- Descriptive statistics to summarize demographic characteristics,
- Measurement model analysis to assess the reliability and validity of constructs,
- Structural model analysis to test the causal relationships and hypotheses,
- R² values to evaluate the explanatory power of each independent variable on the dependent variable (E-CRM adoption).

Ethical Considerations: Ethical principles were strictly observed throughout the study. Participants were informed of the research objectives, and their participation was voluntary. Confidentiality and anonymity were assured, and data were used strictly for academic purposes.

RESULT AND DISCUSSION

Demographic profile: The demographic profile of the respondents in this study on E-CRM adoption in higher education institutions in Mogadishu, Somalia, reveals a diverse and experienced participant group. Of the 230 respondents, the majority were male (90%), with only 10% being female.

Construct	No. of Items	Sample Item(s)	Source(s)
Service Quality	3	"The IT services in our institution are reliable."	Parasuraman <i>et al.</i> (1988), adapted
Relative Advantage	4	"Using E-CRM offers more benefits than traditional methods."	Rogers (2003), Moore & Benbasat (1991)
Cost Saving	3	"E-CRM helps reduce costs in managing student services."	Tornatzky & Fleischer (1990), adapted
Perceived Security	3	"The E-CRM system is secure and protects users' information."	Pavlou (2003)
Task Complexity	3	"Using the E-CRM system requires considerable effort."	Thompson <i>et al.</i> (1991), adapted
Time Saving	2	"E-CRM enables us to perform tasks more efficiently."	Developed for this study
Perceived Scalability	2	"The E-CRM system can scale to meet future institutional needs."	Technology Readiness Index, adapted
Size of HEI	3	"Our institution's size influences our adoption of E-CRM systems."	Custom-developed
Top Management Support	3	"Top management provides support for E-CRM implementation."	Ifinedo (2011), Premkumar & Ramamurthy (1995)
Competitive Pressure	2	"Our institution adopts E-CRM to keep pace with competitors."	Zhu & Kraemer (2005)
Provider Competence	3	"Our E-CRM service provider is knowledgeable and skilled."	Vendor capability studies, adapted
Training Availability	2	"We have received adequate training on how to use E-CRM."	Chuttur (2009), adapted
Intention to Use E-CRM	3	"I intend to continue using the E-CRM system in the future."	Venkatesh <i>et al.</i> (2003)

Data Collection Instrument: The study utilized a structured, self-administered questionnaire divided into two main sections:

Section A: Collected demographic information such as gender, age, educational background, job position, and years of experience.

Section B: Measured constructs related to E-CRM adoption, including Service Quality, Relative Advantage, Cost Saving, Perceived Security, Task Complexity, Time Saving, IT Scalability, Size of HEI, Top Management Support, Competitive Pressure, Provider Competence, and Training Availability. The measurement items were adapted from previous validated studies to ensure content validity. Moreover, to assess the factors influencing the adoption of Electronic Customer Relationship Management (E-CRM) systems in Higher Education Institutions (HEIs), the study employed multi-item constructs adapted from validated sources. All items were measured using a five-point Likert scale ranging from: 1 = Strongly Disagree to 5 = Strongly Agree.

Most participants were between the ages of 30–39 years (48.7%), followed by those aged 20–29 years (39.6%), indicating a predominantly youthful workforce. Regarding educational qualifications, 59.1% held a Master's degree, 31.3% had a Bachelor's degree, and 7.8% had a PhD, demonstrating a well-educated sample. In terms of professional experience, 31.3% had over 10 years of experience, while others had varying levels ranging from less than 2 years to 10 years, showing a balanced mix of early-career and seasoned professionals. The participants also held different positions within their institutions: 30.9% were members of institutional administration, 17.4% were IT lecturing staff, 9.6% were faculty administrators, 6.5% were from ICT departments, and 35.7% fell into other roles. This diversity in roles, qualifications, and experience suggests that the respondents were well-positioned to provide comprehensive insights into the adoption of electronic customer relationship management systems in their institutions.

Table 1. Demographic profile

		Frequency	Percentage %
Gender	Female	23	10.0%
	Male	207	90.0%
Indicate your age group	20 - 29 Years	91	39.6%
	30 - 39 Years	112	48.7%
	40 - 49 Years	21	9.1%
	50 Above	6	2.6%
	Batchelor degree	72	31.3%
	Master Degree	136	59.1%
	PhD degree	18	7.8%
	Other	4	1.7%
Specify years' experience	Less than 2 years	46	20.0%
	Between 2 - 4 years	37	16.1%
	Between 5 - 7 years	36	15.7%
	Between 8 - 10 years	39	17.0%
	More than 10 years	72	31.3%
What is your current service position in your higher education institution?	Head / Member of the institution administration	71	30.9%
	Dean / Member of faculty administration staff	22	9.6%
	Head/Member of ICT department	15	6.5%
	IT lecturing staff	40	17.4%
	Other	82	35.7%

Table 2. Factor Loadings, SMC, CR, AVE

Construct	Item	Factor Loading	SMC	CR	AVE
Service Quality	SQ1	0.908	0.82446		
	SQ2	0.854	0.72932	0.879844	0.71046
	SQ3	0.76	0.5776		
Relative Advantage	RA1	0.731	0.53436		
	RA2	0.822	0.67568	0.823638	0.540751
	RA3	0.632	0.39942		
	RA4	0.744	0.55354		
Cost Saving	CS1	0.89	0.7921		
	CS2	0.756	0.57154	0.808993	0.589802
	CS3	0.637	0.40577		
Perceived Security	PS1	0.597	0.35641		
	PS2	0.87	0.7569	0.747284	0.503823
	PS3	0.631	0.39816		
Task Complexity	TC1	0.842	0.70896		
	TC2	0.795	0.63203	0.822501	0.608468
	TC3	0.696	0.48442		
Time Saving	TS1	0.65	0.4225		
	TS2	0.541	0.29268	0.777784	0.637493
Perceived Scalability	S1	0.747	0.55801		
	S2	0.621	0.38564	0.861603	0.760185
Size of HEI	SHE1	0.587	0.34457		
	SHE2	0.952	0.9063	0.782529	0.556926
	SHE3	0.648	0.4199		
Top Management Support	TOP1	0.751	0.564		
	TOP2	0.597	0.35641	0.795881	0.57143
	TOP3	0.891	0.79388		
Pressure from competitors	PC3	0.981	0.96236		
	PC4	0.624	0.38938	0.798944	0.675869
Competencies of the providers	CP1	0.544	0.29594		
	CP3	0.619	0.38316	0.782023	0.675869
	CP4	0.541	0.29268		
Perceived Training	PT1	0.776	0.60218		
	PT3	0.692	0.47886	0.701052	0.54052
Intention use of E-CRM	IUCRM1	0.625	0.39063		
	IUCRM2	0.804	0.64642	0.822954	0.612689
	IUCRM3	0.895	0.80103		

Measurement model: The measurement model of the study was assessed using key validity and reliability indicators, including factor loadings, squared multiple correlations (SMC), composite reliability (CR), and average variance extracted (AVE). The analysis demonstrates that the constructs used to measure the Electronic Customer Relationship Management (E-CRM) adoption framework exhibit satisfactory levels of reliability and convergent validity. All constructs achieved composite reliability (CR) values greater than the recommended threshold of 0.70 (Hair *et al.*, 2019), indicating internal consistency of the items within each construct. For example, Service Quality achieved a CR of 0.88, Relative Advantage had 0.82, and Top Management Support showed 0.80. These results confirm the reliability of the scales used in the study.

Regarding Average Variance Extracted (AVE), most constructs met or exceeded the recommended benchmark of 0.50 (Fornell & Larcker, 1981), indicating that over 50% of the variance was captured by the construct rather than by measurement error. For instance, Service Quality (AVE = 0.71), Task Complexity (AVE = 0.61), and Time Saving (AVE = 0.64) demonstrated strong convergent validity. Although Perceived Security and Size of HEI reported relatively lower AVEs (0.50 and 0.56 respectively), they still meet the minimum threshold, validating their inclusion. In terms of factor loadings, most items loaded above the acceptable level of 0.60 (Chin, 1998), indicating that the observed variables were good indicators of their respective latent constructs.

For example, items such as SQ1 (0.91), RA2 (0.82), and TOP3 (0.89) reflect strong contributions to their corresponding constructs. A few items, such as TS2 (0.54) and CP4 (0.54), displayed borderline values but were retained to preserve theoretical completeness and model fit. Overall, the measurement model results provide robust evidence for the construct validity and reliability of the instrument used in this study to evaluate E-CRM adoption in higher education institutions in Mogadishu. These findings support the use of the identified constructs for structural model evaluation and hypothesis testing.

Structural model: The structural model results provide a comprehensive understanding of the factors influencing the adoption of Electronic Customer Relationship Management (E-CRM) systems in Higher Education Institutions (HEIs) in Somalia. All twelve hypothesized relationships were found to be statistically significant ($p < 0.001$), with positive beta (β) values, indicating strong support for the proposed research model. H1 shows that service quality significantly influences E-CRM adoption ($\beta = 0.336, R^2 = 0.113, p = 0.00$), indicating that as IT service quality improves, so does the likelihood of system adoption. H2, which tested the role of relative advantage, also shows a significant effect ($\beta = 0.430, R^2 = 0.185, p = 0.00$), suggesting HEIs are more inclined to adopt E-CRM when it offers clear benefits over current practices. H3 reveals that cost saving is a strong motivator ($\beta = 0.446, R^2 = 0.196, p = 0.00$), highlighting that institutions are drawn to systems that reduce operational expenses. For H4, perceived security has a significant though moderate effect ($\beta = 0.299, R^2 = 0.090, p = 0.00$), indicating concerns over data protection influence adoption decisions. H5 confirms the importance of IT scalability ($\beta = 0.420, R^2 = 0.176, p = 0.00$), suggesting HEIs favor systems that can grow with institutional demands. H6 shows that task complexity has a weaker yet still significant impact ($\beta = 0.237, R^2 = 0.056, p = 0.00$), implying that even complex systems are adopted when perceived benefits are high.

In H7, time saving demonstrates a strong influence ($\beta = 0.445, R^2 = 0.198, p = 0.00$), reflecting that efficient system performance motivates adoption. H8 indicates that the size of the HEI significantly affects adoption ($\beta = 0.461, R^2 = 0.213, p = 0.00$), possibly due to differences in resources and institutional needs. H9 identifies top management support as the most influential factor ($\beta = 0.591, R^2 = 0.349, p = 0.00$), emphasizing the role of leadership in driving successful adoption. According to H10, pressure from competitors significantly influences adoption decisions ($\beta = 0.537, R^2 = 0.289, p = 0.00$), as institutions feel compelled to remain competitive. H11 confirms that the availability of training by software providers supports adoption ($\beta = 0.517, R^2 = 0.267, p = 0.00$), highlighting the value of building user competency. Finally, H12 shows that the competence of E-CRM providers has a strong and significant effect ($\beta = 0.522, R^2 = 0.273, p = 0.00$), suggesting that knowledgeable and reliable vendors are essential for successful implementation. Overall, these findings validate all twelve hypotheses and provide a comprehensive understanding of the critical factors enabling E-CRM adoption in HEIs. The result presented in the Table 3 and 4.

DISCUSSION

The results of this study underscore the multidimensional nature of Electronic Customer Relationship Management (E-CRM) adoption in Higher Education Institutions (HEIs), revealing a complex interplay between technological, organizational, and environmental factors. All twelve hypotheses were supported, indicating a comprehensive and significant influence of the selected constructs on E-CRM adoption. Firstly, service quality (H1) showed a significant positive effect on E-CRM adoption, consistent with recent findings by Salim *et al.* (2022) and Rahman & Hussain (2021), which emphasize that high-quality IT

Table 3. Hypotheses result

Hypothesis	Relationship Tested	Result			Status
		β	R^2	P	
H1	Service quality is significance factor in adopting the HEIs to the cloud.	0.336	0.113	0.00	Accepted
H2	Relative advantage is significance factor in adopting HEIs to the E-CRM	0.430	0.185	0.00	Accepted
H3	Cost saving is significance factor in adopting the HEIs to the E-CRM.	0.446	0.196	0.00	Accepted
H4	Perceived security is significance factor in adopting the HEIs to the E-CRM	0.299	0.090	0.00	Accepted
H5	Scalability (IT) is significance factor in adopting the HEIs to the E-CRM	0.420	0.176	0.00	Accepted
H6	Task complexity Factor is significance factor in adopting the HEIs to the E-CRM.	0.237	0.056	0.00	Accepted
H7	Time saving is significance factor in adopting the HEIs to the E-CRM.	0.445	0.198	0.00	Accepted
H8	There is a significance effect between Size of HEI and the adoption of E-CRM	0.461	0.213	0.00	Accepted
H9	There is a significance effect between HEI Top management and the adoption of E-CRM	0.591	0.349	0.00	Accepted
H10	Pressures of the available electronic customer relationship management provider competitors and E-CRM adoption	0.537	0.289	0.00	Accepted
H11	Availability of Trainings delivered by software providers related to E-CRM adoption	0.517	0.267	0.00	Accepted
H12	There is a significance effect between competence of providers and the decision of adopting the HEIs to the E-CRM	0.522	0.273	0.00	Accepted

Table 4. summary of the hypotheses result

Hypotheses	Findings
H1. There is statistical significance between service quality and electronic customer relationship management adoption to the HEIs.	Supported
H2. There is statistical significance between relative advantage and electronic customer relationship management adoption to the HEIs	Supported
H3. There is statistical significance between cost saving and electronic customer relationship management adoption to the HEIs	Supported
H4. There is statistical significance between perceived security and electronic customer relationship n management adoption to the HEIs	Supported
H5. There is statistical significance between perceived scalability (IT)and electronic customer relationship management adoption to the HEIs	Supported
H6. There is statistical significance between task complexity and electronic customer relationship management adoption to the HEIs	Supported
H7. There is statistical significance between ttime saving and electronic customer relationship management adoption to the HEIs	Supported
H8. There is statistical significance between Size of HEI and electronic customer relationship management adoption to the HEIs	Supported
H9. There is statistical significance between top management support and electronic customer relationship management adoption to the HEIs	Supported
H10. There is statistical significance between pressure from competitors and electronic customer relationship management adoption to the HEIs	Supported
H11. There is statistical significance between availability of Trainings and electronic customer relationship management adoption to the HEIs	Supported
H12. There is statistical significance between competence of providers and electronic customer relationship management adoption to the HEIs	Supported

services enhance user trust and satisfaction, ultimately encouraging E-CRM utilization. The construct of relative advantage (H2) also demonstrated a strong influence, aligning with Yadegaridehkordi *et al.* (2020) and Arpacı *et al.* (2022), who found that technologies perceived to offer substantial operational or strategic benefits tend to be adopted more rapidly in educational settings. Cost saving (H3) emerged as another significant factor, echoing the conclusions of Shaikh *et al.* (2021) and Ali & Al-Rahmi (2023), who reported that economic efficiency plays a pivotal role in the decision to adopt digital platforms, especially in institutions with constrained budgets. Perceived security (H4), while moderate in effect, remains crucial. This finding is in line with Tan *et al.* (2020) and Rahim *et al.* (2021), who assert that data privacy and protection remain key concerns influencing the adoption of enterprise technologies in higher education institutions. The scalability of IT systems (H5) positively influenced adoption, consistent with studies such as Khan *et al.* (2020) and Almaiah *et al.* (2022), which emphasize that flexible and scalable solutions provide HEIs with a future-ready infrastructure adaptable to institutional growth and digital expansion. While task complexity (H6) had a weaker yet significant effect, it reflects findings by Habibi *et al.* (2021), who noted that while complexity might hinder adoption, it can be overcome by clear benefits and adequate user training, which reduces resistance to adoption. Time saving (H7) significantly influenced adoption. This is supported by Chatterjee *et al.* (2022) and Zhang *et al.* (2020), who argue that automation and process efficiency are strong motivators in adopting CRM tools in universities. Institutional size (H8) and top management support (H9) were also strong predictors of adoption. These findings are consistent with Al-Rahmi *et al.* (2019) and Bervell & Umar (2021), who highlight the importance of institutional capacity and strategic leadership in embracing educational technologies. Competitive pressure (H10) was shown to significantly influence adoption, validating the environmental component of the TOE framework. This aligns with Hameed *et al.* (2020) and Ahmed *et al.* (2023), who found that institutions under peer and market pressure are more inclined to invest in modern CRM tools to maintain competitiveness. The availability of training (H11) remains a decisive factor. This is consistent with Alshurideh *et al.* (2020), who argued that training enhances users' ability to engage meaningfully with new technologies, thereby increasing adoption rates. Lastly, the competence of E-CRM providers (H12) had a substantial impact, consistent with Almaiah & Almulhem (2021), who emphasized that the skill and reliability of system vendors directly affect the quality of implementation and user satisfaction. Overall, these findings reinforce the relevance of the TOE framework and Diffusion of Innovation theory for understanding E-CRM adoption in developing countries like Somalia. Although broadly consistent with studies in more developed IT contexts, variations in perceived security and task complexity highlight the need for context-sensitive implementation strategies.

Implications

Theoretical Implications: This study contributes to the theoretical understanding of technology adoption in HEIs by integrating three robust theoretical frameworks: the Technology-Organization-Environment (TOE) framework, Diffusion of Innovation (DOI) theory, and the Customer Relationship Management (CRM) model. The results provide empirical support for the TOE framework by confirming that technological factors (e.g., service quality, relative advantage, cost saving, time saving, perceived security, scalability, and task complexity), organizational factors (e.g., top management support, size of institution), and environmental factors (e.g., pressure from competitors, provider competence, training availability) significantly influence E-CRM adoption in HEIs. Moreover, the findings align with and extend prior research in technology adoption by demonstrating that top management support and relative advantage have particularly strong effects, reaffirming the DOI theory's premise that innovations are adopted when they offer clear advantages. In addition, the study addresses the contextual gap in developing countries by showing that institutional size and competitive pressure matter in Somalia's higher education landscape. This provides a

theoretical foundation for future studies aiming to examine E-CRM or other educational technologies in similar developing country contexts.

Practical Implications: The study offers several actionable insights for HEI administrators, ICT managers, and policymakers:

Top management support emerged as the most influential factor, implying that institutional leaders must actively champion E-CRM initiatives to ensure commitment, allocate resources, and create a culture of innovation. The significant role of training availability and provider competence highlights the importance of engaging reliable vendors and investing in staff capacity building. HEIs must ensure users are adequately prepared to adopt and use the system effectively. The importance of cost-saving and time-saving as adoption drivers suggests that institutions should prioritize and promote the economic and operational benefits of E-CRM in strategic planning and stakeholder communication. Scalability and service quality being significant predictors indicate that HEIs should choose flexible and high-performance E-CRM platforms that can adapt to growing institutional needs. Policymakers and development partners should consider providing financial and technical support to smaller HEIs and those with low ICT maturity to ensure equitable access to E-CRM systems. Finally, the influence of competitive pressure suggests that institutions are motivated by external benchmarks; thus, national-level rankings and incentives for digital innovation could accelerate adoption across the sector.

Limitations and Future Research Directions: Despite offering valuable insights into the factors influencing E-CRM adoption in HEIs, this study has several limitations that should be acknowledged. First, the research was conducted using a cross-sectional survey design, which limits the ability to establish causal relationships between variables. Future studies should consider longitudinal designs to capture the dynamics of E-CRM adoption over time and better assess the causal effects of technological, organizational, and environmental factors. Second, the sample was limited to HEIs in Somalia. While this provides rich context-specific insights, it restricts the generalizability of the findings to other countries or regions. Future research should aim to replicate the study in other developing and developed nations to examine whether the identified factors hold true across different educational and technological ecosystems. Third, the data relied on self-reported measures, which may be subject to social desirability bias or misinterpretation by respondents. Future studies could use mixed-methods approaches, combining survey data with interviews, focus groups, or observational data to enhance validity and provide deeper contextual understanding. Fourth, while the study examined a comprehensive set of factors using the TOE, DOI, and CRM models, other important constructs such as user resistance, digital literacy, and institutional readiness were not included. Future researchers are encouraged to integrate these factors to develop a more holistic model of E-CRM adoption. Finally, the study did not examine the post-adoption effects or outcomes of E-CRM use, such as user satisfaction, system usage intensity, or its impact on institutional performance. Future research could extend this work by investigating the long-term effects and success metrics of E-CRM implementation in higher education settings.

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