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THE ASSESSMENT OF INFORMATION SYSTEM EFFECTIVENESS IN E-LEARNING, E-COMMERCE AND E-GOVERNMENT CONTEXTS: A CRITICAL REVIEW OF THE LITERATURE

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ABSTRACT

The assessment of the effectiveness of the Web Information Systems (WIS) is increasingly needed as it significantly contributes to the organizations at organizational and individual levels. Also, in terms of assessment, many recent IS research indicated a literature gap in the conceptualization and completeness of the variables of Delone and Mclean models. For this reason, this study focuses on the critical review of the IS literature, and specially keeps attention on the concept WIS effectiveness at the individual level where the effectiveness is conceptualized in terms of users' performance skills. With the emergency of Internet technology, considering the interaction design quality as a determinant of success is highly important. Therefore, this study explores the impact of IS on the employee competencies. A new theoretical framework is also developed to cover the incompleteness problem in the quality factors side by adding a new factor namely interaction design quality. Since this study discusses WIS effectiveness in terms of user professional and interpersonal skills, it is expected that this study would contribute to the empirical studies in the fields of information system management and human resources development.

Keywords: *E-Human Resources Management, Web Information System (WIS), Information System (IS), Effectiveness, e-Learning, e-commerce, e-Government, User Performance, Interpersonal Skills, Professional Skills.*

1. INTRODUCTION

Web-based management information systems have been broadly employed in many organizations as it greatly contributes to the employees' performance and the organization as a whole. Therefore, putting WBMIS system into operation is extremely important for every firm in order to successfully accomplish its' objectives[1][2][3][4]. The effectiveness of MIS is considered as the most popular dependent variable in IS research and has a very prominent impact upon organizations in term of employee performance [5][6][7]. In this regard, the WBMIS effectiveness refers to the degree to which the WBMIS contribute value in terms of employee performance [8]. The effectiveness evaluation is vital and necessary and there are many assessment models have been developed for this purpose such as Delone and McLean (1992, 2003). With the emergence of the Internet, these assessment models are believed to be the most broadly used models in the Web technology systems such as e-commerce, e-learning and e-government[9][7][10]. Based on literature review (such as, [11][12][13][14][15][2][3][4] it is found that there are critical gaps from the academic perspective where the previous IS studies did not comprehensively discuss the effects of quality factors on the user performance and specially on the interpersonal skills of Web system users. Additionally, few research explore regarding the impact of interaction quality on the user performance in the IS field. To cover the gaps including the incompleteness of quality factors (system quality, information quality and service quality) and justify the IT investment into WBMIS, there is a high essentiality for conceptualizing and investigating the factors that could affect effectiveness, and also, it is important to evaluate the benefits that could be gained in terms of organization objectives including user performance.

2. THE THEORETICAL FOUNDATIONS

In this section, the researcher reviews what has been written about the concepts and definitions of

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effectiveness including organizational effectiveness and WBMIS effectiveness. The organizational effectiveness keeps attention on several dependent variables such as satisfaction, profitability and productivity as the criteria of effectiveness assessment [16][17]. Many IS researchers suggested that information system including WBMIS contributes to the effectiveness of organization in terms of several outcome variable such as user satisfaction, productivity and performance [18][19]. Because of the relationship and integration between organizational effectiveness and IS effectiveness, it seems that it is more appropriate to discuss the two concepts in the following two sub sections.

2.1 Organizational Effectiveness

n the 1960's and 1970's organizational researchers became increasingly interested in the topic of organizational effectiveness [20]. Regarding the concept of organizational effectiveness, [21] defined it as the extent to which the organization is effective in obtaining the outcomes it aims to achieve. Also [22] defined the effectiveness as the capability of the organization to make development towards the utilization of the available significant resources. In similar direction, [23] defined the effectiveness as the extent to which the organization achieves its goals. But in the context of organizational effectiveness, there is no agreement on the measurement of organizational effectiveness using particular model[24][25] highlighted three causes for the existence of numerous organizational effectiveness models: the space of identifying organizational effectiveness as a factor is unknown, there is no convention criteria for measuring organizational effectiveness, and the existence of several models are the results of several models of organizations. Concerning the existence of multiple models, [25] also mentioned that these models control the relationship among effectiveness variables. Thus, [26] and [27] pointed out that assessing the organizational effectiveness brings forth the need for setting up the most suitable criteria which differ from organization to another. Therefore, several researchers assessed the effectiveness based on different attributes. The following Table 1 summarizes the indicators that were actually used to evaluate the effectiveness, where this table is adapted from[28]. Table 1 indicated that [17] found 14 effectiveness indicators, where the adaptability, flexibility, satisfaction and productivity are the most commonly used factors.[16] reviewed 30 studies and indicated many other factors (such as profitability, motivation, job satisfaction, managerial professional skills, managerial interpersonal skills, and internalization of organizational goals) in addition to some of those explored by [17].

Table1: The Indicators Of Effectiveness [28]

Author	Assessment criteria
[16]	Overall effectiveness, productivity, efficiency, profit, product/service quality, Accidents, growth, absenteeism, turnover, job satisfaction, motivation, Morale, control, conflict/cohesion, flexibility/adaptability, planning and goal setting, goal consensus, internalization of organizational goals, Role and norm congruence, managerial interpersonal skills, managerial task skills, information management and communication, readiness, utilization of environment, evaluations by external, entities, Stability, value of human resources, participation and shared influence, training and development emphasis, and achievement emphasis.
[17]	Adaptability, productivity, satisfaction, profitability, resource acquisition, absence of strain, control over, environment, development, efficiency, employee retention, growth, integration, open communications, and survival.

The indicators: adaptability, flexibility, satisfaction, productivity are the most commonly used indicators in the two review studies. Second, according to[25], there are many levels of analysis for measuring the effectiveness including individual level, sub-unit level, organizational level and organizational-environment level. Third, there are four main approaches for evaluating the organizational effectiveness including the systems resource method, the strategic constituencies method, the competing values approach, and finally, the goal attainment approach [29]. The measurement of effectiveness is very important for any organization, and it is specially significant for the non-profit organization as the donors need to know how much the organization is effective in performing its objectives. Therefore, the assessment

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of the non-profit organization outcomes can be done through assessing the performance indicators of these outcomes[30].

For this study, three of the assessment aspects are considered: WBMIS effectiveness, user satisfaction and quality of WBMIS. In the following sub section, the concept of IS effectiveness is discussed in details while the quality factors and user satisfaction with WBMIS are explained in the next sections.

2.2 WBMIS Effectiveness

The information system is considered as user-machine system for supporting management, operations, and decision making process inside the organization [31]. [32] defined the information system as a set of interrelated elements or parts that store, process, retrieve and distribute information in order to support the control and managerial function such as decision making in the organization. They also defined the Management Information System (MIS) as the information system that primarily focuses on the managerial functions such as planning, controlling and decision making at the management level. As another definition, a management information system can be defined as the information system that supports the managerial functions such as decision making at different levels in an organization [32] [33].

Many information system researchers [34] [35] suggested that the deployment of Web-based information systems has positive effects on every organization because the adoption of such systems provides the organization with important advantages such as the improvement of service quality, cost reduction, performance increase. It is highlighted that with the evolution of the Internet technology many information systems have developed to become Web-based information systems such as e-business, e-government and web portals [36]. With the emergency of Internet, these Web systems became widely accessed by everyone as well as many advantages are actually gained [36] [37]. The features that could be obtained from the deployment of such Web systems are innovation, technology transfer, performance improvement, competitive advantage and an increase in the management capabilities [36] [35] [38]. Based on literature review [3] [39] [40] [41] [42] the IS researchers attempted to typically use, adjust or develop the D&M model to involve the impact of Internet technology in the assessment process. The information system studies have taken into consideration the several different aspects and viewpoints of information systems such as process, product, user satisfaction, service quality dimensions, and effectiveness. In that respect, it can be concluded that most of IS studies highlighted that the customer value (i.e. effectiveness) should be taken into consideration, and therefore, the perceptions regarding the above mentioned viewpoints have a critical role in the evaluation of the system [38]. As the information system has positive effects on the individuals, groups, and organization performance as a whole[43] [10], most of the IS researchers indicated that one of the most important issues in the information management field is assessing and enhancing the information system effectiveness [7] [9] [44].

Generally, the criticism of IS research has often referred to the inability to find a universal theoretical base for effectiveness[45] [46]. Many IS researchers (such as [27] [47]) mentioned that despite the information systems effectiveness is a difficult variable to be assessed based on an accurate measure, IS effectiveness is considered the ultimate outcome of IS research(i.e. the IS dependent variable).

Based on literature review, IS success and IS effectiveness are interchangeably used [47] [48] [49] [10]. Although the IS research are not agreed regarding a singular standard definition for IS effectiveness [50] [51], many studies identified the concept of effectiveness such as [8] [52] [53].

[50] defined the IS effectiveness as the degree to which the information system actually adds value towards achieving organizational goals. The effectiveness of accounting information system as a type of information system can be received as a measure of success to fulfill the planned objectives [54][55] considered that the effectiveness of information system can be defined as the providing information to help in decision making process. Furthermore, [8] defined the effective system as a value-added system which influences the user behavior positively, and therefore, IS effectiveness can be assessed in terms of behavioral actions such as communication, productivity, and performance [52] indicated that the effectiveness is an aspect concerned with the impact on the working environment, and the benefits that could be gained from its usage. Also, [56] adds to the evidence that HR outcomes affect business outcomes (e.g.

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Effectiveness). Similarly, [57] mentioned that professionalism and skills are a perceived determinant of the effectiveness.

Also, it is pointed by the researchers that IS could be considered an effective system if it assists the organization in achieving its goals [53]. In that respect, [58] explored relationship between IT usage and individual performance. Also it is suggested that information system should meet the user expectation for being a quality information system, and then it could be considered as an effective IS. [49] indicated that IS effectiveness is the final outcome which is fully dependent on the quality factors, satisfaction and net impact dimensions. In the same direction, [7][9] considered the effectiveness as a dependent variable affected by multi constructs: system quality, information quality, service quality, satisfaction and net benefits. Thus, still the path among these variables is not clear and the relationships among them are not comprehensively examined.

Above all, evaluating the impact of IS/IT on individual performance has become a significant factor in verifying the value of information systems [60] [61]. Many IS researchers e.g. [62] [63] highlight that employee portals have positive impacts upon the organizations in several fields such as employee productivity and communication. As an important point, the WBMIS/ portal is not designed to only view simple information or tools, but also organization processes, and applications should be integrated with it [64] [65].

Concerning the measures of IS effectiveness, many researchers [66][67] highlighted that the efficient measures of effectiveness should be relevant to organizational performance. In case of UNRWA, it has already developed the WBMIS as an essential part of its organizational development plan in order to enhance the performance of the employees in professional and interpersonal skills.

With regard to the evaluation approach, the goal attained approach is concerned with evaluating the organization in terms of its objectives through investigating the difference between actual performance and planned objectives. For UNRWA, the WBMIS is designed to be helpful in achieving organizational objectives, and therefore, fourth approach which is namely goal attained should be adopted. Consequently, the concept of [8] is seemed to be the most appropriate definition. Thus, WBMIS effectiveness is the extent to which WBMIS contributes to the organization at individual levels towards the development of user performance skills as an organization objective. Many IS researchers [33] [7] [66] [49] [47] considered the user satisfaction, organization impact, individual impact, net benefits and user performance as the measures or indicators of information system effectiveness.

In this study, the effects of the quality factors on the WBMIS effectiveness are investigated through developing a new assessment model based on D&M03. Therefore, the net benefits represent the effectiveness of WBMIS, and it should be measured in terms of performance. To comprehensively evaluate the WBMIS effectiveness in terms of user performance, it is important to conceptualize the effectiveness as two parts including professional and interpersonal parties [68]. Consequently, the WIS effectiveness can be defined as the extent to which the WIS contributes to the user performance in terms of professional and interpersonal skills [69] [70].

With the emergence of Web technologies, the information system researchers attempted to adjust and develop D&M03 to be compatible with the E-business, E-Learnng and E-govenement. In the context of this study, a new assessment model is developed on the bases of [49]. Accordingly, WBMIS effectiveness has a significant relationship with the constructs such as system quality, information quality, user satisfaction, and service quality [49] [7]. In addition, many researchers indicated that interaction design influences the WBMIS effectiveness [71]. In the next two sections, the IS studies that employed D&M models in the IS assessment are presented and the relationships between study variables are the quality factors and effectiveness are also discussed.

3. INFORMATION SYSTEM EFFECTIVENESS STUDIES

Based on Literature review, the IS effectiveness studies can be classified into two categories: studies conducted for assessing traditional information systems and studies conducted for assessing web based information systems. Thus, the following two sub sections discuss these information systems studies. For IS assessment studies, Figure 1 reveals

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the classification of IS effectiveness studies in terms of working environment.

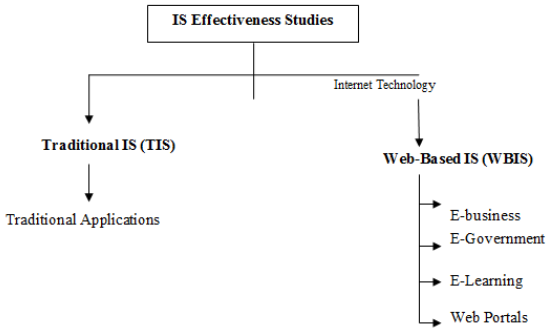

Figure 1: The Classification of IS Assessment Studies.

Based on Figure 1, it is clear that WBIS could be classified into categories: E-business, E-government, E-Learning, and Web portals.

3.1 Traditional IS Assessment Studies

This category refers to the theoretical framework through which the authors originated their models. In this context, IS researchers focused on several aspects such as process, stakeholders, and satisfaction. The theoretical foundation of the assessment models suggested by IS researchers are built based on [47] [49] [72] and TAM. In addition, there are some studies depend on theories such as disconfirmation theory [73], task-technology fit [74], and evolutionary theory (Piccoli et al., 2004). However, the most commonly used model contributing to IS effectiveness assessment are D&M92 and D&M03 [9] [7]. With regard to D&M Assessment Models, Delone and McLean models are considered the most commonly used models for assessing the IS success or effectiveness [7] [9], where these two models are mainly concerned with six success dimensions. However, based on the nature of usage and dimensions, there are some differences between the two models. In the context of [74], it is practically measure the IS success based on six dimensions including, first, two quality dimensions consisting information quality and system quality. Second, user satisfaction, frequent use, individual impact, and organizational impact are considered as the remaining four success dimensions of D&M 1992. Figure 2 shows the six dimensions of D&M92.

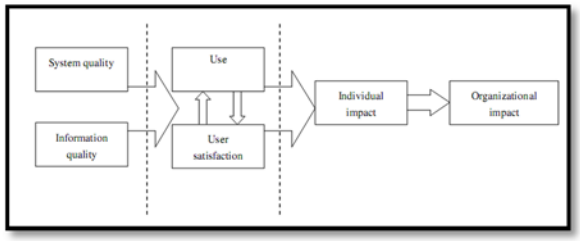

Figure 2: IS Success Model (Delone & McLean 1992)

Many IS researchers typically validate the D&M92 model while others suggested modifying the model by adding new dimensions such as service quality[76] [52]. In the survey study of Delone & McLean entitled with 10-year update study, the authors evaluated the arguments against their IS model, and thus, D&M03 model is developed to include the service quality as a new dimension. The main two differences between D&M 2003 (D&M03) and original model D&M92 is the inclusion of service quality as well as D&M03 groups the individual impact and organizational impact into net benefits. The involvement of the net benefits as a single measure strengthens the model because this makes the model more easily with less measures, and also responds to the negative and positive impacts as a whole [72] [41] [7]. However, an interesting research made a review for D&M03 and eliminated the use construct [78] [79]. Figure 3 shows the IS dimensions included with in D&M03.

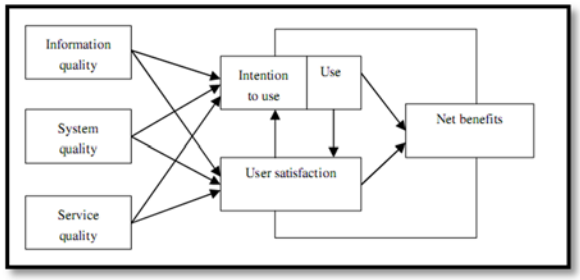

Figure 3: IS Success Model (Delone & McLean 2003)

3.2 WEB-BASED INFORMATION SYSTEM ASSESSMENT

A need for developing the existing information systems emerged with the rise of information technology. Consequently, it is necessary to turn the IS into Web-based information system (WBIS) in order to gain the features of the adoption of the internet technology such as communication

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enhancement. In the Web-based information systems, the basic trend is to typically apply or modify the traditional IS theoretical model such as D&M92 and D&M03 in order to benefit from Internet technology advantages. To this end, the IS researchers attempted to involve the impact of the Internet whenever they apply the typical or the developed form of D&M models, especially in the E-business, E-government, and E-domain in general.

3.2.1 E-Business Assessment Studies

With the emergence of the IT, the manner of business information system has been rapidly changed. The employment of the internet technologies in E-business contributes to the organizations as it provides management competency, innovation, creativity, and other crucial advantages such as communication enhancement [36] [38]. E-Business basically makes a radical change in the way the business is performed.

Any business process that could be accessed through internet environment is called E-business **[37] [36]** indicated that there are several forms of E-business such as Business to Customer (B2C), business to business (B2B), and customer to customer (C2C). Most of authors have interchangeably used E-business and E-commerce as they are used in sharing information, conducting transactions and communication with partners [37]. E-commerce has been defined as the computer mediation for exchanging information between organization and external stakeholders [36]. Many assessment studies have conducted in E-business field such as[13] [14] [15] [80] [81] [82] [83] [77], and thus, several assessment models have already developed. D&M03 is considered as one of the broadly used model in assessing the effectiveness of E-business system. The addition of service quality to D&M03 made the model highly responsive to the E-business requirements and IT advances. [77] conducted an evaluation research on the Jordanian Telecom group where D&M03 and TAM are utilized in building the assessment model. [84] examined the information systems in the public sector in Egypt, and his model is also developed based on D&M03. Moreover, [80] conducted a study to evaluate the E-training effectiveness in the Malaysian multinational companies. In that study, the researchers utilize D&M03 in addition to other theories in originating their model. Further, [13] assessed the impact of mobile shopping system on the performance in Taiwan where the assessment model is developed on the bases of D&M03. Although these studies have encouraging results, they did not comprehensively discuss the factors that might affect the effectiveness of Web-based information systems.

3.2.2 E-Government Assessment Studies

[85] indicated that with the propagation of the Internet technology and Web systems, it is necessary to include the features of Web technology in serving people because this leads to enhance the interactivity between citizens and government (G2C). Therefore, E-government is considered as one of the critical issues that result from the transformation of information systems from traditional to internet working environment.

To respond to the advances in information technology and citizens needs, the governments employ the internet technologies in providing services to its customers (i.e. citizens) in order to increase the quality of the services [86]. Since E-government system could affect the efficiency of the communication between stakeholders and the integration of cross-organization processes, it is essential to develop the assessment model based on proper theoretical foundation [87]. The available assessment models of E-government are examined by many researchers (such as[88] [87]. However, the researchers suggested that these models are one side (i.e. different administrative levels or stakeholders are not involved) and concerned with quantifiable findings. [88] pointed that these models are not sufficient to be used in the assessment, and thus they recommended using D&M models in the E-government assessment.

In practice, many of the most recent IS studies adopt D&M03 in developing their assessment model [11] [12] [89] [90]. suggested that the success of E-government system should be examined in order to check the effectiveness of the electronic services provided to citizens. Also, Sambasivan et al. (2010) conducted an assessment study on the user acceptance of G2C in Malaysia, especially on the electronic procurement, and they developed their assessment model based on D&M03. Additionally, [90] explored the effectiveness of the E-government services in the field of employment and job seeking in Malaysia whereas D&M03 is employed in the development

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of the assessment model. Moreover, [12] assessed the effectiveness of E-government initiatives in Oman where D&M03 measure are utilized to develop the assessment model. Further, [11] examined the citizen centric adoption of e-government through developing an assessment model based on D&M03.

Despite meaningful results of these studies, there might be still gap in the completeness of the factors of the developed assessment models in E-government field [11]

3.2.3 E-Learning Assessment Studies

[91] indicated that the concept of E-learning is one of the commonly used terms in IS studies; however, a conventional definition for this term has not been achieved. E-learning is defined by [92] as Web based system that employ the Web technology advantages such as communication, collaboration, information exchange and training to support learners regardless to the time and location of learning. Several criteria and models are suggested to measure the effectiveness of the E-learning. The E-learning studies can be grouped into four approaches. First, the technology acceptance approach which is adopted by some researchers [93] [94]. As the second approach, E-learning quality approach which depends on Demand-Driven Learning Model (DDLM), and it has been adopted by many researchers such as [92]. Third, user satisfaction as a construct has taken a considerably attention as most of IS researchers considered satisfaction as one of the most important measures of Web-based IS, and specially, E-learning systems [10]. Fourth, Delone and McLean models (D&M03) is considered as one of the most commonly used models where many IS researchers in the field of E-learning orginate their assessment models based on D&M03 [95][96][97][10]. In this concern, Wang et al (2007) conducted an interesting assessment study in E-learning field in which they develop a famous scale and also check the suitability of D&M03's measures. Also, Saba [95] conducted a research to examine the impact of E-learning in terms of student outcomes. This research developed the assessment model based on D&M03. Accordingly, Delone and McLean model (D&M) is considered as one of the most popular models that could be adopted in the IS studies, in general and specially in E-learning as its measures properly address the main issues of E-learning and the other types of IS [98].

3.3.4 Web Portals

To improve the information exchange and provides an effective support to organization processes, many organizations utilize the internet technology through the deployment Web portal system, and therefore, the number of organizations which have Web portals has considerably increased in the most recent years [99] . Many organizations utilize the Web portals to expand the electronic services for their users and customers in several domains commercial portals, bank portals, university portals, and employee portals. Thus, the Web portal is considered as an essential part of E-business [100].

Generally, these organizations have deployed the Web portals in order to grant the users the ability to access data from various locations, and also, to provide an on-line information exchange [101][102]. Tojib [62] pointed out that employee portals introduce many advantages and benefits to organizations as well as their employees. Online information exchange, communication enhancement and employee performance improvement are the main features that could be gained from the employment of such Web portals [62]. Additionally, the Web portals provide a motivated working environment in which the users can easily navigate, find and access the data needed for performing their operational functions such as professional tasks, administrative functions and decision making [103]. Some IS authors considered the Web portal as one of the most essential parts of E-business or E-commerce [100]. Since millions of dollars have paid on the development of Web portals, it is essential to assess such IT investment in terms of their contributions, and therefore, it is necessary to assess the effectiveness of the Web portals [44][104]. Consequently, a group of researchers aimed at specifying the attributes that could be used in the portal assessment [105][99].

The leading studies that focused on the evaluation of Web portals are those of [62][106][107]. These studies proposed a new framework for measuring the user satisfaction with employee portal called B2E Portal User Satisfaction (B2EPUS). The model is developed based on the End User Computer Satisfaction (EUCS) which is established by [108]. Numerous IS studies have been conducted in order to assess the effectiveness of Web portals in terms of many construct including satisfaction. These studies are similar to those in E-business and E-government fields because the researchers developed their

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assessment model based on others (i.e. D&M models or theories such as TPB). As D&M models are considered as the most common assessment models, numerous of IS researcher have adopted them in originating their model variables [19][109][110]. Masrek [110] evaluated the effectiveness of campus portal as a case study in Malaysia where the suggested assessment model is developed based on D&M03. Furthermore, Masrek et al .[109] assessed the effectiveness of the Web portal of the library at Universiti Teknologi MARA from the perception of students (i.e. users), where the assessment model is developed based on D&M03. In addition, Chen (2013) investigated the effects of quality factors including system quality, information quality and service quality on the intention to use and organizational performance in the mobile shopping system field, and thus, Chen[10] actually originated his model based on D&M03.

Based on literature review, it seems that Web portal studies could be classified into four categories in terms of its focus: effectiveness studies [19][109], usage studies such as [19], user satisfaction studies [18][111] , and service quality studies.

The present study developed the assessment model based on D&M03 due to relevance of the theorization behind it to Web portals as well as its potential to evaluate the effectiveness of portal system in a comprehensive and meaningful manner. Moreover, D&M03 has an important contribution to the IS effectiveness literature because it was the leading model that attempted to evaluate IS based on critical effectiveness measures [109]. Therefore, it can be concluded that D&M03 has properly specified the essential measures that could be needed to assess the effectiveness of various types of information systems specially, Web-based information systems [98][9]. However, D&M03 needs to be developed through adding a new measures that could have an important role in the assessment of IS effectiveness [44][7]. As another important point, most IS studies deal with the directions (arrows) inside D&M03 as process's directions, and consequently, there is a shortage in the studies investigating the causality of D&M03 (i.e. the mediation role of user satisfaction). In the next section, an extensive literature review is conducted in order to provide a theoretical evidence on the relationships among study variables including information quality, system quality, service quality, interaction quality (interface quality and communication quality), and user performance. This step is considered as a basic step toward the mediation test of user satisfaction.

4 RELATED WORKS

Many IS research have suggested and proved the significance of the considerably related IS outcomes such as individual productivity as impacts of IS/IT on individuals [33][112][79][113][47]. In this context, [7] and [49] have considered the Net benefits instead of individual and organizational impacts which were included within the model of [47]. Petter et al.[7] also mentioned that it is more comprehensive and accurate to group the individual and organizational impacts into one factor called Net benefits. In terms of the relationships between effectiveness and other factors, the quality dimensions or factors are considered as the most popular factors [7]. Generally, the system quality, information quality and service quality are considered as the broadly used factors. However, based on the critical review, it is found that other factors such as interaction design quality can be proposed to fill the theoretical gap in the quality dimensions. In the following sub sections, details regarding the relationships between quality factors System Quality (SQ), Information Quality (IQ), Service Quality (SERQ), Interaction Design Quality (IDQ) and effectiveness in terms of performance are presented.

4.1 The relationship (SQ→ Effectiveness)

Based on literature review, it is found that IS research indicated that the system quality has positive impact on the effectiveness. The researchers mentioned the relationship between the system quality dimensions such as perceived ease of use and performance [114]. Also, it is highlighted that there is a positive relationship between SQ and perceived usefulness [115][116]. Furthermore, many IS researchers found a significant relationship between SQ and Effectiveness in terms of IS usefulness [117][118][119][120]. Seddon and Kiew [116] examined the relationship between system quality and usefulness and they found that system quality is positively related to usefulness. [119] indicated that ease of use has positive impact on the usefulness. Similarly, [118] found that system quality (i.e. ease of use) hase positive effect on the perceived usefulness of the enterprise system. Floropoulos et al. [117] also suggested that system quality is

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positively related to the perceived usefulness. Therefore, to examine the significance of the positive relationship between system quality and effectiveness, the hypothesis that assumes this relationship should be tested.

4.2 The relationship (IQ→ Effectiveness)

Regarding the relationship between information quality and Effectiveness, many researchers has found that there is positive relationship between information quality and individual impact or usefulness such as [42],[9],[121],[122], and[114]. The information system researchers found positive association between perceived information quality and perceived usefulness such as [122][123]. Bharati & Chaudhury [124] also mentioned the existence of positive relationship between information quality and decision making satisfaction as the Net benefits where decision making is good indicator for user performance. Furthermore, Wang & Liao [41] indicated that information quality is positively related to usefulness of the E-government systems. Lin [42] also found that information quality has a positive impact on the perceived usefulness which is a part of professional performance. Therefore, it is essential to test the relationship between information quality and effectiveness in order to ensure the significance of the positive relationship.

4.3 The relationship (SERQ→ Effectiveness)

Regarding the relationship between service quality and effectiveness, many researchers demonstrated that there is positive association between service quality and effectiveness or perceived usefulness as a part of performance [6][125][128][97][127]. Leonard-Barton and Sinha [128] mentioned that there is a positive relationship between technical skills of developers in terms of their responsiveness and efficiency. Also, it is found that there is positive relationship between service quality including developers' responsiveness, internal support training, and perceived system usefulness [127][129]. Cao et al. [126] concluded that service quality has positive influence on the perceived usefulness of Business To Customer E-Commerce (B2C) website. Ahn et al. [125] suggested that service quality has positive effect on the usefulness of the online retail systems. Moreover, Lin [97] found that service quality positively influences the perceived usefulness. Abugabah and Sanzogni [6] found a positive relationship between service quality and professional skills. Mosahab et al. [120] further reported that service quality has positive association with the customer loyalty which is a part of the user performance. Consequently, to ensure the existence of the relationship between service quality and user performance within the context of this research, it is essential to hypothesize this relationship.

4.4 The relationship (IDQ→ Effectiveness)

Many IS researchers such as Lin [97] suggested that interaction design quality including interface design has positive relationship with usefulness or employee performance. According to Bennett & Franco [131], factors such as availability of resources, feedback and communication affect the motivation of staff positively, where motivation is considered as a key factor in the employee performance [138]. Additionally, Blackler [133] and Arvey et al. [134] found that the interaction factors such as feedback, communication, social interaction and other personality traits affect the employee performance. From IT/IS perspective (i.e. Human computer Interaction HCI), the interaction design quality could be represented by the user interface design or web design quality [135]. Thus, within the context of this study, it is expected to have positive association between the interaction design and effectiveness. The interface design, graphics, communication, social interaction and feedback are conceptualized into two dimensions in order to examine the quality of interaction design. Consequently, it is essential to test the relationships between the two dimensions of interaction design (user interface quality and communication tools quality), and the effectiveness. The following is the summary table that shows the studies supported the relationships between independent and dependent variables:

Table2: Studies Supported Relationships Between Independent And Dependent Variables

Relationship	Supported studies
SQ→ Effectiveness	[114],[115], [118], [119], [120]
IQ→ Effectiveness	[43], [9], [122], [114], [123], [124], [41], [42]
SERQ→ Effectiveness	[6], [125], [128], [97], [127], [126], [129], [97], [130]
IDQ→ Effectiveness	[97], [131], [138], [133], [134], [135]

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5.CRITICAL ANALYSIS

Based on the latest and extensive review such as [11][12][19][14][15][80], the information system researchers mentioned that the existing models (D&M models 1992, 2003) are incomplete to be fit to identify and solve many IS research problem because it is found that there is a shortage in factors identification and theoretical framework [44][80][95][98][90][7]. Practically, the previous IS studies that adopt D&M03 did not consider one of the important factors which is interaction design quality. The IS researchers also mentioned that these models are just to represent the process nature of IS effectiveness/success dimensions as well as the process paths are not broadly valid [33][79].

With regard to usage of the system, it might be important to be explored in terms of the frequent use only through adding one question to questionnaire. However the system usage could not be considered as a separate factor to mediate the relationship between quality factors and WBMIS effectiveness because of the following reasons: 1) the scope of this research is to measure the WBMIS effectiveness through assessing WBMIS contributions to employee performance; it is not to measure the use a dimension of success or effectiveness, 2) Whenever the system is mandatory to be used, then usage does not make sense regarding the system evaluation [7][79][49][78], 3) Many researchers argued regarding the consideration of use, because many studies such as found that the relationship between quality factors and use is not supported [136][137][138][139], 4) according to Seddon [140] claims that IS Use is not an effectiveness measure but it is a behavior. Additionally, the model developed by Sedera and Gable [79] does not support the existence of use as a dimension for measuring the effectiveness of Enterprise Systems.

According to ten years survey of Delone & McLean [49], the researchers who have originate the D&M model mentioned that the term Net benefits describes the meaning of IS impacts more comprehensively because it means both negative and positive impacts. However, the use of this term to represent the contributions needs to determine three main questions including: (1) what qualify as benefits; (2) target group (for whom); (3) the impact will be assessed at what level (individual, group or organizational). Therefore, WBMIS effectiveness could be considered as the net benefits in term of employee performance at individual level [33][7][112][49][113][141]. In addition, it is an important point to highlight that the IS researchers have generally tested the net benefits in term of perceived usefulness measures which are simply considered as a part of user performance. However, this study is one of the fewest studies that consider the relationship between quality factors and interpersonal performance. The published IS studies did not consider the comprehensive concept of employee performance, and specially, interpersonal party. Consequently, in this research the effectiveness is represented in a more comprehensive manner by considering both professional and interpersonal skills of user performance. Based on the theoretical evidence provided in section 4 and the critical review, it seems that the following model can fill a critical gap in IS literature.

Figure 4 presents the proposed assessment model that can be utilized in the assessment of the IS value or effectiveness.

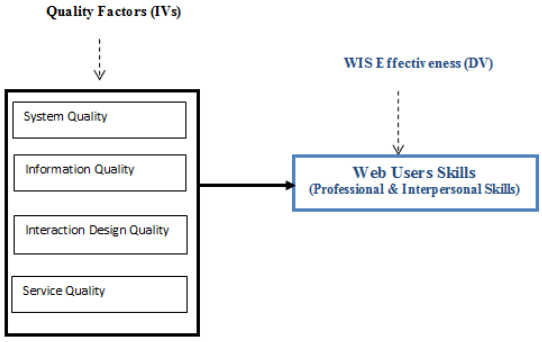

Figure 4. The Proposed Theoretical Framework Of Effectiveness Assessment

6. CONCLUSION

The primary purpose of this study is to comprehensively conceptualize and assess the WIS effectiveness in terms of user performance skills. For this reason, the study reviews the concepts and the related studies in the field of IS effectiveness. Based on this review, it is found that the available D&M models have incompleteness gap as the independent variables (quality factors) did not cover the whole IS functions and features. In addition, it is concluded that the concept of IS

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effectiveness in terms of users' competencies did not comprehensively cover the two parties of user performance. Moreover, it is found that the emergency of Internet brings a need for adding the interaction design as one of the determinants of WIS effectiveness. To this end, a new theoretical framework including interaction quality is developed in order to cover the theoretical gaps in the quality factor dimensions. As a future point of research, it is suggested to test the proposed model in different contexts such as e-learning, e-commerce and e-government.

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