

# A Post Evaluation Framework to Evaluate ERP Project's Acceptance and Success in Saudi Arabia: Literature Review

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**Abstract:** Nowadays, the innovative technologies are the main part of the business organizations, which always support their business culture and processes. In recent years, several tools has been introduced. Enterprise Resources Planning (ERP) system is one of the information systems, which highly support business ideas and assist in their strategies. This paper focuses on ERP, a brief overview on its usage, acceptance, benefits and evolution. The paper presented comprehensive review on previous researches. Synthesis and structured report on previous researches presented to highlights the weaknesses in ERP, which further leads to collect the Critical Success Factor (CSF) of ERP.

**Keywords:** Enterprise Resources Planning (ERP), Critical Success Factor (CSF)

## I. ERP – A BRIEF OVERVIEW

There are several explanation provided for ERP systems in different researches. ERP system mainly use for integrating the major business operations an organization dealing with, whether inside or outside their premises. Most of the time is a customized system where enterprise can manage and customize it based on their current requirements. During the customization process, it provides the number of applications, software based on the requirements of business operations such as accounting, production, administrative or control purposes [1].

Another point of view presented by [2] in their work, that ERP system specially built on the bases of business requirements, it help to identify customer needs as well as employee perspectives. Therefore, the main features it offer are integration of business processes, assisting in handling the large data flowing in the organization and last but not the least, providing the help with several software applications. Moreover, it can provide many other options to run the business effectively and efficiently such as providing the help in decision making process [3], cost reduction [4] and creating competitive advantage [5].

Human resources management, accounting and dealing with other financial matters with the help of software applications are similar perspective of ERP system as discussed above have been second by [6]. They further elaborates that ERP system offers ultimate support to run the business application smoothly, including sales and marketing. [7] emphasized on different perspective of ERP system, by calling each software package as module, integration of all can control business processes as well as all stakeholder's need to perform their task timely.

ERP system detailed and customized architecture has the capability to understand, handle, store and analyze the data flowing in the organization, whereas it offers centralized database, which support every department working in the organization, is another benefit can be achieved using ERP system [6]. In addition, ERP system consist of number of software application known as package. Its comprehensive software architecture incorporate the business activities and procedures using unique and general system and IT architecture [8]. Although, ERP system assist enterprises in many ways, scholars also discussed about the post implementation issues and highlights the list of benefits can be archived through ERP system [9]. The overview of ERP system post evaluation, and which model can be useful in Saudi organization's perspective is the major aim of this study.

Finally, based on the above definitions presented by different scholars can help to understand the purpose, capabilities and characteristics of ERP system. It provides the reason of why organization need ERP system, to integrate organizational business processes and all other software applications. The list of benefits are long, where the process of measuring those benefits is the major purpose of this study. Before moving to the list of ERP use and benefits as discussed later in this paper, the subsequent section elaborates the ERP development as highlighted in different stages.

## II. ERP DEVELOPMENT

Researchers consider the main reason behind the development of ERP system is the integration of different departmental activities in one system. Such as the concept presented by [10] which explained the purpose and role of

business process reengineering connection with ERP system. In addition [11] highlights the production and manufacturing process is one the major component of ERP system.

By exploring the history behind the ERP progression, the researchers associate the ERP first invention was based on inventory control system which further progressed and named as MRP-I. MRP-I was kind of enterprise application created to support the business activities in an organization. It was the era of 1970s, in which these were the remarkable development in the history of designing an application, which can support business processes of several department in an organized way [12].

During 1980s, it was further enhanced with more capabilities in order to create its second version was known as MRP-II [12]. The application was capable to handle the planning, controlling and scheduling the work, material and other requirements for manufacturing industries. In this progression, MRP-I was the main reason and leader behind the development and enhanced version called MRP-II [13]. In this way, the development of ERP system was phenomenal in the history of business organizations. It enhanced the way of doing business in competitive environment, where organizations are eager to run their business processes in efficient manner.

ERP never stops in order to improve the working environment based on the latest technologies. As technologies progressing, ERP development continues to be in better shape with the current IT technologies. Therefore, currently, ERP applications are available based on the latest technology known as cloud ERP. Using the ERP system, which is located on cloud, is the latest way of using ERP system, where organization can use the cloud space to perform their activities appropriately. The regular progress of ERP system as described by different scholar is shown in figure (1).

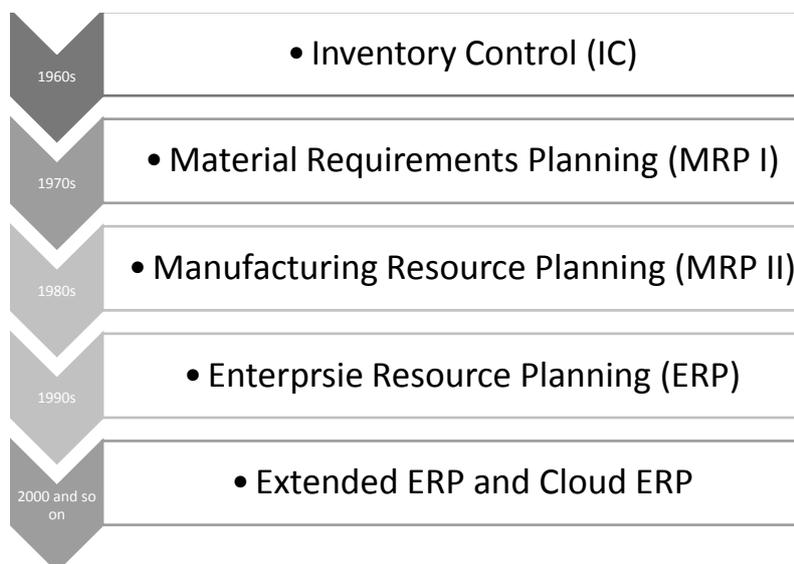


Figure (1) Development of ERP Systems (Adapted from [14])

While, the start of ERP development was based on manufacturing organization, but the current version of ERP can support any type of organization. Education, hospitals, banks, manufacturing, development and almost every organization can help with the use of ERP system. Rather for using it only manufacturing organization, it can provide support for any customer based organization. [15] elaborates the idea of implementing ERP system for smaller organization can be excess from the budget of the organization, where cannot provides the benefits for which ERP system developed, rather for medium and large organizations ERP package is almost essential to deal with heavy rush of customers and business processes.

During the progressing period of ERP system from MRP to ERP. The major purpose of MRP was to track the worker and investigate the materials requirement for manufacturing company. Currently, ERP system can provides the benefits for almost every kind of organizations by providing facilities not for supplier only, but financial management, human resource management, marketing and supplies are some other kinds of benefits ERP system delivers effectively [16].

The researchers conclude the topic of ERP evolution in a way that the current version of ERP system is much improved than its first development as MRP-I and MRP-II in different reasons. Firstly, the ERP system organize the centralized version of all planning and scheduling tools. Secondly, it offers the integrated and real time environment to deal with sales, suppliers and marketing personnel. (iii) ERP system also offers the facilities to external stakeholders such as supply chain, suppliers, partners and others [17].

### III. ERP KIND OF INFORMATION SYSTEMS (ERP AS IS)

Since last two decades, researchers has shown impressive interest to work ERP system implementation and measuring its success and benefits. Scholars mainly categorize the ERP system as one of the major kind of information systems [18]. Like an information system, ERP is also helping the organization to manage, handle, organize and analyze the data transformation in an organization [19]. It also helps to automate several business request or inquiries generated by any kind of stakeholders in efficient way [20].

With the increasing willingness of many organizations in moving from the functional-based way to run the business to the new process-based mode, this system is now one of the most useable application. One of the main thing that motivated corporates to adopt ERP system is the integration capabilities and flexibility which will eventually enable smooth and effective processes reengineering [21]. This kind of automation and collaboration facilitates the daily operational, financial and administration tasks and consequently, organizations can spend less time on the routine duties and can give more attention to specific valuable tasks that make the competitive advantage [22]–[25].

In different researches ERP has been associated and considered as kind of information system such as working of its life cycle [26], creating strategic benefits [4], evaluating its post implementation benefits [27], improving business operational efficiency [28], [29]. As far as ERP post implementation impact over organization, different IS success model and list of benefits used in different researches [5], [30]. Therefore, this study focused on using IS success model to evaluate the CSF of ERP.

### IV. ERP MAIN FEATURES

ERP system implementation help the organization in order to improve the quality of work performing during everyday business activities. Scholars have elaborate the ERP use and benefits achievement in different ways such as to support for business planning and high achievement of organizational objectives [31]. Before highlighting the main benefits can be achieved using EPR system following are some major features of an ERP system as collected from literature review:

Structure: based on the literature review the ERP system can have different kinds of features involve in its basic structure such as; integration, scalable, client-server architecture, managing with supply chain, easy to use for any kind of users, protected environment while using internet or intranet [32]. The implementation structure of ERP system can be varied from organization to organization depend on the functional requirements for what this ERP is implemented for.

ERP system structure can be based on managerial, information, operational or strategic purposes. [33] proposed the model which highlighted the ERP structure in three layers as presented in figure (2). The division of these layers were based on the data flowing in the organization. The presentation of the structure in three layers named as; strategic (specially related with higher level of management, the data can be useful in taking decisions), tactical (known as controlling layer, the data can be useful for generating some kind of reports) and operational (known as for registration layer, to generate schedule reports).

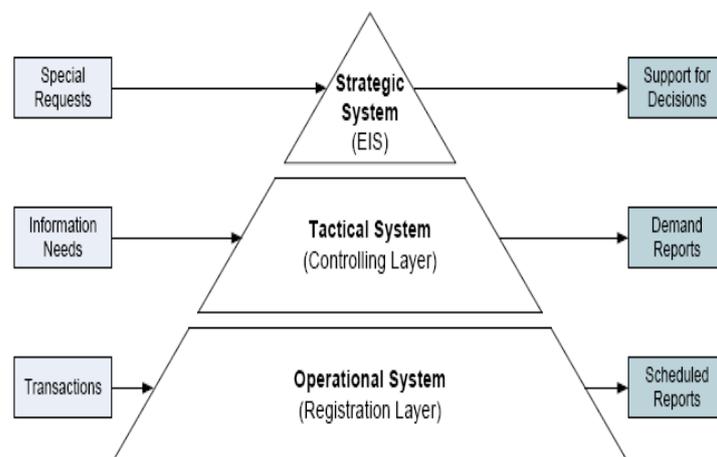


Figure (2) The three layer structure of ERP [33]

Integration: the main purpose of ERP system is to integrate their existing approach for doing business. In this way, organization can integrate the business objectives with IT infrastructure [34], which enhance the collaboration and communication between departmental activities as well as internal and external users in an efficient way. To compete with the business pressure and international market environment, ERP system provide an integrated working environment where the cost of resources reduced while quality of functions improved [5].



Mainly, ERP success is possible where the functional activities integrated properly. Therefore, researchers shown their emphasis on business process alignment with ERP functional processed regularly [18]. This must be the initial step for implementing the ERP system on existing business scenario as discussed by [35] where they called this implementation procedure as process mining. On the other side [36] suggested that with the help of information technology architecture, the primary step for applying any business process reengineering project, the primary thing is to understand the business environment. In this way, ERP system can perform in better way where the integration of business process and procedure will be based on the information collected during understating of entire business organization [37].

**Packages:** This feature of ERP is to know the about the number of vendors available in the market which can design, customize and implement the ERP tool in the organizations. Currently variety of ERP systems are available in the market, demonstrating different kinds of abilities can perform for betterment of the organizations such as; financial management, human resources, sales and marketing, procurement and others. A research presented on the comparative study of different kinds of ERP packages vendors available in the market such as SAP, People Soft and Oracle. The research highlights the comparison between the usage of different selected organization and their list of achieved benefits [5].

Selection of ERP system considered a complex issue for the organization, it need proper guidance and analysis of required functionalities organization is looking for and ERP package. In the market, numerous kind of ERP packages are available commercially, choosing best is always difficult decision organization need to make. In order to select the best available in the market organizations need to understand their requirements exactly.

Therefore, in solving this issue [38] proposed a model based on AHP approach where an organization can select the ERP project using suggested criterion and list of alternatives. Choosing from the list of alternatives (ERP packages available in the market) and number of criterion (requirement of the business organization), this research proposed the framework based on AHP approach. In addition, [39] proposed a method using six stages for buying an ERP package. It further highlights the major requirements for each stages, the stages name shown as planning, information search, selection, evaluation, choice, and negotiations.

**Best Practices:** the third main feature of ERP system, which can help during the selection procedure and can provide the successful result, is known as “best practices”. The researcher defined this feature as most practicing procedure they have been doing since long time [40] . An organization can highlight their best and repeatable business processes where they need extra help of kind of software, which can reduce their workload or improve the performance. The efficient use of the best practices business operation, later on if integrated well with all department can provide the better performance. Commonly, ERP system’s vendors categorize the ERP packages based on best practices as known form their previous experience. Buying those software and organization have a chance to customize them best on their current requirement and needs [16].

## V. ERP BENEFITS

Researchers have categorized the categorized the list of benefits achieved from enterprise resources planning same as benefits can achieve from different information systems. This section is provided with the analysis on most common benefits, which can achieve using ERP system as IS. Whereas next section can specially talk about the critical success factors specially based on ERP system. Table (1) depicted the taxonomy of list of benefits can be achieved using ERP systems as discussed in different researches.

Table (1) Taxonomy of List of Benefits

Benefits	Description	Source
Operational	List of successful factors can achieve in doing operational activities in the organization such as; reducing in cost and improving in production	[41], [42]
Transparency	To make the working environment transparent, where the data will be available based on user role.	[43], [44]
Relationship development	It helps to develop the good relation between different kinds of stakeholders using sort of structure procedure of every task.	[45]
Strategic	An organization can attain different kinds of benefits under this category in order to success their business strategies such as; competitive advantages and customer satisfaction	[4], [46]
Managerial	Business organization are dealing with different kinds of managerial activities to control and schedule the workforce and other resources.	[47], [48]
Organizational	These benefits can achieve in term of creating learning and productive environment in an organization with the help of ERP.	[49], [50]
Business Value	ERP largely affecting on different types of non-financial values known as business value such as; development, satisfaction and loyalty.	[51]



Table (1), highlights the association between the benefits associated with IS can be same as ERP, as discussed by different scholars in their researches. The list of benefits can be measureable in different ways such as using return on investment which also known as financial benefits [52]. The current development in the business environment where people are eager to know other kinds of benefits which are non-financial in nature such as user satisfaction, employee development and others. These type of benefits also known as non-financial benefits, which can be measure using different types of model like value on investment [53], portfolio management techniques [54], or using multi-criteria approaches [55]. The succeeding section highlights the current development in measuring the CSF specially based on ERP system.

### ERP Success Factors – General Overview

The success of ERP project depends on several dimension, as discussed in previous studies [56]. There are different reports published which highlighted the success and failure rate of ERP projects in different situations. In one of the report, the percentage of ERP projects failure has been recorded between the range of 67% to 90% [57]. The same report is further added that, almost 35% ERP project has been abandon before implementation, while the other part of remaining percentage about 65% shown cost and scheduling complexities.

Studies has highlighted the issue with ERP system that, the process of implementation is a kind of complicated issue [11]. The organization needs to understand it measuring factors efficiently, which can help to understand the implantation process as well as post implementation benefits can also be measured using those factors [58]. Therefore, different scholar has elaborated the purpose and use of critical success factor which can be evaluated using pre and post implementation data of ERP system.

One of the recent researches that was done in Greek Small and Medium Enterprises is the research done by [59] they identified different success factors that can raise the successful implementation rate in small and medium organization as shown in figure (3). Assessing the performance of ERP system using non-financial perspective proposed by [9] where they presented different types of dimensions ERP can improve the performance such as strategic, informational and others.

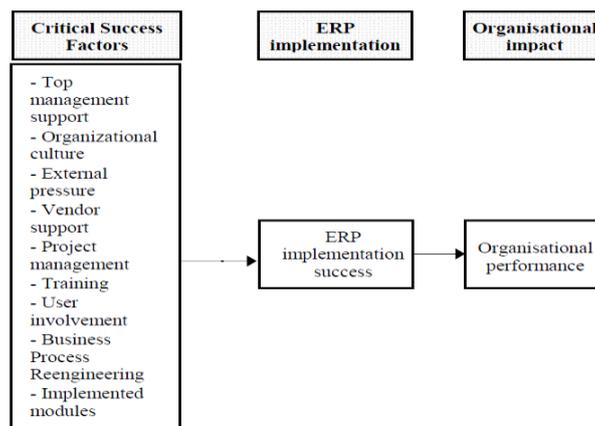


Figure (3) ERP Critical Success Factors [59]

This study has organized in a way to understand the gap between the ERP system implementation and critical success factor. The study has proposed a conceptual framework with the help of IS success model and technology acceptance model. As ERP system is a kind of information system where the use of technology is essential during its implementation. Therefore, this study proposed a holistic framework by combining IS and technology factors, the framework can help the organizations to evaluate ERP system's performance using list of success factors provided in the model. The details of each factors and its major category is further discussed in the next section.

In the subsequent section we will highlight the common critical success factors mentioned in recent literature extracted using different models. We need to include the common identified CSF to the proposed model as it will give an insight if it gets merged with the information systems IS success model that we will use. We also need to assess the role of these identified factors and whether they will work in Saudi's enterprises or not.

## VI. VARIABLES IDENTIFICATION USING RELATED THEORIES

ERP system is known as a kind of information system, which can provide the organization several benefits as discussed in this study. Therefore, previously IS success model is used in this research to identify the measuring success factor of ERP. In addition technology acceptance model integrated with IS success model to propose a holistic framework which consist on number of features related with information systems and information technology. The details of the related

work selected in this study has discussed in the subsequent section. Overall, two main models has been used in this research to propose an integrated framework. The list of each factors selected in this study has further discussed in this section. Firstly, in following section we talked about the each model in brief to better understand the each model itself, further the section will lead to describe each variable used in this research. Secondly, the detailed description of each, their weaknesses and how the proposed framework can overcome those weakness are discusses in Table (2).

#### a. Technology Acceptance Model (TAM)

Technology acceptance model (TAM), is the model uses to understand the information system's implementation, usage and acceptance based on user's perspective proposed by [60] as shown in figure (4). Change management is very common issue in the organization, where users shows their willingness to use traditional system, and being reluctant to start with new system and technology [61]. Using the degree of acceptance of new technology including with different other factors, companies can measure the performance and usage of their newly implemented system in the organization with the help of TAM model.

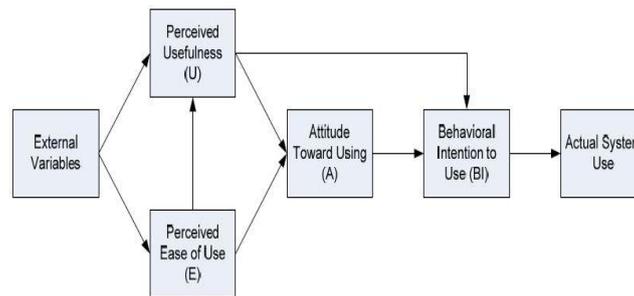


Figure (4) Technology Acceptance Model [62]

TAM has been used several time in order to apply for the situation presented in particular research [63]–[65]. Specifically, TAM has been proposed and extended, particularly known as TAM [60] and TAM2 [66] as shown in figure (5). In addition, another enhancement proposed as TAM3, which modified the model based on e-commerce perspective where impact of trust and risk were two new factors which enhanced the model appropriately [67].

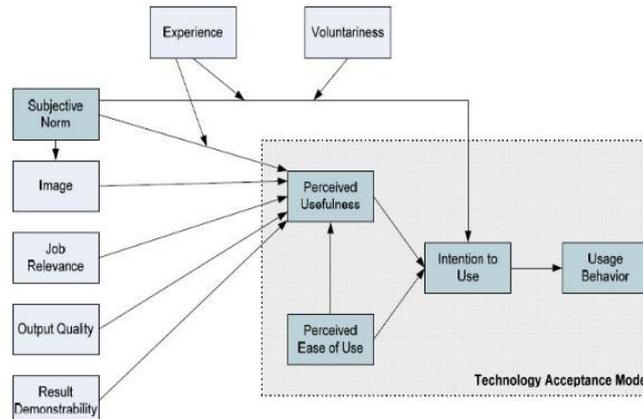


Figure (5) Technology Acceptance Model-2 [66]

The main idea behind the first presentation of TAM model, is to measure the two main variable proposed by [60] perceived usefulness and perceived ease-of-use. Perceived usefulness is related to know the user's point of view regarding the particular development they find while using that system. Personal and professional development are two type parameters can use to understand and measure the perceived usefulness. Another factor is talking about that how system is feasible and easy to use. The features in newly implemented system, the working environment and user friendly interface are different kinds of factors can be associated with this variable.

Several researchers analyzed the TAM using different scenarios. Sung Y. Park [68] presented their work by analyzing student's behavior using electronic system with the help of TAM model. The finding of that research proved that TAM considered a feasible model can be used to evaluate the performance of users in using and accepting the electronic system. In addition, [69] presented the survey on TAM model, which highlights the importance and usage of TAM model, with the help of several researches which used TAM model to support their ideas. That research concluded the idea of TAM which can provides help in understanding and elaborating the user behavior of new technology infrastructure or information systems. In addition, there are several other work found which used the technology acceptance model for evaluating online learning behavior [70], to learn the social influence [71], and online user behavior [72].

This discussion highlight the purpose and use of TAM model in order to evaluate and assess the information system's implementation, usage and acceptance from user's perspective. The TAM model is the main idea in this research has been taken to prove the list of the objective presented in this research. The model has been integration with other model where the result has been analyzed based on the collected data from selected case studies from Saudi region. The idea of integrating the model with other IS model has been discussed and modified using expert opinion. Few modification has been done during the meetings with the expert in order to use the TAM model for ERP system in Saudi organizations as discussed in later sections.

#### b. IS Success Model

The information system success model has one of the well-known framework use to measure the performance of information system in an organization. The model is proposed by [73], which also known as DeLone and McLean IS Success Model. The model has different parameters, using them the organization can understand the impact and benefits achieved during given period after implementation. The main purpose of proposing this model is to help the organizations and managers to understand the behavior of the users as well as continuous improvement. The professional development, performance of the employee, information management, how user behaving to use the system are some other measuring factors can be achieved using this model. This framework specially based on six different dimensions, known as information quality, system quality, service quality, usage intentions, system use, user satisfaction, and net system benefits as shown in figure (6).

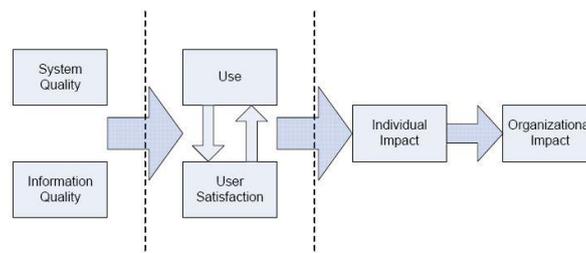


Figure (6) IS Success Model [73]

The IS success model has been revised based on the understanding and current situation, whereas the update has been taken according to the suggestions and feedback from the scholars working in the same area of research [74] as shown in figure (7). The model revisited by adding service quality is the main feature. Service quality can include the functional requirements of the system provided to the users and employees.

The same author who proposed it first time presented its another extension after almost ten years again, highlighting the ten years update which were based on the current technology and information system usage in recent years [75]. Although, even with the current advanced technology, the purpose, usage, and acceptance level of information system is same as managing the organizational operational and business activities which is the main aim behind implementation of any IS.

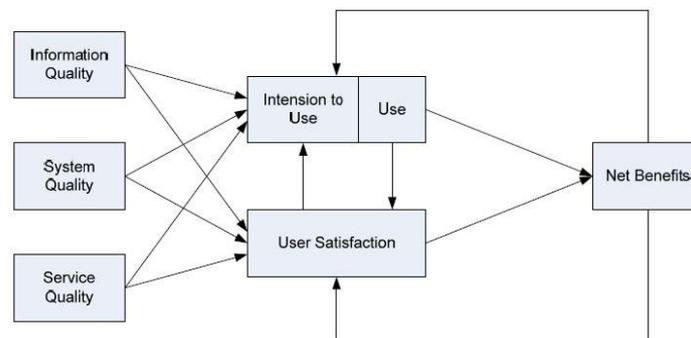


Figure (7) Updated IS Success Model [76]

The IS success model has been used and cited in many other research work presented by several scholars working in different countries. [77] cited this framework in order to evaluate the information system research, which presented to review the resource usage by information system. Measuring the ICT evaluation in Irish higher education center, [78] used the framework in assessing the information system implemented in higher education section doing operation in Irish higher education sector. Moreover, [79] discussed about the IS success model and presented the work that how this model can be helpful in evaluating the information system investment in an organization.

Using IS success model in measuring the success and adoption of ERP, which is also the main purpose of this research, that we integrated the IS success model in this research to evaluate the performance of ERP in Saudi sector. In



collecting the evidence, Several example can be found, where the author used IS success model for evaluating the usage and performance of ERP system implemented in the enterprise [80]–[85].

Those researches are the encouraging factors to use this model in evaluating the ERP adoption, usage, and post implementation success, to be applied in this research, where the case studies selected are from Saudi region. The model has been discussed with different experts working in Saudi organizations. In addition the model is integrated with technology acceptance model presented earlier. Based on the discussion in this section presented to highlight the purpose of using TAM and IS success model. The discussion further leads to explore the identified variables extracted from those models and used in this research. The subsequent section described the details for each variable. While the integrated model will be presented in the next researches.

### c. User Related Variables

There are seven variable used under the category of user related variables, which are directly or indirectly creating some kinds of impact on user performance and adoption process of ERP system. The extracted seven variables are taken from two different models. In which, three variables namely, information quality, system quality, and service quality are extracted from IS success model, whereas output quality, job relevance, image, and result demonstrability are extracted from TAM. All the variables used under this category of user related variables are directly creating impact on perceived usefulness, intention to use/system use, and user satisfaction. The details of each variable are presented below:

#### Information Quality

The main purpose of ERP system is to store, manipulate, analyze, and generate different kinds of report as per the requirements of the organization. Information quality [73] is the variable which shows that how system perform in order to generate for analyzing the data. This factor can directly create some impact on user satisfaction and user's willingness to use the system. Information quality has been emphasized in different other researches [8], [86], [87].

#### System Quality

Apart from information quality discussed above, the system quality refers to the overall performance of the system in order to process the request inquiry from different users or stakeholders of the system. It is very important dimension as presented and proposed in IS success model [73]. System quality is also a variable which can directly associated with user satisfaction and user's ability to use the particular system. As far as ERP system concern the idea has been applied by several scholars using different working scenario [5], [9], [88].

#### Service Quality

In addition, to the information quality and system quality, the third variable in this model is known as service quality. The purpose of this variable is to understand the quality of services provided by the ERP system is up to the mark or not. [73] proposed this variable in order to evaluate the performance of information system whereas it directly create impact on the satisfaction of stakeholder who are using this system and their ability of work with the system in any circumstance. According to [88] presented the work to evaluate the organizational impact using variables related with system, information and service quality. The author has proved the service quality is most influential variable as identified based on the collected data using proposed model.

#### Output Quality

Output quality is the next variable used under the category of user related variable. The purpose of output quality is to measure the performance of output which can be on screen messages coming in reply of user's queries or something generating as printed form like reports or templates for analysis [89], [90]. The first time variable proposed in TAM was in purpose of measuring the quality of matching between the query asked to the system and generated output [66]. Based on the understanding presented in the model [66] the output quality variable is directly associated with perceived usefulness, whereas indirectly it can create impact on user's purpose of using that system.

#### Job Relevance

The idea of job relevance variable to be included here is to know the users point of view that work they are performing in the organization are adaptable using the new ERP system. In addition, the flexibility provided by the system is matching their task and responsibilities they are performing in particular organization [66]. The idea of job relevance has been analyzed and verified in different articles using selected data sets. Such examples can be found in [91] who linked the job relevance with importance of job allocated to the user, [92] which ideally suggested and linked the job relevance variable with user's personal importance.

In addition, the user perception to use of provided technology for given task investigated by [93], whereas [94] highlighted that user's cognitive power of managing the given responsibilities with particular system. So, there are several examples which can be incorporated with job relevance variable as used one of the success factors in this research.



## Image

Rather than the usage of the system is easy or flexible, this variable indicates the status of social image in public after using the system. This variable actually considers as a social influence factor as mentioned in the original TAM2 [66]. This is the psychology of the human being, who always wanted to make his proper image in the public or within working group of people [95]. The factor also creates a high level of motivation towards working hard, showing your importance and specially desire to gain more importance socially [96]. The factor image is directly associated with perceived usefulness, whereas indirectly it creates an impact on intention to use. It can be elaborated as in what extent the use of implemented information system has created the positive impact of particular user over the same or other group of working team [97].

## Result Demonstrability

The result demonstrability variable is the last variable in the category of user-related variable. One of the significant variables used in the TAM, which can explore the performance of the information system in order to demonstrate the result acquired by any user [65]. The result demonstrability can be described as an ability to communicate the messages throughout the working environment as well as the observing power of current situation [97]. This variable has the one of the influential parameters to measure the performance of information system which directly creates effects on user satisfaction and his/her ability to perform the particular task using that system [98].

## d. Intermediate Variables

In this category, only two variables are identified which were basically extracted from the TAM2 [66]. The intermediary variables are normally defined as those variables which are not directly affecting all other variables but on some variables they do. Intermediate variables refer to play a middle role between the input and output variables [99]. Both of the extracted variables are impacting two different other variables directly and finally you can get the net benefits achieved through the system. According to the scenario presented in this study, both of these variables generate an impact on user's intention to use the system. The impact can be in the favor of system usage positively or against the system in a way that avoiding to do working using latest system. Subjective norm and ease of use, both of the variables can demonstrate the user's perception and behavior to the ERP system recently implemented.

## Subjective Norm

As discussed earlier, subjective norm is the variable that plays an intermediary role in the model TAM originally presented by [66]. The model fortunately deals with the different perspectives such as user behavior, system quality, information handling, as well as psychological parameters. Subjective norm is one of the examples of a factor which can elaborate the user satisfaction using their psychology. The user behavior towards using the new system is always doubtful, sometimes it can accept the changes or may take enough time to understand the new scenario. Subjective norm actually refers to the user's perception and behavior and/or positive/negative correlation between them. [100] explained it in a way that if other person's perception toward usefulness of the system then the other colleagues will also have the same idea. Moreover, [101] suggested that whenever there is new technology or system implemented in an organization, the person's behavior towards using those systems or pressure to perform in a better way are some kinds of examples of subjective norm. Therefore, this variable is known as intermediary, because it can be measured through an external perspective, whereas this factor is directly creating an impact on successful indicators known as user intention to use the system.

## Perceived Ease of Use

The second and last variable used under the category of intermediate variables is known as perceived ease of use. This variable can be explained as the user's perception towards newly implemented systems that it would be easy to use with a friendly environment [60]. The user can think in the beginning that how the system looks like, whereas the practical experience can answer more clearly about easy use of system or not. The factor is more about to investigate the screen layout, input and output design, schemes of color, use of input boxes, which is overall demonstrating human interaction with the system [102]. There are several articles found during literature review which highlighted the positive effect of this variable in measuring the user's intention to use.

## Perceived Usefulness

Perceived usefulness is the first variable we have selected in our model which can be considered one of the critical success factors while evaluating the ERP system. The most important successful factor, where it is more related to employee commitment towards organization in order to perform his or her task appropriately [79]. User's perception over how the system can be useful or in what extent the system has enhanced their working abilities are some kinds of reasons behind keeping this variable in the TAM model [60]. The idea has been used and validated in different other researches such as analyzing the employees' performance in small and medium firms working in New Zealand [103]. In the current scenario of business organization, for information systems investment, a large amount is allocated, in order to justify the investment [79] mapped the performance of the information system with its usage and how was its usefulness. In their proposed model, employee commitment, ease of use, training and education to understand the



system effectively are some other variables presented. Although, perceived usefulness can be better achieved with high value, if the companies are giving enough time and training sessions to overcome the issues their employees may have or can learn the working on the new system according to their responsibilities successfully.

#### e. Success Indicators

The last part of the model consisting on the measuring the success indicators in order to get the overall performance of system investigating in this research. There are different variables used in this phase, each of them can reflect the evaluation of ERP system. The original model has been modified in this research on the bases of expert's opinion. Basically the variables such as perceived usefulness, intention to use and user's satisfaction are extracted from previous model. In addition, the variable net benefits or system success which can highlight the overall performance of the system is divided into two variables such as informational benefits and strategic benefits. During the discussion with experts working on ERP system in Saudi organization, they suggested that to explore the net benefits in other ways. As behind of every ERP system there is a major purpose of organization, either they want to implement it to improve the performance of data management or sometime they want to achieve their new business strategy. Therefore, the model has been modified by diving net benefit variable into informational and strategic benefits. The results of this model can indicate that which type of benefits are achieved using the investigated ERP system, either informational or strategic or both of them.

#### Intention to Use / Use

The use factor in IS success model is one of the important factors selected in this study to be evaluated. The factor is more about to know understand the use's intentions over using the implemented system. Intention to Use or system use is one of major success factor of ERP system [104]. According to IS success model this variable can elaborate the performances of different other predecessor factors such as perceived usefulness, subjective norm, information quality, system quality and service quality. The variable is use as final indicator to evaluate the ultimate net benefits may achieve through the ERP system. In this study, this variable considers as a major factors to understand the user's satisfaction to use the ERP system, while further it can provide the detail analysis on the list of benefits achieved.

#### User Satisfaction

User satisfaction another successful indicator to understand the behavior and usefulness of the system in employee's point of view. In measuring the success of information system this variable can play a vital role which indicate the performance of the user in using particular system [105]. The vast literature reviews suggested that user satisfaction is important indicator [4], [9], [105]–[107], whereas in this study also we investigated it properly, as its positive correlation with intention to use can give us a feedback that the ERP system was successful.

#### Informational Benefits (Net Benefits)

Net benefits if the final factor in the model which can indicates the performance of the information system in particular scenario. The net benefits is also known as the indication to know about the success and failure rate of the system [75]. Informational benefits are very common factor use to assess the performance of the ERP system [5], [9], [108] which originally in the model known as net benefit. The net benefit factor has been enhanced with the agreement of ERP expert during the meeting process at preliminary work. As originally the net benefit element is quite ambiguous as commented by one the participant during the interview. Therefore, the point was highlighted there, that if we can improve this factor by associating some kinds of benefits with it will be more practical and easy to evaluate. While, the informational benefits can evaluate by using different perspectives such as improve information handling, easier access to the data, fast response to the queries and others [4], [9].

#### Strategic Benefits (Net Benefits)

Another part of net benefit defined in this research is known as strategic benefits. This kind of benefits also discovered from the original name which was net benefit proposed by [105]. Strategic benefit are like net benefits which can achieved by an ERP system are complex to measure. In this research we first proved that the strategic benefits has positive association with user's intention to use and user satisfaction. [4] explained the idea of measuring strategic benefits using different other parameters such as if the system provides extra competitive advantage in the business market. The system can also help in creating useful link with other organizations.

Table (2) Research Gap and Comparison of the Proposed and Existing Framework in Related Work

Model/ Year	Measurement Factors	Limitations	Proposed Framework
TAM-2 (2000)	10 factors	-There are several benefits, which are not included in this model. -Specifically Information and strategic benefits are not measuring using this model.	-The integrated model presented which can measure the different other kinds of benefits, such as system quality, information quality, user satisfaction.



		-Using this model for measuring ERP system, is not provide the list of benefits related with information quality, system quality and service quality. -The model was more specific with technology rather IS.	-The integrated model has been checked and reviewed by ERP experts.
IS Success Model-2 (2003)	6 factors	-There are few variables used to understand the behavior of the user. -Output quality and result demonstration are two major factors missing in this model.	-The model proposed in this study can help to measure both kinds of benefits; IS and technology acceptance.

## VII. SUMMARY

The paper explores the main idea of this research by covering vast literature review. Firstly, it discusses the very basic idea of ERP, its development and different kinds of model presented to measure the acceptance and adoption of ERP system in general. Secondly, we elaborated the list of general kinds of benefits can be achieved from any information system. Furthermore, the discussion leads to highlight the major factors extracted from literature review and investigated in this research. Thirdly, based on the finding form previous literature reviewed, the research gap highlighted in measuring the ERP implementation and success.

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