I.J. Information Technology and Computer Science, **2023, 5, 12-24**
Published Online on October 8, 2023 by MECS Press (http://www.mecs-press.org/)
DOI: 10.5815/ijitcs.2023.05.02

Implementing Enterprise Resource Planning Systems in Tanzanian Higher Education Institutions: The Influence of Task-technology Fit on Staff Performance

Mhina J. R. A.
Department of Computer Science and Mathematics, The Institute of Finance Management (IFM), Tanzania
E-mail: julius.raphael@ifm.ac.tz
ORCID iD: https://orcid.org/0000-0002-0056-8259

Lashayo D. M.*
Department of Computer Science and Mathematics, The Institute of Finance Management (IFM), Tanzania
E-mail: deogratius.lashayo@ifm.ac.tz
ORCID iD: https://orcid.org/0000-0003-3311-3418
*Corresponding Author

Received: 27 March 2023; Revised: 26 May 2023; Accepted: 18 July 2023; Published: 08 October 2023

Abstract: Individual user performance over ERP systems in Higher Education Institutions (HEIs) is less researched. Furthermore, the simultaneous impacts of Task-Technology Fit (TTF) on individual user (staff) performance over ERP systems in the context of Tanzania is little known. This study aimed at investigating both the direct and indirect impacts of TTF on staff performance over ERP systems in HEIs in Tanzania. This study was quantitatively designed using the snowball sampling technique by modifying D & M IS success model. The modified framework was subjected to a sample of 163 staff who are using the ERP system to accomplish business processes. The data collected was analyzed using Structure Equation Modelling (SEM). The results show that TTF has considerable direct and indirect impacts towards the performance of staff who are using ERP systems. This implies that whenever an enterprise is implementing an ERP system to improve its business process outcomes then a deep analysis has to be taken on three key elements of TTF i.e. task, technology and individual characteristics. The discussion and implications of impacts were also reported.

Index Terms: ERP System, Higher Education Institutions (HEIs), Implementing, Task-technology Fit (TTF), Staff Performance, Tanzania.

1. Introduction

Since the year 1990 Enterprise Resource Planning (ERP) systems software have been proliferated in different enterprises [1, 2]. ERP system evolved from old system software called Material Resource Planning (MRP) which was invented to manage the materials of manufacturing organizations [2]. ERP system was meant to provide single system software to manage all business processes so that an enterprise would get away from the fragmentation of information or “island of information” [3].

Fragmentation of information is a problem for many organizations and Higher Education Institutions (HEIs) in particular. HEI as a kind of enterprise has recently tried to implement this solution to improve the performance of its core business activities which include student admission and management, staff resource management, purchasing and stock to mention a few. In the course of the implementation of ERP system software, these HEI are spending a significant amount of money which is estimated to be around USD 20 million [4]. For instance, in the year 2007 it was reported that the total amount invested in HEIs globally was 5 billion USD [5]. Furthermore, it was expected that by 2002 the amount spent on the implementation of ERP system software was USD 72.63 Million [6].

Despite the number of efforts spent in implementing ERP systems, current industry reports and academic research show that the majority of enterprises which have implemented these solutions have not realized the expected performance [1-7], recent statistics indicated that 55-75 % of ERP systems which have been implemented do not demonstrate expected results [8, 9]. Furthermore, the literature shows that the majority of studies are on organizational performance and impacts and less on individual performance. Issues such as user performance's measures such as user needs, user tasks' requirements and other user issues have received little attention [10]. In this context, a direct impact means a straight influence of one variable onto another variable understudy while indirect impact means that there exists another variable outside those two variables under consideration which has a mediating influence. The frameworks which have so far been developed for individual/user performance measurements have not yet considered the simultaneous (directly and indirectly) impacts of task-technology fit on individual performance [10]. Although there are studies which investigate the impacts of quality factors (e.g. [10-13]) the extent of quality factors in parallel with task-technology fit over the ERP system in Higher Education Institutions in Tanzania is scant. Therefore, this study intends to achieve the following objectives in HEIs in Tanzania context:

- To investigate the direct impact of task-technology fit on staff performance of ERP systems;
- To investigate the indirect impact of task-technology fit on staff performance of ERP systems;
- To investigate the impact of quality factors on staff performance in ERP systems;

The significance of this study focuses on the improvement of information systems especially ERP systems since the ultimate goal of any Information System (IS) is in improving individual user tasks' accomplishment [14, 15]. With that in mind, HEIs spend millions of dollars on ERP systems nowadays to try to improve their business processes and information retrieval, however, both practitioners and researchers would like to understand the direct and indirect influence of task-technology fit (the matching between information characteristics and individual user needs). Therefore, the findings of this study will add much value to ERP systems development and implementation.

This paper proceeds as follows, section 2 (literature review), this section survey ERP systems, a theoretical and empirical studies. In section 3 (methodology), the study design, sampling methods and data collection will be documented. In section 4 (data analysis), in this section, descriptive and regression analysis will be computed and documented. In section 5 (discussion and implication), in this section results from section 4 will be interpreted, compared and implied. In the last section (discussion and study limitations), in this section main findings will be reported as well as any limitations of this study will be reported.

2. Related Works

2.1. ERPs and ERPs Derivatives in Higher Education Institutions

Higher Education Institutions (HEIs) in this context means all tertiary institutions whose role is to provide training, research and consultancy. Such educational training results in students to be awarded postgraduate education, undergraduate education and technician education [16, 17]. Many of these HEIs are currently implementing different kinds of ERP systems to ease their business processes and information retrieval. In the course of HEIs implementing ERP systems, a lot of resources including financial investment have been used. The literature shows that for thorough implementation of an ERP system in one HEI it is required approximately up to USD 20 million and such a project may span across a period of 2 to 3 years. Furthermore, records show that by the year 2002, a total of USD 72.63 was expected to be well spent globally to implement ERP systems. This indicated that there is a huge investment which is continue been poured into the implementation of such ERP systems with high expectations to improve the individual performance of different kinds of users in HEI.

ERP software system is an Enterprise Resource Planning which originated in the year 1990 from an older software system called Material Resource Planning (MRP). MRP came into the picture in the year 1960 and was designed to handle supplies and all materials for manufacturing to help manufacturing industry becoming efficient and effective for handling different kinds of materials [18]. It was typically for the manufacturing industry. Later on, this MRP with additional modules to handle some business processes seems an ideal software solution for an enterprise, that came to ERP which provides a common workflow or datasets across an entire organization. Furthermore, there are different segments of these ERP software systems, which have been grouped into tiers 1, 2 and 3. The famous tier 1 ERPs include Systems Applications and Products (SAP), Microsoft and Oracle which handle complex or large organization, while tier 2 are more specific and include Epicor and Info, and tier 3 provide functions for specific industry with few business processes.

With the availability of all these tiers, still, 55-75 % of them do not demonstrate the expected results which include improving individual tasks. This percentage of failure indicates that not only ERP system is enough for the successful improvement of the business process of a given enterprise but also some other variables need to exist in a given environment, however, there were some other studies which were conducted as far as ERP systems are concerned. Examples of those studies include ERP systems integration with education processes [19, 20], the evolution of ERP systems and the ability of ERP systems to support business processes in HEIs [21].

The literature further shows that limited studies were engaged in the investigation of the impact of TTF on staff performance of ERP systems in HEIs. Recently quantitative studies which tried to investigate the impact of TTF on user performance in other contexts show a very positive result. For instance, in the context of online job-seeking applications, TTF impacts user performances [22, 23], however, those studies were not involving IS quality factors. Therefore, the question of what will happen when quality factors will be engaged together with TFF in the context of HEIs still unanswered. Even when the qualitative design was employed it showed a positive result in the context of online job-seeking applications [24]. These limited studies of TTF on staff performance provide motivation for the current study.

2.2. Theories on IS/ERP Individual Performance

There are two most referred models for measuring individual user performance of information systems, namely the D&M IS success model and task-technology fit [25]. The D&M IS success model is the most cited model compared to that of task-technology fit with a current number of citations equal to 16,904 [26]. This shows that many researchers have trusted the multi-dimensional factors that D&M IS success model suggested. D&M IS success model's main argument is that individual user performance over any information system is guided through several factors including system quality, information quality, use and satisfaction as shown in figure 1.

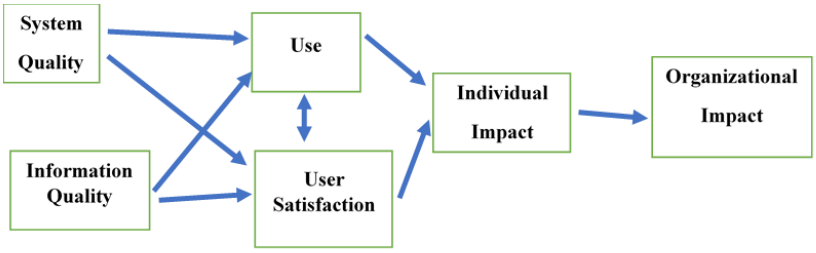

Fig.1. D & M IS Success (Source: DeLone & McLean, 1992, p. 87)

Measurement of individual impact/individual performance of ERP system may depend on system quality and information quality which in turn affect the use and user satisfaction which ultimately affect the ERP system.

The two quality factors (information quality and system quality) of the D & M IS success model come from two studies i.e. information quality coming from the mathematical study [27] and system quality from information output measurement [28]. The current ERP system study adopted D & M IS success model for measuring individual performance in the pharmaceutical industry, while this study adopted D & M IS success model in HEIs which may bring different results.

2.3. Empirical Studies on Individual ERPs Performance in HEIs

There are few current studies which modified the D & M IS success model as a framework for ERP systems in HEIs. The literature which this study has successfully reached shows that few studies empirically investigated the performance of individual users. Abugabah in 2015 studied the impact of ERP systems in HEIs by modifying the D & M IS success model with task-technology fit and two other factors (perceived usefulness and ease of use) from Davis's [29] model. That study did not investigate the direct impact of task-technology fit on user performance. Only indirect impact via perceived usefulness (PU) and perceived ease of use (PEOU) were investigated. The result indicated that TTF has a relatively moderate indirect impact on user performance via PU and PEOU. In another study where management quality (MQ) was added to D & M IS Success model, the results show that quality factors (service quality and system quality) together with management quality were significantly impacting stakeholders' performance. Again, the direct impact of TTF on user performance was not considered by Althonayan in 2017.

2.4. Hypotheses and Model Development

A. Task-technology Fit

Goodhue in 2005 defined Task-technology fit (TTF) as the interdependence between an individual (a technology user), technology (data, hardware, software tools and the services they provide) and task (activity carried out by individuals to produce the required output) characteristics. As time goes by this construct becomes very important because it takes into consideration not only technology which most people think is enough for the improvement of the performance of enterprise but also the task requirements and individual competency of people. In short, Goodhue in 2005 argue that Task-Technology Fit is a function of three key elements which are Task characteristics, Technology characteristics and Individual characteristics, this argument has brought new dimensions of inputs that need to be considered during the implementation and adoption of any information system. Also, the integration of this TTF with quality factors for the successful improvement of ERP systems in Higher Education Institutions (HEIs) has rarely been done. The empirical study shows that TTF has an indirect impact on user performance, however when tested alone without indirect connection to any factor (s), it shows that it impacts user performance. For instance, Abugabah in 2015 shows that TTF influences perceived usefulness in ERP systems. This study intends to test simultaneously (indirectly and direct) in the ERP system. It hypothesizes that:

H1: Task Technology Fit positively and significantly directly affects the System Performance of ERPs in HEIs.
H2: Task Technology Fit positively and significantly affects the Perceived Usefulness of ERP system in HEIs.

B. System Quality

System Quality (SQ) is regarded as the fitness of the system which produces information [30]. In this context, it refers degree to which the ERP system fits the needs of the organization in context. It is characterized by reliability, response time, flexibility, integration and accessibility [31]. Empirical study shows that SQ impacts PU [1]. Furthermore, in information systems studies it was reported that SQ impacts satisfaction. Since impact of SQ on PU and satisfaction is less researched especially on HEIs using ERP systems, then this study hypothesized that:

H3: System Quality positively and significantly affects the Perceived Usefulness of ERP system in HEIs.
H4: System Quality positively and significantly affects Satisfaction of ERP system in HEIs.

C. Information Quality

Information Quality (IQ) is the fitness of the content of messages which an information system is generating [30]. This is another important quality aspect of information systems and in particular ERP systems. The items for this factor include accuracy, timeliness, completeness, relevance and consistency [30]. Literature reported that IQ has a positive impact on Satisfaction of ERP system users. This study hypothesizes that:

H5: Information Quality positively and significantly affects Satisfaction of ERP system in HEIs.

D. Perceived Usefulness

Perceived Usefulness (PU) is the degree to which the user of an information system perceives the ERP system as extra-advantages over other systems which are trying to achieve the same task. In normal IS a system it has been reported that this Perceived Usefulness (PU) affects Satisfaction [31-33]. Specifically, ERP system measurement in HEIs and smart manufacturing shows an impact on satisfaction [34-38]. In some ERP systems in HEIs, PU impact user performance. Based on those past studies this study hypothesized that:

H6: Perceived Usefulness positively and significantly affects Satisfaction of Staff ERP system in HEIs.
H7: Perceived Usefulness positively and significantly affects User Performance over ERP system in HEIs.

E. Satisfaction

Petter in 2012 defined satisfaction as affection. Many information systems studies consider satisfaction as a proxy for improving the performance of users. Empirical studies in ERP system show that satisfaction predicts user performance. This study hypothesizes that:

H8: Satisfaction positively and significantly affects User Performance over ERP system in HEIs.

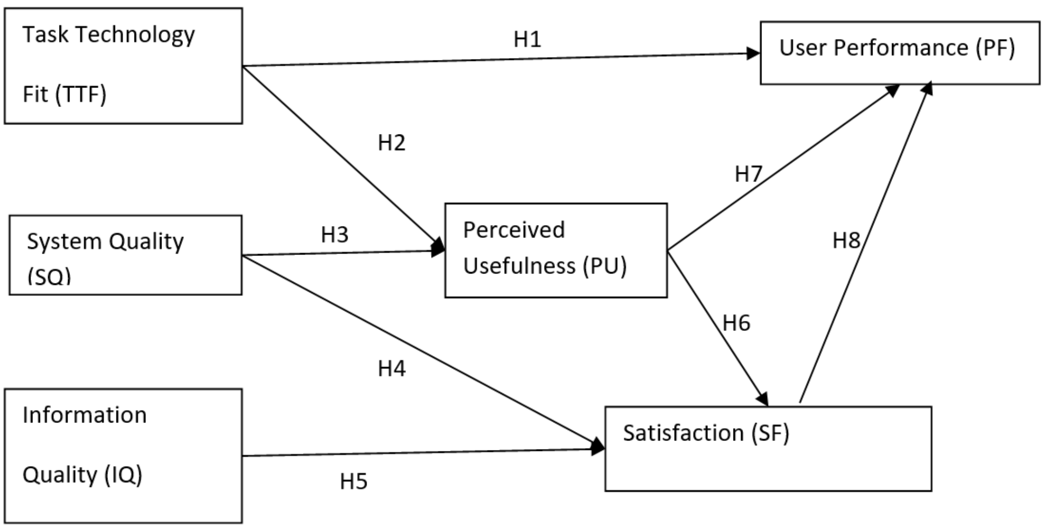

Fig.2. Research conceptual framework

3. Methodology

3.1. Research Design

This study was been designed to be quantitative because of the hypotheses stated in section 2.4. The factors influencing individual user performance were identified by thoroughly reviewing the existing literature (books, high-ranked journals and conference proceedings). Then the research conceptual framework was developed by modifying on D & M IS Success model, thereafter the questionnaire was developed based on items which were previously implemented in past studies. In the data collection exercise, which was conducted between November and December 2022, descriptive survey studies were applied to identify the traits in the population understudy and regression analysis was applied to estimate the relationship among dependents and between independents and dependents factors.

3.2. Research Setting, Population and Sampling

The population for this study is the staff who used the ERP systems in different Higher Education Institutions (HEIs) in Tanzania. Because of convenience, limitation of time and resources, the current study chose the Institute of Finance (IFM) which is a government-owned institute in Tanzania as a case study for data collection. IFM has its kind of ERP system called Enterprise Management System (EMS) which has been implemented since the 2021/2022 academic year.

IFM is the public-owned higher education institution in Tanzania established by a Parliament Act number 3 of 1972. This institution has four campuses (Dar es Salaam, Mwanza, Dodoma and Simiyu) of which it offers 20 undergraduate programmers and 14 postgraduate programmers. These academic programmers are offered across four academic faculties (Faculty of Computing, Information Technology and Mathematics, Faculty of Economics and Management Science, Faculty of Insurance and Social Protection and Faculty of Accounting, Banking and Financial Services). These faculties host over 14,000 students. As with any other HEIs, IFM implemented its own ERP system called Enterprise Management System (EMS) in the academic year 2021/2022. With this EMS, several business processes changed which attracted sort of resistance from users. Currently, EMS at IFM is managing mainly the student's admission process and examination management process. As with any other sort of ERP system, this EMS is intending to cater for all business processes in IFM. Although EMS has been there for about two years now, no studies have been undertaken to investigate the performance of users (both staff and students) over EMS.

The sampling technique employed in this study was a snowball, which is a non-probability sampling technique. This sampling technique was also applied in previous studies (e.g. Jo in 2023). According to Wampold and Freund in 1987, the number of respondents is proportional to the number of constructs times ten in a given research conceptual framework. The number of constructs in figure 2 was five (5) which means that 5*10 was equal to fifty (50), however, this study managed to collect 162 responses which were far beyond the suggested size by Wampold and Freund in 1987 which was 50. The WhatsApp platform was employed as a tool to share online questionnaires.

3.3. Questionnaire Development

The questionnaire was the main tool for data collection in this study. It re-uses items which were previously developed as shown in Appendix A. The questionnaire contains mainly two sections the first section details the biography of staff and the second, describes the factors with their respective items. The gauging of items was in the range of 1 to 5 (Likert scale). Number 1-Strongly Disagree to number 5-Strongly Agree, and in the middle was number 3-Neutral.

4. Analysis of Data

The current study employed a multivariate statistical analysis as a technique, using Structural Equation Modelling (SEM) of which AMOS and IBM version 21 software were used.

4.1. Descriptive Analysis

Table 1 presents the descriptive statistics of the proposed research model shown in figure 1. The results show that all means lean more to the agreement side as they are all greater than 3 indicating that the majority of the respondents have a positive perception of the measured constructs. Additionally, the results show that there is internal consistency among the data values as Cronbach's alpha coefficients are all greater than 0.7 [38].

Table 1. Descriptive statistics

	Mean	**Std. Deviation**	**Cronbach's α**
Perceived Usefulness (PU)	3.8528	0.50253	0.877 (3)
Task Technology Fit (TTF)	3.8359	0.46180	0.892 (4)
System Quality (SQ)	3.8119	0.47868	0.781 (3)
Information Quality (IQ)	3.7500	0.49144	0.816 (4)
Satisfaction (SF)	3.7178	0.63676	0.899 (3)
Performance (PF)	3.8119	0.50142	0.903 (6)
Scale: *1 = Strongly Disagree; 2 = Disagree; 3 = Neutral; 4 = Agree; 5 = Strongly Agree*			

4.2. Evaluation of the Measurement Model

This study employed a two-step approach to examine the relationship among research model factors [39- 40].

In the first step, the measurement model was analyzed to assess the reliability and validity of the measurement instrument while in the second step, the research hypotheses were tested in the structural model. In the first step, a confirmatory factor analysis (CFA) was performed using AMOS 21 software using the maximum likelihood method to estimate the model's parameters in which all the analysis was conducted using variance-covariance matrices.

Before the CFA was conducted, it was essential to test for assumptions of multivariate statistical analysis. The tests performed included multi-collinearity and normality.

Table 2. Assumptions of multivariate statistics analysis

Construct	Skewness	Kurtosis	Collinearity Statistics	
			Tolerance	VIF
PU	-2.378	9.620	0.253	3.957
TTF	-2.687	9.899	0.261	3.826
SQ	-1.636	4.188	0.311	3.219
IQ	-1.752	4.486	0.479	2.088
SF	-1.669	3.448	0.376	2.662
PF	-2.177	7.080	N/A	N/A
Key: *TTF = Task Technology Fit; PU=Perceived Usefulness; IQ = Information Quality; SQ=System Quality; SF=Satisfaction; VIF = Variance Inflation Factor; PF = Performance*				

According to Brown [41], when utilizing Structural Equation Modelling (SEM) technique, as it is with the current study, the acceptable values of skewness are between -3 and 3, and the values of kurtosis are between -10 and 10. In this case, the factors showed maximum absolute values of 2.687 (TT) and 9.899 (TT) for skewness and kurtosis, respectively hence falling within the acceptable absolute.

The measurement model and structural models should meet some fit indices to be considered good models [41]. For this study, the following model fit indices were chosen to assess the models due to their popularity among renowned scholars: A Normed Chi-Square (X2/Df), Standardised Root Mean Residual (SRMR) and Comparative Fit Index (CFI). Four items - T1, IQ1, PF3, and PF5 were deleted from the initial 23 – items measurement model one item at a time while re-running the model after each delete to ensure a good fit between the measurement model and the data [42, 43]. The final adjusted measurement model (see figure 3) consisted of 19 measurement items. The thresholds for a good model are shown in Table 3 in which according to Gaskin and Lim [44], all are acceptable. The same indices used to assess goodness-of-fit for the measurement model were applied in assessing the structural model. As shown in Table 3, both models showed a good fit for the data. Since all model fit indices were within the acceptable range, therefore, we can proceed with the assessment of reliability, convergent validity and discriminant validity which are necessary tests for evaluating and validating whether the psychometric properties of the measurement model are adequate, an important step preceding the structural model analysis.

Table 3. Model fit indices

Indices	Adjusted Measurement Model	Structural Model	Threshold	Interpretation
$\chi 2$/D	2.840	2.841	Between 1 and 3	Excellent
CFI	0.903	0.901	>0.95	Acceptable
SRMR	0.053	0.057	<0.08	Excellent
Notes: $\chi 2$ = chi-square; df = degree of freedom; SRMR = standardized root mean residual; CFI = comparative fit index. Sources: Gaskin and Lim (2016)				

Convergent validity assesses the reliability of the measurement items in measuring the given latent variable i.e., construct and eliminate unreliable items [45]. On the other hand, Discriminant validity assesses the extent to which the constructs are statistically different [46]. In this case reliability, convergent validity and discriminant validity were measured using Cronbach's alpha coefficients (α), Composite Reliability (CR), and Average Variance Extracted (AVE) were all used to assess the reliability, discriminant validity, and convergent validity of the measurement model. For reliability to be achieved, $\alpha > 0.7$ and CR should be ≥ 0.7, for convergent validity to be achieved; AVE > 0.5. Table 4 shows that the CR for all constructs ranged from 0.791 (SQ) to 0.902 (PF), and the AVE ranged from 0.559 (SQ) to 0.697 (PF). In the case of discriminant validity, is achieved when all √AVE- which is shown as the diagonal values in table 4 (in bold), are all greater than all other values along the row and column for all constructs. In this case, only one the discriminant validity for IQ was achieved hence indicating some issues with discriminant validity. However, since no multicollinearity was detected (see table 2), it was sufficient to proceed with analysis of the structural model.

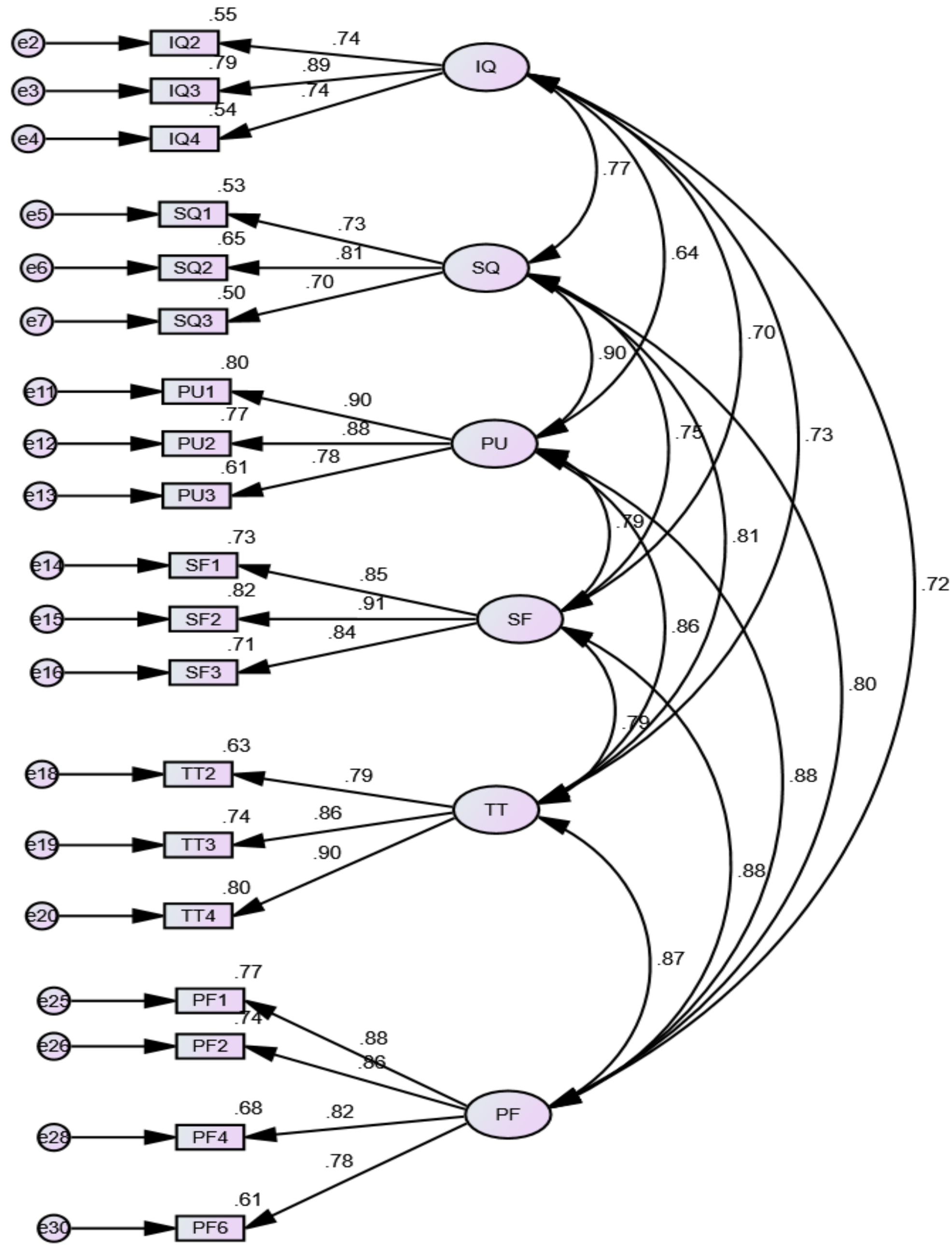

Fig.3. Adjusted measurement model

Table 4. Construct reliability, convergent validity and discriminant validity

	CR	AVE	IQ	SQ	PU	SF	TT	PF
IQ	0.833	0.627	**0.792**					
SQ	0.791	0.559	0.774***	**0.748**				
PU	0.889	0.727	0.643***	0.902***	**0.853**			
SF	0.901	0.753	0.700***	0.751***	0.788***	**0.868**		
TT	0.887	0.723	0.729***	0.806***	0.865***	0.794***	**0.851**	
PF	0.902	0.697	0.719***	0.796***	0.879***	0.880***	0.870***	**0.835**

Key: *TTF = Task Technology Fit; PU=Perceived Usefulness; IQ = Information Quality; SQ=System Quality; SF=Satisfaction; AVE = Average Variance Extracted; C.R = Composite Reliability; PF = Performance*

4.3. Evaluation of the Structural Model

The same criteria that were used to assess the goodness of fit of the measurement model were used to assess the goodness of fit (GOF) of the structural model. Both models showed similar model fit results (see table 3). Since the structural model showed acceptable model fit (χ^2/df =2.841, SRMR=0.057, CFI=0.901), therefore the analysis of the structural model relationships was performed to test the hypotheses.

Table 5. Path analysis results

Relationship	Estimate (β)	S. E	C.R	*p-Value*	HNO	Results
TTF→PF	0.267	0.126	2.466	0.014	H1	Supported
TTF→ PU	0.460	0.123	4.380	***	H2	Supported
SQ→ PU	0.513	0.125	4.567	***	H3	Supported
SQ→SF	-0.113	0.257	-0.609	0.542	H4	Unsupported
IQ→SF	0.341	0.139	3.330	***	H5	Supported
PU→SF	0.667	0.214	3.868	***	H6	Supported
PU→PF	0.308	0.128	2.400	0.016	H7	Supported
SF→PF	0.431	0.070	4.943	***	H8	Supported
Key: *TTF = Task Technology Fit; PU=Perceived Usefulness; IQ = Information Quality; SQ=System Quality; SF=Satisfaction; α = Cronbach's Alpha Coefficient; S.E = Standard Error of Estimation; C.R = Composite Reliability; HNO = Hypothesis Number; PF = Performance*						

The structural model results show that seven (7) out of eight (8) hypotheses were confirmed (see Table 5 and figure 4). More specifically, the results show that Task Technology Fit (TTF) ($\beta = 0.460$, $p<0.001$), System Quality (SQ) ($\beta = 0.513$, $p<0.001$) have a significant and positive impact on Perceived Usefulness (PU) explaining up to 85% of its variance. These results offer confirmation for hypotheses H2 and H3.

Furthermore, the results show that the factors IQ ($\beta = 0.341$, $p<0.001$) and PU ($\beta = 0.667$, $p<0.001$) have a significant positive impact on SF hence showing support for hypotheses H5 and H6 and explain up to 71% of the variance on SF. On the other hand, the factor SQ ($\beta = -0.113$, $p>0.05$) showed a negative and insignificant impact on SF hence showing no support for hypothesis H4.

Finally, the results show that TTF ($\beta = 0.267$, $p<0.05$), PU ($\beta = 0.308$, $p<0.05$), and SF ($\beta = 0.431$, $p<0.001$) have a significant and positive impact on PF hence showing support for hypotheses H1, H7 and H8 respectively. Moreover, the factors TTF, PU and SF contributed to an explained variance of 88% on PF.

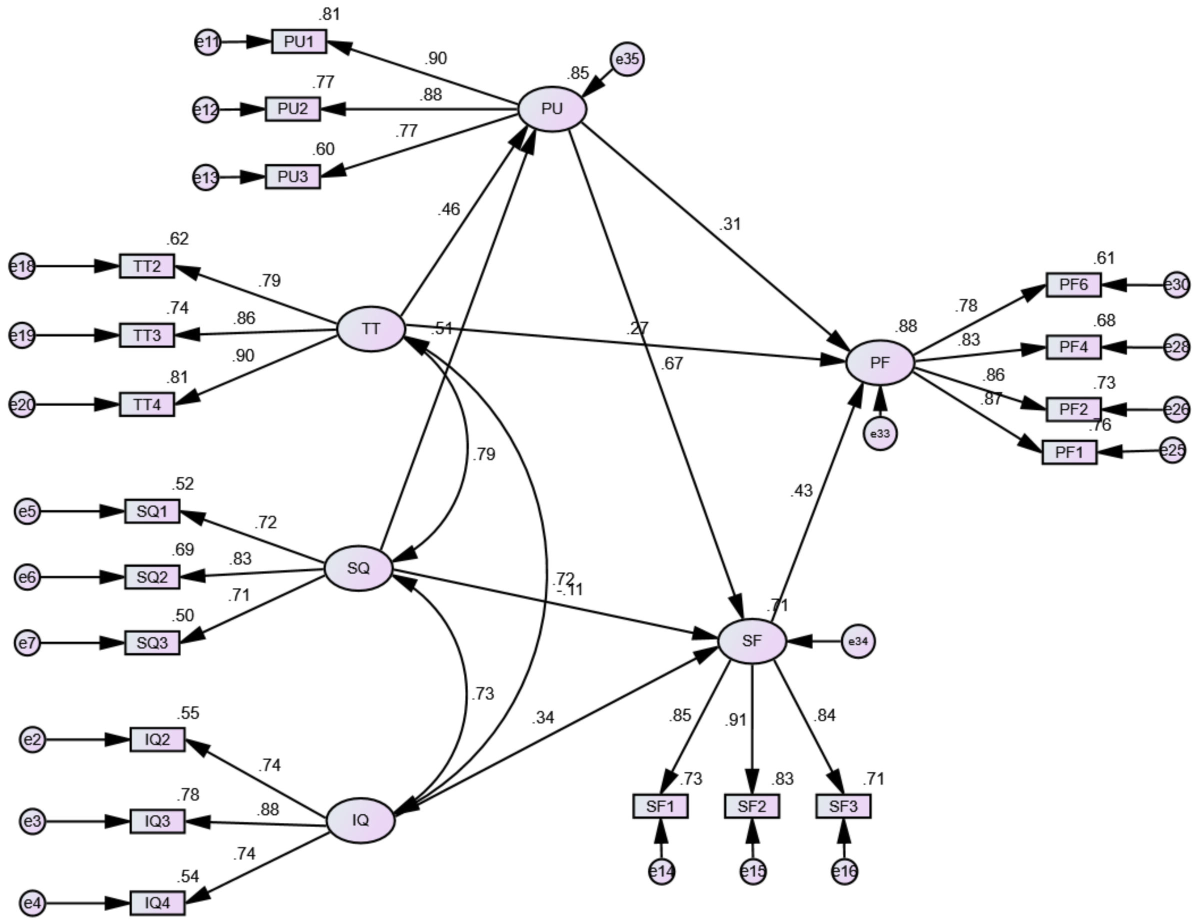

Fig.4. Path analysis result

5. Discussion of Results and Its Implications

5.1. Discussion of Key Findings

The current study suggests eight hypotheses, and based on the above analysis one hypothesis was unsupported (statistically, p-value > 0.05). In this section, the discussion will take into consideration the magnitude of strength (β) of the relationship between variables (hypothesis) and segmented them into three, that is weak strength (β <= 0.2), medium strength (0.2 < β < 0.5) and strong strength (β>= 0.5) [47]. Also, the power of variable (staff performance) to capture factors which influenced it increased to 88% compared to previous studies (e.g. Abugabah in 2015) that got 61%.

H1: Task Technology Fit positively and significantly directly affects the System Performance of ERPs in HEIs. The result supported this hypothesis with a magnitude of strength (β=0.267), which mean that task-technology fit has a medium impact on the performance of staff who are using the ERP system in Higher Education Institution. It further means that for an ERP system to bring further improvement to tasks that staff are performing there should be a matching among three key elements which are technology (hardware, software, support, training) together with characteristics of tasks and staff capability. The simultaneous integration of this hypothesis with other especially of quality factors is the one which makes this study unique. This is the main contribution of this study.

H2: Task Technology Fit positively and significantly affects the Perceived Usefulness of ERP system in HEIs. The result supports this hypothesis with medium magnitude (β=0.460), which means that task-technology fit (TTF) brings a strong perception of the relative advantage of the ERP system over other information systems which were intended to improve the performance of staff. This result is consistent with past studies (e.g. Abugabah in 2015).

H3: System Quality positively and significantly affects the Perceived Usefulness of ERP systems in HEIs. The result in this study support strongly this hypothesis (β=0.513), this means that characteristics of an ERP system such as reliability, response time, flexibility, integration and accessibility are very important for staff perceptions of its relative advantage of ERP system over other systems. This result is also consistent with past studies of Abugabah in 2015

H4: System Quality positively and significantly affects Satisfaction of ERP system in HEIs. The results of this study do not support this hypothesis. This needs further study.

H5: Information Quality positively and significantly affects Satisfaction of ERP system in HEIs. The current study result has medium support (β=0. 341). This means that when the generated message content become accurate, complete and relevant more staff become affectionate with the ERP system. This is consistent with previous studies (e.g. Abugabah in 2015).

H6: Perceived Usefulness positively and significantly affects Satisfaction of Staff ERP system in HEIs. This study's results strongly support this hypothesis with a magnitude of impact (β=0. 667), this means that among factors which highly influence the satisfaction (affection) of staff over the ERP system is Perceived usefulness (perceptions of relative advantages of ERP system). This is consistent with a previous study in HEIs (e.g. [48]) and ERP systems in smart manufacturing (e.g. Jo in 2023).

H7: Perceived Usefulness positively and significantly affects User Performance over ERP system in HEIs. The current study supports this hypothesis with medium magnitude (β=0. 308). This means that the more staff realize the relative advantages of the ERP system the more they will improve their performance. This is relevant to other studies (e.g. Abugabah in 2015).

H8: Satisfaction positively and significantly affects User Performance over ERP system in HEIs. This study's results support this hypothesis with medium strength. This means that the affection of staff over the ERP system is significant for improving the performance of staff. This is consistent with another study in smart manufacturing (e.g. Jo in 2023).

5.2. Implications of Results

The results from this study have implications for both practitioners and researchers, especially in the industry of information systems (IS) and ERP systems in particular.

A. To Researchers

The researchers in IS and ERP systems have received a framework which may be used in the implementation of ERP systems in higher education institutions. The researchers have extended their understanding, especially on factors which may directly impact user performance over ERP systems. Even the variance of user performance found in this study has increased to 88% from existing ratio of 61%.

Furthermore, the impact of IS quality factors (system quality and information quality) and task-technology fit (TFF) has well demonstrated in this study.

The novel of this study lies in the demonstration of the direct impact of TTF on user (staff) performance over ERP system which is rare, especially when IS Success model is modified. Few existing literatures demonstrate this impact but, in a situation, when IS Success model is not been involved.

B. To Practitioners

Through the findings of this study, practitioners have been provided with the tool which will support them in the course of designing and developing ERP systems in HEIs. The direct influence of TFF on staff ERP performance will widen understanding among practitioners of ERP systems. The designers of ERP systems need to make sure that in order to improve performance of staff who are using ERP systems, other variables such as task characteristics and user capabilities have to be taken on board.

Most practitioners have that feeling that only technology (i.e. IS) is enough to affect the performance of users of information systems, but with this study's findings strongly indicate that IS has to consider characteristics and nature of activities undertaken and characteristics of users involved in order to increase performance in organization's workplace.

6. Conclusions, Limitations and Future Studies

This section will conclude by summarizing the key study findings as per the study purpose and hypotheses as well as the value and its contribution. It will also highlight limitations and opportunities for further studies.

6.1. Conclusions

The purpose of this study was to investigate the simultaneous (direct and indirect) impacts of task-technology fit (TTF) on staff performance. Also, to investigate the extent of impacts of IS quality factors when mixed with TTF in context of HEIs. In order to achieve the stated purpose, the conceptual research framework was established based on a modification of IS success model (D & M IS success model), which measure different factors affecting individual performance in an ERP system environment. The empirical data was collected through the case study of the Enterprise Management System (EMS) of the Institute of Finance Management (IFM). The main tool which was employed to collect empirical data from IFM's staff was a questionnaire comprising five-point Likert items. Three independent variables, task-technology fit (TTF), system quality and information quality were suggested to positively impact the performance of staff who are using EMS at IFM.

The major finding in this study was the direct impact of TTF on the performance of IFM's staff over EMS unlikely previous studies concentrated only on the indirect impact of TTF which was also indicated to have a considerable impact. Furthermore, the system quality and information quality show an indirect impact via perceived usefulness and satisfaction.

This implies that HEIs and IFM in particular have to put strong consideration not only on ERP system (EMS) but also on the staff characteristics which include their competency over ERP system and characteristics of tasks that are expected to be accomplished through ERP system to reap the expected performance.

6.2. Limitation and Future Studies

This study is not without limitations. First, this study is a cross-sectional study in which empirical data were collected once, however, the perceptions of people vary over time, therefore the authors suggest future study to be carried out as a longitudinal study.

Second, this study uses only one government-owned higher education institution (IFM), in future; the authors suggest more higher education institutions be involved to broaden the sample data which will enhance the outcome as well. Since public funds are used to support the government-owned institutions in Tanzania.

Third, the main users of the ERP system (in IFM is referred to as EMS), our staff and students, however, this conceptual research framework of this study were testified using perceptions of staff; authors suggest that a future study may testify the current research framework using sample of students too.

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 easily find the information I am looking for
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
	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 managed these in a satisfactory manner
3	This EMS meets my pre-use expectations.
	Task Technology Fit
1	It is ease to locate the data in the EMS applications that I use
2	EMS applications that I use are consistent with my tasks
3	EMS applications fit with my work aspects
4	The information obtained from the EMS, relates to my task
	User Performance
1	The EMS helps me to do more work than was previously possible
2	E The EMS reduces the time taken to accomplish my task
3	EMS increases the number of tasks I perform in my job
4	The EMS helps me solve my job problems
5	EMS reduces performance errors in my job
6	EMS system enhances my effectiveness in my job

References

[1] A. Abugabah, L. Sanzogni, and O. Alfarraj, "Evaluating the impact of ERP systems in higher education," Int. J. Inf. Learn. Technol., 2015.
[2] T. H. Davenport, "Putting the enterprise into the enterprise system," Harv. Bus. Rev., vol. 76, no. 4, 1998.
[3] C. C. Law and E. W. Ngai, "An investigation of the relationships between organizational factors, business process improvement, and ERP success," Benchmarking Int. J., vol. 14, no. 3, pp. 387–406, 2007.
[4] D. Swartz and K. Orgill, "Higher education ERP: Lessons learned," Educ. Q., vol. 24, no. 2, pp. 20–27, 2001.
[5] M. J. Davis and Z. Huang, "ERP in higher education: A case study of SAP and campus management," Issues Inf. Syst., vol. 8, no. 1, pp. 120–126, 2007.
[6] C. R. Holland and B. Light, "A critical success factors model for ERP implementation," IEEE Softw., vol. 16, no. 3, pp. 30–36, 1999.
[7] P. Ifinedo, "Examining the influences of external expertise and in-house computer/IT knowledge on ERP system success," J. Syst. Softw., vol. 84, no. 12, pp. 2065–2078, 2011.
[8] M. Babaei, Z. Gholami, and S. Altafi, "Challenges of Enterprise Resource Planning implementation in Iran large organizations," Inf. Syst., vol. 54, pp. 15–27, 2015.
[9] A. Terminanto and A. N. Hidayanto, "Identifying characteristics and configurations in open source ERP in accounting using ASAP: A case study on SME," in 2017 International Conference on Soft Computing, Intelligent System and Information Technology (ICSIIT), 2017, pp. 227–232
[10] M. Althonayan and A. Althonayan, "E-government system evaluation: The case of users' performance using ERP systems in higher education," Transform. Gov. People Process Policy, vol. 11, no. 3, pp. 306–342, 2017.
[11] H. A. Awad, "The impact of ERP system on the customer performance: A case study in the institution of higher education in kingdom of Saudi Arabia," Int. J. Econ. Finance Manag. Sci., vol. 4, no. 3, pp. 138–142, 2016.
[12] A. Y. Noaman and F. F. Ahmed, "ERP systems functionalities in higher education," Procedia Comput. Sci., vol. 65, pp. 385–395, 2015.
[13] L. Syafiraliany, M. Lubis, and R. W. Witjaksono, "Analysis of critical success factors from ERP system implementation in pharmaceutical fields by information system success model," in 2019 Fourth International Conference on Informatics and Computing (ICIC), 2019, pp. 1–5.
[14] W. H. DeLone and E. R. McLean, "Information systems success: The quest for the dependent variable," Inf. Syst. Res., vol. 3, no. 1, pp. 60–95, 1992.
[15] D. L. Goodhue, "Understanding user evaluations of information systems," Manag. Sci., vol. 41, no. 12, pp. 1827–1844, 1995.
[16] D. M. Lashayo and J. R. A. Mhina, "Antecedents of Instructor Intention to Continue Using E-Learning Systems in Higher Learning Institutions in Tanzania: The Influence of System Quality and Service Quality," Int. J. Technol.-Enabled Stud. Support Serv. IJTESSS, vol. 11, no. 1, pp. 1–16, 2021.
[17] R. M. Mushi and D. M. Lashayo, "E-Learning Readiness Assessment on Distance Learning: A Case of Tanzanian Higher Education Institutions," Int. J. Inf. Commun. Technol. Hum. Dev. IJICTHD, vol. 14, no. 1, pp. 1–10, 2022.
[18] N. Alsharari, "the Implementation of Enterprise Resource Planning (Erp) in the United Arab Emirates: a Case of Musanada Corporation," Int. J. Technol. Innov. Manag. IJTIM, vol. 2, no. 1, 2022.
[19] C. Draijer and D.-J. Schenk, "Best practices of business simulation with SAP R/3," J. Inf. Syst. Educ., vol. 15, no. 3, p. 261, 2004.
[20] C. LeRouge and H. W. Webb, "Appropriating Enterprise Resource Planning Systems in Colleges of Business: Extending Adaptive Stucturation Theory for Testability," J. Inf. Syst. Educ., vol. 15, no. 3, p. 315, 2004.
[21] J. Fedorowicz, U. J. Gelinas Jr, C. Usoff, and G. Hachey, "Teaching Tip: Twelve Tips for Successfully Integrating Enterprise Systems Across the Curriculum," J. Inf. Syst. Educ., vol. 15, no. 3, p. 235, 2004.
[22] M. Aljukhadar, S. Senecal, and J. Nantel, "Is more always better? Investigating the task-technology fit theory in an online user context," Inf. Manage., vol. 51, no. 4, pp. 391–397, 2014.
[23] K.-Y. Huang and Y.-R. Chuang, "A task–technology fit view of job search website impact on performance effects: An empirical analysis from Taiwan," Cogent Bus. Manag., vol. 3, no. 1, p. 1253943, 2016.

[24] D. Do and D. Ohlsson, "The impact of task-technology fit on user performance within an applicant tracking software: A qualitative study on the bullhorn system." 2018.
[25] G. G. Gable, D. Sedera, and T. Chan, "Re-conceptualizing information system success: The IS-impact measurement model," J. Assoc. Inf. Syst., vol. 9, no. 7, p. 18, 2008.
[26] "How many citations are in D & M IS sucess model - Google Search." https://www.google.com/search? (Accessed Mar. 18, 2023).
[27] C. E. Shannon, "A mathematical theory of communication," Bell Syst. Tech. J., vol. 27, no. 3, pp. 379–423, 1948.
[28] R. O. Mason, "Measuring information output: A communication systems approach," Inf. Manage., vol. 1, no. 4, pp. 219–234, 1978.
[29] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," MIS Q., pp. 319–340, 1989.
[30] W. H. DeLone and E. R. McLean, "The DeLone and McLean model of information systems success: a ten-year update," J. Manag. Inf. Syst., vol. 19, no. 4, pp. 9–30, 2003.
[31] S. Petter, W. DeLone, and E. R. McLean, "The past, present, and future of 'IS success,'" J. Assoc. Inf. Syst., vol. 13, no. 5, p. 2, 2012.
[32] S. Bhattacharjee, R. D. Gopal, K. Lertwachara, and J. R. Marsden, "Consumer search and retailer strategies in the presence of online music sharing," J. Manag. Inf. Syst., vol. 23, no. 1, pp. 129–159, 2006.
[33] R. F. Premuroso and S. Bhattacharya, "Do early and voluntary filers of financial information in XBRL format signal superior corporate governance and operating performance?" Int. J. Account. Inf. Syst., vol. 9, no. 1, pp. 1–20, 2008.
[34] W. H. DeLone and E. R. McLean, "Information systems success measurement," Found. Trends® Inf. Syst., vol. 2, no. 1, pp. 1–116, 2016.
[35] "Philosophy and Core Values of IFM." https://www.ifm.ac.tz/about-us/historical-background/78-template-details/design-a-features/171-solid-features-2 (accessed Mar. 18, 2023).
[36] H. Jo, "Examining the key factors influencing loyalty and satisfaction toward the smart factory," J. Bus. Ind. Mark., vol. 38, no. 3, pp. 484–493, 2023.
[37] B. E. Wampold and R. D. Freund, "Use of multiple regression in counseling psychology research: A flexible data-analytic strategy.," J. Couns. Psychol., vol. 34, no. 4, p. 372, 1987.
[38] J. F. Hair, W. C. Black, B. J. Babin, R. E. Anderson, and R. L. Tatham, "Multivariate data analysis (Vol. 6)," 2006.
[39] J. C. Anderson and D. W. Gerbing, "Structural equation modeling in practice: A review and recommended two-step approach.," Psychol. Bull., vol. 103, no. 3, p. 411, 1988.
[40] R. E. Schumacker and R. G. Lomax, A beginner's guide to structural equation modeling. psychology press, 2004.
[41] T. A. Brown, Confirmatory factor analysis for applied research. Guilford publications, 2015.
[42] R. B. Kline, Principles and practice of structural equation modeling. Guilford publications, 2015.
[43] P. Awang, SEM made simple: A gentle approach to learning Structural Equation Modeling. MPWS Rich Publication, Bangi, 2015
[44] J. Gaskin and J. Lim, "Model fit measures," Gaskination's StatWiki, vol. 37, no. 3, pp. 814–822, 2016.
[45] K. A. Bollen, Structural equations with latent variables, vol. 210. John Wiley & Sons, 1989.
[46] D. Gefen, D. Straub, and M.-C. Boudreau, "Structural equation modeling and regression: Guidelines for research practice," Commun. Assoc. Inf. Syst., vol. 4, no. 1, p. 7, 2000.
[47] E. T. Lwoga and M. Komba, "Antecedents of continued usage intentions of web-based learning management system in Tanzania," Educ. Train., 2015.
[48] M. Zviran, N. Pliskin, and R. Levin, "Measuring user satisfaction and perceived usefulness in the ERP context," J. Comput. Inf. Syst., vol. 45, no. 3, pp. 43–52, 2005.

Authors' Profiles

Julius Raphael Athuman Mhina holds a PhD in ICT from Management and Science University (Malaysia), MSc in Advanced Computer Science from Sheffield University (UK), and BSc in Computer Science from the University of Dar es Salaam (Tanzania). Currently, he is a Lecturer at the Institute of Finance in Tanzania. Apart from teaching, Dr. Julius has supervised several projects at undergraduate and postgraduate levels. Dr Julius is a regular publisher in reputable peer-to-peer reviewed journals. His research area includes emerging web technologies, Electronic Governance, and E-learning Systems. Contacts: julius.raphael@ifm.ac.tz

Deogratius Mathew Lashayo holds a PhD in ICT from Management and Science University (Malaysia). Currently, he is a Lecturer at the public-owned institution (Institute of Finance in Tanzania) and non-executive director of private-owned IT company in Tanzania. Apart from teaching, Dr. Lashayo has supervised several projects at undergraduate and postgraduate levels. Dr Lashayo has published a lot in reputable peer-to-peer reviewed journals. His research areas include: Electronic Learning Systems, Artificial Intelligence (AI), and Information Security and Enterprise Resource Planning Systems. He may be contacted through: deogratius.lashayo@ifm.ac.tz

How to cite this paper: Mhina J. R. A., Lashayo D. M., "Implementing Enterprise Resource Planning Systems in Tanzanian Higher Education Institutions: The Influence of Task-technology Fit on Staff Performance", International Journal of Information Technology and Computer Science(IJITCS), Vol.15, No.5, pp.12-24, 2023. DOI:10.5815/ijitcs.2023.05.02