Business Education Journal
Volume 9 Issue I
Email: jeditor@cbe.ac.tz
Published Online October 2023 in http://www.cbe.ac.tz/bej

INVESTIGATION OF FACTORS INFLUENCING SATISFACTION AND LOYALTY TOWARD USE OF ENTERPRISE RESOURCE PLANNING SYSTEMS: A CASE OF TANZANIAN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

Enterprise resource planning (ERP) systems are developed to accomplish and integrate business processes across institutions' functions and settings. Higher Education Institutions (HEIs) are one of the recent institutions which have deployed ERP systems. Many studies on ERPs in HEIs have concentrated on intention to use, usage and continuous usage, with little attention to user satisfaction and loyalty over ERP systems. Based on Information System (IS) success literature and enriching it with other factors, this study develops a framework to examine the effects of IS quality factors, perceived usefulness, and social influence on users' satisfaction and loyalty toward ERP systems' use. The snowball technique was employed to gather the perceptions of 163 Institute of Finance Management (IFM) employees. The results indicate that social influence has a medium impact on both satisfaction and loyalty of employees who are using ERP systems. Perceived usefulness and satisfaction also greatly impact satisfaction and loyalty, respectively. The major contribution of this study was to investigate the factors affecting satisfaction and loyalty over ERP systems in HEIs in one setting. The implication of theory and practice and future studies are discussed.

Keywords: *ERP system, EMS, IS quality, perceived usefulness, social influence, user satisfaction, user loyalty, IFM.*

1. INTRODUCTION

Many Enterprise Resource Planning (ERP) systems installed and used in institutions globally tend to fail (Babaei et al., 2015; Terminanto et al., 2017; Terminanto & Hidayanto, 2017). More than 70% of ERP systems that have been implemented failed, attracting further studies into this area to ascertain the underlying factors for such high failure. The literature further indicates that half (1/2) of ERPs in developing countries like Egypt failed (Abdellatif, 2014). Many ERPs of both developed and developing countries encounter this problem of failure (Malik & Khan, 2021), however in the general perspective of information systems, it is indicated that satisfaction influences users of information systems (DeLone & McLean, 2003, 2016, Petter et

al., 2012). On the other hand, recent studies show that user satisfaction leads to users' loyalty to the information system in a place (Aktepe et al., 2015; Gallarza et al., 2016; Ofosu-Boateng & Agyei, 2020). Unfortunately, none of these studies has been in ERP systems.

Enterprise Resource Planning (ERP) systems are regarded as complicated and widespread software packages designed to integrate all business processes and functions of an institution (Althonayan & Althonayan, 2017). An ERP system contains modules that manage different aspects of an institution, starting from human resources, accounts and payments, and stock, to mention a few. Irrespective of all difficulties and risks expected to be involved in accepting and using these ERPs, institutions still spend millions of dollars on them, hoping to improve individual and institutional performance. Such systems were applied in manufacturing and higher education institutions (Tenhiälä & Helkiö, 2015). For instance, literature shows that each Higher Education Institution spent a total of $20 million in implementing ERPs (Orgill & Swartz, 2000), while a total of $72.63 billion was expected to be well spent by 2002 to equip institutions with ERPs (Holland & Light, 1999).

Despite all such investments, studies show that the failures of ERPs in HEIs still exist and are attributed to a lack of reliable measurement tools (Althonayan & Althonayan, 2017; Lin, 2010). One of the parameters which can be used to measure the success of ERPs is the satisfaction and loyalty of users (Al-Jabri, 2015; Jo, 2022; Laumer et al., 2017a; Tenhiälä & Helkiö, 2015). Not many studies studied the factors affecting this satisfaction and loyalty in one setting (Jo, 2022), especially using ERP systems in HEIs in the Tanzania context.

Literature shows that satisfaction impacts loyalty toward using a system (Carvache-Franco et al., 2021; Dewi & Abidin, 2021; Encinas Orozco & Cavazos Arroyo, 2017a); however, this linkage has rarely been investigated over ERPs in HEIs. In IS success studies, information quality plays a significant role in affecting the satisfaction of users (DeLone & McLean, 2016c; Petter et al., 2012); also, in intention to continue using IS, perceived usefulness plays a significant role in impacting satisfaction (Bhattacherjee, 2001; Mtebe & Raphael, 2018). However, only some of these studies are typically on ERP systems in HEIs. Also, the influence of service quality on users' loyalty over ERP systems in HEIs is limited.

Furthermore, social influence (peer influence), especially on youth using smartphones and other electronic devices to manage online purchases, is growing daily (Collin-Lachaud & Diallo, 2021; Purani et al., 2019). However, these studies were not applied to ERP systems in HEIs. In this study, the authors anticipated that social influence impacts satisfaction and loyalty.

Therefore, the current factors affecting satisfaction and loyalty in HEIs using ERP systems have yet to be simultaneously investigated. Hence recent study seeks to determine the following:

1) Factors affecting the satisfaction of users on ERP systems in Higher Education Institutions;

2) Factors affecting the loyalty of users to ERPs systems in Higher Education Institutions;

3) The impact of users' satisfaction on the loyalty of ERP systems in Higher Education Institutions.

This study is important because a significant amount of money (more than $72.63 billion) has already been used to implement ERP systems in HEIs in developing and developed countries (Holland & Light, 1999). Studies show that the levels of satisfaction and loyalty of employees determine the effective use of ERP systems in HEIs. However, finding the factors determining the satisfaction and loyalty of key stakeholders such as employees is very important, considering that this system is mandatory in most HEIs. The factors determining employees' satisfaction and loyalty to ERP systems from other industries, such as manufacturing, cannot be directly applied to HEIs because of the different business processes found in HEIs (Althonayan & Althonayan, 2017).

This paper is progressing as follows; section 2 covers the literature review about ERP systems in HEIs and two key outcomes of ERP systems: satisfaction and loyalty—section 3 covers methodology describing - the research design, population and sampling techniques adopted in this study. Section 4 covers the analysis of collected responses, section 5 covers the discussion and implications of results, and the last section is section 6, which covers the conclusion and limitations associated with this study.

2. LITERATURE REVIEW

2.1 ERP in Higher Learning Institutions

Higher Education Institution (HEI) provides formal tertiary education training and ultimately awards learners certificates, diplomas or degrees (Lashayo & Mhina, 2021; Mushi & Lashayo, 2022). Many institutions have invested in information systems and ERPs for positive outcomes (Althonayan & Althonayan, 2017; Lashayo & Mhina, 2021). The records show that each HEIs invested heavily (Yen et al., 2015), and statistics show that around 20 million USD is spent in implementing ERPs projects which may spin in a range of 2 to 3 years (Orgill & Swartz, 2000). Apart from this magnitude of investment, there are challenges facing HEIs, including management of human resources, payments, purchases and stocking (Althonayan & Althonayan, 2017). Therefore, a study on ERP systems is imminent.

Furthermore, the institution and composition of HEIs are different from manufacturing industries and other institutions in other sectors (Althonayan & Althonayan, 2017). The differences come from two main aspects: functions and stakeholders (Okunoye et al., 2006). HEIs have multiple functions, tracking the number of activities, including human resources systems, students information systems and financial systems (Kvavik et al., 2002). Regarding stakeholders, HEIs comprise faculty members/instructors, students/learners and non-academic staff. Applying studies and experiences in manufacturing and other industries will bring a limited understanding of implementing ERP systems in HEIs.

Enterprise Resources Planning (ERP) can be configurable information systems or packages that bring together information and information-based processes within and across functional

areas in an institution (Zhu et al., 2010). Large and medium-sized public and privately owned institutions have continually adopted ERP systems for various reasons, mostly technical and institutional, to address legacy (existing) systems' limitations, such as defragmentation and associated incompatibility (Elmes et al., 2005). Some rewards for institutions adopting ERP include cost saving, improving use capabilities, reduced system development time, boosting competitive advantages and enhancing productivity (Khoo et al., 2011). With above-ground ERP, software package has become a worldwide technology for personal users and large institutions (Min Khoo & Robey, 2007). Therefore, these technologies/systems are increasingly extended in Higher Education Institutions (HEIs). However, there are still limited studies of ERP systems worldwide in the context of HEIs (Kalema et al., 2014).

The Institute of Finance Management (IFM) is one of the HEIs in Tanzania. IFM has currently implemented an ERP system. In 2018, the IFM's ERP system development team conducted a feasibility study and requirement engineering (requirement gathering, analysis and specification) using mainly a team of experts within an institution, mainly from the faculty of computing, information systems and mathematics, together with the directorate of computer services and office of the registrar. In the academic year (2021/2022), IFM has managed to have live processing of examination results for two semesters, managing the admission of students. A typical ERP system in IFM is called Enterprise Management System (EMS). EMS bears characteristics of ERP, which demand an employee to be disciplined because it changes employee workflows and demands additional documentation, which may attract resistance and employ only minimal use (Yen et al., 2015). Although this system is already running live in IFM, there are no studies have been conducted to investigate factors which determine both satisfaction and loyalty of current users of EMS (faculty members/instructors, students/learners, non-faculty members) since loyal users will tend to explore more in terms of features and functionalities proactively. The current research is determined to fill this literature gap.

2.2 Measurement of Satisfaction and Loyalty

Measurement of the success of information systems is determined by both usage frequencies and users' satisfaction with that system (DeLone & McLean, 1992, 2003). When the system under investigation is mandatorily used, usage as a factor is no longer an interesting measurement (DeLone & McLean, 2003, 2016). On top of that, recent studies indicate that satisfaction is an imperative predictor of loyalty (Ofosu-Boateng & Agyei, 2020; Wang et al., 2018). ERP, a typical example of an information system, has been used in different contexts, including manufacturing industries, government departments, and agencies (Jo, 2022). However, more studies still need to be conducted, particularly in HEIs (Althonayan & Althonayan, 2017).

There is quite a difference between loyal users and continuance users (Day, 1976). The continuance emphasises behaviour manifestation, while loyalty emphasises behaviour manifestation plus psychological commitment (Day, 1976).

2.2.1 Satisfaction

Users' satisfaction is a popular measure of information system (IS) effectiveness and is the best alternative measure of system success in IS studies (DeLone & McLean, 2003, 2016,

Kalankesh et al., 2020; Laumer et al., 2017b). According to DeLone and McLean (2016), satisfaction is affection. Doll and Torkzadeh (1988) regard satisfaction as an affective attitude towards a specific computer application for users directly interacting with the given computer application. Perceived satisfaction is considered a measure of the reliability of any information system, which will determine whether the user will continue using an IS (Shee & Wang, 2008).

Many tools were developed to measure the satisfaction of users in information systems. The oldest is a tool developed by Bailey and Pearson (1983), including 39 items categorised into the following factors, information quality, systems performance, personal relationship with staff and top management. However, this tool was limited to mainframe computer systems, unlike many information systems running on personal computers. Hence its wide application was still in doubt (Au et al., 2002). There was much effort to improve that tool for vast information systems, including a study by Ives et al. (1983). This tool can only be used in a data-processing computing environment and not in other settings (Xiao & Dasgupta, 2002).

Doll and Torkzadeh (1988) developed another tool to measure user satisfaction by comparing traditional data processing and end-user computing environments. This tool comprised five factors: content, accuracy, format, ease of use, and timeliness. It is one of the tools widely used and validated by several studies. However, most of the factors in this tool were later included in only one factor (information quality) by DeLone and McLean (2003, 2016).

Current studies developed to measure satisfaction in the context of HEIs were developed using IS success model, integrating them with other factors. For instance, Nizamani et al.(2017) developed a tool in which only three quality factors (information, system and service) were successfully validated to measure the satisfaction of ERP users in Pakistan. However, as time goes on, other factors may also affect satisfaction. Unlike Nizamani et al. (2017), Soliman and Aria (2017) proposed a tool using factors from IS success model, Diffusion of Innovation (DOI) and Critical Success Factor (CSF). That was limited since no empirical test was done. Therefore, there still needs to be a gap in current factors affecting ERPs' satisfaction in HEIs.

2.2.2 Loyalty

Recently loyalty has become an ultimate measure of the success of Information Systems (B. Kim, 2019; Yen et al., 2015). Loyalty is composed of distinct dimensions (i.e., behavioural and psychological).In the marketing industry, loyalty is explained using two terms attitudes and behaviour (Uncles et al., 2003). Uncles et al.(2003) defined attitude as an intention to re-purchase a product or service and recommend it to other potential customers, while behaviour as aspects, such as continuous purchases, frequent purchases, being in a relationship for many years, and many different products the customer buys from the supplier. Information systems can be measured via users' proactive, extended uses of a system and willingness to take on positive word-of-mouth recommendations of such users to others (Yen et al., 2015). The key loyalty determinants include trust, satisfaction, emotion, perceived value and service quality (D. Kim & Kim, 2018; Ofosu-Boateng & Agyei, 2020). Users' loyalty to a certain product brought several benefits, including frequent visits by a consumer, little marketing and awareness campaign and consolidation of the product (B. Kim, 2019). Few studies were conducted to measure loyalty for mandatory information systems (Yen et al., 2015), of which the current ERPs in HEIs are mandatory systems.

Only some studies have tried to measure satisfaction and staff loyalty in ERPs in HEIs. Furthermore, the factors that affect employee satisfaction and loyalty in HEIs have yet to be comprehensively researched.

2.3 Research Hypotheses and Model Development

Figure 1 shows the proposed research conceptual framework for explaining and predicting staff satisfaction and loyalty over ERP systems in Higher Education Institutions. The framework was developed by adapting the IS success model (DeLone & McLean, 1992, 2003, 2016c; Petter et al., 2012) and enriching it with current factors impacting satisfaction and loyalty. Loyal employees voluntarily and proactively advocate positive word of mouth about products or services and, in this case, ERP systems in HEIs. However, many studies have explored the initial, continuance, and in-depth assessments (Yen et al., 2015). However, understanding what factors affect staff satisfaction and loyalty in the ERP system in one setting is more than important. In this study IS success model is adapted with additions of other factors, such as social influence from the Unified Theory of Acceptance and Use of Technology (UTAUT and UTAUT2) (Venkatesh et al., 2003, 2012) as well as perceived useful from the expectation confirmation model (Bhattacherjee, 2001).

2.3.1 Satisfaction

Many practitioners and researchers consider satisfaction a vital predictor of the success of information systems (IS) (DeLone & McLean, 1992, 2003, 2016; Jo, 2022). Satisfaction equally means affection. Studies indicated that when the expectation of users of information systems are met, users will have positive feelings (affection) over the system (Bhattacherjee, 2001; Chea & Luo, 2008). Users satisfied with IS will likely spread good word of mouth (D. Kim & Kim, 2018) and become more loyal to IS than unsatisfied users. Besides ERPs in HEIs, studies indicate that satisfaction affects loyalty (Dewi & Abidin, 2021; Encinas Orozco & Cavazos Arroyo, 2017; Lee et al., 2019). Therefore, the current research expects a positive effect of satisfaction on loyalty and comes out with this hypothesis.

H6: Staff satisfaction positively and significantly affect employees' loyalty to ERP system in HEIs

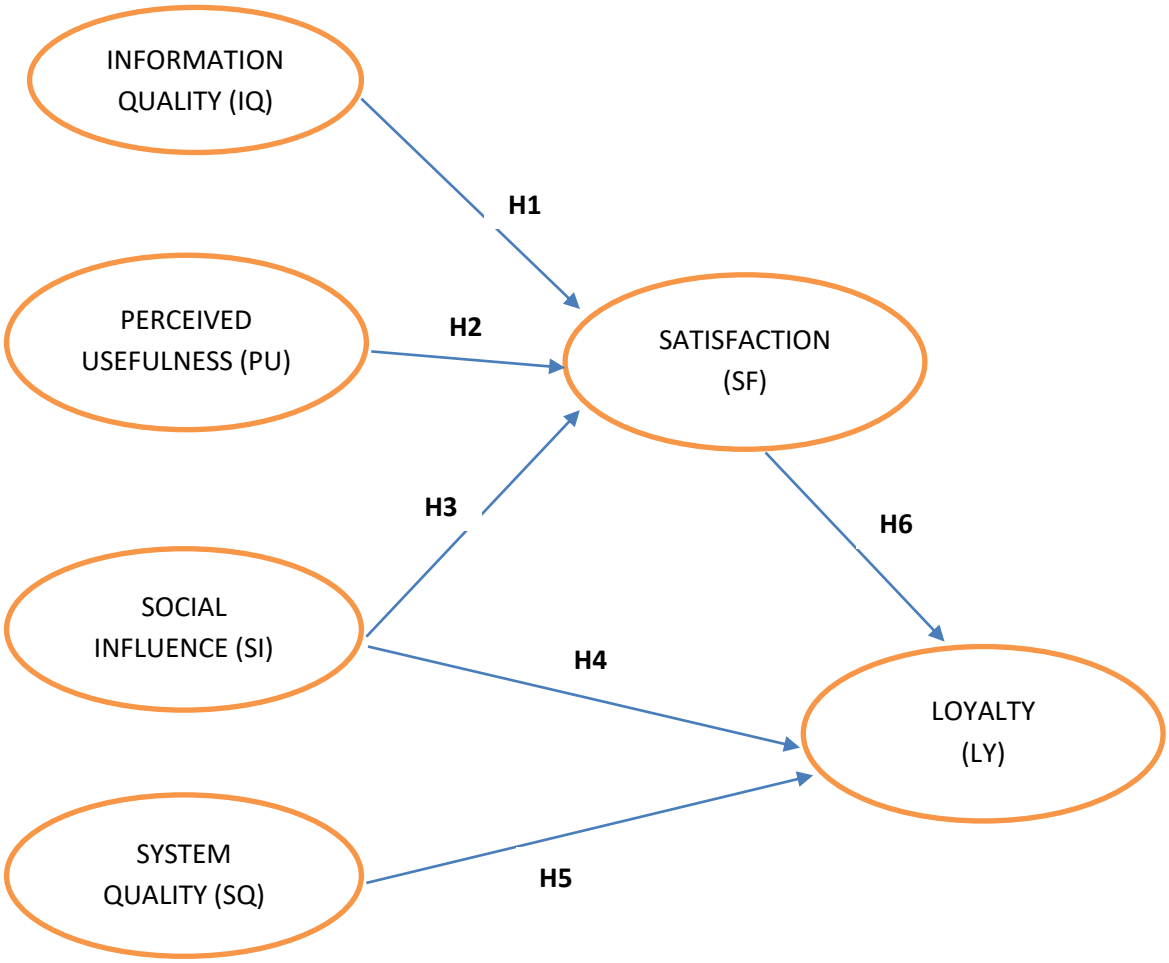

Figure 1: Research conceptual framework

2.3.2 Information Quality

The fundamental function of any information system is to manage information and produce information that users want (Petter et al., 2012). Information quality in the ERP system measures the fitness of content generated from the ERP system (DeLone & McLean, 2003). It is attributed to accuracy, timeliness, completeness, relevance, and consistency (DeLone & McLean, 2003). Information quality is an essential factor in measuring the success of IS and, in particular, has received attention in ERP systems. Literature on ERP systems shows that information quality impacts satisfaction (Lin, 2010). In the same line, the current study in the context of HEIs hypothesises that:

H1: Information quality positively and significantly affect staff satisfaction with ERP system in HEIs

2.3.3 System Quality

An information system is an analogy to machine-producing products. Based on this argument, product quality highly depends on the machine's quality. Now information system quality sometimes regarded as information quality is an essential aspect of information systems. It is

considered the technical fitness of information systems (DeLone & McLean, 2003). System quality attributes include reliability, response time, flexibility, integration and accessibility (DeLone & McLean, 2003; Petter et al., 2012). The ERP system literature shows that system quality impacts staff satisfaction (Lin, 2010).

Regarding the impact of system quality on staff loyalty, current studies indicated that system quality indirectly (via perceived benefits and perceived workload) affects loyalty (Yen et al., 2015). This study is interested in investigating this linkage in the context of HEIs, especially the direct link. It hypothesises that:

H5: System quality positively and significantly affect staff loyalty over ERP system in HEIs

2.3.4 Perceived Usefulness

Perceived Usefulness is the degree of confidence in the benefits the information system will bring into users' activities (Davis, 1989). In motivational theory, the perceived usefulness of IS is an external motive to users (Deci & Ryan, 2012). Past studies show that perceived usefulness impacts satisfaction (Bhattacherjee, 2001; Mtebe & Raphael, 2018b). Studies in ERP systems of HEIs show that perceived usefulness impacts satisfaction (Zviran et al., 2005). Furthermore, perceived usefulness affects satisfaction in other contexts of ERP systems, such as smart manufacturing (Jo, 2022). The literature review shows that this linkage needs to be adequately investigated in measuring ERP systems in HEIs. Therefore, this study suggests the following hypothesis:

H2: Perceived Usefulness positively and significantly affect employees' satisfaction with ERP system in HEIs

2.3.5 Social Influence

Social influence is the pressure from groups connected to an individual or institution, specific behaviour like emotions, support or availability specific behaviours, e.g. emotional or informational support or our perceived availability (Venkatesh et al., 2003, 2012). Social influence triggers the form of encouragement, motivation, information and shared experience of support resources (Dabi et al., 2018). This construct is similar to the subjective norm, image, and social factors. Empirical research shows that social influence impacts ERPs' effectiveness or performance (Dabi et al., 2018). It further indicates that the continued use is influenced by social influence (Dabi et al., 2018). For youth, social influence (peer influence) seems to influence loyal use of online purchases using smartphones and other electronic devices (Collin-Lachaud & Diallo, 2021; Purani et al., 2019). However, social influence on both satisfaction and loyalty is less researched using ERP systems. Therefore, this study hypothesises that:

H3: Social influence positively and significantly affects employees' loyalty to the ERP system in HEI

H4: Social influence positively and significantly affects satisfaction in ERP system in HEI

3. METHODOLOGY

The focus of this study is based on the following objectives:

1. To determine factors affecting the satisfaction of ERPs systems in Higher Education Institutions
2. To determine factors affecting staff loyalty on ERPs systems in Higher Education Institutions
3. To determine the impact of users' satisfaction on the loyalty of ERP systems in Higher Education Institutions.

3.1.1 Research Design

This study employed a quantitative research design to validate the stated hypotheses in section 2. The quantitative approach is useful to this study as it enables the expected findings to be extrapolated to typical information systems, particularly in HEIs. The research was conducted from November to December 2022 due to limited resources, which include time, and funds, to mention a few.

3.1.2 Research Context, Population and Sampling

The targeted population for this study is employees of Higher Education Institutions (HEIs) in Tanzania. Tanzania has more than 33 registered HEIs (Lashayo, 2020), offering many academic programmes from technician to bachelor's degree certificates. These HEIs have currently tried to use ERP systems to facilitate the integration of information systems in different functional areas. The Institute of Finance Management (IFM), as an instance of the existence of HEIs, has currently installed and implemented EMS for managing student information, employees' information, and payment details.

The minimum sample size is 60 employees, according to Wampold and Freund (1987). Wampold and Freund (1987) recommended that several constructs proposed in the conceptual research framework are material for estimating sample size. However, this study collected data from 163 respondents, more than Wampold and Freund (1987) suggested. The current research proposed six constructs (information quality, system quality, perceived usefulness, social influence and satisfaction) to measure employees' loyalty.

The sampling procedure applied in this study was a snowball. The non-probability approach was employed to select employees, and the online method was used to share the questionnaire with the respondents. The respondents who are IFM employees were asked to share the questionnaire with co-workers. This approach works in the current environment where most people have smartphones (Lashayo & Mhina, 2021). The researchers used different WhatsApp employee groups to pass on the online questionnaire.

3.1.3 Questionnaire Development

The questionnaire was developed based on previous literature, as mentioned in Appendix A. The items were gauged from 1 to 5 (Likert scale). The numbers 1 - strongly disagree to 5 - strongly agree, whereas the middle number 3 - neutral. The questionnaire was developed using google forms and distributed online, ensuring convenience to respondents, and no item was not attended to.

4. ANALYSIS AND RESULTS

Structural Equation Modelling (SEM), a multivariate statistical analysis method, was used in the study using the IBM SPSS version 21 and AMOS version 21 software.

4.1 Demographics

The demographics of the sample are shown in Table 1. The majority of respondents, 152 (93.3%), were males between the ages of 35 and 50. Regarding education, 107 respondents (65.6%) said they had a master's degree. In addition, the majority of respondents, 134 (82.2), indicated that they had used the system for less than one year but more than six months when the survey was performed.

Table 1: Characteristics of Respondents (n = 163)

Variable	Values	Frequency	Per cent	Cumulative Percent
Age	18 to 34	2	1.2	1.2
	35 to 50	159	97.5	98.8
	51 and above	2	1.2	100
	Total	**163**	**100**	
Gender	Female	11	6.7	6.7
	Male	152	93.3	100
	Total	**163**	**100**	
Time of Use	less than one year	134	82.2	82.2
	less than six months	16	9.8	92
	less than two years	13	8	100
	Total	**163**	**100**	
Education	Bachelor	16	9.8	9.8
	Masters	107	65.6	75.5
	PhD	40	24.6	100
	Total	**163**	**100**	

Source: Research data (2023)

4.2 Assumptions of SEM

Table 2 presents results for normality and multicollinearity tests. These are important

assumptions for multivariate statistical analysis before analysing the measurement and structural models (Hair et al., 2013).

Table 2: Tests for Assumptions of Multivariate Statistical Analysis

Construct	Mean	STD	Skewness	Kurtosis	Tolerance	VIF
Satisfaction (SF)	3.7178	.63676	-1.669	3.448	N/A	N/A
Perceived Usefulness (PU)	3.8528	.50253	-2.378	9.620	.301	3.318
Social Influence (SI)	4.0537	.70697	-1.755	4.885	.401	2.492
System Quality (SQ)	3.8119	.47868	-1.636	4.188	.314	3.189
Loyalty (LY)	3.8814	.63687	-1.431	3.940	N/A	N/A
Information Quality (IQ)	3.7500	.49144	-1.752	4.486	.477	2.096

Notes: *Scale: 5 = Strongly Agree (SA); Standard Deviation = (STD); 2 = Disagree (D); 3 = Neutral (N) ; VIF = Variance Inflation Factor; 5 = Agree (A); 1 = Strongly Disagree (SD).*

The means for the data ranged from 3.7178 for SF to 4.0537 for SI, indicating the respondents' positive (>3) perception of using the ERP system (see Table 2).

The absolute skewness and kurtosis values were within values 3 and 10, respectively, indicating the absence of normality issues (Brown & Greene, 2006).On the other hand, the values of tolerance and variance inflation factor (VIF) were >0.1 and < 5.0 hence indicating the absence of multicollinearity (Pallant, 2010) (see Table 3).

4.3 Measurement Model Estimation

The recommendations from Schumacker and Lomax (2004) were followed in model analysis. It is required that the data be subjected to a two-step analysis. First, the measurement model was assessed, followed by the structural model. The measurement model was analysed to confirm the proposed model, i.e., confirmatory factor analysis (CFA), followed by the hypothesis testing as predicted in the structural equation model (SEM).

The following model fit indices were applied in the CFA and SEM - a normed χ-square ($\chi 2/df$), comparative fit index (CFI), Standardised Root Mean Residual (SRMR), and root mean square error of approximation (RMSEA) (see Table 3).

Table 3: Composite reliability, convergent validity, and discriminant validity

Construct	CR (items)	CR	AVE	IQ	SQ	PU	SI	SF	LY
IQ	0.816 (4)	0.830	0.555	**0.745**					
SQ	0.781 (3)	0.792	0.560	0.790***	**0.749**				
PU	0.877 (3)	0.888	0.727	0.672***	0.889***	**0.853**			
SI	0.900 (4)	0.908	0.719	0.648***	0.693***	0.691***	**0.848**		
SF	0.899 (3)	0.902	0.754	0.700***	0.740***	0.781***	0.779***	**0.868**	
LY	0.777 (3)	0.785	0.551	0.611***	0.738***	0.772***	0.795***	0.793***	**0.742**

Notes: CR = Composite Reliability; AVE= Average Variance Explained; and α = Cronbach's Alpha Coefficient.

The initial analysis of the measurement model consisting of 20 items showed that the factor loadings of the measurement items were within the acceptable minimum threshold of 0.6 (Hair *et al.*, 2010*).* However, two measurement items, i.e., SI4 and IQ1, showed factor loadings of 0.57 and 0.597, respectively. However, these measurement items were retained in the model as their factor loadings were very close to 0.6 (Wang, 2016).

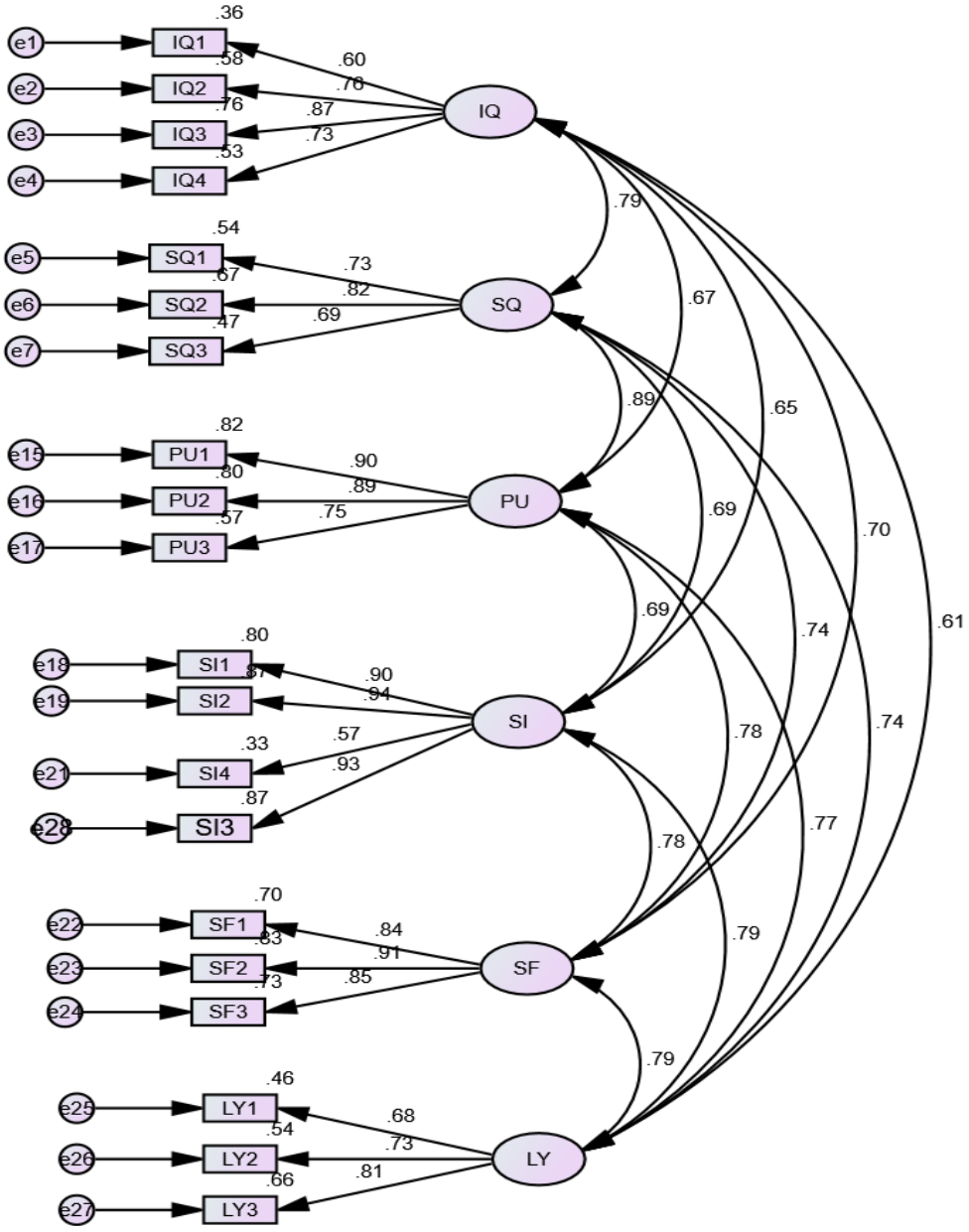

Figure 2: Measurement Model

The convergent validity, discriminant validity, and construct reliability of the measurement model were evaluated using Cronbach's alpha (α), Composite Reliability (CR), and Average Variance Extracted (AVE).

The results of the analysis (see Table 3) showed that α >0.7, CR >0.7, and AVE>0.5 for all values, hence showing that internal consistency, composite reliability and convergent validity, respectively, were achieved (Hair et al., 2013).

On the other hand, the determine discriminant validity, the square root of the AVE values of the constructs was calculated. These values are shown along the diagonal in Table 3; for discriminant validity to be achieved, these values should be greater than all values along the respective rows and columns for all constructs (Banday & Mattoo, 2013). For this case, the discriminant validity was achieved except for two constructs, i.e., SQ and PU, whose values were slightly greater than the corresponding diagonal values. These constructs will need to be investigated further in future studies.

The satisfactory test results for the psychometric test concluded the assessment of the measurement model and hence the permitting for analysis of the structural equation model (SEM) in which hypotheses were tested.

Table 4: Model fit indices

Indices	Measurement Model	Structural Model	Threshold	Interpretation
$\chi 2$/df	2.317	2.295	Between 1 and 3	Excellent
CFI	0.917	0.917	>0.95	Acceptable
SRMR	0.06	0.06	<0.08	Excellent
RMSEA	0.07	0.07	<0.06	Acceptable

Notes: CFI = comparative fit index; $\chi 2$ = chi-square; df = degree of freedom; SRMR = standardised root mean residual; RMSEA = root mean square error of approximation; Sources: (Hair et al., 2013; Hu & Bentler, 1999; Kline, 2011)

4.4 Structural Model Estimation

Before testing the hypotheses, the structural model was tested for fitness using the same criteria used for testing the goodness of fit of the measurement model, as listed in Table 4. The analysis showed acceptable results.

The AMOS software was used to measure the structural model parameters.

When the p-value is less than 0.05, the association between the independent and dependent variables is significant (Babaei et al., 2015). information quality (IQ), perceived usefulness (PU), social influence (SI), and system quality (SQ) were the four independent variables in this study. Satisfaction (SF) was the mediating variable, while loyalty (LY) was the sole independent variable. The findings demonstrated that IQ, PU, and SI positively influence SF, accounting for up to 73% of its variance. Similarly, SI, SF, and SQ accounted for 73% of the explained variance on LY.

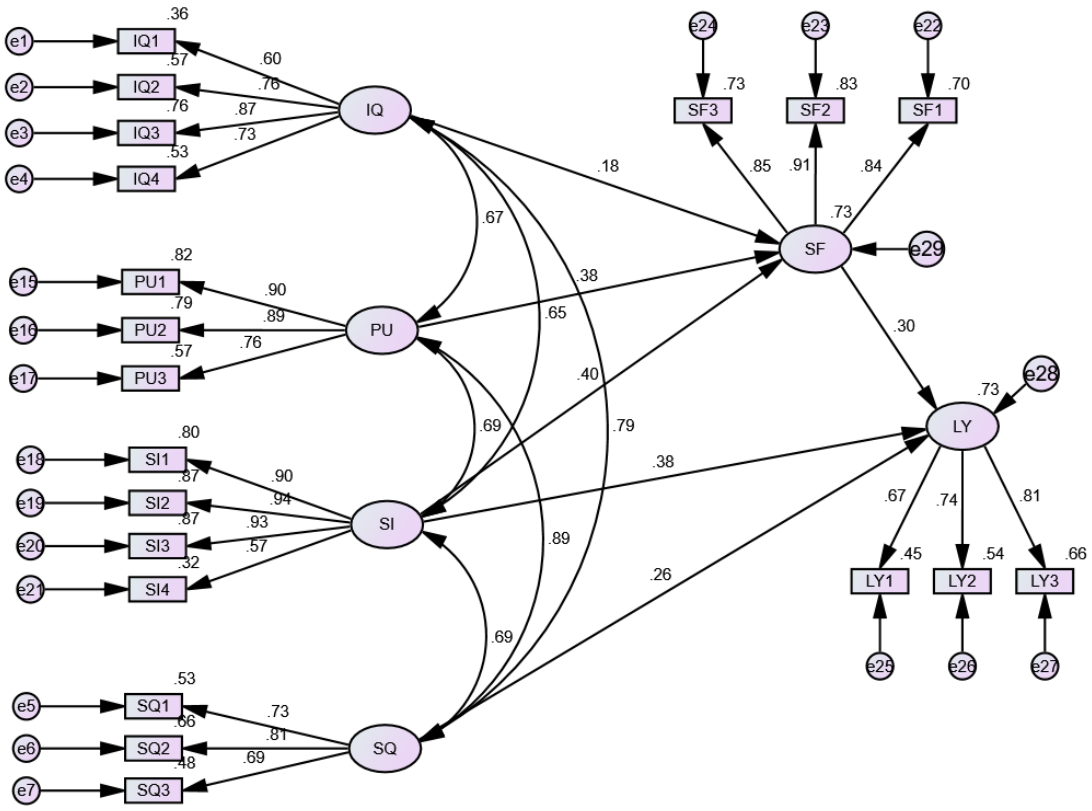

Figure 3: Path Analysis Results

In this study, the seven relationships illustrated in figure 1 were examined using AMOS and results were summarised in Figure 3 and Table 5. The six hypothesised relationships were supported (see table 5).

Table 5: Structural Path Results

Relationship	Estimate *(ß)*	S. E	CR	P-Value	HNO	Results
IQ→ SF	0.181	0.119	2.098	0.036	H1	Supported
PU→SF	0.383	0.107	4.301	***	H2	Supported
SI→SF	0.397	0.067	4.775	***	H3	Supported
SI→LY	0.377	0.078	3.324	***	H4	Supported
SQ→LY	0.262	0.134	2.234	0.025	H5	Supported
SF→LY	0.300	0.114	2.25	0.024	H6	Supported

Notes: * = $p< 0.05$, **= $p< 0.01$, *** = $p< 0.001$, ns = Not Significant; HNO=Hypothesis Number; EST = Estimate, β = Standardized Regression Weights, SE = Standard Error.

5. DISCUSSION AND IMPLICATIONS

5.1 Discussion of Key Findings

The strength of the influence of the independent variable on the dependent variable varies. The path strengths can be categorised as follows: $\beta \leq 0.2$ is regarded as weak; $0.2 > \beta < 0.5$ is stated as a medium; and $\beta \geq 0.5$ is considered strong (Lwoga & Komba, 2015). In this study, all six hypotheses described in figure 1 were testified to be significant. Furthermore, social influence's impact on satisfaction and loyalty was found to have a medium effect.

Hypothesis 1 (H1): The results showed the standardised path coefficient value (β) of 0.181 and a p-value of less than 0.05, supporting the hypothesis. This finding means that users of ERP system are influenced by the quality of the information provided by the current system. Quality of information in this context is attributed to data accuracy, completeness, relevancy and consistency. Although information quality has a significant impact on satisfaction, but its strength of the impact of these attributes is weak (Lwoga & Komba, 2015). This result is unlikely that study of Lin (2010) conducted in Taiwan using 732 respondents, which proved insignificant. The significance of information quality demonstrated in the current ERP system may be due to design of database and business logic of programming part of ERP system existed in HEIs in Tanzania.

Hypothesis 2 (H2): The results showed a standardised path coefficient value (β) of 0.383 and a p-value of less than 0.00001. Therefore, hypothesis H2 was supported. This finding indicates a moderate impact on employees' perceptions of the usefulness of ERP on their satisfaction. This result implies that having an ERP system in the HEIs working place makes employees fully satisfied with their previous expectations, as in past studies in HEIs (e.g., Zviran et al., 2005). Zviran et al. (2005) failed to quantify and classify the extent of that linkage. The significance and medium strength of impact of ERP system demonstrated in this hypothesis indicated that employee feel that having ERP system in their workplace give them advantages compared to previous systems in HEIs in Tanzania.

Hypothesis 3 (H3): The results showed the standardised path coefficient value (β) of 0.397 and a p-value of less than 0.00001. Therefore, hypothesis H3 was confirmed. The way people who are important around the employees who are using ERP system think that employees shall use ERP system, then it catalyses the employees' satisfaction. The moderate level of importance set the alarm to HEIs over the significance of social influence in the acceptance of ERP systems. This empirical result is so important in ERP systems in HEIs since the previous results (e.g., Dabi et al., 2018) was not directly investigating this linkage.

Hypothesis 4 (H4): The results showed the standardised path coefficient value (β) of 0.377 and a p-value of less than 0.00001, confirming hypothesis H4. Out of the exogenous factors modelled in the research framework, social influence shows an extra-ordinary character of influencing both employees' satisfaction and loyalty, with a moderating level of impact. This result implies the remarkable significance of this factor; people around employees are very important as a catalyst to employees' satisfaction over deployed ERP system.

Hypothesis 5 (H5): The results showed the standardised path coefficient value (β) of 0.262 and a p-value of less than 0.05, confirming hypothesis H5. The system's quality implies the technical part of the ERP system, which is characterised by reliability, ease of use and offering appropriate functionality. This result suggests that the technical characteristics of the ERP system partly determine continued use and recommendations for users of ERPs. This result support previous study by Lin (2010) in Taiwan of which a sample used was the employee who worked in manufacturing industry. This implies that perceptions of employee who are using ERP system in manufacturing and those who are using same system in HEIs are same.

Hypothesis 6 (H6): The results supported this hypothesis with the standardised path coefficient value (β) of 0.300 and a p-value of less than 0.05. Satisfaction, which in many information systems is a central factor, behaves the same way even in ERP systems in HEIs. The current study in HEIs in Tanzania shows that the e-learning system's continuous use is highly affected by user satisfaction (Lashayo & Mhina, 2021). The same result is reported in this study. Unlike continued usage of ERP systems, some studies show that, although not in the context of HEIs, they extend user satisfaction with loyalty use (e.g. Aktepe et al., 2015; Gallarza et al., 2016; Ofosu-Boateng & Agyei, 2020).

5.2 Implications for Research and Practice

5.2.1 In research

This research brings about several theoretical implications. First, the major contributions of this study were to extend user satisfaction to loyalty use. Most previous studies concentrated on adoption intention, continuous intention and recommendation (Jo, 2022). As far as our knowledge is concerned, this is the only study in ERPs in Tanzania that empirically extend ERPs in HEIs using a modification of the IS success model.

Second, is the influence of social influence (peer pressure from peer employee) on user satisfaction and loyalty. This result enriches the framework. This finding has brought out a new understanding because limited studies exist on ERPs in HEIs in which social influence is significant and positively affects satisfaction and loyalty at the same setting.

Third, the perception of the usefulness of ERPs in HEIs proved significant in employees' ERP satisfaction. This finding shows consistency with other post-adoption studies in HEIs (e.g. Bhattacherjee, 2001).

Lastly, this study shows that the two most critical system qualities are information quality and system quality. The augment raised by Delone and McLean (DeLone & McLean, 2003, 2016) in the previous studies in IS has also been proved to be true in this study.

5.2.2 Implication for Practice

The designers of ERP systems in HEIs should be aware of the impact of user satisfaction in using ERP systems. That is, satisfaction leads to the loyalty of users. With this note, it means that repetition of use for ERP users and users become ambassadors of same ERP system in context of HEIs is largely determined by their satisfaction.

Designers and developers of ERP systems in HEIs shall be aware that user satisfaction is so central to the welfare of such a system; therefore, emphasising user satisfaction is important to ensure that the system is well delivered.

Developers of ERP systems in HEIs are supposed to put more effort into the fitness of both information (contents from ERPs) and ERP system.

6. CONCLUSION, LIMITATIONS AND FUTURE STUDIES

6.1 Summary of Results

The current study was intended to determine what factors influence the satisfaction and loyalty of users using ERP systems in the context of Higher Education Institutions (HEIs). To achieve that, authors used IS success literature to formulate the conceptual research framework (figure 1) comprising of the following independent factors - information quality (IQ), system quality (SQ), perceived usefulness (PU) and social influence (SI). The findings reveal that social influence (peer employees' pressure) was the most significant factor affecting both employees' satisfaction and loyalty over ERP systems in HEIs. Furthermore, perceived usefulness shows a medium influence on employee satisfaction. Further findings reaffirm that apart from satisfaction and normal usage, loyalty exists for the effective use of ERP systems in HEIs which also justifies the significant amount of money used in implementing ERP systems in HEIs.

6.2 Limitations and Future Research

There are limitations which have been associated with this study. First, the context of the current research and respondents (employees) came from a single government institution, the Institute of Finance Management (IFM). Therefore, their perceptions may introduce biasedness in the results. The authors recommend the next study, which applies the framework in Figure 1 to expand the number of respondents to include a wide range of HEIs in Tanzania and other countries. Second, another late introduced quality factor is service quality (DeLone & McLean, 2016). In future large contexts, studies may try to testify to the significance of this factor. Third, this study is cross-sectional; in future, it may be conducted longitudinal and compare those results with the current research.

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Appendix A. Questionnaire items

S/N	Items
	Information quality – adapted from DeLone and Mclean (2003) and Nelson et al. (2005)
1	The information from EMS is always up to date.
2	The information provided by EMS is accurate.
3	EMS produces comprehensive information
4	The information provided by EMS is well formatted.
	System quality is derived from Tam and Oliveira (2016)
1	EMS is reliable

2	EMS allows me to find the information I am looking for easily
3	EMS is easy to use and offers appropriate functionality
	Perceived Usefulness is derived from Davis (1989) & Althonayan (2017)
1	Using EMS helps me accomplish things more quickly.
2	Using EMS increases my productivity.
3	Using EMS increases the quality of output for the same amount of effort.
4	EMS generally improve my performance
	Perceived Social Influence from Venkatesh et al. (2003; 2012)
1	People who are important to me think that I should use ERP.
2	People who affect/influence my behaviour think that I should use ERP.
3	People whose opinions I value prefer that I must use ERP.
4	In general, the institution has supported the use of ERP.
	Satisfaction is derived from Russell-Bennett et al. (2007)
1	I am fully satisfied with the current EMS.
2	When I have experienced unforeseen or critical situations, EMS has satisfactorily managed these.
3	This EMS meets my pre-use expectations.
	Loyalty from Chen et al. (2014)
1	If I were to use the ERP system again, I would likely use it from the current EMS.
2	I intend to continue using this ERP system than discontinue its use.
3	I will recommend the ERP system to co-workers or friends.