# Stimulating individual performance with information system quality: Evidence from Small and Medium Enterprises in Sudan

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***Abstract:****The main aim of this study is to examine the impact of Information System (IS) quality on individual performance of employees within small and medium-sized enterprises (SME)in manufacturing sector. Fewer researchers have focused on this topic especially in Sudan. The DeLone and McLean IS success model (D&M) has been one of the leading established models in IS research. This model has been adapted to match with the context of this study. The proposed model consist of six dimensions including system quality (SYQ), information quality (INQ), service quality (SVQ), system use (SU) user satisfaction (UST) and individual performance (INDP). A survey was conducted to collect data from 211 information system users. The respondents were employees working for SMEsin state of Khartoum, Sudan from three major industrialmanufacturing sectors. The study findings suggest that SYQ, INQ, SVQ and SU positively influence UST, while the UST positively influence INDP. The four independent variables explained 42.3% variance in User satisfaction and all 5 variables combined together explained 50.8% variance in the dependent variable individual performance.*
***Keywords****: information system; SMEs; System Quality, Individual Performance; User Satisfaction.*
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## I.   Introduction

Companies are investing in Information systems (IS) as they seek to remain competitive the marketplace. Organizations have to undertake enormous investments in information systems (IS) to obtain the maximum benefit from these systems. Despite thatthere are many cases ofISimplementations that result in failure. As companies seek to achieve a return on investments from IS, they must evaluate and understand thefactors that lead towards success of IS. In previous studies, numerous models of IS success have been applied that identify such factors that affect IS success. Adoption and implementation of IS has a significant impact on the organizations, it plays an important role in bringing competitive advantage and providing better services. The organizations continuously assess the effectiveness of these systems to find out its effect on individuals performance [1] as it largely contributes in overall organizational performance.

DeLone and McLean (D&M) presented IS success model in 1992, which they later updated in 2003, these models has been tested and validated by IS researchers for many years. However, according to our knowledge from literature review, not much empirical research included particularities of SMEs mainly due to scope of those studies. Generally, SMEs have severe resource restrictions, and- rely on short-term planning. This study adapted D&M 2003 model to investigate from the SMEs in Sudan.

[2] proposed IS model to have a significant effect of user satisfaction (UST) on system use (SU) and individual performance (INDP) in the electronics industry.Their results show that higher levels of UST can lead to increased SU and enhance INDP.Similarly increased system usage will lead to enhance employee performance. In addition, [3]have developed a model to assess e-learning system in manufacturing company from the perspective of users through  a mixed-methods approach using survey and direct observation to data collection, to assess   IS. They found that information system quality has increased the satisfaction and performance of system users. In addition, they found SU improved user performance, and user performance indirectly increase the net benefits. Similarly, another study [4]suggested a conceptual model and examined it to find the influence of some of the individual, technological and organizational variables on the SU and its influence on the INDP in manufacturing companies, their result indicates that the compatibility, organizational support, computer self-efficacy, training, have a significant and a positive influence on SU which in turn has a positive and significant influence on INDP. Although previous research have proposed a significant and positive relationship between investment in IS and the productivity of companies, the overall results of these studies have been inconclusive.

In Sudan, the SMEs vouch to obtain the benefits of these technologies. In addition, SMEs have also been investing in IS related projects but many of these projects fail. Therefore, IS evaluation is recommended and the research outcomes could be significant for future IS users and decision makers. This paper attempt to extend knowledge in the area of IS by developing an integrated model for measuring IS success within SMEs.

This research focuses on the assessment of success of IS and also intends to empirically investigate the user's perspective, who has an association between the firms and the customer. More concretely, the aim of this research is to measure the success of SMEs, by proposing model based on D&MIS success model. It is significant to realize the factors that influence user satisfaction and individual performance to improve the IS usage. This study focus to examine the factors that determine user satisfaction and individual performance of IS in SMEs. Therefore the objective of this study is to answer the following research questions: 1- what are the factor influence on user satisfaction, and individual performance? 2- Does the quality dimensions of the information system have only a direct effect on individual performance? 3- Does usage of the system influence on user satisfaction and individual performance? To answer of research questions and provide a better comprehension of the impact of information systems on user satisfaction and individual performance.

The structure of this study as follows: Part two will explain a summarized of the literature review on IS advantages and applications. A discussion about the model used in this study is then presented in Part three. Part four defines the methodology used to conduct this study, and Part five displays the results obtained from the analysis of the study data. The discussion of the reported results is presented in Part six. Finally, concludes of the study.

## II. Literature Review

D&M [5], proposed model to measure the success of IS, the model introduces six main variables which include "system quality"; "information quality"; "use"; "user satisfaction"; "individual impact"; and "organizational impact". By using above factors, the theoretical and empirical literature and suggest a descriptive model of IS success. [6]indicated that D&M model is an important development in promoting research IS success in different respects. First, it supports prior studies. Second, it classifies and organizes the measures of IS success. Third, it begins to classify different groups of stakeholder in the procedure. Finally, it has been adopted as an appropriate basis for further theoretical and empirical studies, and has met with general acceptance such as [5]. This model has been most accepted and used in several IS studies [7].

D&M have made some and important changes to their original model for over more than a decade to reflect the changes in needs of users and technologies. They have merged "individual impact" and "organizational impacts" in "net benefits". In addition, they have included 'service quality' as a third characteristic, to their model. The items that contribute to service quality are, responsiveness, reliability, assure and empathy. In their original model, "service quality" was a part of system quality[8]. Most empirical research supported the part of the D&M model, which proposed that "System Quality", "Information Quality" and 'Service Quality' cause 'User Satisfaction' and 'System Use'[9]. It has been confirmed that quality effects behavior and attitude in an IS context. Nevertheless, various discussions have arisen on the build of IS success model. The IS success construct is differed according to the field[10].

Past studies such as [11] have conducted to test if the outcomes of empirical research supported the relationships hypothesized by original of D&M model. The reviews of these studies explained that some relations in the D&M model had received support whereas others have received mixed support and others did not support. Numbers of studies was used D&M model to assess the IS success of different types such as e-government systems[12], knowledge management[13], web portals[14]. However, there is a few studies on the use of D&M model to evaluate IS in SMEs success to improving performance of organizational and particularly developing countries such as Sudan.

IS has become very important and significant effect on the commercial processes, therefore have attracted large investment levels [9]. Despite the expected advantages, a few research actually test the achievement of such systems to ensure achieve the benefits. Nevertheless, IS success assessing is challenging due to the lack of agreement on contributing variables [15]. Firstly, work practices and information systems are very complicated, therefore, making it difficult to understand their discrete effect on the success [16]. Secondly, the impact of IS performance is indirect and is affected by several variables, such as organizational, environmental and social. The technical and social aspects with each other, make such measurements very complex [9]. Thirdly, the methodological aspects that are used to measure IS success in which identifying dependent variables is very difficult [16].

**IS Success among SMEs in Developing Countries**

IS offer numerous advantages to small- and medium-sized enterprises (SMEs) of developing countries[17]. Due to the decrease in the price of IS, many companies in developing countries have access to a comparatively developed, obtainable IS resources. Some modern researches have confirmed that SMEs in developing countries make a large investment in IS to sustain their competitive location[18, 19]. Until now the literature of IS explains that SMEs of developing countries have not been as developed or effective as their equivalents in developed countries in taking advantage from information technology, e.g. IS [20, 21].

To answer this question why SMEs in developing countries are incompetent or fewer successful in benefiting from their IS, we should highlight to the next important points. The past studies have shown that, in fact, productivity of SMEs in developing countries seems very low [22]. At the administrative level, companies in developed countries were decided to be way forward in terms of achieving efficiency and use better applications compared with equivalents companies in developing countries[22]. Since to the administrative difficulties in SMEs of developing countries, these companies may not definitely comprehend technologies of IS and resource and may not in drawing upon their possibilities to completely advantage of IS [19, 23]. Thus, it is important to SMEs in developing countries to realize how they can be improved performance and effective benefiting from there IS.

Our review of past study detected that a few recent studies have attempted to identify the tools through which SMEs of developing countries can convert the use of IS resources into business benefit. Though these papers observed that IS resources can be a benefit to support various technological resources to enhance the individual performance, still none of them explained how SMEs, at the individual performance analysis, can improve the satisfaction with implementation of IS, and derive benefit from characteristic of considerable of IS. Through our review of previous studies, there is a few studies that usages the D&M model to describe the success of IS within SMEs of developing countries. Although the success of IS at the organizational level is good studied and the most of interactions within factors of success of IS are well supported at this level, at the individual level of analysis, nevertheless, a lot of work remains to be done to test the success of IS model's proposals. Generally, the interactions within various factors of success of IS at the individual level of analysis are, as of yet, in general unexplored. Importantly, there is a lack of specific findings of UST with IS, SU, and net benefits of IS at the individual level of analysis, and especially between SMEs of developing countries.

### III. Development of Conceptual Model and TheoreticalBasis

In line with the D&M IS success model (1992) which proposed that system Quality (SYQ) and information Quality (INQ) influence the System Use (SU) and User Satisfaction as well as System Use (SU) and User Satisfaction influence on Individual Impact, and Individual Impact direct impact on organizational impact. in addition,, D&MIS success model (2003), which proposed that Information Quality (INQ), System Quality (SYQ), and Service Quality (SVQ) influence the System Use (SU) and User Satisfaction (UST), as well as System Use (SU) and User Satisfaction (UST) influence on the Net Benefit (NBs), thus, our study model suggests that SYQ, INQ, SVQ, and SU will have a significant influence on UST and Individual Performance INDP. Also UST has a significant influence on INDP. Fig.1demonstrates the adapted IS Success Model, and the suggested hypotheses are presented in Table 1.
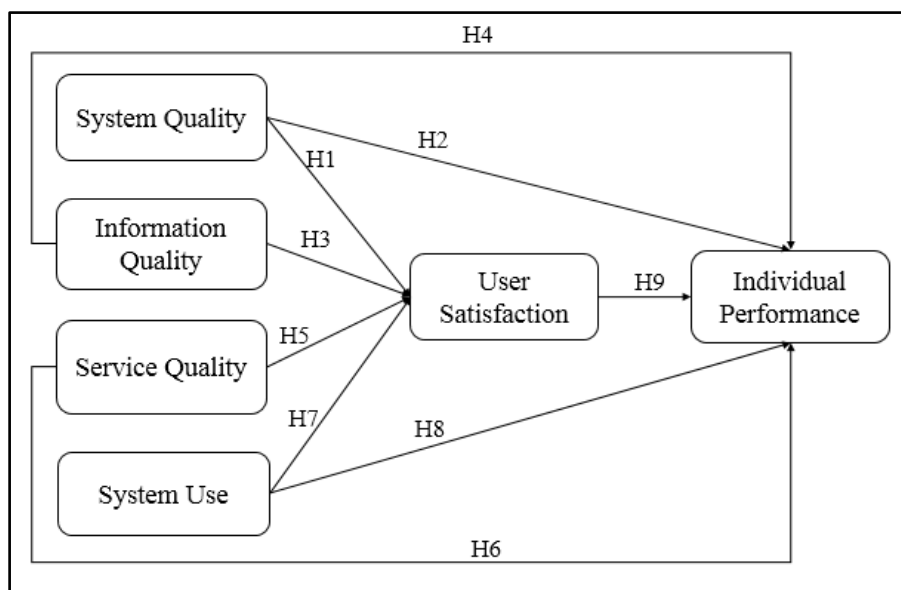


**Fig 1:**Research conceptual model

**Table 1**: Proposed relationships and the description of variables included in the conceptual model

| Variables | Description of variables and proposed relationships with a dependent variables | Supporting sources |
|---|---|---|
| SYQ | Refers to desirable the characteristics of an information system, which will positively influence on the user satisfaction and individual performance. | [24], [25], [26],[27], [28] |
| INQ | Refers to the desirable characteristics of an output of an information system, which will positively affect the user satisfaction and individual performance. | [24],[25], [26], [28] |
| SVQ | Represents the quality of the support that the system users receive from the information technology staff, which will positively influence the user satisfaction and directly affect the individual performance | [28] |
| SU | Use is a measure of the spread of technology and it's more likely to have a significant influence on user satisfaction and individual performance. | [29], [2] |
| UST | Refers to the degree of happiness obtained from the system use in question, which will positively influence on individual performance. | [2], [30] |
| INDP | Individual performance defined as a measure of the extent to which (IS) has influenced the capabilities, the effectiveness of key-users, enhanced decision-making, job effectiveness and quality of work. | [5] |

### System Quality (SYQ)

SYQ refers to an IS features, and therefore, accounts for measures of the IS it same which specifically concentration on the characteristics and aspects of IS performance[31]. According to[13]SYQ is Includes with the following: ease of use, system errors, response time, flexibility and stability. In addition [32] demonstrated the important effect of SYQ on the SU.[6] Conducted meta-analysis of results reported in nine published research that tested the impact of SYQ on UST and SU. The results of their study explainedthat, generally, SYQ had a significant and strong impact on the SU and UST. Regarding the review of studies that above-mentioned, we can be posits that the higher of the SYQ in SMEs, the more probable it is that the user of system will be satisfied, and the researcher proposed it is leads that to influence on the INDP. Therefore, the following hypotheses have been proposed:

*H1. System quality has significant influenceuser satisfaction.*
*H2. System quality has significant influenceindividualperformance.*

### Information Quality (INQ)

INQ is measured by many characteristics which Includes accuracy, timeliness, completeness, reliability, availability, relevance, consistency, format, scope, and precision [30]. [25] Illustrated that the INQ is "often seen as a key of user satisfaction". Study investigation which conducted by [31] on SU and UST of student IS confirmedanimportant effect of INQ on UST and perceived usefulness (PUF). According to [29] the results of their research demonstrated that INQ have a positive impact on perceived usefulness and UST a positive impact of SU [26]. Based on the previous studies above discussion which found a strong and significant influence for the positive association between 'INQ' and 'UST', we can be posits that the higher of the INQ of IS in SMEs, the more probable it is that the user will be satisfied, and the researcher proposed it is leads that to influence on the INDP. Thus, the following hypotheses have been proposed:

*H3. Information quality has significant influence user satisfaction.*
*H4. Information quality has significant influence individual performance.*

### Service Quality (SVQ)

According to [33]SVQ refers to direct or non-direct support offered in relative to the service that the organizations has to offer, to improve the experience of customer. On the other hand [8]explained that the poor support of user will lead to lost customers and decreased sales. [34] after their reviewed of various studies and analyzed they concluded that SVQ equates to the difference between customer's expectation and customer's perception. Also[34],[32] referred that there is a positive effect of SVQon SU.An empirical investigation by [35] which tested the success of the Greek Taxation IS, confirmed the significant and strong effect of SVQ on UST and PUF and the researcher proposed it is leads that to influence on the INDP.In consist with prior research described above-mentioned, the study hypotheses have been proposed:

*H5. Service quality has significant influence user satisfaction.*
*H6. Service quality has significant influence individual performance.*

### System Use (SU)

According to [31]SU is the degree in which information system is used. In addition, they go on to detailed that assessing SU is a comprehensive concept which can be reflected across different perspectives. On

the other hand, [36],[8],[37]explained that the effective use is an significant evidence of IS success. Some researchers such as [38], [39], [29]conducted empirical study and found that their results in support the study of [36],[8],[37]as they explained that an important and positive association between SU and UST. Based on the above-mentioned argument, we can be stated that the higher the SU in SMEs, the more probable it will be lead to satisfaction of users, and the researcher proposed it is also leads that to influence on the INDP. Thus, the proposed hypotheses are:

*H7. System use has significant influence user satisfaction.*
*H8. System use has significant influence individual performance.*

**User Satisfaction (UST)**

UST is considered as the one of most common success measure of IS [40]. [41]refer UST as the sum of person's attitudes and feelings toward of factors variety that affecting of status [42]clarify that UST is one of the most broadly utilized dimensions for evaluation of IS success.[43]Stated that the UST is measuring the consequences of users' response by using the output of IS. In other hand [44] described the satisfaction as being the users' level of satisfaction with the system. IS literature demonstrates that at the analysis of organizational level, organization-wide satisfaction with ISled to enhanced job satisfaction, improved performance, , increased productivity and improved decision making [45],[46]. This particular relationship among organizations has been supported by empirical evidence.

Based on the theories that are above mentioned in previous studies, proposed hypothesis is stated as follows:
*H9. User satisfaction has significant influence individual performance.*

**Individual Performance (INDP)**

INDP defined is the actual performance of an individual using an IS.[5] noted that INDP could also be "an indication that IS has given users a better perception of the decision context, improved decision making productivity". Several of previous research have evaluated the INDP of IS which includes numerous items such as improved decision-making effectiveness, improved individual productivity, increased job performance, and strengthened problem description skills[5]. for instance, [47] conducted an empirical investigation of the effect of IS on processes of business and found that an implementation of IS was significantly related with enhanced business procedures and might comprise higher data quality for decision-making, effectiveness in business procedures of, and better organization among several sections in company. In their research of IS, [48] detected that system usage frequency were proved to improve the effect of decision-making at the INDP, such as "speed of problem identification, speed of decision-making, and analysis of decision-making". On the other hand, [49] suggested that SU has a direct positive impact on INDP"i.e., perceived influence of IS on quality of decision-making, efficiency of the job, performance, and productivity".

**Table 2:** Variables and corresponding items

| Variables | Survey questions/items | Supporting Reference |
|---|---|---|
| SYQ | SYQ1: The system is ease to use. | [12],[8] |
| | SYQ2:The system is ease to learn. | |
| | SYQ3:The system response time always in quick. | |
| | SYQ4:The system is reliable. | |
| INQ | INQ1: The system provides accurate and correct information | [12] |
| | INQ2:The system provides complete and sufficient information. | |
| | INQ3:The system provides information relevant to my needs. | |
| | INQ4: The system provides easy-to understand information. | |
| SVQ | SVQ1: IT people provide dependable service. | [12] |
| | SVQ2: IT people have technical competence. | |
| | SVQ3: IT people give prompt service to users. | |
| | SVQ4: IT people provide the right solution to requests. | |
| | SVQ5:IT people provide accurate service. | |
| SU | SU1: I frequently use the system. | [12], [50], [51] |
| | SU2:I use many functions of the system. | |
| | SU3: I depended on the system. | |
| | SU4: Using the system supports my work procedures. | |
| UST | UST1: The System meets our needs. | [12],[52], [50], [53], [13] |
| | UST2: I am satisfied with the system efficiency. | |
| | UST3: I am satisfied with the system effectiveness. | |
| | UST4: The system is successful | |
| | UST5: Overall I am satisfied with the system | |
| INDP | INDP1: Using system increases my productivity in my job. | [26] |
| | INDP2:My effectiveness on the job is enhanced through system. | |
| | INDP3:The system aid to me in the performance of my job. | |
| | INDP4: The system improves the quality of my work. | |
| | INDP5: The system helps me come up with new solutions to job problems. | |

## IV.     Research Methodology

For data collection a questionnaire was administered as it is a suitable technique for testing the UST and INDP of IS in SudaneseSMEs sector.

### The Instrument of Research

A questionnaire was employed for data gathering in this study contained two classes of questions. Firstly: demographic information "such as gender, age, education" of respondents. Secondly: Likert scale questions were 27 questions these questions were included to gather study data which to test the research model as well as hypotheses which presented in the above-mentioned (Section 2). The participants had to rate all questions on a five-point Likert scale [32], as follows: 1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree.

The 27 questions of Likert scales were designed to measure the attitudes of participants in terms of six variables as show in figure1 and table 2. Every variable was consist of special set of questions. As illustrated above, the others 6 questions collected data on the demographic factors. The total of questions of the questionnaires were 33.

### Data Collection

Data was gathered from employs who use the IS in manufacturing SMEs in Khartoum state. Users of IS were considered to be the most suitable population for measuring the study model and proposed hypotheses regarding UST and INDP. Consequently, the participants of this questionnaire comprised of users of system at the chosen manufacturing SMEs. Survey questions were developed firstly in English, depending on the literature, then the final version was translated to Arabic by an expert translator. After determining the respondents, the researcher contacted to Human Resource staff to facilitate to distribute the questionnaire to users who utilized IS, and then they mailed the questionnaire to the users, data collection started from July 2018 to end of October 2018 to all users of IS which selected within manufacturing SMEs. We received 235 questionnaires. After review, the researchers observed that 24 questionnaires had missing data or incomplete for some of the questions, then we removed these 24 questionnaires in order to reliability and maintain accuracy. Subsequently, the data gathered from 211 users were analyzed by using SPSS, the results from which are shown in part 5 and Which are discussed in part 6. The analyses of data comprised: demographic information, the test of reliability, and descriptive statistics. Lastly, analyses of linear regression were analyzed in order to examine the hypotheses which were proposed in Part 3.

## V.     Study Findings

### Demographic Information

As shown in table 3 the demographic information of the questionnaire participants in terms of gender, age, education, position, working experience, computer skills, and computer experience. The table demonstrates that the largest respondents proportion are 30–40 years old (42.2%), male (63%).

**Table 3.** Demographic information

| Variables | Group | frequency | % |
|---|---|---|---|
| Gender | Male | 133 | 63.0 |
| | Female | 78 | 37.0 |
| | Total | 211 | 100.0 |
| | | | |
| Age | < 30 | 62 | 29.4 |
| | 30 - 40 | 89 | 42.2 |
| | 40 - 50 | 45 | 21.3 |
| | 50> | 15 | 7.1 |
| | Total | 211 | 100.0 |
| | | | |
| Education | Diploma | 22 | 10.4 |
| | Bachelor | 123 | 58.3 |
| | Master | 56 | 26.5 |
| | PhD | 3 | 1.4 |
| | Others | 7 | 3.3 |
| | Total | 211 | 100.0 |
| | | | |
| Position | Administration Staff | 92 | 43.6 |
| | Technical  Staff | 26 | 12.3 |
| | Head of Department | 35 | 16.6 |
| | Manager | 15 | 7.1 |
| | Others | 43 | 20.4 |
| | Total | 211 | 100.0 |

| | | | |
|---|---|---|---|
| Working Experience | < 1 | 13 | 6.2 |
| | 1 - 2 | 22 | 10.4 |
| | 3 - 4 | 32 | 15.2 |
| | 4 - 5 | 41 | 19.4 |
| | > 5 | 103 | 48.8 |
| | Total | 211 | 100.0 |
| Computer Experience | < 1 | 11 | 5.2 |
| | 2 - 3 | 23 | 10.9 |
| | 3 - 4 | 45 | 21.3 |
| | 4 - 5 | 45 | 21.3 |
| | > 5 | 87 | 41.2 |
| | Total | 211 | 100.0 |

## Reliability Test

Table 4 presented test of reliability, which analyzed to measure the internal consistency of the questionnaire items for all variables. According to [54] there are four cut-off points for Cronbach's alpha representative of reliability, which are 1- 0.90 and above", indicating excellent reliability; 2- "0.70 to 0.90" for high reliability; 3- "0.50 to 0.70" indicating moderate reliability; and 4-"0.50 and below" for low reliability. As shown by Table 4, out of six variables used in this paper, one variable has an excellent reliability measure. Whereas, alpha values for other variables indicate that the items have relatively high internal consistency. In general, the values of Cronbach's alpha for all variables indicate that all items of the individual variables of which are highly internally consistent.

**Table 4**: Reliability Test

| Variables | N | n | Cronbach's Alpha | Reliability type |
|---|---|---|---|---|
| SYQ | 211 | 4 | 0.812 | High |
| INQ | 211 | 4 | 0.849 | High |
| SVQ | 211 | 5 | 0.884 | High |
| SU | 211 | 4 | 0.855 | High |
| UST | 211 | 5 | 0.913 | Excellent |
| INDP | 211 | 5 | 0.891 | High |

**Note1**: SYQ = system quality, INQ = information quality, SVQ = service quality, SU = system use, UST = user satisfaction, INDP = individual performance.
**Note 2:** N= Sample size, n= number of items

## Discriminant Validity

There are two ways to assess discriminant validity. First, indicators' cross loading. In table 6 we can be verifying discriminant validity by the test of the indicators' cross loading, comparing the load of each indicator on its variable with the load of the indicator on other variables. The loading of indicator should be higher on the associated variable than its loadings on other variables, confirming the discriminant validity. Second, compares the square root of the AVE with correlations of the latent variable (as shown in table 5), both ways assessed indicate the discriminant validity of the research model.

**Table 5** Discriminant validity

| | Mean | Std. Dev. | SYQ | INQ | SVQ | SU | UST | INDP |
|---|---|---|---|---|---|---|---|---|
| SYQ | 4.1319 | 0.619 | **0.784** | | | | | |
| INQ | 4.1058 | 0.614 | 0.591 | **0.796** | | | | |
| SVQ | 3.8997 | 0.719 | 0.473 | 0.531 | **0.822** | | | |
| SU | 4.1630 | 0.693 | 0.408 | 0.479 | 0.389 | **0.841** | | |
| UST | 3.9592 | 0.778 | 0.532 | 0.528 | 0.462 | 0.497 | **0.863** | |
| INDP | 4.3242 | 0.618 | 0.472 | 0.522 | 0.355 | 0.637 | 0.544 | **0.835** |

**Note1:** SYQ = system quality, INQ = information quality, SVQ = service quality, SU = system use, UST = user satisfaction, INDP = individual performance.
**Note2:** Diagonal elements are the square roots of the AVE.

**Table 6** cross loading

| | SYQ | INQ | SVQ | SU | UST | INDP |
|---|---|---|---|---|---|---|
| SYQ1 | **0.779** | 0.449 | 0.298 | 0.359 | 0.362 | 0.400 |
| SYQ2 | **0.768** | 0.422 | 0.270 | 0.365 | 0.292 | 0.371 |
| SYQ3 | **0.786** | 0.478 | 0.433 | 0.253 | 0.463 | 0.310 |
| SYQ4 | **0.801** | 0.493 | 0.451 | 0.313 | 0.516 | 0.397 |
| INQ1 | 0.473 | **0.788** | 0.453 | 0.360 | 0.393 | 0.396 |
| INQ2 | 0.405 | **0.773** | 0.391 | 0.360 | 0.432 | 0.410 |
| INQ3 | 0.463 | **0.811** | 0.405 | 0.378 | 0.431 | 0.409 |
| INQ4 | 0.536 | **0.812** | 0.441 | 0.422 | 0.424 | 0.446 |

| | | | | | | |
|-----|-------|-------|-------|-------|-------|-------|
| SVQ1 | 0.401 | 0.429 | **0.815** | 0.355 | 0.338 | 0.241 |
| SVQ2 | 0.340 | 0.466 | **0.815** | 0.304 | 0.383 | 0.322 |
| SVQ3 | 0.434 | 0.425 | **0.800** | 0.288 | 0.340 | 0.311 |
| SVQ4 | 0.394 | 0.500 | **0.854** | 0.316 | 0.411 | 0.349 |
| SVQ5 | 0.382 | 0.349 | **0.823** | 0.343 | 0.419 | 0.222 |
| SU1 | 0.293 | 0.324 | 0.238 | **0.777** | 0.288 | 0.486 |
| SU2 | 0.351 | 0.365 | 0.310 | **0.834** | 0.365 | 0.479 |
| SU3 | 0.390 | 0.471 | 0.337 | **0.889** | 0.474 | 0.635 |
| SU4 | 0.329 | 0.427 | 0.407 | **0.860** | 0.509 | 0.525 |
| UST1 | 0.417 | 0.421 | 0.392 | 0.471 | **0.754** | 0.412 |
| UST2 | 0.416 | 0.434 | 0.418 | 0.406 | **0.896** | 0.483 |
| UST3 | 0.449 | 0.407 | 0.374 | 0.396 | **0.870** | 0.434 |
| UST4 | 0.482 | 0.458 | 0.424 | 0.421 | **0.895** | 0.467 |
| UST5 | 0.524 | 0.545 | 0.386 | 0.449 | **0.893** | 0.538 |
| INDP1 | 0.380 | 0.425 | 0.279 | 0.545 | 0.425 | **0.816** |
| INDP2 | 0.440 | 0.526 | 0.344 | 0.569 | 0.501 | **0.865** |
| INDP3 | 0.331 | 0.346 | 0.223 | 0.559 | 0.395 | **0.822** |
| INDP4 | 0.408 | 0.462 | 0.295 | 0.519 | 0.408 | **0.837** |
| INDP5 | 0.407 | 0.409 | 0.337 | 0.467 | 0.539 | **0.836** |

**Hypotheses Testing**

Hypotheses of study model are shown in table 7. Referring to the table, the path coefficients, which suggest the strengths of the relationship among the independent and dependent variables. $R^2$ value shown in Table 8, which describes the amount of variance clarified by the independent variables [55]. $R^2$ and the path coefficients indicate how well the data support the model of the study. For the predictive capability of the study model, $R^2$ of the dependent variables should be greater than or equal to 0.1 [56]. According to [57] lower values offer a few information, whereas, the researchers propose that this value should be greater than or equal to 0.19. In our study, all the variables have acceptable predictive quality (as shown that in Table 8) all these hypotheses are discussed in more detail in section 7.
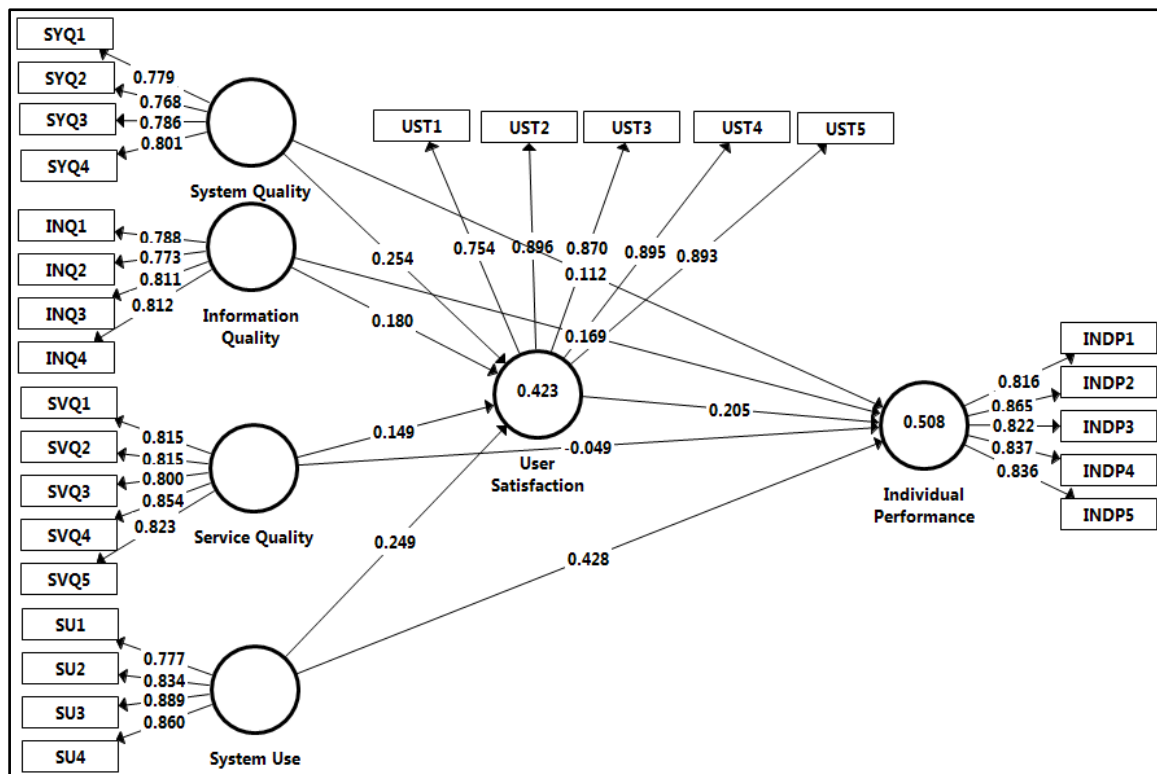


**Figure 2:** The results of structure model

**Table 7**: Presentation of results

| Hypothesis | Relationship | Std Beta | Std Error | T Value | P Values | Decision |
|-----|-----|-----|-----|-----|-----|-----|
| H1 | SYQ -> UST | 0.254 | 0.084 | 3.030 | 0.003 | Supported |
| H2 | SYQ -> INDP | 0.112 | 0.084 | 1.325 | 0.186 | Rejected |
| H3 | INQ -> UST | 0.180 | 0.088 | 2.038 | 0.042 | Supported |
| H4 | INQ -> INDP | 0.169 | 0.074 | 2.277 | 0.023 | Supported |
| H5 | SVQ -> UST | 0.149 | 0.073 | 2.050 | 0.041 | Supported |

| H6 | SVQ -> INDP | -0.049 | 0.064 | 0.760 | 0.448 | Rejected |
| H7 | SU -> UST | 0.249 | 0.074 | 3.344 | 0.001 | Supported |
| H8 | SU -> INDP | 0.428 | 0.074 | 5.815 | 0.000 | Supported |
| H9 | UST -> INDP | 0.205 | 0.074 | 2.775 | 0.006 | Supported |

**Table** 8: $R^2$

| Variables | $R^2$ |
|---|---|
| UST | 0.423 |
| INDP | 0.508 |

$Q^2$ has been used to measure the predictive competency of dependent variables of the study model. This test is calculated using the blindfolding Method in smart PLS. The $Q^2$ should be greater than zero so that the variable has predictive validity [57], given that the values above zero show that the model predictability is appropriate [58]. As can be illustrated in Table 9, all the values of $Q^2$ are above zero, which confirms the predictive relevance of the study model in relation to the dependent variables.

**Table** 9. $Q^2$

| Variables | $Q^2$ |
|---|---|
| UST | 0.286 |
| INDP | 0.323 |

## VI. Discussion

There are several results in this research are worth noting. First, SYQ is shown to be significantly associated with UST, This finding revealed that the SYQ in the SMEs' IS has a positive direct influence on UST. This indicate that the quality in systems will provide valid and more reliable sources of information for the users of IS in this research, therefore, resulting in their satisfaction. Furthermore, the result is consistent with evidence from the prior studies [59] and [60]. Therefore, there is a need for the management team of the SMEs to implement plans such as system improvement and processes of the review to ensure that the quality of system in their information systems is reliable and beneficial to their employees. We found that SYQ has not significant influence INDP. This indicates that users find the IS not enough to provide the necessary reports and processes as required or expected, to improve their work and productively. Moreover, this result is inconsistent with [61] and [62] where they found a positive and significant relationship between SYQ and INDP. With regard to INQ, we found that INQhave a positive effect on UST, This indicate that the sufficient and relevant information provided by the system, reinforces the UST.This results is in line with the results of a study by[35]. We also found that the INQ has a significant influence on INDP, This results is consistent with the results of studies by[25], [63], [64], [65],[66],[67], [61].[68].On the other hand, SVQ has a significant influence UST. This significant relationship shows that SVQ is an important factor, as it is what the SMEs employees experience with the system. This indicate that the users need a system which would provide sufficient technical support and quick response rate in solving problems. It is argued that system which is able to meet the users' requirements would promote their satisfaction.Moreover, this result is in line with prior study such as [69], [70], [71], [72].We also found that the relationship between SVQ and INDP is not significant, this result is contradictory with[61], as they found a significant relationship between SVQ and INDP.With regard to SU the study showed that SU had a significant influence UST. The results of this study is in line with study by[2].Furthermore, we found thatSU has significant influence on INDP. This result is in line with [2],[73]as they also found that appositive and significant relationship between SU and INDP.Finally, we found that UST had a significant influence INDP, this result is in line with [74]; [49], [26]. Also, this resultconsistent with [2].

## VII. Conclusion and Future work

This study examined the influence of SYQ, INQ, SVQ, and SU as selected independent variables on UST and INDP within SMEs context. Below they are some of the inferences drawn from the studyshown:
- SYQhas a positive influence onUST.
- INQ has a positive influence on INDP.
- SVQ has a positive and significant influence on USTwithin SMEs once IS has been implemented and accepted.
- The SU has a positive and significant influence on UST and INDP. Consequently, a conducive of the environment is essential at the first steps of IS employment in order to involve users by the new technology.

Despite this study provides some useful ideas into the comprehension of information systems success from its user's perspective, there are several limitations that must be confirmed from the researcher' perspective. The sample size used includes users from 51 different manufacturing SMEs in Khartoum state, therefore ensuring a substantial individual characterization variety, the obtained findings can be generalized if an even

broader variety of users had been accessed. Moreovera comparative study can be conducted not only with other manufacturing SMEs in Sudan but also from SMEs of different countries. The extension of the data gathering task from other companies must be considered for future studies. Also another limitation concerning the used sample was reality that we did not profile it, therefore leading to concentricity of answers in a little academic fields with a few control of the likely influence that the experience with information technology (IT) might have on the perception of users of possible individual performance from IS. This problem represents, a possible trigger for the study model developed, as we think that users' experience with IT can possibly act as a moderator of the relationship between the quality of IS and system use, and also individual performance.

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