

Assessing the Digital Divide Status of the Jordanian Telecentre

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Abstract

This study investigates the status of digital divide amongst Jordanian Telecentres. The objective of this study is to analyze the impact of the perceived usefulness, the perceived ease-of-use and the facilitating conditions on the behavioral intention of employees. In addition, the study investigates the effect of the three mentioned factors on the user acceptance while the behavioral intention on the user acceptance is used as a mediating factor. The proposed research model was validated by distributing 150 survey questionnaires to the Telecentres in Jordan. Structural equation modeling (SEM) technique was used to analyze the results. One of the main limitations of this study is that the results cannot be universal since the study was limited to Jordan. Similar study needs to be conducted in different countries to either support or negate our results.

Keywords

Digital Divide, User Acceptance, Information and Communication Technology, Telecentre

1. Introduction

The digital divide is considered as the gap between people who have access to information via digital means (e.g., the Internet) and those people who do not. In this age of digital information, people who do not have access to the Internet and World Wide Web are at a disadvantage. The digital divide means that people who do not have the access to the digital information are denied the option to participate in new ICT-based jobs, e-government, ICT-improved healthcare, and ICT-enhanced education [1]-[3]. A large gap between different people can negatively affect education, employment and economic growth of any country [4]. Since information and communication technologies (ICT) play a crucial role in socio-economic development in developing coun-

tries, governments, non-government organizations and International Telecommunication Union (ITU) are sponsoring Telecentres in most of the developing countries [5]-[10].

Telecentres are capable to offer public access to computers and related ICTs with the intention of facilitating local community development [11]. The International Telecommunication Union reports that only 26.6% of the world population has internet access at home. However, most of this percentage is in the developed world [12]. Recent research findings have shown that the public access to computers and the Internet through Telecentres platform has become popular over the last two decades [12]. The fact of many users can share network resources (e.g., lines of communications) facilities the extending of ICTs to more people. Whilst the word “Telecentres” is often used in this study, the concept of this term is too wide as it has been given a variety of names both in developed and developing countries.

There are many Telecentres in Jordan, for example, the cities of Irbid, Balqa, Zarqa, Tafelah, and the capital Amman. These centers offer training in information and communication technology. Primarily, Telecentres are meant to promote digital literacy, alleviate digital divide, poverty alleviation, and provide employment opportunities as well as to contribute to the e-governance and the e-commerce initiatives [6]. However, despite the aforementioned benefits of Telecentre highlighted, Telecentres have received little academic attention in respect of its user acceptance and use [5]. Previous studies identified some of the determinants of their potential users’ acceptance in developing countries using a revised version of unified theory of acceptance (UTAUT) and technology acceptance model (TAM) [13] [14].

Since a significant gap exists between regions and countries in terms of reaching and sharing the information across rapid developments in computer science and information technologies [15], this study examines the main factors affecting the digital divide status in Jordanian Telecentre. Such a study is rare (if any) in the context of developing country like Jordan. The lack of empirical studies in the developing countries on the determinants of digital divide in relation to the on-going implementation of Telecentre has necessitated conducting this study. Hence, this research provides useful insights into motivations underlying the intention and acceptance of Telecentre in a developing country like Jordan.

The rest of this paper is organized as follows. It commences with the research model and hypotheses formulation. Then, the methodology used for the study is discussed. After that, the presentation of the analyses and the results are described. The discussion and conclusion are then stated and areas for future research are also provided.

2. Motivation of Study

The empirical measurements of the number of people benefited from training and the number of available jobs created to the generality of employees are used to measure the effectiveness of Telecentres [16] [17]. Other factors such as the human development and the well being reported on the self sustaining infrastructure that add value to the community as a whole are also used [18]. A number of researchers deliberated on the sustainability of Telecentres [19]. The reason is often attributed to ineffectiveness on both the planning and implementation stage by the implementers [20]. The effectiveness can be defined as a degree to which an organization realized its goals. The closer the output meets the goal of organization, the more effective the organization is [21]. The achievements of Telecentres implementation are reported the literature [19]. However, a few of them address the issue of the effectiveness of Telecentres. On the other hand, a study on the effectiveness of Telecentre from the demand side (users) using the two levels of effectiveness management and program effectiveness are reported to be limited [22]. Corrocher and Ordanini (2002) presented the role played by political, institutional and cultural cross-country differences to explain the gap; on the other hand, they also emphasized the multidimensional and complex nature of digital divide [23]. In a study conducted by Doong and Ho (2012), secondary data of ICT relevant variables of 136 countries spanned five continents from 2000 to 2008 were collected and analyzed [24]. Their proposed framework involved data clustering and multidimensional data ranking. They showed that most countries had a convergent ICT development path during this period. In addition, countries with different gross national income (GNI) levels have different ICT development paths. The study conducted by Bagchi (2005) investigated the factors that contributed to the problem of digital divide in the global community with the value of information technology index including four different resources of IT data (the Internet, PC, Cell phone and telephone) [25]. The study used cross sectional and time-series methods and with a large set of variables that may affect the cross-country divide.

Previous research studies showed that a positive correlation between ICT utilization and economic development exist (e.g., Gholami *et al.*, 2004) [26]. More than a decade ago, Jordan recently started exploring the use of ICT to enhance the development of its economy and to achieve a successful integration with the global environment. His Majesty King Abdullah II launched an ambitious strategy aimed at transforming Jordan into a knowledge-based economy and society, and positioning the Kingdom as the leading ICT hub in the region. Accordingly, in April 2002 Jordan's Ministry of Information and Communication Technology (MoICT) was established. Some efforts have already been made to build an ICT industry that is based on a logical ICT strategic vision at the national level. The spread of the telecommunication sector started in 1995. This study aims to study the theoretical concept of digital divide and comparing it with practical the practices in the Telecentres. By understanding the digital divide related with user acceptance, some practical recommendations can be offered to reduce the gap in digital divide. Thus, this research contributes in defining and assessing the success factors that can reduce the digital divide gap.

3. Research Model and Hypotheses Formulation

The unified theory of acceptance and use of technology (UTAUT) and technology acceptance model originated by Davis (1989), Taylor and Todd (1995), and Venkatesh and Davis (1996) are used to derive the research model adopted in this study [13]-[28]. Taylor and Todd (1995) presented an empirical support to show that IT acceptance can be explained by UTAUT model [27]. The UTAUT model can also be applied to the challenges of implementing Telecentre. Consequently, the UTAUT (Taylor and Todd, 1995) model was adopted as a theoretical framework to examine Users' acceptance of Telecentre [27]. An over view of Telecentre context revealed a slight departure from the traditional IT context. Thus, UTAUTs' fundamental constructs and TAM may not completely reveal the specific influences of Telecentre context factors that may alter user acceptance. This paper studies the direct effect of the perceived ease of use, the perceived usefulness, and the facilitating condition on behavioral intention and the effect of behavioral intention on user acceptance. In addition, this paper studies the mediating effect of behavioral intention between the perceived ease of use, the perceived usefulness, and the facilitating condition on user acceptance. This study hypothesizes positive linkages between dependent and independent factors as follows (see **Figure 1**).

3.1. Perceived Usefulness

The concept of perceived usefulness can be defined as the perception that a given technology can help a user achieve his or her work goals (Venkatesh and Morris, 2000) [29]. They argued (within the context of adopting and using a new technology in the workplace, evidence) that the most important determinant of an employee's attitude toward adopting and using a new technology is his or her perception of the usefulness of the technology (*i.e.* the perceived usefulness) typically explaining 30% - 35% of the variance observed in the behavioral intent.

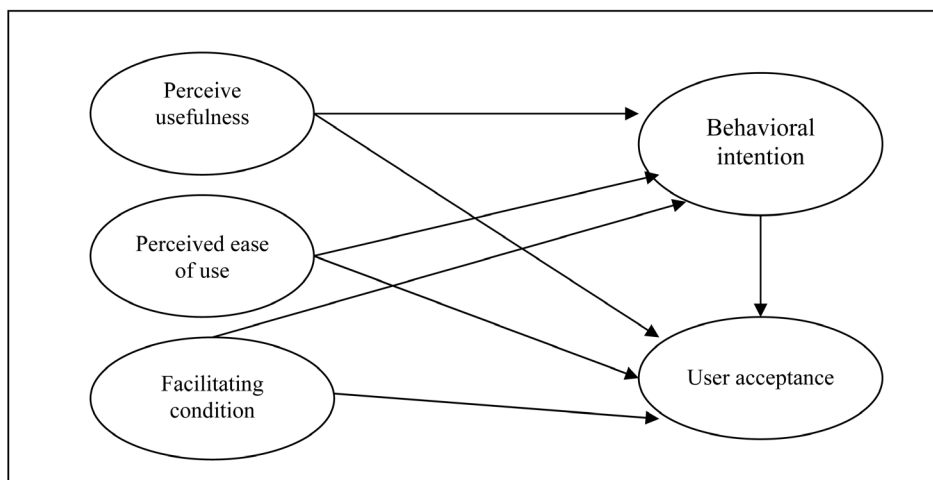


Figure 1. Research model.

Employees are much more likely to adopt a system that they believe will help them achieve their work goals. Therefore, we posited that:

H1: The perceived usefulness will have a positive influence on the behavioral intention.

3.2. Perceived Ease of Use

The ease of use is a concept refers to user's perception of how the technology in organization is difficult to use, it is the evaluation of the degree to which using the technology is free of effort (Davis, 1989) [13]. It is unlikely for a complex system to be used when an alternative method exists. Thus, these difficult-to-use technologies are judged by the users to be less useful under voluntary conditions. Thus, we posited that:

H2: The perceived usefulness has a positive influence on the behavioral intention.

3.3. Facilitating Condition

Taylor and Todd (1995) defined the facilitating conditions as the degree in which a user believes that an organizational and technical infrastructure exist to support the use of new information system [27]. The theoretical foundation of facilitating condition is derived from four models used by (Taylor and Todd, 1995) [27]. Wang and Chou (2006) showed that the facilitating conditions have positively influenced the practice of information technology stage [30]. Therefore, we test the following hypothesis:

H3: The facilitating condition has a positive influence on the behavioral intention.

3.4. Behavioral Intention

The behavioral intention construct is defined as a measure of the strength of one's intention to perform a specified behavior; and the behavior intention was identified as extremely important construct in the technology acceptance study as it was referred to "as a key criterion in User acceptance research" (Taylor and Todd, 1995), and it was originated from the theory of reasoned action (TRA) by (Fishbein and Ajzen, 1975) [31]. Previous studies have shown that behavioral intention has a direct impact upon the individuals' actual use of a given technology [32]. Consequently, we test the following hypothesis:

H4: The behavioral intention has a positive effect on the user acceptance.

3.5. Mediating Effect of Behavioral Intention

In this study the researchers theorize behavioral intention as a mediator in the relationship between the factors (Perceived usefulness, perceived ease of use, facilitating condition) and user acceptance. Therefore, we test the following hypotheses:

H5: Behavioral intention will have mediating effect between perceived usefulness and user acceptance.

H6: Behavioral intention will have mediating effect between ease of use and user acceptance.

H7: Behavioral intention will have mediating effect between facilitating condition and user acceptance.

3.6. Direct Effect of Factors on User Acceptance

In this study the researchers hypothesized the direct relationship between the factors in the framework, (perceived usefulness, perceived ease of use, and facilitating condition) and user acceptance in order to show which of these factors has significant effect on user acceptance.

H8: Perceived usefulness will have influence on user acceptance.

H9: Perceived ease of use will have influence on user acceptance.

H10: Facilitating condition will have influence on user acceptance.

4. Research Methodology

To confirm the content validity of the measurement scales, the items used to measure the constructs of behavioral intention and facilitating condition were adapted from Taylor and Todd (1995), while the items measuring perceived ease of use and perceived usefulness concept originated from Davis (1989) relevant in the context of Telecentre [13] [33]. In addition the items measuring user acceptance was adapted from Wang and shih (2008) [14]. The scale used from (1 - 7) with choice from "strongly disagree" to "strongly agree" were used to measure

all the items. **Table 1** shows the measured constructs and the questions measuring each construct.

The users of Telecentres were selected as sample using simple random sampling methods. According to (www.ks.gov.jo) 149 Telecentres in Jordan with varying characteristics were selected for this study. 37 of the Telecentres are located in rural areas, 60 in a semi-urban area and 52 in an urban area. 200 questionnaires were distributed and 150 questionnaires were found to be valid for conducting analysis. This number represents 75% of the total distributed surveys. The research model was tested using structural equation modeling techniques using AMOS 20. The unit of analysis of this study is individual. The individuals are shown as the most appropriate respondents for this research because they are the end-users. There is empirical evidence on the previous researches that have used individuals as their key respondent such as (Wang, Wu, and Wang, 2009) [34]. The characteristics of the respondents are shown in **Table 2** which consists of gender, age, educational level and income.

5. Data Analysis and Result

5.1. Assessing the Reliability of the Constructs

In order to proceed to the SEM analysis, it is essential to assess each scale for interconsistency reliability by using Cronbach’s alpha. This stage is vital to exclude all components with low reliabilities in the SEM analysis (*i.e.*, purify the items before conducting the confirmatory factor analysis or CFA). Furthermore, some researchers (e.g., Hair *et al.*, 2006) recommended Cronbach’s alpha values between 0.60 and 0.70 [35]. While the description of the scale items as well as the reliabilities for the observed items of the survey constructs are presented in range from 0.69 - 0.85, as shown in **Table 3**, all of the research constructs exceeded the recommended value of Cronbach’s alpha (*i.e.*, between 0.60 and 0.70), and thus revealed a satisfactory degree of reliability and the composite reliability values ranged from 0.73 to 0.83, and all were greater than the recommended value of more than 0.60 [36].

5.2. Assessing the Validity of the Constructs

While convergent validity test is important in the measurement model to verify if the indicators in a scale load together on a single construct, discriminant validity test is also important to confirm if the items developed to measure different constructs are absolutely evaluating different constructs.

Table 1. Constructs and measurement items.

Construct	Measurement items
Perceived usefulness (PU)	PU1: Using the Internet enables me to accomplish the required tasks more quickly. PU2: Using the Internet improves my work. PU3: Using the Internet improves my learning productivity. PU4: Using the Internet makes it easier to study and learn.
Perceived ease of use (PE)	PE1: It is easy for me to remember how to perform tasks using the Internet. PE2: I believe that it is easy to get the Internet to do what I want it to do. PE3: My interaction with the Internet is clear and understandable. PE4: Getting the information from the Internet is easy.
Facilitating condition (FC)	FC1: I have the resources necessary to use ICTs facilities in Telecentre. FC2: I have the knowledge necessary to use ICTs facilities in Telecentre. FC3: Detail instruction about Telecentre use is available to me. FC4: There is sufficient electricity and Internet service to use ICTs facilities’ in Telecentre. FC5: A central support is available to help with technical problems. FC6: A specified person (or group) is available in case of difficulty.
Behavioral intention (BI)	BI1: I intend to use ICTs facilities in Telecentre in the future. BI2: I predict I would use ICTs facilities in Telecentre in the future. BI3: I plan to use ICTs facilities Telecentre in the future. BI4: I perceive using Telecentre as voluntary.
User acceptance (UA)	UA1: Telecenter strongly supports my using the database. UA2: I would like to use the database because my colleagues think I should use it. UA3: I would like to use the database because Telecenters thinks I should use it. UA4: My colleagues strongly support my using the database.

Table 2. Characteristics of the respondents (N: 150).

Characteristics	Number	Percentage
1. Gender		
Male	110	73%
Female	40	27%
2. Age		
20 - 29	100	67%
30 - 39	15	10%
40 - 49	20	13%
50 - 59	15	10%
3. Educational level		
Secondary school	50	33%
Diploma	62	42%
Bachelor degree	30	20%
Others	8	5%
4. Income (JD)		
200 - 300	115	77%
350 - 500	25	17%
500 - 1000	10	6%

Table 3. Reliabilities of the scales (N = 150).

Constructs	Indicators	Cronbach's alpha
Perceived usefulness	PU1-PU4	0.81
Perceived ease of use	PE1-PE4	0.79
Facilitating condition	FC1-FC6	0.71
Behavioral intention	BI1-BI4	0.85
User acceptance	UA1-UA4	0.69

5.3. Convergent Validity

Some researchers (e.g., Schwab, 1980) argued that convergent validity is established when the factor loadings (*i.e.*, the standardized regression weights) are significant [37]. Also, Bollen (1989) emphasized that the greater the factor loadings, the stronger is the indication that the measured scales represent the constructs [38]. As shown in **Table 4**, the researchers examined the standardized regression weights for the research's indicators and found that some indicators had a low loading towards the latent variables (*i.e.* less than 0.50, which is the criterion value recommended by Newkirk and Lederer (2006)). In particular (PU4 = 0.246, PE1 = 0.398, FC4 = 0.378, FC5 = 0.379, FC6 = 0.339, BI4 = 0.401). Moreover, since all of these items did not meet the minimum recommended value of factor loadings of 0.50 (Newkirk and Lederer, 2006), they were all removed and excluded from further analysis [39].

5.4. Discriminant Validity

Discriminant validity was investigated using several tests. Fronell and Larcker (1981) argued that discriminant validity could be examined in the measurement model by investigating the shared average variance extracted (AVE) by the latent constructs [40]. Also, the correlations among the research constructs could be used to measure discriminant validity by examining if there are any extremely large correlations among them. Presence

Table 4. Reliability and factor loadings.

Construct	Factor loading	Composite reliability
Perceived usefulness		0.760
PU1	0.732	
PU2	0.794	
PU3	0.582	
Perceived ease of use		0.831
PE2	0.782	
PE3	0.774	
PE4	0.705	
Facilitating condition		0.793
FC1	0.694	
FC2	0.591	
FC3	0.759	
Behavioral intention		0.737
BI1	0.723	
BI2	0.812	
BI3	0.784	
User acceptance		0.781
UA1	0.622	
UA2	0.745	
UA3	0.534	
UA4	0.798	

of such extremely large correlations implies that the models have a problem of discriminant validity.

In addition, if the AVE for each construct exceeds the squared correlation between that construct and any other constructs, then discriminant validity occurs (Fronell and Larcker, 1981) [40]. As shown in **Table 5**, and following Fronell and Larcker's (1981) formula of calculating the average variance extracted of a latent construct, this study showed that all the constructs explained 50 percent or more of the variance, and ranged from 0.61 to 0.76, which met the recommendation that AVE values should be at least 0.50 for each construct [36] [41]. Furthermore, as shown in **Table 5**, discriminant validity was demonstrated, as the AVE values were more than the squared correlations for each set of constructs. Therefore, the measures significantly discriminated between the constructs.

5.5. Assessment of Measurement Model

In order to have statistical influence in the model fitness to the dataset, Maximum Likelihood Estimation (ML) is suitable in SEM for several reasons. Firstly, ML is a widely-used estimation method, especially with limited sample sizes of 100 to 200 [42]. Also, it is applied to estimate all model parameters simultaneously [43]. The χ^2/df ratio is also considered as one of the indices that requires three or less values for an acceptable model [43]. In this case, the smaller the value of the ratio, the better is the fit. However, some researchers (e.g., James *et al.*, 1982) recommended the ratio to be between 2 and 5 [44]. Furthermore, if the AGFI, NFI, IFI, TLI and CFI values are from 0.80 to 0.90, they are considered acceptable [45]. RMSEA value takes the goodness-of-fit of the model into account. The accepted values should range between 0.05 and 0.08 [35]. Accordingly, the result confirmed that the measurement model fits with the data collected (see **Table 6**).

Table 5. AVE and square of correlations between constructs.

	PU	PE	FC	BI	UA
PU	0.730				
PE	0.180	0.760			
FC	0.117	0.306	0.635		
BI	0.228	0.136	0.355	0.617	
UA	0.135	0.161	0.149	0.177	0.674

(Note: Diagonal elements are the average variance extracted for each of the five constructs. Off-diagonal elements are the squared correlations between constructs.)

Table 6. Fit indices for measurement and structural model.

Quality of fit measure	Recommended value	Measurement model	Structural model
χ^2/df	2 to 5	1.11	2.215
AGFI	0.80 to 0.90	0.60	0.85
CFI	0.80 to 0.90	0.921	0.971
TLI	0.80 to 0.90	0.822	0.943
IFI	0.80 to 0.90	0.772	0.887
NFI	0.80 to 0.90	0.833	0.944
RMSEA	0.05 to 0.08	0.021	0.045

5.6. Hypotheses Testing and Result of the Study

The findings from the empirical study, as shown in this study, presented interesting results for discussion, which extended previously research in the areas of behavioral intention and user acceptance. As noted in **Table 7**, ten propositions related to the aims of this study were developed and tested. Out of the ten proposed relationships, two were not supported and eight were supported.

Table 7 presents each parameter's C.R. estimate. Based on the results provided, it is clear that behavioral intention has a significant positive and direct impact on user acceptance ($P = 0.002$). Therefore, H1 is supported. H2 is also supported as perceived usefulness has a significant positive on behavioral intention ($P = 0.001$). H3 is not supported because perceived ease of use has insignificant impact on behavioral intention ($P = 0.221$). For H4, facilitating condition has a positive significant impact on behavioral intention ($P = 0.018$) indicating support for it. Perceived usefulness has a positive significant impact on user acceptance ($P = 0.014$), indicating that H5 is also supported. In addition, for H6, perceived ease of use is found to has a positive direct impact on user acceptance ($P = 0.02$) also indicating the support for it. In addition, facilitating condition is found to have impact on user acceptance ($P = 0.01$) indicating that H7 was accepted.

5.7. Result of Behavioral Intention as a Mediating Effect

For this study, the researchers tested the mediating effects of behavioral intention in the relationship between the (perceived usefulness, perceived ease of use, facilitating condition) and user acceptance as shown in **Table 8**. The insignificant result of empirical finding (direct effect 0.044 more than indirect effect 0.002) confirmed that behavioral intention did not mediate the relationship between perceived ease of use and user acceptance. To conclude, this finding did not support H9. In contrast, the significant empirical result (direct effect 0.174 less than indirect effect 0.186) confirmed that behavioral intention mediated the relationship between perceived usefulness and user acceptance. Consequently, H8 was supported. Another significant result of empirical finding (direct effect 0.035 less than indirect effect 0.071) confirmed that behavioral intention mediated the relationship between facilitating condition and user acceptance. Hence, H10 was supported.

Table 7. Summary of proposed results for the theoretical model.

Research proposed paths	t-value (CR)	Coefficient value (std. estim)	P-value	Results
PU \longrightarrow BI	2.334	0.110	***	Supported
PE \longrightarrow BI	4.320	0.201	0.221	Not Supported
FC \longrightarrow BI	2.825	0.104	0.018	Supported
PU \longrightarrow UA	2.301	0.101	0.014	Supported
PE \longrightarrow UA	6.407	0.612	0.026	Supported
FC \longrightarrow UA	2.013	0.216	0.012	Supported
BI \longrightarrow UA	6.245	0.208	0.002	Supported

(***P ≤ 0.005, **P ≤ 0.01, *P ≤ 0.05). Notes: Path = Relationship between independent variable on dependent variable; C.R = Critical ration; S.E = Standard error; P = Level of significance.

Table 8. Mediating effect of behavioral intention.

Hypothesis	From	Mediation	To	Direct effect	Indirect effect	Total effect	Results
H8	PU	BI	UA	0.174	0.186	0.36	Supported
H9	PE	BI	UA	0.044	0.002	0.046	Not supported
H10	FC	BI	UA	0.035	0.071	0.106	Supported

6. Discussion and Conclusions

The findings have shown that acceptance of Telecentre can be verified by perceived ease of use, perceived usefulness, and facilitating condition. The findings further highlighted the fitness of using the revised UTAUT model and TAM in accepting user behavioral intention and user acceptance in relation to Telecentre acceptance. In the point of view of this study, perceived usefulness and facilitating condition are the most significant determinant of behavioral intention. These findings are consistent with most prior research in technology acceptance [14] [46]. In addition, perceived ease of use is insignificant of behavioral intention, and this finding is consistent with previous study [47]. Furthermore, behavioral intention has a significant impact on user acceptance, and the result is consistent with previous study [48]. Thus, the implication of influences factors like perceived ease of use and facilitating condition as the most important factors of behavioral intention in the context of Telecentre shows that the individual should make the most of the advantage of Telecentre. In addition, this study found significant effect of perceived ease of use, perceived usefulness and facilitating condition on user acceptance; these findings are consistent with prior research like [20]. Moreover, this study found that there were mediating effects between behavioral intention, perceived usefulness, facilitating condition and user acceptance, while there was no mediating effect with behavioral intention on the relationship between ease of use and user acceptance. This result confirmed that there was insignificant impact on technology ease of use on behavioral intention of user Telecentre.

An empirical research was performed with the intention of investigating the determinants of user acceptance of Telecentre in Jordan. All the three factors explored in this study (perceived usefulness, facilitating condition, behavioral intention) found significant impact on user acceptance of Telecentre. The findings suggest that these might be the key success factors for user acceptance of Telecentre in Jordan. The main robust of this study is in its dependency on factors base on previous models and empirical researches by focusing on those factors that have the most significant effect in technology acceptance research. The present study does not include culture variable. Future research should study the effect of this variable on the determinants of user acceptance of Tele-

centre. The study could also be extended to other developing countries operating in comparable conditions to see if similar results could be recognized. Furthermore, users have to understand that user acceptance is a dynamic practice, which needs frequent modification. Indeed, since every user is subject to an exclusive environment, the practical responses to the challenges of user acceptance vary from one Telecentre to another. Thus, a successful partnership is one that can evaluate and react to the particular conditions faced. Moreover, the data and results reported in this study were based on a single country, Jordan. Thus, they are applicable specifically to the Jordanian context. This raises inquiries regarding the generalization of the findings for other contexts. As a result, further research is needed in other countries, since this would assist to advance the understanding of the user acceptance issue, and the conditions of enhancing it from different international origins in different contexts. Finally, since there are recent calls from researchers (e.g., Mardikyan *et al.*, 2015) to investigate the topic area further, and as the topic of digital divide still remains one of the most essential areas in the MIS field, the researchers hope others to apply qualitative research methods in order to further reveal the status of the digital divide amongst Jordanian Telecentres [15].

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