

## Mobile Technology Adoption - A Case Study

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*Abstract:* - Acceptance theories have been used in traditional information systems to help predict and explain their adoption. In recent years, researchers have attempted to find suitable acceptance models to explain adoption of mobile information systems as well. In this paper we examine the suitability of the adoption criteria of traditional models, UTAUT in particular, for mobile information systems in organizations. Other previously proposed criteria which seem to influence the adoption of such systems are also discussed. A case study of an introduction of a mobile ordering system in a restaurant is used to achieve these goals. Analysis of the reasons behind individual employees' decisions to use or reject the mobile device system helps to understand which criteria are likely to influence adoption of mobile technology in organizations. As the result of this study, proposed adoption factors suitable for mobile context include: Effort Expectancy, Performance Expectancy, Facilitating Conditions, Mobility, Trust, and Enjoyment.

*Key-Words:* technology adoption, mobile information systems

### 1 Introduction

This study aims to investigate the main factors affecting adoption of new mobile information systems in an organizational context. Constantiou et al. [1] stress that technological advances and service availability do not automatically lead to widespread adoption and use. As mobile information systems are still at an early stage of development and their uptake has not been great, a better understanding of their adoption and use becomes an important goal. Repeated suggestions have been made that more efforts should focus on understanding issues and factors explaining adoption, acceptance, and use of mobile services [1]. It is hoped that such studies will lead to improved strategic planning, more successful solutions, as well as better profits and increased benefits both for organizations and systems providers.

Section 2 of this paper discusses technology adoption theories and situates them in the mobile context. An overview of related work is presented in Section 3 and the methodology is set out in Section 4. Section 5 provides the case study background. The authors discuss the results of the case research in Section 6 and conclude the paper in Section 7.

### 2 Technology Adoption Theories and Mobile Context

Acceptance models have been traditionally used to help explain and predict adoption of new technologies. They are based on specific factors, or constructs, that influence the individual's decision to adopt or reject a new technology. Venkatesh et al. [2] closely examined eight acceptance and adoption theories and combined the relevant constructs from different theories under one model, the Unified Theory of Acceptance and Use of Technology. UTAUT includes four determinants of user acceptance and technology usage. The constructs and their definitions are presented in Table 1.

<b>Performance expectancy</b>	the degree to which an individual believes that using the system will help them attain significant rewards
<b>Effort expectancy</b>	the degree of ease associated with the use of the system
<b>Social influence</b>	the degree to which the individual perceives that important others believe he or she should use the new system
<b>Facilitating conditions</b>	the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system

Table 1: UTAUT adoption factors [2]

Both UTAUT, and the previous models that it is built upon, have been empirically tested and validated in numerous applications [3]. Mobile information systems however are a new field, and although adoption of such systems is a focus of many new studies, researchers are still looking for analytical tools to help explain and improve mobile technology adoption. Because of the amount of existing knowledge on traditional information systems adoption, it seems important to determine whether existing models can be applied to mobile technologies in a similar way. This case study therefore attempts to discover the suitability of traditional models, in this case UTAUT, for predicting mobile information systems adoption. Mobile devices have unique features that do not guarantee that the same traditional models can be used to predict their adoption in the same way. Can we apply the same models to understand mobile device and systems adoption, and if so, do the same acceptance criteria apply? Do they need to be modified to suit particular characteristics of mobile technology? This paper represents an attempt to answer the above questions.

UTAUT has been chosen as the focus of this study as it corresponds to the most recent development in the organizational technology adoption [3]. It is also the compilation of other validated models. UTAUT has been successfully used to predict adoption of information systems [3]. What is more, its focus is on organizational context.

Researchers have already tried to apply the traditional acceptance models to predict adoption of mobile technologies (see Table 2 for the authors).

<i>Adoption determinant for mobile technology</i>	<i>Authors</i>
<b>Mobility</b>	Amberg et al. [4], Mallat [3]
<b>Cost</b>	Amberg et al. [4]
<b>Trust</b>	Serenko [5], Dahlberg et al. [6], Mallat [3]
<b>Enjoyment/ Gratification</b>	Pedersen [7], Stafford et al. [8]

Table 2: Adoption factors proposed for mobile technologies to supplement traditional determinants

Most closely follow the existing acceptance theories, often however expanding the models to include new critical determinants of mobile devices adoption.

Some new factors proposed for mobile services adoption in previous publications are summarised in Table 2, along with the authors of these studies. Analysis of these studies however reveals that their focus was on mobile technology adoption outside organizational context, such as in mobile portals, mobile parking, and mobile payments. This paper adds to the existing body of knowledge about the use of traditional acceptance models for mobile technologies by examining them in an organizational context. Therefore, the relevance of these previously proposed acceptance factors for employees in an organization should be analysed as well. To sum up, this study not only aims to examine the suitability of the traditional UTAUT constructs from Table 1 for mobile systems in organizations, but it also explores the appropriateness of the other proposed adoption factors from Table 2.

A case study of an introduction of a mobile ordering system in a restaurant is used to achieve these goals. The use of a mobile ordering device in this organization is voluntary, so it depends on each individual employee's decision. They are welcome to use note pads and pens, and then enter the order into a stationary terminal. Some employees have chosen not to adopt the new system, while others use it all the time. This provides a good perspective on the adoption determinants, since opinions and attitudes of both adopters and non-adopters could be analyzed. It seemed worthwhile to investigate what made some users accept the mobile device system, what specific features made them want to try and then keep using it, and what advantages were important to them; furthermore, discovering reasons for the lack of adoption among some employees could be even more significant.

### 3 Related Work

Kay & Er [9] also examined adoption of a new restaurant mobile ordering system. While their study presented the perspective of the restaurant owner and manager, this paper takes an employee-centric view. There is often a disconnect between managers deciding to buy a system, and employees deciding to use it. In the restaurant researched in this study, even though the managers were the buyers, they are not the ones to use the system. Each employee could decide to use or reject the mobile technology. If employees of any organization do not use a new

system, it is not likely to get widely adopted elsewhere. What is more, the organization misses out on a number of rewards and benefits. It seemed important to find out attitudes of the actual end-users of the system.

Another study on the use of mobile devices for order taking was undertaken by Prasad et al. [10]. Their focus was on identifying the differences and similarities of the perceived benefits of managers and employees. Perceived benefits are related to one of the UTAUT factors, performance expectancy; the current study in turn tries to explore additional adoption factors as well to provide a more complete explanation of adoption of such systems.

#### 4 Methodology

The case study methodology was chosen as the most suitable to help answer why users adopt a new mobile information system, and how the adoption can be explained. According to Yin [11], 'how' and 'why' research questions are explanatory in nature, and likely to favour the use of case studies. The case study is preferred when such 'how' and 'why' questions are being asked about a contemporary event, as it involves direct observation of the events being studied, and interviews of the persons directly involved in the events [11]. Case research is particularly suitable for practice based problems as it enables the researcher to capture practitioner knowledge and later generate theory [10]. Case research is now considered a useful and relevant research strategy within the IS community [13].

A common criticism of case studies is their lack of rigour if proper procedures or good methodological techniques are not followed. To avoid this problem, the authors have followed systematic procedures on case studies to ensure validity of the research, mainly based on Yin [11] and Pare [12]. One such recommended validating procedure was having the draft of the results discussion and conclusions reviewed by two of the participants to elicit any additional feedback [11]. Such a review of case study report by key informants increases both construct validity and internal validity of the research [12].

Another criticism is that case studies provide little basis for scientific generalization. Yin [11] argues that although case studies are not used to represent samples, and they cannot be generalizable to populations or universes like surveys are, they are

instead generalizable to theoretical propositions, so their goal is expanding and generalizing theories. Accordingly, this study strives to generalize a particular set of results to a broader adoption theory.

This case study was conducted in June of 2005. The unit of analysis was factors that have influenced the adoption or non-adoption of mobile devices for order taking by individual employees since the introduction of the system in March 2005. This particular restaurant was seen as a good choice for this study since the use of the mobile device is voluntary for each waiter. Furthermore, the fact that both adopters and non-adopters were willing to take part in the study provided a good opportunity to learn from this case. The researchers could also visit the location on a number of occasions. In a process of case selection, opportunity to learn is of primary importance [14]. A case chosen should provide some typicality, but it is recommended to choose that case from which researchers feel that they can learn the most [14].

Data collection and analysis were structured around the UTAUT acceptance factors, as well as the other previously proposed adoption criteria (see Tables 1 and 2). Pare [12] observes that the use of a conceptual framework\* in a case study helps researchers make sense of occurrences, ensures that important issues are not overlooked, provides a set of constructs to be investigated, and guides interpretation and focus.

Seven waiters agreed to take part in interviews that focused on their use of the mobile device, and their reasons behind the decision to use or not to use it. All the semi-structured interviews were face-to-face. Interviews are an essential source of case study evidence because most such studies are about people [11]. Such human affairs should be reported and interpreted through the eyes of specific interviewees, and well-informed respondents can provide important insights into a situation.

According to Yin [11], a major strength of case study data collection is the opportunity to use many different sources of evidence. Direct observation serves as another source of evidence in a case study. Field visits provided opportunities to watch the employees during their work, and during order taking in particular. As Yin points out [11], if a case study is about a new technology, observations of the technology at work are invaluable aids to further understand the limits of the problems with the technology.

Finally, documentation is likely to be relevant in many case studies, and therefore staff manuals, memoranda, as well as printouts of receipts produced by the new system have been used to confirm and augment evidence from the other sources [11].

To better illustrate the profile of participants of this study, from the seven waiting staff who agreed to take part in the interviews, three use the mobile device every time at work, two do not use it at all (one did use it for a while but desisted while the other one only used it as a trial several times), and two use it sometimes, depending on the circumstances. Their ages range from 22 to 55, and all but two employees have had more than five years experience as waiters in this restaurant.

## 5 Case Study Background

The restaurant has been operating for ten years. It is located in a well known tourist area of Sydney. It boasts magnificent views so it attracts many international visitors, as well as local residents on the weekends. It has a large seating area, accommodating 150 guests outside, and 80 patrons inside. Additionally, there are 40 seats upstairs, apart from special function rooms. The restaurant employs about 15 waiters at any given time, with 8 scheduled to work on busiest nights, and 3 on very quiet nights. Waiters' duties include taking orders of meals and drinks, and delivering drinks to the tables. Meals are delivered by food runners. Customer service is a major part of the waiters' duties. On a busy night, one waiter would serve 60 or more guests.

The focus of this research was on a mobile ordering system introduced in the restaurant in March 2005, i.e. three months before the study started. Prior to that time, the restaurant relied on three fixed terminals for waiters to enter orders. The employees would use pen and paper to take orders, and then walk to the terminals to put the order through. This was sent to printers in the kitchen and the bar. According to the managers, the restaurant needed a new system as the previous one became too unreliable, with at least one computer crashing almost every night, resulting in lost orders. The new system includes a server located in the manager's office, two stationary terminals inside near the main entrance, one terminal in the cashier room, five Pocket PCs, three printers in the kitchen and one in the bar. Orders can be entered either into one of the two fixed terminals, or the five handhelds. When a

waiter submits the order, relevant information is printed at each station - cold entrees and desserts at one kitchen station, another one prints hot entrees orders, and the third one is for main courses. Drink orders are printed in the bar. There are also two receipt printers, next to the two stationary terminals.

Each waiter has a choice. The waiter may elect to use (1) a mobile device to enter orders while still at the table or (2) a pen and paper to write the order down, and then walk all the way to one of the two fixed terminals to process it there.

The Personal Digital Assistants (PDA) are models PPT 8800 by Symbol with Windows Mobile 2003. Wireless connectivity is provided through IEEE 802.11b (WLAN). The PDAs are touch-screen, operated with a stylus. Screens include 2D buttons in different colours, with names of submenus and products, but with no icons (see Figure 1).

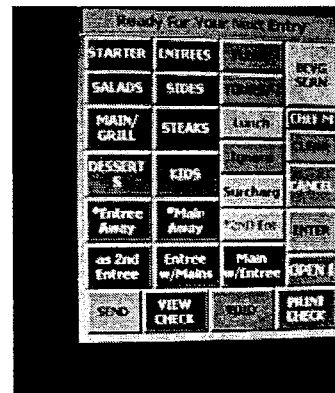


Figure 1: Main screen of the ordering device (pic. Roman Fulmanski)

There are several hierarchical menu levels, so the main screen includes access to such submenus as Entrees, Kids, Starters, or Desserts. On some menus, the user needs to scroll up and down to see the whole screen. The order is submitted when the waiter presses the Send key.

## 6 Results Discussion

Various analytic techniques are proposed by Yin [11] to help analyse data collected in a case study. Interpretational analysis refers to examining the data for constructs, themes, and patterns that can be used to describe and explain the phenomenon studied [15]. A technique that seems particularly suitable to this study, which is essentially organized around eight potential acceptance factors, is making a matrix of

categories and placing the evidence within such categories [11]. Pare [12] similarly proposes rearranging data into categories, which facilitates insight, comparison, and the development of theory. He also suggests that the categories of the coding scheme should be consistent with the conceptual framework. Accordingly, the main reasons for adoption or non-adoption of the new mobile ordering system have been placed within categories consistent with the theoretical acceptance factors, and are further discussed within these categories in the following sections.

A procedure proposed by Pare [12] has been applied to ensure the reliability of the coding process, and therefore the reliability of this study. Two coders have individually assigned the reasons provided by the employees to a suitable category. The results were subsequently compared, and the few differences discussed and resolved.

### 6.1 Performance Expectancy

Performance expectancy has been defined as 'the degree to which an individual believes that using the system will help him or her better attain significant rewards'. According to UTAUT if users elect to adopt a system, they need to see important benefits in it. This concept has been evident in previous adoption models as well, and it is referred to as 'perceived usefulness' in Technology Acceptance Model (TAM) [16].

For one waiter the main reason to use the mobile device is that it saves him from a lot of walking, because he no longer needs to travel many times to one of the stationary terminals to process orders. This makes the job less tiring for the employee, and becomes especially important on busy nights. Another benefit that was most influential for another waiter is the control she has over the whole process. She can do everything at the table now, without a delay. She finds it easier to control the order entry now, review and update the order, or answer the guests' questions. Another significant reward of using the system was time saving. The employees stressed that although it takes longer to enter the order through the mobile device than through the fixed one with a larger screen, in general the mobile devices still save more time because everything can be done at the table. The waiters believe that they can serve more customers, which brings them additional rewards, as incentive systems are used in the

restaurant. Monetary incentives are paid to the employees who achieve set sales targets on the night.

When asked about other benefits of using the mobile system over the traditional method, the employees stressed that it also saves them from waiting for a stationary terminal to be available to process the order. With the two fixed terminals, waiters would often need to wait in a queue to enter their paper-based order. They also liked the fact that any changes requested by guests can be entered immediately at the table, reducing chances of errors. Even if they do enter something incorrectly, the system still allows them to reverse errors.

Some more benefits that are missing but which the employees would find important in this system include the attached printers. When printing a receipt, they still have to walk to the stationary terminals to pick it up from there. Furthermore, the receipts from mobile devices have not been designed well, and they cannot show a breakdown of the order by seat numbers, which is important if the guests want to split payments. This means more work for the waiter who needs to calculate subtotals for each patron if they ask for it.

The system becomes less useful during special promotions. The support staff does not know how to update the system so the prices are often wrong. This means that the cashier needs to be asked to manually override the prices before the receipt is printed.

Improved customer service is one reward that could be expected from introducing such a new mobile system [9]. While it is likely to be important to managers, for the waiters improved customer service was also important in expectation of higher tips. During observation time, it was noted that the waiters had to spend a lot of time looking down at the handheld's screen. The waiters with mobile devices did not maintain as much eye contact with customers as the paper and pen carrying waiters. When the guests were ordering, the waiters were looking down at the devices and entering orders straight away, just repeating and nodding as feedback, but rarely looking directly at the customers. They did not talk to the patrons as much as the waiters without PDAs did. The interaction between the customer and the mobile carrying waiters resembled 'dictating' encounter rather than a customer service situation. For the waiters who were writing down orders in a note pad, the interaction with customers seemed more spontaneous and dynamic. The use of the mobile device does not seem to improve customer service.

## 6.2 Effort Expectancy

The degree of ease associated with the use of the system is defined in UTAUT as Effort Expectancy. None of the employees perceived the system as difficult to learn. The waiters said they became confident using the device after 1-2 busy nights with it. One person stressed that the buttons are logically grouped so their location was easy to remember.

Two employees however never use the system now, and they both cited inconvenience and too much effort as the main reasons. They argued that entering orders on a small cluttered screen is so inconvenient compared to a larger screen that they cannot be bothered anymore. They found it much easier to find suitable buttons on a large screen, and thought it was much easier to enter data there. Another employee who still uses the mobile devices sometimes, often just does not feel like making an effort to pull out the device and use it. Around half of the time he would elect to use the stationary terminal.

What is more, one employee who never uses the mobile device during a day argues that the main reason is the difficulty in seeing anything on a small screen, especially in outside glare.

The mobile device screen seems to have a number of buttons that are never used. They clutter the screen unnecessarily. The waiters believe that several buttons on the main screen have no valid function, and they feel that this could have been avoided if the waiting staff, not just managers, had been consulted before the system was implemented.

Even the regular users of the mobile device thought that the least convenient part is entering modifiers. If a guest wants to modify an original dish, a waiter needs to type in a message to the kitchen. This results in a waiter standing in front of the table, making the customers wait till they finish typing. Another inconvenience is that the system is easiest to use when all the entrees for the table are entered first, followed by all the mains. This however is rarely the case, and ordering is often spontaneous and flexible. For persons ordering their entrée and main at the same time, or their dessert and coffee together, the user has to switch between the submenus a number of times. The interviewees found it very inconvenient.

## 6.3 Social Influence

According to UTAUT, adoption is increased when the individual perceives that important others believe he or she should use the new system. None of the

participants mentioned social expectancy as one their reasons to use or not use the mobile device. Even when specifically asked about how others have affected their decision to try and use the system, the employees did not see the significance of this factor.

None of the employees thought that using the device gave them status among other employees. With the exception of the first week after the implementation, they never talked about the mobile devices, and the interviewees were not even able to state which of their colleagues used the system. It did not matter to them. They also do not feel any pressure from management to use the mobile system, as it is voluntary.

In some previous studies authors stressed that such mobile ordering systems often impress customers [10]. The employees did not think it was a case. They hardly ever receive any customer comments about the mobile devices.

## 6.4 Facilitating Conditions

In UTAUT this factor is described as 'the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system'. Support in the restaurant is provided by one employee who received one week training from the supplier. The employees like to have one of their colleagues as support staff as they find it easy to approach him. They did not think it was a very important adoption determinant though, possibly because no major problems or network failures have been recorded yet. They reported however that the support person does not know how to make changes and updates to menus, and therefore an employee from the supplying company must be called to do it. It therefore takes too long to introduce special prices in the system.

Staff complained that they have to pick up and change batteries every two hours. They did like the fact however that the system gives them plenty of warning before it happens. The fact that the order does not get lost and can be recovered easily was most important to the waiters.

## 6.5 Enjoyment/gratification

The interviewees remembered that when the mobile system was to be introduced, they were very excited by it. Initially, all the employees wanted to try it because they considered it a novelty.

They said that especially in the first week they liked to surprise their guests by submitting parts of the order straight away, so the drinks would be brought out even before the waiter finished taking the order. It was fun for the waiters since they liked watching the guests' reaction. The employees said they now got bored with this and do not do it anymore, but in the first weeks they often used the devices just for the fun of it.

Mobile devices in organizations can still be perceived as a novelty, and this case suggests that some adopters tried the system because of that. From the interviews however it seems clear that enjoyment influenced their decision to try the system, but not to continue to use it.

### 6.6 Mobility

One of the previously proposed factors, mobility, refers to the mobile service being available anytime, anywhere (see Table 2 for authors). One employee who often works in the upstairs section pointed out that at some tables at the far side of the restaurant there is simply no coverage, or if there is, then it is too slow to process an order. This means that in some places waiters simply cannot use the device, even if they want to.

One employee stressed that the biggest problem with the devices according to him, and one that sometimes makes him not want to use it anymore, is the batteries. He pointed out that the devices run out of power every two hours, which means he needs to change them three times during a long and busy shift. The process of replacing a battery takes up to 2 minutes, and requires restarting the device.

The restaurant is very large, and waiters need to walk a lot. They seemed comfortable wearing their devices on the belt, and they did not think that they are too heavy. The PDAs are also quite robust, and two interviewees said that although they had dropped the devices several times, they were not damaged.

### 6.7 Trust

Security of transactions did not matter to the participants of this study. They did not care whether someone could intercept information passing through the system. One employee thought that it could be important to managers who may want to keep their daily takings a secret. To the waiting staff however the issue did not seem relevant.

Trust in the facilitating technology has a broader meaning than just perceived security. As Mallat [3] points out, institution-based trust indicates the importance of technology by including perceptions of technological safeguards that help users to reach a desirable outcome. Users should believe that the underlying technology infrastructure and control mechanisms are capable of facilitating mobile transactions according to their confident expectations [3]. The interviewees reported that they trust the system with all standard operations. They believe that each kitchen and bar station will receive a correct order. The waiters also noted that the strength of the system is the fact that they can be sure that the order will not get lost even when the battery discharges.

The employees did not seem to trust the system with non-standard orders. When a guest orders something not on a standard menu and an employee processes the order by a combination of text input and traditional buttons, the waiters do not trust the system to produce correct receipts for the kitchen. They walk to the kitchen to check the printed order. It has happened before that the system would interpret such non-standard orders as entrees instead of mains for example, and the food was brought out too early. The participants who mentioned this problem reported that they still use the system despite of this because such orders happen rarely. The adopters trusted the system in all other situations.

### 6.8 Cost

The interviewees did not care how much the devices cost. The waiters thought it must have cost a lot to purchase the system with five mobile devices, but while clearly important to management, adoption by individual employees has not been affected by the cost of the devices at all.

## 7 Conclusions

This case study aimed to find out why users adopt or reject new mobile information systems in organizations, and whether established acceptance models used in traditional information systems can be used to explain adoption of mobile technologies.

Performance Expectancy and Effort Expectancy seem to be the most influential adoption factors in the

mobile ordering system. All but one of the main reasons given by the employees explaining their use or lack of use of the device were related to either performance expectancy or effort expectancy (see the reasons in bold in Table 1). This supports the traditional acceptance models where the two criteria have been listed as the main determinants of adoption [2, 16]. It seems that in the case of a mobile information system, the same traditional determinants can be used to predict and explain adoption.

One difference suggested by the results of this study seems to be the relevant importance of each of the two factors. Traditionally, usefulness has been shown to be more influential than ease of use [16]. According to Davis [16], users are driven to adopt an application primarily because of the functions it performs on them, and only secondarily on how easy or hard it is to achieve these functions. Davis [16] also argues that users are willing to cope with some difficulty of use in a system that provides significant functions. In the case of this mobile system however, for the non-adopters almost all the reasons included the mobile devices being harder and less convenient to use than the larger fixed terminals. Even though they did see many great benefits of using the system, lack of ease of use and convenience was the main barriers to their adoption – i.e. they were not ready to put up with the lack of ease of use for the sake of useful rewards of the system.

This could be due to the fact that ease of use becomes even harder to achieve with mobile devices with their small screens and harder input, so the difference between ease of use of traditional and mobile systems becomes even more significant. Usefulness seems to be more easily achieved in mobile systems by introducing a number of immediate benefits. If this theory is confirmed in future studies, more effort needs to be concentrated on designing usable and convenient to use mobile devices, without sacrificing Effort Expectancy for Performance Expectancy.

Facilitating Conditions were seen as an important factor too, both for adopters and non-adopters, which supports the theory proposed by Venkatesh et al. [2]. Not having support ready to immediately implement changes makes it hard to use the device during promotions. Having a colleague as support staff on-site seemed a popular decision.

One of the UTAUT factors, Social Influence, did not seem to have effect on this technology adoption

at all. The users did not care what others think about them using the system; what is more, they never even talk about the system or know which of their colleagues use it.

One factor that does seem to influence the use of the system is Enjoyment, since the employees thought that the new system was exciting and a novelty, and initially fun to use. This however only seemed to influence the decision to try the system, but was not enough to make them keep using it.

Mobility of the system seems an important adoption factor since the employees working in an upstairs section would not rely on the system to work there. Battery weakness has been one of the most influential disadvantages of the system. The adopters liked the fact that they can carry the device with them anytime, anywhere.

Trust and cost have been proposed in other studies of adoption of mobile services by individuals (see Table 2 for authors of such studies), however for employees in an organization cost does not seem to be relevant at all. In terms of trust, even though the waiters did not care if the data can be intercepted, they still needed to trust the system that the transactions will be performed as expected, and that the order will not get lost when the battery discharges.

To sum up, the main adoption factors that seem to influence an individual employee's decision to use or reject mobile technology in an organization include Effort Expectancy, Performance Expectancy, Facilitating Conditions, Mobility, and Trust. Enjoyment is also believed to influence the decision to try the system. Ease of use of mobile devices must be improved, especially compared to fixed terminals. Practitioners also need to focus on providing even more useful benefits that can be discovered by talking to end-users of such systems. The employees stressed that both ease of use, and a number of significant rewards of the system could be increased by involving actual end-users, not just management, in the design and implementation process as the waiters are the ones who know most about daily routines of their work, and the ones who will use the system every day. Facilitating conditions dictate that support staff must be knowledgeable, and ready to update the system with any changes in a rapidly changing restaurant environment. Mobility requirements that need to be improved include increasing the coverage range and battery life. Trust in the new technology should be improved by



making even non-standard operations more reliable. By making the system fun to use adoption could increase as well.

The limitation of this study is that it examines mobile technology adoption in one specific industry, namely hospitality. Further research is necessary to confirm the extension of the adoption theory for mobile systems that was proposed in this paper. Case studies of introduction of mobile information systems in other organizations can provide further empirical results that can be compared to the proposed theory. If two or more cases are shown to support the same theory, replication may be claimed [11]. A higher number of cases are necessary to attain theoretical saturation [12], and additional case studies of mobile technology implementation projects will increase the validity and reliability of the theoretical propositions developed in this research.

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