THE STUDY OF THE ROOT CAUSES OF THE ADOPTION AND NON-ADOPTION OF PERSONAL DIGITAL ASSISTANT (PDA): A CASE STUDY OF SMALL BUSINESSES IN THAILAND

การศึกษาปัจจัยที่แท้จริงที่มีผลต่อการนำพีดีเอมาใช้ กรณีศึกษา: ธุรกิจขนาดย่อมในประเทศไทย

Anupong Avirutha
Head of Management Department
Faculty of Business Administration, Sripatum University
Email: anupong.av@spu.ac.th

ABSTRACT

The purpose of this study is to find the root causes of the use of PDA by small businesses in Thailand. The study is expected rich detailed understandings of PDA users and non-PDA users concerning their perceptions of PDAs by exclusive interview the owner of the businesses. More important, the study attempts to derive the known factors that would be beneficial for government or trade associations such as the federation of Thai industries to promote a policy to the use of m-commerce regarding infrastructure, tax promotion, and price.

KEYWORDS: Technology, Adoption, Adopter and non-adopter, PDA (Personal digital assistant), Small businesses

บทคัดย่อ

วัตถุประสงค์การวิจัยครั้งนี้จัดทำขึ้นเพื่อศึกษาหาปัจจัยที่แท้จริงที่มีผลกระทบต่อการนำเอา พีดีเอ (personal digital assistant) มาใช้ในการทำงานในธุรกิจ ซึ่งในงานวิจัยครั้งนี้ผู้วิจัยมีความประสงค์ในการหาข้อมูลเชิงลึก โดยการสัมภาษณ์กับทางผู้บริหารของธุรกิจ เพื่อหาสาเหตุที่แท้จริง และเหตุผลของการไม่นำเอาพีดีเอ มาใช้ในธุรกิจ เพื่อหวังว่าผลงานวิจัยจะเป็นข้อมูลที่มีประโยชน์ต่อทางองค์กรภาครัฐและเอกชนในการวางนโยบายเทคโนโลยีสารสนเทศของประเทศ ไม่ว่าจะเป็นในแง่ของการส่งเสริมการใช้เทคโนโลยี การวางแผนทางด้านงานระบบให้กับองค์กรต่อไป

คำสำคัญ: เทคโนโลยี การนำมาใช้ ผู้ใช้เทคโนโลยีและผู้ไม่ใช้เทคโนโลยี พีดีเอ ธุรกิจขนาดย่อม

มหาวิทยาลัยศรีปทุม
SRIPATUM UNIVERSITY

Introduction

Technology is one of the important factors that provide the potential to change the way of doing business. It is also a key to the growth and success of all businesses of all sizes. In addition, technology is an important element for success in the global economy due to the increasing a business's ability to process transaction information, transmit more quality information to management, and maintain more efficient inventories (Keen, 1991). Furthermore, the availability of many information and rapid technology advancement increases customer's expectations at the faster rate; therefore, in order to satisfy the customer needs and expectations, businesses should be responsive in shorter time.

The explosive growth of penetration and usage of mobile devices, including mobile phone, smart phone, personal digital assistant (PDA), ultra mobile personal computer (UMPC), and other handheld devices, is regarded as a driving force for m-commerce, which is the next wave of electronic commerce (e-commerce). People may think that e-commerce is the evolution of the way to do business, and the e-commerce has moved beyond first-to-market players and real-time information. However, mobility technology is a practical extension of the digitalized commerce on how people work and what they will be required to do business today.

Many businesses believe that the new technology would not provide many benefits to enhance their businesses. As a result, they might not adopt the new technology into their businesses. Therefore, the problem of this study is to identify factors that affect the decision of the adoption of PDA by small business in Thailand. Network operators also are interested in the trend towards converging technology since they have seen a huge opportunity about mobile services. M-commerce is expected to experience a substantial growth regarding rapid of mobile device adoption and its advantages such as working wirelessly, and anytime-anywhere connectivity. Convergence of telecommunications and information technologies have revolutionized the way that peoples use these technologies (Haque, 2004). The technology has been increasingly delivered through broadband mobile medium known as 2.5G (second and a half generation of mobile technology), which is an evolution from 2G to 3G technology because the technology offers faster and wider range of more advanced services while achieving greater network capacity including wide-area both wireless voice and data at the same time (Ahonen, Kasper and Melkko, 2004). The third generation (3G) of mobile is the evolution of existing mobile networks, having potential growth opportunities in the market which will affect the way of doing business (Wallage, 2008).

With the technology, PDA, emerging companies ask themselves the same question that was asked at the onset of e-commerce. Why should we invest in the technology? New technology such m-commerce takes companies beyond the benefits of the Internet. M-commerce is rapidly becoming involved in daily operations, particularly in large corporations that invest heavily in new innovations. The device is improved to provide a faster speed in communication quickly anytime and anywhere through a wireless, Internet-enabled device, and without the use of a computer.

However, despite the Thai ministry has initiated and promoted a series of national plans and activities known as IT-2000, and IT2010, which focus on the basic foundations for the development and to promote full potential of information technology investment in business to gain a sustainable economy, to support technology

มหาวิทยาลัยศรีปทุม SRIPATUM UNIVERSITY

adoption in both public and private sectors, the rate of the technology adoption in the business sector is still slow (Chulikavit, 2003), although technology is able to conduct business transactions especially by means of communication network.

Therefore, the purpose and over all goal of this study is to find the causes of the adoption and non-adoption of PDA by small businesses in Thailand. A better understanding of the factors influencing PDA usage will enable small businesses to invest and adopt of PDA use for business functions. More important, the study attempts to derive the known factors that would be beneficial for government or trade associations such as the federation of Thai industries to promote a policy to the use of m-commerce regarding infrastructure, tax promotion, and price.

Literatures and Research Question

Many studies have proven that the use of technology systems improves the quality of decision making and enhances the organizational effectiveness. Technology provides a way for small businesses to reach new customers and find new suppliers. Thong and Yap (1995) found that technology helped small businesses develop their markets, increase sales turnover, increase profitability, and achieve competitive advantages. Furthermore, DeLone (1981) reported that technology provides small businesses to improve productivity and performance within the organization, to improve management perception of business environments, and to provide faster and better customer relationships.

Nevertheless, in order to adopt a technology used in businesses, Barney (1996) found that the heavy investment in advanced technology did not always lead organizations to a positive return on investment. Generally, to invest in technology is to reduce production cost; however, the massive investment in technological hardware is not followed by a significant reduction in costs unless the organization invests in related technology, such as technological software to improve business functions.

Thong and Yap (1995) found that if the managers are unaware or do not understand the technologies available; they are unlikely to use them in their organizations. O' Brien and Wilde (1996) indicated that a change in a chief executive's attitude toward information technology can be achieved by the method of training adopted. O'Brien and Wilde (1996) also reported that the end-user experience is a significant predictor of the use of technology. According to Kaminer (1997), the ability to learn new technology is also related to the innovation that it can be used as an indicator of an increased rate of adoption. Furthermore, those who adopted technology tended to have more prior knowledge of any other technology, a greater degree of innovativeness, and more interest in technology adoption (Nickell & Seado, 1986). Raymond (1985) agreed that managers with more computer knowledge tended to have a positive relationship to adoption of new technology. Many studies explored and identified factors that contributed to the diffusion of innovation affecting the use of technology in businesses (Kwon & Zmud, 1987; Rogers, 1995).

Therefore, drawing from these studies, the research develops a study for PDA adoption in order to find the causes of the adoption and non-adoption of PDA. Hence, the following research question is stated:

Research question 1: what are the causes of PDA adoption and non-adoption?

Research question 2: what are your main reasons of using or (non-using) a PDA?

มหาวิทยาลัยศรีปทุม SRIPATUM UNIVERSITY

Research question 3: what is your opinion to the PDA?

This question is designed as an open-ended question in order to provide respondents' comment of adoption and non-adoption of PDA by small businesses.

Research Methodology

An in-depth interview instrument is used as a qualitative research methodology in order to extend the information. The interview is expected the rich detailed understandings of PDA users and non-PDA users concerning their perceptions of PDA.

Participants are interviewed personally and privately. During the interview session, the participants are asked to respond to standardized open-ended questions; the participants are asked the same questions in the same order.

The sampling technique used in this study is a convenience sampling. The samples of this study consisted of 30 small businesses. The participants in this study are voluntary and anonymity. Furthermore, the sample is 15 of PDA adopters and 15 of PDA non-adopters. To ensure the samples are in small business section, the interview is done at business seminars which are only for small businesses. The seminars are the new entrepreneurs creation network 1st, and how to start up a business.

Results

A total of 30 participants are interviewed individually and privately. The researcher interviews the participants and asked the following questions: what are your main reasons of using or (non-using) a PDA; and what is your opinion to the PDA? Typical comment summary from the business owners and managers are presented in figure 1.

The interview begins with a brief introduction and purposes of the interview. Each participant is interviewed independently. When PDA users are asked their main reasons for using a PDA, the findings showed opinions are divided into two categories. These categories included beliefs about the importance of communication and technology replacement.

A positive perception of the benefits of technology known as relative advantage in the five attributes theory of Rogers (1995) impacts a decision to adopt a PDA. The interviewee comments show that they believe the PDA is an effective tool of communication for customer service and for organizational networking. PDA users reveal of their feeling about using a PDA and suggested changes needed. PDA users like the PDA as an alternative communication tools for communicating and staying connected with colleagues and customers while they are away from their desks.

In the finding, the important factors that determined the adoption of a PDA outside of using it for communication and information management that is that the participants who currently use a PDA used the gadget as a laptop replacement. Other participants inform that adopting a PDA because they think it to be a laptop replacement. The participant reports many examples of using a PDA as a laptop replacement. They believe the PDA is an effective gadget for replacing a laptop as the battery life of PDA supports applications and mobility. In particular, the participants compare the battery life of the PDA with the battery life of a laptop. PDA's batteries are able to run for days under the heaviest possible use before needing to be recharged, allowing them to work during a long trip.

Additionally, the interviewees claim that a PDA comes with many software add-ons, helping perform the role of a laptop replacement. The interview reveals

มหาวิทยาลัยศรีปทุม SRIPATUM UNIVERSITY

most users basically installed an application called Agendas to manage information in their handheld. The application allows users to manage all kinds of information such as data-contact, agenda-calendar, diary, memo and password. Further, Many PDA users added basis software called Documents To Go, allowing to worked on Microsoft Word, Excel and PowerPoint.

Furthermore, PDA is portable, relative inexpensive, and it have the ability to go mobile. It is noted that a PDA raised the ability to connect to constantly changing information all of the time since the workforce is becoming increasingly mobile.

On the other hand, when the same above question is asked to non-PDA users for the causes of non-adoption of PDA, the findings show barriers were divided into three categories. These categories include the cost of the PDA, the complexity of the PDA and the attitude toward the PDA.

Cost is a huge barrier of all new technology investment. Although PDA are normally less expensive than laptop or desktop computers, most of small businesses do not have specifically budget for handheld devices. The participants who do not adopt PDA report reason prevented them from being using a PDA is a high investment cost. Hence, although the technology is much cheaper than before, the cost remains a major threat for small business to adopt technology.

Interestingly, the costs that the participants are concerned with outside the initial cost of a PDA are the cost of networking infrastructure and specialist or technician support. According to the participants, without appropriate networking infrastructure, the communication capability of the PDA is obstructed. To improve communication and networking infrastructures will require a high investment. Furthermore, most of small businesses do not have the appropriate IT department to maintain and support technology systems.

Moreover, the lack of skilled personnel and computer literacy of the participants are their barriers to adopting a PDA. The barrier to adopt a PDA is led by their negative attitude and perception as well. Non-PDA users complain about the complexity of PDA. Most of the non-PDA users almost give the exactly same opinion; "It is so difficult to use a PDA""It is for the businessperson who wants to have a hands-on calendar at their fingertips only."

Additionally, the third barrier category to PDA adoption is the attitude toward the PDA. The interviewees believe that the complicated nature of technology created user stress. The participants express negative feeling of frustration and exhaustion over learning new technology.

One reason affecting adoption of a PDA is the negative perception because those non-adopters are committed to an old way of doing their work, and an innovation is seen as creating a high degree of change in their routines. Some participants comment that the missing of a keyboard in a PDA or the small keyboard on a handheld makes them feel difficult for typing, and it is seemed to be a disadvantage for some people who do not like a stylus used for writing. Additionally, the size of the screen is another issue. Some participants reveal that although a small screen is necessary to make a PDA smaller to fit into a pocket, a small screen is limited to present the optimal display of data.

When the participants are asked about their opinions, the participants those who currently use a PDA are enjoy with their PDA allowing them to stay organized, informed, and connected all while maintaining their mobility. The findings reveal comments are divided into two main opinions. These opinions include PDA/ Phone combination, and fashion accessory.

มหาวิทยาลัยศรีปทุม SRIPATUM UNIVERSITY

Since every current PDA owner participant has embraced cell phones, they plan to buy a PDA/Phone combination for their next PDA. Additionally, most of them believe a PDA/Phone combination will become the norm, giving them the ability to stay organized while only carrying one piece of equipment. A participant said "PDA/Phone is very practical. When I am getting a call and need to check my calendar or information quickly, I can access information in any second."

Conversely, some of the participants prefer not to change to use a PDA/Phone combination because if the PDA integrated phone, they may find some ways difficult to take notes or check their schedule on the PDA, it becomes more difficult than anticipated.

The interview find out that some of the participants view a PDA as more than an information or communication device. PDA become an essential part of fashion specifically for younger workers and older teenagers; they use a PDA as a fashion accessory.

Nevertheless, since PDA are increasingly used as mobile tools, most users carry a PDA everywhere they go, thus, security and confidential are important factors to consider in adopting a PDA. Additionally, one of the greatest threats to the security of the PDA is loss of the handheld device. Business owners and managers feel the security of their business may be in jeopardy if they lost the device. The interviewees indicate that the PDA security is a critical issue; most PDA is lack of build-in security. Most users generally store critical information such as work passwords, PIN number, corporate-confidential information, and personal and client contact information, many of them are afraid of the threats.

Such threats are known as risks; the security of the PDA used in business and virus threats to PDA are factors that directly affect the attitude and perceived attributes when thinking about using PDA in businesses. These risks concerned the business founders the most over how a PDA might change or affect their businesses.

Discussion

Derived from the findings, there was a positive significant association between the PDA adoption and the adopter's educational level. This finding is common for any innovation adoption. According to the results, owners or managers with higher educational levels were significantly more likely to use the PDA. This suggested that the owner or manager who has higher educations was more likely to possess and understand the technological issues of new technology because the ability to understand and apply complex technical knowledge is needed for adoption.

Hence, to increase the rate of using technology, a technology curriculum should be provided and taught in schools, colleges, and universities to address the technological skills which businesses need since education is one of the keys to moving potential adopters from a state of unawareness to awareness. This could be done by supporting of the Thai government that they should more focus on infrastructure development and education of technological skills. The push for more technology-oriented education from school through university level will provide a foundation of experienced computer users who can find better ways to leverage new technology. As a result, focusing on enhancing technological skills can provide the overall potential economic benefits of enhancing the human resources.

Further, to increase the PDA usage, appropriate network infrastructure is needed. Increasing online access to the internal information system and database was found to be associated with the objectives of using a PDA since the key objectives of using a PDA are

มหาวิทยาลัยศรีปทุม SRIPATUM UNIVERSITY

communication and information management purposes. The infrastructure could be used to share information in the organization, allowing productive collaborations among workers in the organization. Additionally, it can reduce a risk barrier threatened to the adoption of technology. This will go a long way to ensure the PDA users that their personal and business information will be protected. Furthermore, small businesses can increase security by improving the technical infrastructure, enabling more protection to ensure their information is secured while using a PDA to communicate for business.

Lastly, knowledge-based skills and technologies required to adopt PDA cannot be acquired from policy only. The business has to cultivate and develop their own IT skills and knowledge to be readily in place so that they can adopt and implement the technology to respond to competition in a timely manner. Trainings in IT can be done quickly to gain more technology literacy and to increase the positive attitude toward the adoption, while decreasing the technology resistance by the potential technology adopters in the future.

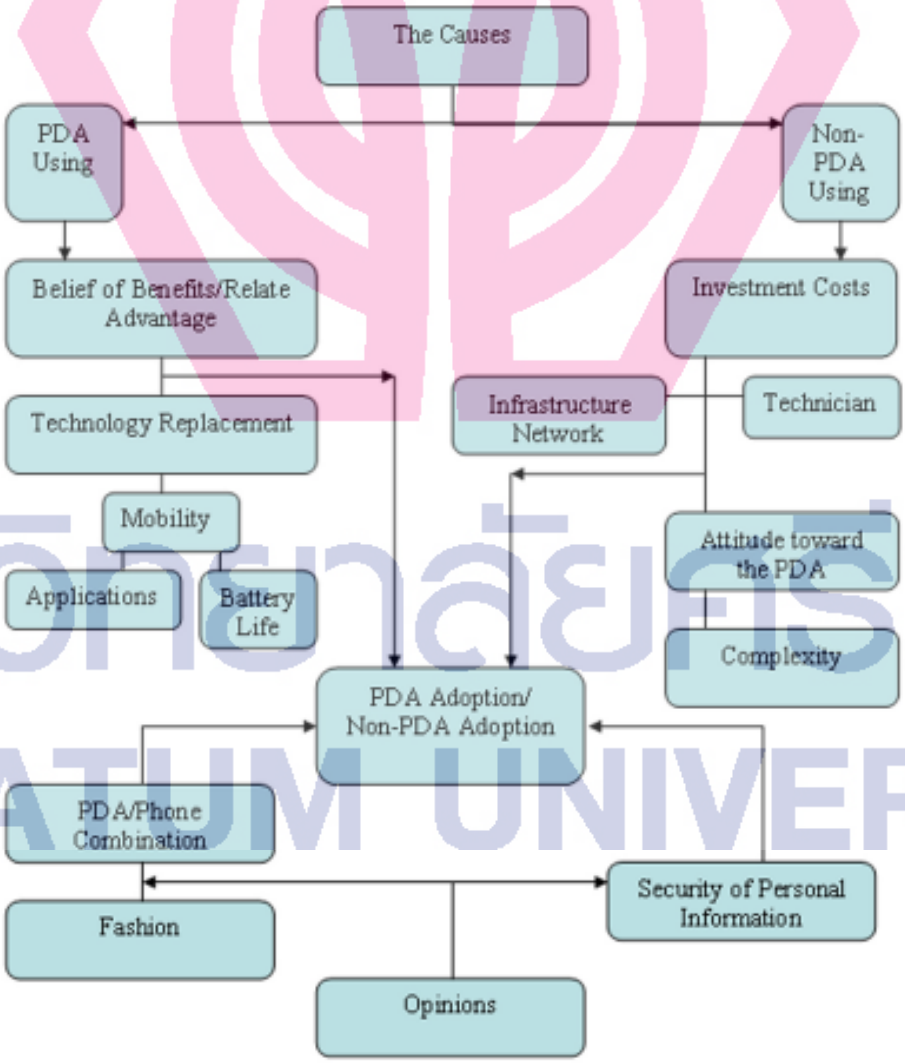

Figure 1 Typical comment summary

มหาวิทยาลัยศรีปทุม
SRIPATUM UNIVERSITY

References

Ahonen, T. T., Kasper, T., & Melkko, S. 2004. **3G marketing: communities and strategic partnerships.** New York: John Wiley & Sons.

Barney, J. B. 1996. **Gaining and sustaining competitive advantage**. Reading. MA: Addison-Wesley.

Best, J., & Kahn, J. 1998. **Research in education**. Boston: Allyn and Bacon.

Chulikavit, K. 2003. **The influence of the Internet on channel directness of export SMEs.** Doctoral Disseration, Washington State University.

Davis, F. D. 1989. "Perceived usefulness, perceived ease of use, and user acceptance of information technology." **MIS Quarterly.** 13,3: 319.

DeLone, W. H. 1981. "Firm size and the characteristics of computer use." **MIS Quarterly,** 7,4: 65-77.

Fichman, R., & Kemerer, C. F. 1997." The assimilation of software process innovations: an organizational learning perspective." **Management Science.** 43,10: 1345-1363.

Haque, A. 2004. "Mobile commerce: customer perception and it's prospect on business operation in Malaysia." **Journal of American Academy of Business, Cambridge. Hollywood.** 4: 257.

Kaminer, N. 1997. "Scholars and the use of the internet." **Library & Information Science Research.** 19,4: 329-345.

Keen, P. G. 1991. **Shaping the future: Business design through information technology**. Boston, MA: Harvard Business School Press.

Kwon, T. H., & Zmud, R. W. 1987. **Unifying the fragmented models of information systems implementation.** New York: John Wiley.

Nickell, G., & Seado, P. 1986. "The impact of attitudes and experience on small business." **American Journal of Small Business.** 10: 37-48.

O'Brien, G., & Wilde, W. 1996. "Australian manager's perception attitudes and use of information technology." **Information and Software Technology.** 38: 783-789.

Raymond, L. 1985. "Organizational characteristics and MIS success in the context of small business." **MIS Quarterly.** 9,1: 37-51.

Rogers, E. M. 1995. **Diffusion of innovations**. 4th ed. New York: Free Press.

Thong, J., & Yap, C. 1995. "CEO characteristics, organizational characteristics and information technology adoption in small business." **Omega-International Journal of Management Science.** 23,4: 429-442.

Wallage, S. 2008. "Mobile payments key to rise in m-commerce." Retrieved February 02, 2009 from http://www.3gsmworldcongress.com/bweek

มหาวิทยาลัยศรีปทุม
SRIPATUM UNIVERSITY

>> Anupong Avirutha

Anupong Avirutha holds a Doctor of Business Administration (DBA) in Strategic Management (First Class Honor) from Argosy Unversity, USA, and two Master of Business Administration degrees in Information Technology (First Class Honor), and Marketing (First Class Honor) from Oklahoma City University, USA.

Currently, Dr. Anupong Avirutha is a Head of Management Department in Faculty of Business Administration at Sripatum University. Dr. Anupong has taught business including E-Business and developed business courses at the graduate and undergraduate level. His research interests included the study of organizational adaptation to environment change, technology used in business area, and organizational learning. He has been researching and publishing numerous researches and articles such as Current Overview and Future Business Higher Education, and the Exploration of Factors Affecting the Adoption of Personal Digital Assistant Used in Small Businesses.