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An Investigation into Employees' Acceptance of Integrating Mobile Commerce into Organizational Processes

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Abstract

Through the use of business-to-business (B2B) mobile commerce solutions, wireless devices can eliminate the need for location-dependent connections to corporate information systems. These solutions have the potential to eliminate troublesome bottlenecks in organizational processes that result when the information system is inaccessible to employees, such as when employees travel. This paper investigates employees' initial acceptance of a mobile solution that provides wireless access to various business applications. Findings from a pilot study conducted in late 2002 in cooperation with a Fortune 100 company will be highlighted. Results of the study provide us with insights into the technology-related and user-related factors that influence organizational mobile technology usage, as we investigate employees' initial willingness to accept the mobile commerce solution.

Keywords: Mobile commerce, wireless technologies, user acceptance, Technology Acceptance Model, organizational processes

Introduction

In today's corporate environments where information systems have become an important and indispensable tool for most organizations and their employees, mobile commerce solutions, using such devices as web-enabled cellular phones and personal digital assistants (PDAs) with wireless modems, can allow mobile employees to remain connected to the company's network at times when they are away from the office and would otherwise be unable to access the system. Several organizational and individual benefits could arise by removing this location-based access requirement. First, employees can continue to process tasks that would otherwise wait until they return to their office location, thus alleviating costly process inefficiencies caused by bottlenecks. Second, by having mobile access to the company's information system, employees can turn otherwise idle time (e.g., waiting for a flight) into productive time, which can improve their productivity. Third, through the use of a mobile commerce solution, a decision by a traveling manager can now be more thorough given that she has greater access to information and activities despite that she is physically removed from the office. Lastly, mobile solutions can help employees handle emergency situations.

Despite the abovementioned benefits, several questions arise regarding the appropriateness, usefulness, and impact of mobile solutions on an organization and its employees. *What processes would most benefit from the wireless solution? Will employees be willing to use mobile commerce technologies given their existing habits and experiences with technology? If employees are willing to use mobile commerce technologies, what applications will they most utilize? Do these solutions fit with the underlying organizational processes and operational tasks? Are applications more successful when they fit with time-critical or mission-critical tasks? What impact will these technologies have on the organization and its processes? How can we quantify the value*

of wireless technology to the organization? etc. (See Tarasewich et al. (2002) for a thorough categorization and discussion of mobile commerce research issues.)

In this paper, we investigate the issue of employees' acceptance of mobile commerce technologies, including the applications they see as most suitable for a mobile environment. A pilot launch of a mobile commerce solution at a Fortune 100 company, conducted in late 2002, serves as the basis of our empirical findings. The organization of this paper is as follows. First, we will outline our motivation for conducting this research project. This will be followed by a literature review that presents relevant research and existing theories. Next, our research model will be presented, including a listing of the hypotheses that will be tested. Then, the details and results of our empirical investigation will be presented. Lastly, we will present a discussion of the results and provide direction for future research.

Motivation for Study

Why is this work important? Our motivation for this research is two-fold. First, it is important for the Information Systems community to develop an understanding of mobile technology and its role in organizational processes. This includes developing an understanding of the usability of mobile technology devices and the acceptance of mobile solutions by employees. This understanding is crucial, as an organization must have its employees' acceptance of the technology in order to achieve its anticipated benefits. On an individual level, several factors could potentially impact an employee's decision to use a mobile device to expedite a business process, as compared to the alternative of waiting to use wired methods of access. Contributing factors may including the employee's need for mobile connectivity (e.g., level of mobility, level of process involvement), the employee's ability to use and operate the functionalities of the mobile device, the employee's perception of the usefulness of the mobile system, and the employees' perceptions of the costs associated with waiting to use wired methods of access.

Second, research regarding the acceptance of mobile technology has primarily focused on usage by consumers, not by employees. Although the results of these studies provide valuable insight into the acceptance of mobile technologies, their findings cannot be generalized to explain the usage of mobile technologies in organizational settings. Studies on organizational mobile technology are less prevalent.

Who would be interested in the results? Many people have predicted that mobile commerce will find its "killer applications" in corporate environments. The findings from our study can facilitate the developments in that area, as the findings are relevant to organizations and groups that utilize distributed workers. Insights from our results have the following practical applications: (a) the identification of organizational tasks and processes that are candidates for mobile solutions, (b) the identification of employee groups that have the greatest need for mobile access and are the most likely to use mobile devices, (c) the identification of potential acceptance issues prior to application development so that these issues can be considered throughout the design of the solution, and (d) the identification of potential usage barriers that can be addressed through such activities as employee training.

Literature Review

Mobile Commerce in the Enterprise. Mobile commerce, defined as delivering content and conducting transactions on mobile devices, is becoming the next evolutionary stage of electronic commerce (Leung & Antypas, 2001). Through the use of mobile commerce solutions, the "anytime-anywhere" benefits of traditional person-to-person mobile communications devices (e.g., cellular phones, two-way radios) can be used to eliminate the need for a location-dependent (hard-wired) connection to an information system (Zhang et al., 2002). This potential allows for the development of services that capitalize on the uniqueness of the median, specifically those arising from its ubiquity, its localization, and its always-on connectivity (Kemper & Wolf, 2002). Varshney & Vetter (2002) outline various emerging mobile commerce applications, including mobile financial applications, mobile advertising, mobile inventory management, product locating and shopping, proactive service management, wireless reengineering, mobile auctions, mobile entertainment services and games, mobile office, mobile distance education, and wireless data centers.

Wireless technologies have primarily been applied in consumer-oriented areas (Barnes 2002), but there is a growing interest in increasing the usage of wireless technology in the enterprise environment (Varshney et al., 2002). Leung & Antypas (2001) suggest that mobile commerce can enhance business efficiency by distributing information to the workforce remotely and by offering new channels on which to interact with customers. Varshney et al. (2002) further suggest that organizations that are capable of harnessing the power of mobile technologies to automate and streamline business processes may reap the benefits of

improved productivity, lowered operational cost, increased customer satisfaction, and improved decision-making. However, there are several wireless deployment issues that need to be considered, including (a) determining the role and suitability of m-commerce and other mobile applications in the enterprise environment, (b) determining business applications that would need mobile support, (c) determining the effect of user and data mobility on business applications, and (d) addressing the overall usability of mobile devices (in terms of form factors, user interfaces, location functions, storage, and the ability to access multiple wireless networks) (Varshney et al., 2002).

Wireless Technology Acceptance & Usability. A majority of technology usage studies in the Information Systems field are based on models extended from the Theory of Reasoned Action (Fishbein & Ajzen, 1975), including the Technology Acceptance Model (Davis et al., 1989) and the Theory of Planned Behavior (Ajzen, 1985). In these models, the beliefs and attitude of the individual towards a certain behavior are important determinants of the individual's intention towards the adoption of that behavior (Khalifa & Cheng, 2002).

Adoption research confirms the importance of understanding the user and the impact that usage requirements has on individuals' acceptance of IT applications (Davis, 1989). This understanding is especially important in the context of mobile commerce, as various technological design factors can impact the potential usability of a mobile application. When compared to the wired methods of connecting with an information system, mobile devices possess smaller display screens, awkward methods for inputting data, limited processing power, lower bandwidth capabilities, and the need for greater security and user identification (Zhang et al., 2002). These disadvantages may impact an employee's willingness to use the device, despite any benefits attributed to using the solution, particularly given that alternative methods of access are available (e.g., the use of existing non-mobile desktop systems). These disadvantages could be contributing factors to the slow acceptance of mobile commerce in the business-to-consumer marketplace. Despite the high exposure to mobile devices[1] and the moderate ownership of mobile commerce-enabled devices,[2] less than 2% of the owners of mobile commerce-enabled devices have used these functionalities (Prior, 2001). Islam & Fayad (2003) suggest that current ubiquitous technology usage behavior is driven by deployment complications associated to infrastructure issues. They suggest that finding solutions to these challenges will spawn the acceptance of ubiquitous computing.

Empirically supported research on mobile technology acceptance and usage is beginning to see publication in the Information Systems discipline. Beulen & Streng (2002) surveyed mobile employees using WAP-enabled cellular phones equipped with Mobile Office before and after an 8-week trial. Results of their surveys found (a) that the perceived usefulness of the device after the trial was greater than the perceived usefulness of the device at the beginning of the trial, and (b) that the increase in effectiveness attributed to using the device was higher for relationship managers than for technicians. Khalifa & Cheng (2002) studied the role of exposure in mobile technology adoption. Results of their survey of students found that exposure to mobile commerce moderates positively the relationship between attitude towards mobile commerce and intention to adopt mobile commerce. Palen & Salzman's (2002) study on the usability of wireless telephones among consumers found that the hardware, software, netware (the mobile network and its service coverage areas, the service type (analog vs. digital), the location of the call when placed (inside vs. outside) and whether the call was placed while roaming or while in area), and the bizware (the calling plan agreement and policies (peak vs. nonpeak, promotion periods like free weekends)) influenced usage decisions.

Contributions to Existing Knowledge. Findings from our research will expand existing knowledge by investigating the impact that various factors have in employees' mobile commerce acceptance decisions. Furthermore, since existing acceptance and usage models, such as the Technology Acceptance Model, are often tested using stand-alone applications (e.g., a word processing program), these models should be revisited to reflect a technological environment that spans beyond the application to incorporate other factors that impact the usage decision. In the context of mobile commerce technology acceptance, these factors could include the stability of the wireless network, the specific device's form factors, the individual's perceptions of the security of the network, and the individual's level of mobility. Furthermore, as companies incorporate mobile capabilities into their existing systems and business processes, the individual's usage decision incorporates organizational factors such as the effect one's usage has on organizational process (e.g., faster requisition approval) and the negative ramifications associated with non-usage (e.g., delays in ordering needed supplies). The availability of alternative technologies also comes into consideration in situations where employees have the option of using the mobile device or its non-mobile alternative (to which they have become accustom to using). Thus, the acceptance decision also becomes a trade-off of the two alternatives, each having its own benefits and

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[1]Some European and Asian markets have wireless phone penetration rates as high as 85%, while 51% of Americans own wireless phones (Telephia.com, October 2002).

[2]A total of 40% of all wireless devices owned in the United States (and over 60% in Europe) have mobile commerce functionalities such as wireless e-mail or wireless Web (Khalifa & Cheng, 2002).

disadvantages. This paper provides an initial understanding into the impact these factors have on the acceptance decision, while also providing an early insight into the applications that are most suitable for organizational mobile commerce.

Research Model

Our theoretical model considers technology-related and user-related constructs, which are commonly considered in studies derived from the Technology Acceptance Model. However, our model is expanded to incorporate additional factors, including situational and process-related factors, that might influence the acceptance decision for mobile solutions. Figure 1 illustrates our theoretical model.
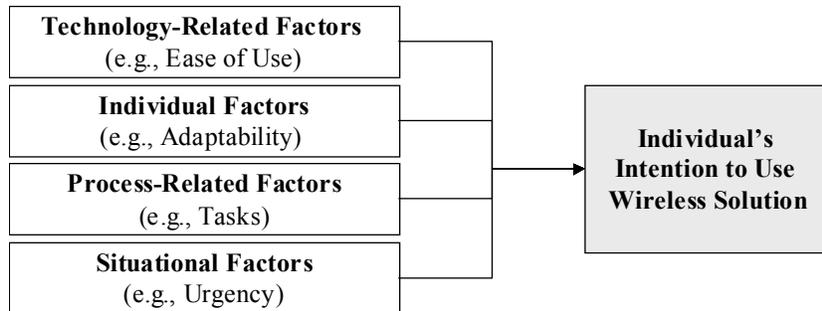

Figure 1. Acceptance of Wireless Technology as Part of an Organizational Process

Definitions of Key Constructs. Definitions of many key constructs are adapted from previous studies. For this study, we define *Behavioral Intention to Use* as "the individual's intention to use the mobile solution to facilitate his/her business process activities." Behavioral Intention to Use has served as the dependent variable in many technology acceptance related studies. For this study, we define Attitude as "the employee's positive or negative belief toward the wireless (mobile) solution." Many studies on the acceptance of various software applications have found Attitude to have a direct influence on Behavioral Intention to Use. We define *Perceived Usefulness* as "the probability that the wireless solution (or specific mobile application) will increase performance," and *Perceived Ease of Use* as "the level at which using the wireless system (or specific mobile application) would be free of effort." Perceived Usefulness and Perceived Ease of Use frequently has been found to have an impact on Attitude. We define *Employee's Desire for Mobile Access* as "the employee's desire to have mobile access to a specific application on demand," and we define *Job's Need for Mobile Access* as "the individual's need to have access to a specific application on demand as warranted by his/her organizational role."

Hypotheses. To discovering insights into the appropriateness of out theoretical model, we test for factors that influence mobile technology acceptance. Furthermore, we survey the suitability of various wireless applications in a wireless environment. Our first set of hypotheses, as illustrated in Figure 2, tests the appropriateness of the Technology Acceptance Model for understanding the factors that influence employees' acceptance of mobile commerce solutions.
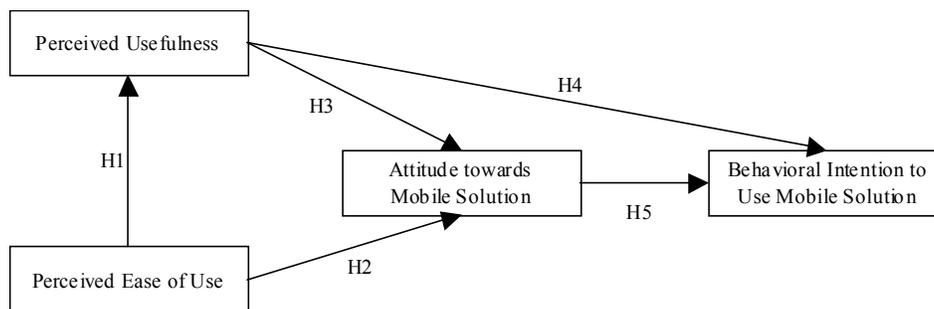

Figure 2. Testing TAM for Mobile Commerce Solutions

H1 ***Perceived Ease of Use is related to Perceived Usefulness.*** Thus, an employee who perceives the wireless solution to be easy to use will also perceive the solution to be useful.

H2 ***Perceived Ease of Use is related to Attitude.*** Thus, an employee who perceives the overall wireless solution to be easy to use will have a high attitude toward the overall wireless solution

H3 ***Perceived Usefulness is related to Attitude.*** Thus, an employee who perceives the overall wireless solution to be useful will have a high attitude towards the wireless solution.

H4 ***Perceived Usefulness is related to Behavioral Intention to Use.*** Thus, an employee who perceives the overall wireless solution to be useful will have a high intention to use the wireless solution.

H5 ***Attitude is related to Behavioral Intention to Use.*** Thus, an employee who has a high attitude toward the wireless solution will also have a high intention to use the wireless solution.

Next, we test employees' desires and job needs for mobile access to specific organizational applications and the impact that these needs and desires have on their overall attitudes towards the wireless solution and usage intentions. See Figure 3 for the model.
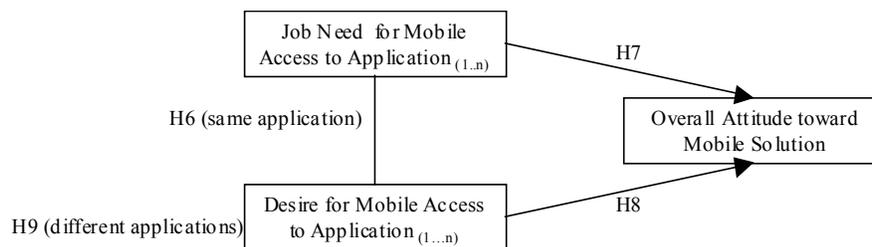

Figure 3. Testing Desires and Needs for Mobile Access to Specific Applications

H6 ***Job's Need for Mobile Access (to Specific Organizational Application) is related to Employee's Desire for Mobile Access (to Same Application).*** Thus, an employee whose job requires on-demand access to a specific organizational application will also have a strong personal desire for mobile access to that application.

H7 ***Job's Need for Mobile Access (to Specific Organizational Application) is related to Employee's Attitude.*** Thus, an employee whose job requires on-demand access to a specific organizational application will have a strong attitude toward the overall mobile solution.

H8 ***Employee's Desire for Mobile Access (to Specific Organizational Application) is related to Employee's Attitude.*** Thus, an employee with a strong desire to have mobile access to a specific application will have a strong attitude toward the overall mobile solution.

H9 ***Employee's Desire for Mobile Access (to Specific Organizational Application) is related to Employee's Desire for Mobile Access (to Other Organizational Applications).*** Thus, an employee who has a strong desire for mobile access to one organizational application will also have a strong desire for mobile access to other organizational applications.

We also test the impact that employees' perceptions of specific mobile applications has on their acceptance of the wireless solution, as is modeled in Figure 4.
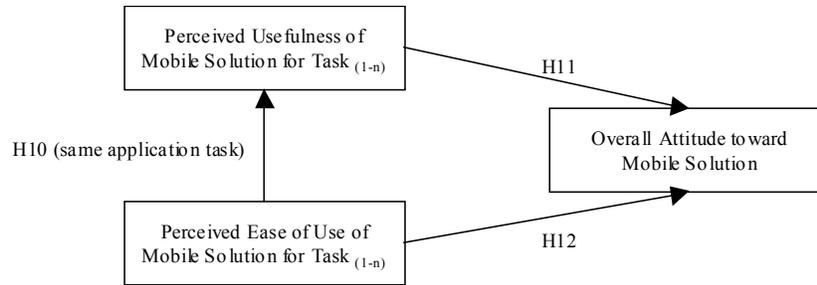
Figure 4. Testing the Relation of Application Tasks with Attitude

H10 ***Perceived Ease of Use (of Specific Application/Task) is related to Perceived Usefulness (of Specific Application/Task).*** Thus, an employee who perceives the wireless solution to be very easy to use for a specific application or task will also perceive the wireless solution to be very useful for that same application or task.

H11 ***Perceived Ease of Use (of Specific Application/ Task) is related to Attitude.*** Thus, an employee who perceives the wireless solution to be easy to use for a specific application or task will have a high attitude towards the wireless solution.

H12 ***Perceived Usefulness (of Specific Application/Task) is related to Attitude.*** Thus, an employee who perceives the wireless solution to be useful for a specific application or task will have a high attitude towards the wireless solution.

Methodology

The acceptance and usage of a mobile commerce solution developed internally for employees of a Fortune 100 company in the telecommunications industry was the basis for our study. A description of the solution is below, followed by an explanation of the methodology that we used to empirically test our model.

The Mobile Commerce Solution. The company has been developing a wireless solution to support its mobile workforce. The solution, which is developed on a flexible platform, can provide wireless access to various corporate applications, including the company's electronic procurement system, the corporate email system, and the corporate directory system, which allows users to search for contact information for anyone within the company. By using the wireless solution to access the electronic procurement system, employees can receive purchase order status notifications, they can approve purchase order requests that await their approval, and they can initiate new purchase order requests. The solution interoperates with various global public and private cellular and radio networks and supports industry standards, which suggests that it is not limited to any specific wireless devices. Users of the device must use a security card to clear the company's firewall.

The Participants. Three corporate locations, located in the United States, Japan, and the United Kingdom, were targeted for a pilot launch of the mobile solution. Corporate sponsors selected 33 employees across the three locations to participate in our study based on their role within the organization and their level of participation with the existing procurement system. Ultimately, 27 employees participated in our study by completing surveys. An informational training session was available for those who wanted more insight into the solution. Eleven of these employees attended the training session.

The Data Collection Procedure. Two surveys were used to gather data from the participants. The purpose of the first survey was to gather data on employees' attitudes and experiences regarding wireless devices, in general. The purpose of the second survey, which was distributed one week later, was to gather data on employees' perceptions of the usefulness and usability of the wireless solution and on employees' intention to use the solution. (A follow-up survey will also be distributed during the pilot study to capture longitudinal data.) While most survey items were adapted from prior surveys (Agarwal & Prasad (1999), Lucas & Spitler (1999), Davis (1989) & others), other survey items were developed by the authors. Most survey items used a seven-point Likert scale. Open-ended items were also included to provide additional insights.

Results

Employees' Overall Acceptance of Mobile Commerce Solution. Responses indicated that there was great variance among the respondents' perceptions of the usefulness of the mobile solution, as indicated by the high standard deviation of 2.12. The mean of the responses to the statement "Overall, the wireless system will be useful to me." was 4.86. Respondents also greatly varied on their perceptions of the ease of use of the mobile solution (standard deviation of 1.80), as indicated by the responses to the statement "I believe it will be easy to use the wireless system." which averaged a response of 4.29. At the time of the survey, respondents had relatively positive attitudes towards using the wireless system as 42.9% strongly agreed to the statement "I think positively toward using the wireless system." The mean of the responses was 6.00 with a standard deviation of 1.15. The majority of the respondents suggested that they would use the wireless system whenever they were away from the office for a full-day (57.1%) while fewer respondents suggested that they would use the wireless system when they were away from their desktop computer for just part of the day (28.5%). Nearly 30% of the respondents indicated that they would only use the wireless system for tasks that were urgent.

The testing of the hypotheses derived from the Technology Acceptance Model, as is illustrated in Figure 5, provides some interesting results:
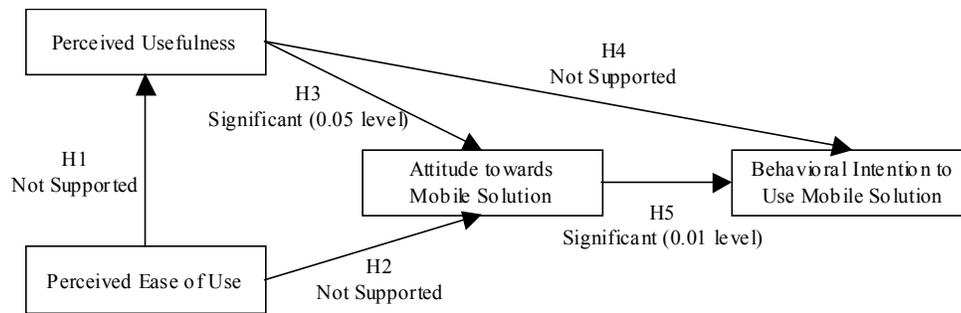

Figure 5. Results of the TAM for Mobile Commerce Solutions

H1 *Perceived Ease of Use is related to Perceived Usefulness.* Not supported. Results indicate that the relationship between the two constructs is not significant. The variance explained (R^2) was .301.

H2 *Perceived Ease of Use is related to Attitude.* Not supported. Results indicate that the relationship between two constructs is not significant. The variance explained (R^2) was .171.

H3 *Perceived Usefulness is related to Attitude.* Supported. Results indicate that the relationship between the two constructs is significant at the 0.05 level (correlation of 0.852).   The variance explained (R^2) was .725.

H4 *Perceived Usefulness is related to Behavioral Intention to Use.* Not supported. Results indicate that the relationship between the two constructs is not significant. The variance explained (R^2) was .596.

H5 *Attitude is related to Behavioral Intention to Use.* Supported. Results indicate that the relationship between the two constructs is significant at the 0.01level (correlation of 0.931). The variance explained (R^2) was .833.

Influence of Application Desires and Needs on Employees' Mobile Commerce Acceptance. Respondents indicated a strong need to access certain organizational applications when out of the office. All respondents have needed access to e-mails when out of the office, as indicated by the responses to the question "For my job, I have needed access to e-mails when I have been out of the office." (The mean of the responses was 6.14, with a standard deviation of .90.) Respondents indicated a weaker need to access the corporate directory (mean of 4.71, with a standard deviation of 1.70) or the procurement system when out of the office (mean of 4.71, with a standard deviation of 2.06). Furthermore, respondents indicated a strong desire to have mobile access to their applications while out of the office. Nearly half of the respondents (46.7%) strongly agreed that they would like to have mobile access to e-mail while out of the office, while the remaining respondents also favored the possible use of wireless e-mail. (The mean of the responses was 5.93, with a standard deviation of 1.39.) Additionally, the respondents favored having mobile access to the corporate directory with a mean response of 5.47 (standard deviation of 1.94). Fewer respondents were enthusiastic about having wireless access to the Tigers system (mean of 4.40, with a standard deviation of 1.68).

As is shown in Figure 6, the testing of the hypotheses suggests that employees' needs and desires for mobile access to certain applications influences their willingness to accept the overall mobile commerce solution:
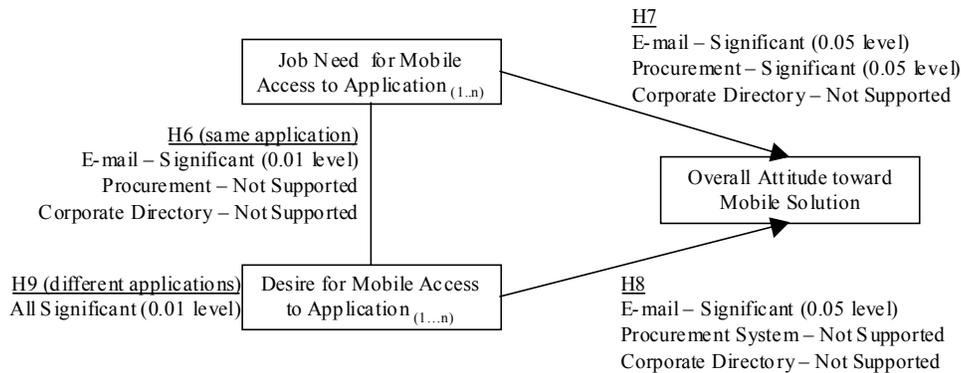

Figure 6. Results of the Desires and Needs for Mobile Access to Specific Applications

H6 ***Job's Need for Mobile Access (to Specific Organizational Application) is related to Employee's Desire for Mobile Access (to Same Application).*** Partially supported. Results indicated that the relationship between job's need for on-demand access to certain applications and employee's desire to have mobile access to the application was significant at the 0.01 level when considering mobile access to e-mail (correlation of 0.904). However, the correlations for the procurement system and the corporate directory were not significant.

H7 ***Job's Need for Mobile Access (to Specific Organizational Application) is related to Employee's Attitude.*** Partially supported. Results indicate that the relationship between the job's need for on-demand access to certain applications and the employee's attitude toward the mobile solution is significant at the 0.05 level, for the procurement system (correlation of 0.841) and for e-mail (correlation of 0.802). However, the need for on-demand access to the corporate directory did not significantly influence the employee's attitude toward the mobile solution.

H8 ***Employee's Desire for Mobile Access (to Specific Organizational Application) is related to Employee's Attitude.*** Partially supported. Results indicate that the correlation between employees' desire for mobile e-mail and their attitude toward the mobile solution was significant at the 0.05 level (correlation of 0.759). However, there was not a significant correlation between the employee's desire for mobile access to the procurement system or the corporate directory.

H9 ***Employee's Desire for Mobile Access (to Specific Organizational Application) is related to Employee's Desire for Mobile Access (to Other Organizational Applications).*** Supported. All bivariate correlations among the multiple applications were found to be significant at the 0.01 level. (The procurement system/corporate directory combination had the strongest correlation with 0.773, followed by the e-mail/corporate directory combination with 0.749, and the procurement system/e-mails with 0.686.)

Influence of Task Usefulness and Ease of Use on Employee's Acceptance of Mobile Commerce Solution. Respondents indicated that certain tasks would be easier to complete using the wireless system than would other tasks. *Checking e-mails* (mean of 6.00 with a standard deviation of 1.00) and *approving requisitions* (mean of 5.29 with a standard deviation of 1.25) were the two tasks that were considered to be the easiest to complete using the wireless system. Other tasks that were considered to be relatively easy to complete include *accessing the corporate directory* (mean of 4.86 with a standard deviation of 1.57) and *tracking requisitions* (mean of 4.14 with a standard deviation of 1.68). *Creating requisitions* was perceived to be the most difficult task to complete using the wireless system (mean of 2.29 with a standard deviation of 1.70), while *creating e-mails* also faired to be somewhat difficult (mean of 3.86 with a standard deviation of 1.68).

Additionally, the completion of certain tasks was found to have a higher perceived usefulness among the respondents. Specifically, the respondents indicated that they perceived the wireless system to be most useful for *checking e-mail* (mean of 6.43 with a standard deviation of .79). Respondents also perceived the wireless system to be somewhat useful for *approving requisitions* (mean of 5.43 with a standard deviation of 1.27), *accessing the corporate directory* (mean of 5.14 with a standard

deviation of .90) and *creating e-mail* (mean of 5.00 with a standard deviation of 1.63). Respondents perceived the wireless system to be not as useful for *creating requisitions* (mean of 2.57 with a standard deviation of 1.51). The perceived usefulness of the wireless system to *track requisitions* greatly varied among the respondents (mean of 3.71 with a standard deviation of 2.06).

Respondents were also asked to anticipate the percentage of accesses to the specific application that they would conduct using the mobile solution (rather than its non-mobile alternative). Forty-two percent of the respondents indicated that they would use the wireless system more often than they would use traditional desktop systems for at least one of the abovementioned tasks. The majority of the respondents anticipated that they would use the wireless system for e-mail more than for conducting procurement-related tasks or directory searches.

The testing of the hypotheses, shown in Figure 7, suggests that employees' needs and desires for mobile access to certain applications influences their willingness to accept the overall mobile commerce solution:
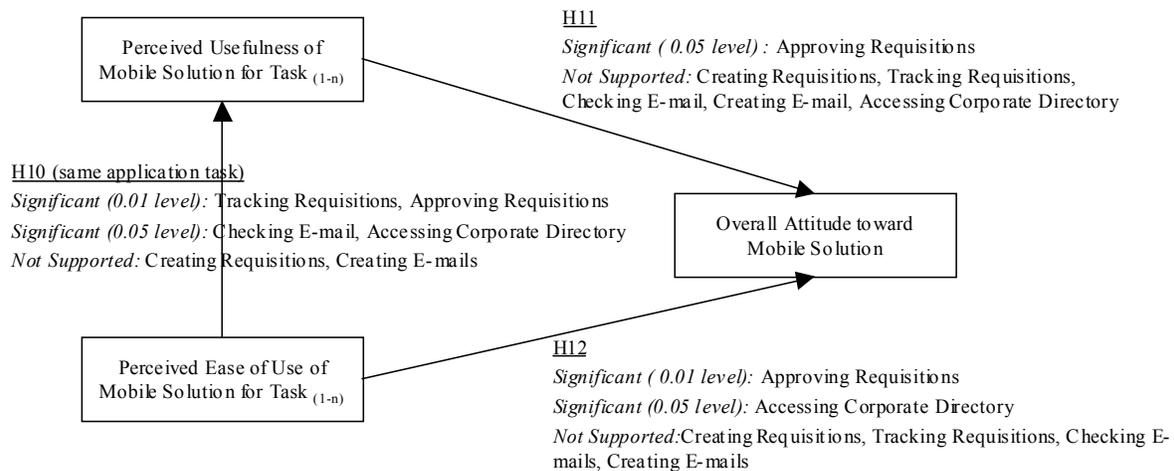

Figure 7. Results of the Relation of Application Tasks with Attitude

H10 *Perceived Ease of Use (of Specific Application/Task) is related to Perceived Usefulness (of Specific Application/Task).* Partially supported. Results indicate that the correlation between Perceived Ease of Use and Perceived Usefulness is significant for several application-related tasks, including tracking requisitions using the wireless procurement system (correlation of 0.931, significant at the 0.01 level), approving requisitions using the wireless procurement system (correlation of 0.955, significant at the 0.01 level), checking e-mail (correlation of 0.847, significant at the 0.05 level), and accessing the corporate directory (correlation of 0.841, significant at the 0.05 level). However, the correlation between Perceived Ease of Use and Perceived Usefulness was not significant for creating requisitions and creating e-mails.

H11 *Perceived Ease of Use (of Specific Application/ Task) is related to Attitude.* Partially supported. Results indicate that the correlation between Perceived Ease of Use and Attitude are significant at the 0.05 level for approving requisitions (correlation of .806). However, the correlation between Perceived Ease of Use and Attitude were not significant for other tasks: creating requisitions, tracking requisitions, checking e-mail, creating e-mail, and accessing the corporate directory.

H12 *Perceived Usefulness (of Specific Application/Task) is related to Attitude.* Partially supported. Results indicate that the correlations between Perceived Usefulness and Attitude are significant at the 0.01 level for approving requisitions (correlation of 0.907) and significant at the 0.05 level for accessing the corporate directory (correlation of 0.802). However, the correlations between overall Attitude and Perceived Usefulness of the wireless solution for completing the following tasks were not significant: creating requisitions, tracking requisitions, checking e-mails, creating e-mail, and accessing the corporate directory.

Discussion

The results of this study provide insight into the suitability of B2B organizational mobile commerce solutions using wireless technologies. Findings provide initial awareness into the willingness of employees to accept mobile commerce, as well as the mobile applications that they identify as most likely candidates for mobility.

First, hypotheses 1-5 were used to test the appropriateness of the Technology Acceptance Model in the context of mobile commerce. TAM has often been found to explain technological attitudes and predict usage behavior in stand-alone technologies, by addressing the technological-related factors and the individual-related factors that influence the acceptance decision. However, with technologies that support organizational processes, as is the case with organizational mobile commerce technologies, other factors could weigh heavily on the acceptance decision and usage. As illustrated in Figure 7, three of the five relationships among the primary constructs of TAM were not supported in this study. This suggests that the mobile commerce acceptance decision is not simply based on technology-related factors. Rather, additional factors, which might include situational and process-related factors, have a strong influence on the acceptance decision of mobile commerce solutions.

However, results indicate that employees are generally enthusiastic about the possibility of having mobile access to their organizational applications, and that they desire mobile access to certain applications more than others. As indicated by Hypotheses 6-8, the inclusion of certain applications more positively impacted their overall attitude toward the mobile commerce solution. Specifically, the inclusion of e-mail triggers a more positive attitude toward the overall mobile solution than did other applications. Interestingly, these employees wanted mobile access to their e-mail, even if their job didn't specifically warrant the need for it. This suggests that employees don't only view mobile technologies as a work-related tool, but also as a personal productivity or communications tool. Furthermore, findings from Hypothesis 9 suggest that employees who are interested in having mobile access to one organizational application also have a very strong desire to have mobile access to other organizational applications. This implies that these employees find value in having a suite of organizational applications available on their mobile commerce solution rather than simply having a mobile commerce solution that accesses a single application.

Furthermore, respondents indicated that they perceived mobile commerce technologies to be more suitable for certain application tasks than it is for other tasks, as found through the results of Hypotheses 10-12. In the context of the usability of mobile commerce technologies, tasks that require less data entry, such as approving requisitions, are perceived to be easier to complete using the mobile device, than are tasks that require extensive data entry, such as creating e-mails. As is indicated by the Technology Acceptance Model, individuals' perceptions of the ease of use of a technology influences their perceptions of the usefulness of the technology. However, when we assessed this relationship for mobile devices, in the context of completing specific application tasks, the relationship between perceived ease of use and perceived usefulness only held true for lower complexity tasks. With tasks of higher complexity, which were considered to be more difficult to complete, the respondents still viewed the mobile applications to be useful for those tasks. Furthermore, the perceptions of the usefulness and ease of use of the mobile solution for specific tasks did little to explain the variance in the overall attitude towards the mobile solution. Again, this supports the need to study the role that other factors, such as task urgency, has on employee acceptance.

Conclusion

As businesses contemplate the development of wireless solutions to support organizational business processes, several issues need to be addressed. A primary consideration for the organization is the employees, the intended users of the technology, as businesses will not get the most out of any solution if it is not fully accepted by users. The unique characteristics of mobile devices, specifically its form factors and its ubiquitous nature, can influence employees' initial willingness to accept mobile commerce solutions. Thus, it is important to identify the factors that inhibit and encourage acceptance and usage, as these factors can assist companies in selecting employees who would most likely benefit from and use wireless solutions and can direct the design of the solution to incorporate applications best suited for the mobile environment.

Results from this study of employees at one Fortune 100 company indicated that employees have an interest in having on-demand mobile access to their applications. The findings indicate that technology-related and individual-related constructs alone do not adequately explain the variance in attitudes and usage behavior. This suggests that we should consider additional factors, such as the environment in which technologies are employed, when attempting to understand technology acceptance and anticipated usage behavior. Identifying these factors, and addressing related concerns during the technology development process, can reduce some of the uncertainty associated with usage and can strengthen the solutions' potential for success.

Future Research Directions. Continued study is needed to further identify the critical factors that influence the acceptance of organizational mobile commerce technologies. As found in this study, technological-related and individual-related factors do not adequately explain acceptance of mobile commerce technologies. Thus, additional studies are needed to identify and test the factors that impact mobile commerce acceptance.

As user factors are dynamic, not only is it important to address the factors that influence initial acceptance, but it is also important to address the factors that influence long-term usage of the technology, such as whether there are enough critical mass of needs for employees to decide that continued use is worth the effort. Other related areas include researching the impact that added functionalities (e.g., applications) has on mobile commerce acceptance and the role culture and location has on wireless acceptance, as countries are at different stages for adopting mobile devices. Additionally, research is needed to address the fit of mobile commerce solutions with organizational processes and operational tasks to help improve the design and management of emerging wireless technologies.

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