Electronic Business in Saudi Organization

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Abstract
This paper is to shed light on the use of electronic business and mobile applications in Saudi organizations to perform their various activities. The paper examined the validity of a previous model that was found from the literature, to identify the most significant factors that affect the intention to adopt mobile electronic business within Saudi organizations. The research suggests and tests seven hypotheses on a population consists of employees in public and private sectors. Therefore, a regular random sampling procedure was used in which 256 respondents were identified. Structural equation modeling had been performed to analyze the collected data, giving more superior empirical results that led to reject five of the seven hypotheses. Results indicate that mobile electronic business features and opportunities as well as social influence both positively affect the intention to adopt mobile electronic business in Saudi organizations.

Keywords: Information Systems, Organizations, Information Technology Adoption, Mobile Commerce, Mobile Phones, Mobile Electronic Commerce, Information Systems in Organizations, Information Technology, Mobile Commerce Adoption, Electronic Business, SEM.

Introduction
With the rapid development in information technology (IT), public and private organizations have been forced to adopt electronic business (eBusiness) and mobile applications in order to compete and provide their stakeholders with the needed services. In today’s world, the desire of people towards the use of mobile applications and services in their daily life’s is increasing day after day. The most significant advantage of mobile applications is that they allow users to access online services to perform their transactions anytime from anywhere.

According to StatCounter (2016) recent study about the global internet usage in October 2016 revealed that, the access to the internet from mobile and tablet devices is 51.3% compared to the access to the internet by desktops which is 48.7% (see Figure 1). Within the Kingdom of Saudi Arabia (KSA) the case is the same and the usage of mobile broadband is 26.6 million users compared to 3.06 millions for fixed broadband service (CITC, 2016).

Figure 1: Access to the internet from mobile and tablet devices (StatCounter, 2016).

The research problem can be expressed by the following question: What are the influential factors that impact on using Mobile Electronic Business (MEB) Applications in Saudi public and private organization's? MEB can include all the actions that employees can perform in order to achieve their tasks via online services
using mobile devices and applications. The research objective was to disclose the nature of the relationship between factors that positively affects the Intention to adopt MEB in organizations. The importance of this research is to provide a theoretical framework that can be referred to identify the influential factors which impact the adoption of MEB in organizations. The practical importance stands by answering the research question to confirm or deny partially or completely the most influencing factors that impact the adoption of MEB in Saudi public and private organization's activities.

**Literature Review**

Many models on technology acceptance were presented in the literature such as (Rogers, 2003; Venkatesh, Morris, Davis, & Davis, 2003; Venkatesh, Thong, & Xu, 2012). In addition, there is lots of studies such as (Bhatti, 2007; Lu, Tzeng, Cheng, & Hsu, 2015; O'Donnell, Jackson, Shelly, & Ligertwood, 2007; Park, Im, & Noh, 2016; Sgriccia et al., 2007; Tiwari, Buse, & Herstatt, 2006; Zheng & Ni, 2006) in the literature which look at the adaption of new technologies from different perspectives using different adaption factors. Other studies highlight success factors and drivers of mobile commerce (Nisar & Prabhakar, 2017; Zeeshan, Cheung, & Scheepers, 2007) as well as the impact of payment services (Hassinen, Hyppönen, & Trichina, 2008; Henten, Olesen, Saugstrup, & Tan, 2004; Kapoor, Dwivedi, & Williams, 2015; López Catalán & Díaz Luque, 2008; Mallat & Tuunainen, 2008). Recent studies (Alfahl, 2016; Alfahl, Sanzogni, & Houghton, 2012) look at the adoption of mobile commerce within organizations.

This paper continues previous research and focus in the adoption of MEB within organizations. Alfahl (2016) proposed adoption model and this paper will examined the validity of the proposed model. The model in Figure 2 contains seven independent variables that may affect the intention to adopt MEB in Saudi organizations. The model was chosen as it was developed by combining some technology adoption theories including diffusion of innovation (Rogers, 2003), unified theory of acceptance and use of technology (Venkatesh et al., 2003), technology acceptance model (Davis, 1989; Davis, Bagozzi, & Warshaw, 1989), theory of reasoned action (Fishbein & Ajzen, 1975). The independent variables (constructs) that are presented in Figure 2 are detailed in Table 1. The current research will examine the effect of these factors on the intention to adopt MEB (ITM). The research hypotheses that will be tested in this paper is presented in Table 2.

**Figure 2: mCommerce organizational adoption model (Alfahl, 2016)**
Research Methodology

In this study, we have utilized a research design to consider the forecast of intention to adopt MEB in Saudi Arabia. In this research, the population consists of employees in public and private sectors in Saudi Arabia. A regular random sample was used in which 256 respondents were identified. The questionnaire was divided into six parts: part 1 contains nine items that measure PE and Part 2 contains six items that measure OR. Part 3 contains five items that measure MFO and three items that measure CMS. Part 4 contains three items that measure PLE, three items that measure SI, and two items that measure TMS. Part 5 contains four items that measure ITM. Part 6 contains nine questions to collect some demographic information. All factors were measured using a five-point Likert scales from (1) Strongly disagree, (2) Disagree, (3) Undecided, (4) Agree, (5) Strongly Agree.

The current study applied structural equation modeling (SEM) to analyze the collected data instead of multiple regressions because SEM can give more goodness of fit indices for the full structural model, giving more superior empirical results (Hair, Black, Babin, & Anderson, 2010).

<table>
<thead>
<tr>
<th>Construct</th>
<th>Definition</th>
<th>Items included</th>
<th>Supporting literature</th>
</tr>
</thead>
</table>
| Performance Expectancy (PE)| “The degree to which an individual believe that using the system will help him/her to attain gains in job performance”. (Venkatesh et al., 2003) | • perceived usefulness  
• relative advantage  
| Organizational Readiness (OR)| It includes all the needed IT infrastructures and governance arrangements, and organizational culture. | • ICT infrastructure  
• organizational culture  
• organizational policy | (Alfahl, 2016; Elahi & Hassanzadeh, 2009; Grandon & Pearson, 2004; Léger, Cassivi, & Fosso Wamba, 2004; Molla & Licker, 2005; OECD, 2007; Premkumar & Ramamurthy, 1995; Yang, 2005) |
| MEB Features & Opportunities (MFO)| This variable includes the different value-added features and the opportunities that can be gained using MEB. | • perceived ease of use  
• security | (Alfahl, 2016; Bhatti, 2007; Davis, 1986, 1989; Davis et al., 1989; Grandon & Pearson, 2004; O’Donnell et al., 2007; Snowden et al., 2006; Subramanian, 1998; Venkatesh et al., 2003; Yang, 2005; Yaseen & Zayed, 2010). |
| Compatibility of MEB Services (CMS)| How MEB is compatible and fit with the employees tasks as well as with the culture and ICT infrastructure. | | (Alfahl, 2016; Elahi & Hassanzadeh, 2009; Grandon & Pearson, 2004; Moore & Benbasat, 1991; Rogers, 2003; Sait et al., 2004; Venkatesh et al., 2003). |
| Policy & Legal Environment (PLE)| It includes all the relevant governmental regulations impacts MEB adoption. | | (Alfahl, 2016; O’Donnell et al., 2007; OECD, 2007; Sharma, Murthy, & Sundar, 2006; Yang, 2005). |
| Social Influence (SI)| “The degree to which an individual perceives that important others believe he or she should use the new system”. (Venkatesh et al., 2003) | • social factor  
• subjective norms | (Al-Somali, Gholami, & Clegg, 2009; Alfahl, 2016; Bhatti, 2007; Davis et al., 1989; Dutta & Roy, 2003; Mathieson, 1991; Taylor & Todd, 1995; Thompson et al., 1991; Venkatesh et al., 2003; Yaseen & Zayed, 2010). |
| Top Management Support (TMS)| Top management support “for IS refer to the senior executives’ favorable attitude toward, and explicit support for IS” (Sabherwal, Jeyaraj, & Chowa, 2006). | | (Alfahl, 2016; AlHaj Ali, 2005; Chang, Peng, Hung, Chang, & Hung, 2009; Elahi & Hassanzadeh, 2009; Premkumar & Ramamurthy, 1995; Sabherwal et al., 2006; Teo, Chan, & Parker, 2004). |

Table 1: Independent Variables
Factor Hypotheses
PE H1: PE has a positive effect on the ITM.
OR H2: OR has a positive effect on the ITM.
MFO H3: MFO affect positively the ITM.
CMS H4: CMS affects positively the ITM.
PLE H5: PLE has a positive effect on the ITM.
SI H6: SI has a positive effect on the ITM.
TMS H7: TMS affects positively the ITM.

Table 2: Research Hypotheses

Data Collection and Analysis
The survey questionnaires were printed and distributed. The survey was also available online and 256 responses were collected. 44 responses were collected from the paper-based questionnaires and 212 responses were collected from the online questionnaires. SEM were preformed using AMOS program. Some demographic information about the study sample is presented in Table 3 based on SPSS 22.0 results.

Table 3: Participants Demographic Information
As we can see from Table 3, all respondents are over 20. There are more male respondents compared to female. The majority the respondents were from public sector. Finally, the majority of the respondents’ income were more than SAR 11000.

Reliability and Validity Analysis
This study contains seven independent variables and one dependent variable. The reliability test is illustrated in Table 4. The reliability test for all the variables, that is represented by Cronbach alpha, were range from 0.717 to 0.951 which is acceptable as they are above 0.60 (Nunnally & Bernstein, 1994). It is also detectable that correlations are above 0.5 which is acceptable (Nunnally & Bernstein, 1994).
### Table 4: Results of Reliability analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
<th>Items</th>
<th>Correlation Value Of Item</th>
<th>New Cronbach’s Alpha after Deleting the Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>0.948</td>
<td>35</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PE</td>
<td>0.951</td>
<td>PE1</td>
<td>0.828</td>
<td>0.946</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PE2</td>
<td>0.865</td>
<td>0.943</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PE3</td>
<td>0.843</td>
<td>0.945</td>
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<tr>
<td></td>
<td></td>
<td>PE4</td>
<td>0.862</td>
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<td></td>
<td></td>
<td>PE5</td>
<td>0.781</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>PE6</td>
<td>0.759</td>
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<td></td>
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<td>PE7</td>
<td>0.818</td>
<td>0.946</td>
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<td></td>
<td>PE8</td>
<td>0.811</td>
<td>0.946</td>
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<td></td>
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<td>PE9</td>
<td>0.782</td>
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<tr>
<td>OR</td>
<td>0.894</td>
<td>OR1</td>
<td>0.549</td>
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<td></td>
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<td>OR2</td>
<td>0.807</td>
<td>0.868</td>
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<td></td>
<td></td>
<td>OR3</td>
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<td>OR4</td>
<td>0.826</td>
<td>0.870</td>
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<tr>
<td></td>
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<td>OR5</td>
<td>0.803</td>
<td>0.871</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR6</td>
<td>0.800</td>
<td>0.871</td>
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<td>MFO</td>
<td>0.822</td>
<td>MFO1</td>
<td>0.621</td>
<td>0.786</td>
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<tr>
<td></td>
<td></td>
<td>MFO2</td>
<td>0.710</td>
<td>0.757</td>
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<tr>
<td></td>
<td></td>
<td>MFO3</td>
<td>0.797</td>
<td>0.778</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MFO3</td>
<td>0.838</td>
<td>0.762</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MFO5</td>
<td>0.503</td>
<td>0.844</td>
</tr>
<tr>
<td>CMS</td>
<td>0.830</td>
<td>CMS1</td>
<td>0.768</td>
<td>0.807</td>
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<td></td>
<td></td>
<td>CMS2</td>
<td>0.887</td>
<td>0.664</td>
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<td></td>
<td></td>
<td>CMS3</td>
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<td>PLE</td>
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<td>PLE1</td>
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<td>0.844</td>
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<tr>
<td></td>
<td></td>
<td>PLE2</td>
<td>0.873</td>
<td>0.801</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PLE3</td>
<td>0.836</td>
<td>0.836</td>
</tr>
<tr>
<td>SI</td>
<td>0.717</td>
<td>SI1</td>
<td>0.622</td>
<td>0.676</td>
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<tr>
<td></td>
<td></td>
<td>SI2</td>
<td>0.720</td>
<td>0.615</td>
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<tr>
<td></td>
<td></td>
<td>SI3</td>
<td>0.699</td>
<td>0.594</td>
</tr>
<tr>
<td>TMS</td>
<td>0.810</td>
<td>TMS1</td>
<td>0.847</td>
<td>0.810</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TMS2</td>
<td>0.804</td>
<td>0.810</td>
</tr>
<tr>
<td>ITM</td>
<td>0.923</td>
<td>ITM1</td>
<td>0.853</td>
<td>0.905</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ITM2</td>
<td>0.864</td>
<td>0.900</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ITM3</td>
<td>0.905</td>
<td>0.889</td>
</tr>
<tr>
<td></td>
<td></td>
<td>ITM4</td>
<td>0.848</td>
<td>0.907</td>
</tr>
</tbody>
</table>

**Convergent Validity Analysis:**

The investigation of the validity was accomplished using confirmatory factor analysis (CFA). Moreover, the average variance extracted (AVE) and combination validity (CR) were calculated manually by following the steps mentioned by (Hair et al., 2010). The results of convergent validity analysis are presented in Table 5 which shows that the AVE is more than 0.5 and the CR is above 0.6 for all the constructs which are acceptable (Hair et al., 2010).
### Table 5: Convergent Validity

In addition, according to Hair et al. (2010), the factor loading should be more than 0.7. In Table 5, the factor loading of MFO3, MFO5, and OR1 are less than 0.7. As a result, the model was adjusted through the following process:

- If MFO5 was deleted, the result shown no output.
- If MFO3 was deleted, then the factor loading of MFO5 became 0.350, (it was 0.385), AVE did not change.
- If MFO5 and MFO3 were deleted at the same time, the result shown no output.
- If OR1 was deleted, the results shows that both of the factor loading and convergent validity decrease in the same construct.

As noted, MFO3, MFO5, OR1 have factor loading above of 0.3, therefore, the three items were not removed from the model. According to (Hair, Black, Babin, Anderson, & Tatham, 2006), the factor loading between 0.3 and 0.4 is considered as significant, which is the minimal accepted loading, as well as the factor loading between 0.4 and 0.5 is considered as more important. So the convergent validity is acceptable.

#### Discriminate Validity analysis

Discriminate validity were tested using AVE square root and the correlation coefficient matrix, as shown in Table 6. Diagonal line Indicates the square root of AVE, other values mean the correlation coefficient of the constructs in the row and column.
Table 6: Analysis Results of Discrimination Validity

According to Fornell and Larcker (1981), the square root of AVE is required to be more than its correlation coefficient with another construct. This is all verified in the previous analysis, except for three cases from a total of 21 which are the correlation coefficients of (PE with MFO), (CMA with SI), and (SI with TMS). In the case of (PE with MFO) square root of AVE is 0.70 and the correlation coefficient is 0.78, in case of (CMA with SI) square root of AVE is 0.69 and correlation coefficient is 0.70, in case of (SI with TMS) square root of AVE is 0.83 and correlation coefficient is 0.88. Therefore, the scale has an acceptable discrimination validity.

Model Fitting Analysis

Before drawing any conclusions or results for the hypothesis testing, the fit of the model must be analyzed. The analysis results for the fit of the model are presented in Table 7.

Based on what confirmed by Hair et al. (2010), all the values within the limits are acceptable. The analysis results that are shown in Table 7 indicate that the tested model has an acceptable model fitting.

Table 7: Model Fitting Indices

Hypotheses Testing

After the SEM was created by AMOS22 to analyze the hypotheses, the results are shown in Figure 3.
In addition, the influence coefficient of variation and its significant level was obtained. Table 8 shows the path validation results of the proposed model. According to the results in table 8, hypothesis H1, H2, H4, H5, and H7 were rejected, however, H3 and H6 were accepted.

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>From</th>
<th>To</th>
<th>Coefficient</th>
<th>Type of Correlation</th>
<th>P-value</th>
<th>Hypothesis Support</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>PE</td>
<td>ITM</td>
<td>-0.113</td>
<td>Negative Correlation</td>
<td>0.301</td>
<td>NO</td>
</tr>
<tr>
<td>H2</td>
<td>OR</td>
<td>ITM</td>
<td>-0.051</td>
<td>Negative Correlation</td>
<td>0.504</td>
<td>NO</td>
</tr>
<tr>
<td>H3</td>
<td>MFO</td>
<td>ITM</td>
<td>0.609</td>
<td>Positive Correlation</td>
<td>***</td>
<td>YES</td>
</tr>
<tr>
<td>H4</td>
<td>CMS</td>
<td>ITM</td>
<td>-0.129</td>
<td>Negative Correlation</td>
<td>0.388</td>
<td>NO</td>
</tr>
<tr>
<td>H5</td>
<td>PLE</td>
<td>ITM</td>
<td>0.054</td>
<td>Positive Correlation</td>
<td>0.557</td>
<td>NO</td>
</tr>
<tr>
<td>H6</td>
<td>SI</td>
<td>ITM</td>
<td>0.348</td>
<td>Positive Correlation</td>
<td>***</td>
<td>YES</td>
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<tr>
<td>H7</td>
<td>TMS</td>
<td>ITM</td>
<td>-0.029</td>
<td>Negative Correlation</td>
<td>0.904</td>
<td>NO</td>
</tr>
</tbody>
</table>

Table 8: Path Validation Results

Discussion
According to the previous analysis, the results show that H1, H2, H4, H5, and H7 were rejected. This section will discuss the results and illustrate the reasons behind such rejection. In case of H1, besides PE, there are other factors may affect, for example, some risks may prevent users from using MEB, just PE is not enough for participants’ to get their final adoption decision of MEB. For H2 and H4, OR and CMS may also not be priority attention of participants. In case of H5, it can be concluded that the perceived risk is very important for participants to not use MEB, but not a necessary condition. In case of H7, ITM may be affected by understanding the importance of TMS.

On the other hand, H3 and H6 had been accepted, accordingly MFO and SI both positively affect ITM in Saudi organizations. The users’ of mobile devices in Saudi Arabia gives priority to MFO, and SI which affect users’ ITM. As results of the research showed that the most important factors are MFO which is aligned with the results of (Alfahl, 2016) and SI as confirmed by (Alfahl, 2016; Venkatesh et al., 2003; Venkatesh et al., 2012).

The Resulted Model and Future Work
Based on the results of this research, we propose that there are intermediate factors influencing intention to adopt MEB in Saudi organizations. If the indirect effect is greater than direct effect then the mediating is satisfaction (Kaufman, Kaufman, & Maclehose, 2009; Kaufman, Kaufman, MacLehose, Greenland, & Poole, 2005). As a result, the model in figure 4 was proposed and the following hypotheses were also propose to be tested in future research:

H8: MFO mediates the relationship PE, OR, CMS, PLE, and TMS with intention to adopt MEB.
H9: SI mediates the relationship between PE, OR, CMS, PLE, and TMS with intention to adopt MEB.

![Figure 4: The proposed MEB adoption model](image-url)
Conclusion
In the literature, there are a number of models were suggested which include the factors that affects the intention to adopt MEB. In this research the mCommerce organizational adoption model (Alfahl, 2016) were tested within Saudi organizations. The results of the research showed that the most important variables are MFO and SI that affect the intention to use MEB in Saudi organizations. MFO can include all the important features of MEB and the new business opportunities for organization that can be offered by MEB. Moreover, it seems that in Saudi Arabia, the SI has great effect on such adoption.

References
Technology (IAMOT’04), Washington D.C, USA.


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Dr. Husam Alfahl works as an assistant professor and he also the vice dean of the, College of Business Administration at Taibah University, Saudi Arabia. Dr. Alfahl holds a B.Sc in management information systems (MIS), master in business administration, master in information technology, and Ph.D in MIS. Dr. Alfahl research interest includes information technology adoption, electronic commerce, MIS, enterprise recource planning, mobile commerce and enterprise architecture.

Ahmad Abuseeni received the B.Sc from Jordan University in 1993. He received the Master of in Computer Information Systems (CIS) from Arab University for Banking and Finance – Amman – Jordan in 2005. After working as a Lecturer at Al-Balkaa University/ Amman college, he received the PhD in Computer Information Systems (CIS) from Arab University for Bank’ing and Finance – Amman – Jordan in 2011), his research interest includes information retrieval, information systems development, system analyses, and decision support systems. He works as assistant professor from 2011 till now at Department of MIS -Taibah University-Saudi Arabia.