Determine the Critical Factors of Information Systems Success (ISS) to Enhance Customer Satisfaction on SME Performance in Saudi Arabia

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Abstract
In today's worldwide environment, information systems (IS) usage is growing swiftly. As a result, it now affects every aspect of life and serves as a general growth tool for individuals, groups, and governments. information system success (ISS) is affected by customer satisfaction and their acceptance of using these services. In addition, this issue will be a critical thing for SMEs, especially in Saudi Arabia. SMEs have a shortage and lack IT experience and resources. The research's question is What are the ISS that will improve customer satisfaction and SME performance in Saudi Arabia. Through an online survey, The data on how Saudi SMEs succeed in IS was acquired. Citizens and residents users in Saudi Arabia, representing a range of ages and educational backgrounds. In the IS success factors evaluation, which assessed the degree of agreeability and disagreeability of specific statements related to the six dimensions based on the empirical data, it was found that the users agreed with the majority of the claims. For users, usability is the most important feature. This study discovered that enhancing the system's overall user experience might lead to higher overall satisfaction.

Keywords:
DeLone and McLean IS success model, SME performance, Saudi Arabia, customer satisfaction

1. Introduction

Applications for computer-based information systems (IS) are increasingly a requirement of daily life for SMEs. They now have a significant impact on the development and survival of these companies [1]. The success of information systems (ISS) has long been of interest to information systems (IS) and information technology (IT) research and practice [2].

How successfully organizations and governments use IS impacts both their operational efficiency and their ability to withstand pressure from the marketplace. The success of IS implementation has therefore long been a subject of discussion in the field of IS [3]. However, just as the context, function, and impact of IT have evolved through time, so too have our methods for determining an information system's efficacy.

End-user satisfaction is one of the success factors for information systems, and some researchers claim that when information is provided that is both beneficial and helpful, end-user satisfaction increases [4]. For nearly 20 years, behavioral research on information systems (IS) has focused heavily on the user satisfaction concept. However most academics and industry experts agree that the user satisfaction survey has improved the field of information systems [5].

The development of several technologies for evaluating user satisfaction has surely encouraged more study on the concept and practitioners' use of it to gauge system effectiveness. To the extent that they are reliable and valid, these scales can provide information on the general satisfaction with IS products and services. Before a system is put into place, it is essential to develop ideas that may be utilized to predict user behavior in addition to researching and comprehending the past [5]. Leading researchers Delone and McLean created the IS success model, one of the key theoretical foundations for IS. This model is recognized as the most often utilized model by a significant number of academics due to its generalizability and plenty of empirical data [6]. System quality, information quality, use, user satisfaction, individual impact, and organizational effect are listed as the six main components of this paradigm [7].

The most populous and densely populated GCC nation is Saudi Arabia. It is one of the top 20 most competitive economies in the world and the Middle East is a popular place for investments [8]. The number of SMEs worldwide is increasing. In Q1 2022, there were 752,560 SMEs operating in Saudi Arabia, up from 650,550 during the same period last year, a 14.6% rise year over year [9]. According to SMEA, 2022 [9]. Small enterprises, which account for 45.5% of all firms in Saudi Arabia, have less than five employees. Saudi Arabia has 42 and 3.8%, respectively, of enterprises with five to 59 employees and those with more than 60 [10]. The SME sector is made up of microbusinesses and Small and Medium-Sized Enterprises (SMEs).

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Saudi Arabia's SMEs face a variety of difficulties, much as those in the majority of developing and Arab countries. The main problems and constraints SMEs face include bureaucracy, a lack of financial support, and a lack of financing options [11]. A hostile business environment, a lack of training, inconsistent policy changes, and insufficient government support are also viewed as important barriers to the growth of SME in Saudi Arabia [11]. Saudi Arabian SMEs have a number of challenges, including weak relationships with large corporations, a lack of legislative framework and regulation, and a lack of government support [11].

Kutlu and Zturan (2008) [12] state that SMEs may use IS as a tool to reduce transaction costs, promote innovation, open up new market niches, and develop stronger relationships with customers and suppliers. IS aids SMEs in addressing challenges brought on by a changing environment. SMEs' access to IS has the ability to boost economic growth, but because these companies lack the capacity for growth and diversification, current technologies are useless [12]. SME companies may get above-average returns on their IT investments by implementing IT governance frameworks and managing IT risk.

Due to the various benefits of IS, SMEs are attempting to incorporate IS applications to aid their businesses. Due to their unique characteristics, SMEs implement IS differently than larger companies. Saudi Arabia's economy is impacted by e-systems and related applications, including e-commerce and ERP [13]. As a result, employing these techniques, SME revenue in the transportation, hospitality, and food sectors climbed by nearly 50% over the preceding two years [13].

This paper provided an overview of IS applications in business environments particularly in SMEs. It also emphasizes researching the topic of customer satisfaction's importance in IS success. Additionally, the paper included the theoretical underpinnings, hypotheses, and study methodology before concentrating on the key findings, followed by an implication and discussion.

2. Literature review

The success of information systems (ISS) has long been of interest to information systems (IS) and information technology (IT) research and practice. Customer satisfaction and their willingness to use these services have an impact on the success of information systems (ISS). Additionally, this problem would be crucial for SMEs, particularly in Saudi Arabia.

Modern businesses must deal with increasing complexity due to the increased volatility, unpredictability, and ambiguity of their business environment [14]. Information systems (IS) are essential to enterprises in this environment and are found in almost every area of the organization, acting as a significant business core asset required to increase productivity, reduce operational costs, or gain a competitive edge [15]. Organizations must constantly adapt and embrace new, superior, and more modern ways of doing things, claim Ngereja et al. (2021) [16]. IT currently plays a key role in attaining this objective and is essential to IS efforts [17]. Increasing the efficiency of business transactions and processes, improving communication and centralization the access to information to help in decision-making, changing the underlying principles of competition and the nature of the sector to create competitive advantages, and researching novel business models are the four main categories that Alavi et al. (2015) [18] divide this impact into.

Leading researchers Delone and McLean created the IS success model, one of the key theoretical foundations for IS. This model is recognized as the most often utilized model by a significant number of academics due to its generalizability and plenty of empirical data [6]. System quality, information quality, use, user satisfaction, individual impact, and organizational effect are listed as the six major components of this paradigm [7]. Soon after the publication of the D&M success model, IS experts began urging revisions to it. Seddon, Kiew, et al. (1996) [19] investigated a portion of the IS success model (i.e., system quality, information quality, usage, and user happiness) in response to the authors' call for "additional elaboration and validation". They changed the definition of "use" in their assessment because they "conjectured that the fundamental success construct that academics have been seeking to access is Usefulness, not Use." (p. 93). DeLone and McLean added the elements of system quality, information quality, service quality, system use, user satisfaction, and net benefits to this model in 2003 [20]. It has been observed that the D&M model provides a solid framework for setting up IS success measures. This model is often used by IS academics to understand and quantify the elements of effective IS. The six primary success elements of the new model were also consistent with one or more of the variables used to define the performance of an information system [21].

The capacity of Saudi Arabia's small and medium-sized enterprises (SMEs) to employ a sizable labor force, particularly among young people and in rural areas, relieves pressure on the public sector to do so [22]. This is popular in Saudi Arabia since SMEs are simple to set up, their administrative structures are straightforward, and they only

need a small sum of money to start out and operate. Everyone agrees that it is difficult to come up with a uniform definition of SME that the Gulf nations, especially Saudi Arabia, would embrace [11]. According to the Saudi Arabian General Investment Authority (SAGIA) [23], microbusinesses have fewer than 25, small businesses have between 25 and 59 workers, and medium-sized enterprises have between 60 and 99 employees.

Kutlu and Zturan (2008) [12] state that SMEs may use IS as a tool to reduce transaction costs, promote innovation, open up new market niches, and develop stronger relationships with customers and suppliers. IS aids SMEs in addressing challenges brought on by a changing environment. SMEs' access to IS has the ability to boost economic growth, but because these companies lack the capacity for growth and diversification, current technologies are useless [12]. Sharp differences in IS-related activities like e-commerce and e-procurement show that there is a digital gap between SMEs and their bigger rivals ((Lefebvre and Lefebvre (1992) [24]; Levy and Powell (1998) [25]). Between developed and developing countries, as well as between small and large businesses, there is a digital divide. The business environments in developing countries are substantially different from those in industrialized countries in terms of rules and regulations, control by governments, labor features, style of management, and customer income features [26] [27] [28] [29]. Roztocki and Weistroffer (2011) [30] draw attention to the high rate of failure of IS execution in developing nations and also point out that IS applications in developed countries have a "different focus because mature infrastructure is already in place, and project success is frequently determined by very different criteria" (p. 164). Saudi Arabian SMEs have similar difficulties integrating ICT into their daily operations. The main obstacles to ICT adoption among SMEs are a lack of resources for training and the belief that technology is not essential for their area of work [31].

Saudi Arabia's economy is impacted by e-systems and related applications, including e-commerce and ERP. For instance, practically all restaurants in Saudi Arabia now take orders online, analyze sales, and provide information on topics like sales, employee productivity, profitability, and how rapidly business is moving [32]. End-user satisfaction is one of the success factors for information systems, and some researchers claim that when information is provided that is both beneficial and helpful, end-user satisfaction increases [4]. IS user satisfaction theories are simply insufficient at this time to fulfill this need. It goes without saying that the foundation for defining IS effectiveness requirements is numerous and varied [33] . According to the research, user satisfaction is undoubtedly the greatest metric to use when assessing an IS.

3. Theoretical framework

In this research, The success characteristics of information systems (ISS) that can improve customer satisfaction and boost the performance of Saudi SMEs were assessed using DeLone and McLean's (2003) model as a theoretical framework. The theoretical framework of this study offers a thorough assessment of the most crucial factors that lead to enhancing customer satisfaction in Saudi SMEs. This makes it possible for us to provide a thorough response to the research topic. Six fundamental constructs are included in the theoretical framework. The following hypotheses were developed in order to quantify customer satisfaction with IS in Saudi SMEs in order to achieve the study objectives. They were based on the representation and analysis of prior literature. According to the various model dimensions, the hypotheses were tested:

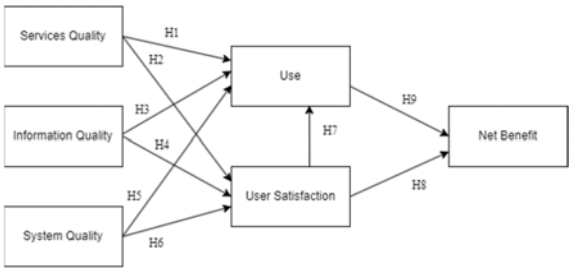

Fig. 1 Updated DeLone and McLean IS success model and hypotheses.

- H1: Service quality positively affects SMEs customers' use of IS.
- H2: Service quality positively affects SMEs users' satisfaction with IS.
- H3: Information quality positively affects SMEs customers' use of IS.
- H4: Information quality positively affects SMEs users' satisfaction with IS.
- H5: System quality positively affects SMEs customers' use of IS.
- H6: System quality positively affects SMEs users' satisfaction with IS.
- H7: User satisfaction positively affects SMEs customers' use of IS.
- H8: User satisfaction positively affects net benefit.
- H9: Use positively affects net benefit.

4. Methodology

By extracting the suggested framework constructions from the literature that was already available on the models and concepts discussed, the theoretical framework's development was evaluated. Ten components make up the model: service quality (SQ), information quality (IQ),

system quality (SyQ), user satisfaction (CS), Use (US), and net benefit (NB).

In this study, the combinations were computed using multi-item scales. From previous literature, we analyzed and assessed the most shared factors that lead to information systems factors combined them into six factors, and integrated them with the theoretical framework. In addition, we want to gauge Saudi SMEs' customers' satisfaction with IS services. We focus on end-users of the services in SMEs based on the prior ISS classifications.

5. Data gathering

Through an online questionnaire, information on how Saudi SMEs are using IS success factors was acquired. Additionally, a 24 tems using a Likert scale that comprises five levels (1- Strongly disagree, 2- Disagree, 3- Neutra, 4- Agree, 5- Strongly agree) were developed. The information was gathered over the course of 3 months by distributing an electronic version of the self-administered surveys utilizing a survey from Google Forms.

Based on the categories of criteria identified from the literature, we created a questionnaire. Each component category is tested using six different questions, with the number of questions used for each factor varying according to its significance. Using specific questions and concentrating on the findings and statistics, we made an effort to go beyond the words in order to prevent problems with personal replies. We started the survey with questions on demographics (gender, age, nationality, and education). The additional inquiries were made using the previously specified factor categories. 101 people made up the sample overall, male participants were (78), and female participants were (23).

6. Data analysis and main finding

6.1 Confirm the validity of the data

It's critical to confirm at the study's commencement that the questions being used to evaluate the variables have a certain amount of consistency, dependency, and reliability. The survey was optional, and participants were able to leave at any time to finish it without having to give a justification. The survey was distributed and had clearly specified study objectives. There were no blanks in the survey's replies. The reliability test has been conducted in order to exclude anomalous components by validating the validity of the data and the internal coherence of the components in the constructs of the defined theoretical framework of the research model. The minimum value of 0.6 was used in this investigation as recommended by various meta-analytical studies [3]. The range of Cronbach's alpha values—0.668 to 0.810—for the six constructs shown in Table 1 demonstrates the internal consistency and dependability of the survey results.

Table 1: Internal consistency and reliability

Factors codes	Mean	SD	SKew	Kurtosis	Cronbach's alpha	CR	AVE	Rotated factor loadings
SQ	4.30	0.628	-0.772	0.643	0.668	0.679	0.514	0.938
IQ	4.381	0.575	-1.410	4.922	0.626	0.735	0.583	0.886
SyQ	4.48	0.576	-1.699	5.888	0.617	0.629	0.50	0.873
US	4.45	0.576	-2.465	10.072	0.638	0.765	0.611	0.898
CS	4.55	0.541	-1.222	1.337	0.707	0.768	0.532	0.962
NB	4.49	0.677	-1.508	2.021	0.810	0.822	0.611	0.996

6.2 Audience, and Distribution

The target audience for the survey was Saudi SMEs. The target respondents' backgrounds in terms of education, society, and age were diverse. The majority of the target audience was between the ages of (25–44), which indicates that they were young individuals. Most of Saudi Arabia's population was also in this age range (25.4% Saudis and 33.9% residents) [34]. The participants' average level of high education (bachelor's and diploma) was also the highest.

To evaluate the quality of the survey and findings, a random sample of 25 people representing one-fourth of the dataset was selected. The survey was administered to the target population after being arbitrated by three academics with expertise in computers and information technology.

6.3 Exploratory factor analysis (EFA) and confirmatory factor analysis (CFA)

EFA is frequently used to determine the dimensionality of unending data. Only a few of the complex tests that are run when functioning as an EFA include the eigenvalue, Bartlett's B test, and the Kaiser-Meyer-Olkin (KMO) test. Prior to employing SEM to analyze the survey findings, the validity of the data for factor analysis was checked in the IMB SPSS application. The results of Bartlett's test of sphericity and KMO scores are shown in Table 2.

Table 2: The CFA tests results

Component	Initiale eigenvalues			Extracted sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.014	30.069	30.069	3.047	15.235	15.235
2	2.496	12.480	42.550	2.698	13.489	28.724
3	1.727	8.636	51.186	2.361	11.806	40.530
4	1.498	7.492	58.677	2.199	10.993	51.522
5	1.281	6.405	65.082	2.138	10.691	62.214
6	0.935	4.676	69.759	1.509	7.545	69.759

7. Hypothesis Testing

It is critical to quantify the relationships between the constructs utilizing the three main tests of p-value, Standardized Regression Coefficient, and t-value in order to evaluate the hypotheses put forward between the constructs. In this study, three tests are conducted to identify the strong and weak linkages between the entities. The results in Table 3 further demonstrate that every element that was put to the test met the prerequisite for SEM, which is the standard for accepting the proposed theoretical framework model. The overall construct findings demonstrated the positive effects of information system performance on client satisfaction in Saudi SMEs and how these connections relate to the core tenets of the theoretical framework. As shown in Table 3, it was found via this investigation that the majority of the links between the essential items and their associated hypotheses are relevant.

Table 3: Indicators of the CFA test

Test	Estimation Indices	Suggest results	Actual Result
X^2	Chi Square (X^2) Degree of Freedom (df)		172.725
Df			6
X^2/df		X^2/df < 3.0	28.78
GFI	Goodness-of-Fit Index	GFI > 0.90	0.788
TLI	Tucker–Lewis Index	TLI >0.90	0.094
NFI	Normed Fit Index	NFI > 0.90	0.636
CFI	Comparative Fit Index	CFI > 0.90	0.638
IFI	Incremental Fit Index	IFI > 0.90	0.644
AGFI	Adjusted Goodness-of-Fit Index	AGFI > 0.80	0.258
RMR	Root Mean Square Residual	RMR < 0.08	0.118
RMSEA	Root Mean Square Error of Approximation	RMSEA < 0.08	0.373

8. IS success model with results

Based on DeLone and McLean's updated IS success model, this study hypothesized a relationship between the three quality-related parameters and utilization, user satisfaction, and net benefits on the other hand. According to the authors, utilization and user happiness are closely related concepts, and user satisfaction is typically better when using an IS effectively. This will result in a number of net advantages for the user. However, if the user does not experience any net benefits from using the system, their use of it and their satisfaction with it will be modest. The following figures show the hypotheses with results:

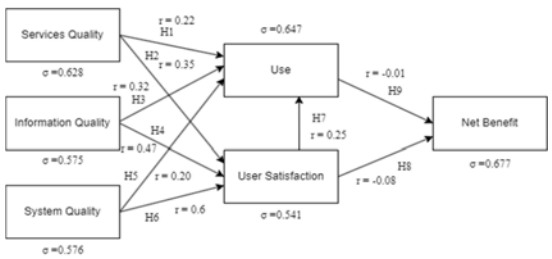

Fig. 2 Updated DeLone and McLean IS success model and hypotheses with results.

Table 4: Hypothesis testing results

Hypothesis No.	Hypotheses	Estimate	S.E.	C.R	P Label
H1	SQ → Us	.226	.060	5.003	***
H2	SQ → CS	.289	.047	6.125	***
H3	IQ → Us	.276	.054	5.157	***
H4	IQ → CS	.446	.055	8.153	***
H5	SyQ → Us	.174	.046	3.750	***
H6	SyQ → CS	.058	.055	1.056	.291
H7	CS → Us	.226	.060	3.767	***
H8	CS → NB	-.078	.078	-1.003	.316
H9	Us → NB	-.009	.086	-.104	.917

9. Discussion and implication

As previously discussed in the preceding section, the findings and analyses were based on the data collected from 101 survey takers. The conversation started with a demographic study of the respondents. The great majority of participants were men, aged 25 to 44, with advanced degrees (diploma, bachelor's, and master's). Data from a survey of Saudi SMEs consumers was utilized in the quantitative phase to assess the model. The model demonstrated a reasonable fit and supported the majority of assumptions when SEM, EFA, and CFA methods were applied. The respondents also agreed with the six criteria of service quality, information quality, system quality, use, user happiness, and net benefits. All of the hypotheses were verified, with the exception of the sixth, eighth, and ninth.

10. Limitation

The limitations of this study have been mentioned. The IT environment in Saudi SMEs is still in its infancy in terms of maturity. That may have had an impact on the replies, research sample, and study outcomes. For the following reasons, it cannot be assumed that the SMEs customers who participated in the survey are representative of all SMEs customers or have interacted with their systems. First, participation is greatly influenced by cultural background and technological proficiency. Second, the SME industry is still developing, and some of them employ IS just partially or not at all. It's also conceivable that the responses are more likely to apply to one type of IS than to others or to one SME than to others because the participants used a range of SME-specific IS systems. Therefore, it could be advantageous for future studies to restrict the research to SMEs that utilize a certain form of IS or sector-type of SMEs. However, this study is significant as a vital first step in supplying Saudi Arabian SMEs with the essential elements of ISS.

11. Conclusion

In this research, we focused on the success factors that can lead to customer satisfaction in the IS of Saudi SMEs from the perspective of users. According to the findings, service quality, information quality, and use are crucial elements that boost user satisfaction in Saudi SMEs. In the IS success factors evaluation, which measured the degree of agreeability and disagreeability of specific statements related to the six dimensions, it was found that the users agreed with the majority of the assertions. The results of the hypothesis testing show that the elements of the DeLone and McLean ISS model when used to evaluate ISS characteristics have a close relationship with one another. The empirical findings of this study indicate that it is possible to use the model to identify the ISS variables.

This research recommended doing a qualitative investigation of the essential ISS components from the perspective of SMEs, employees, and managers in order to reinforce the DeLone and McLean ISS model. This would reveal usage themes that a quantitative assessment would not have covered. The model could undergo additional validation in a number of different industries, including healthcare or education. If such systems exist, they may be used in Saudi Arabia or other circumstances.

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