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The Value of Mobile Commerce to Customers

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ABSTRACT

This research studies the values of m-commerce using a qualitative means-ends approach, called Value-Focused Thinking. The conceptual foundation for this research is the Work System Framework. By interviewing both current and potential m-commerce users, we captured the values of m-commerce and develop a means-ends objective network to illustrate the relationships among these values. As one of the first empirical research to assess the values of m-commerce, this research contributes to an increased understanding of m-commerce. The means-ends objective network also serves as a theoretical foundation for future research in m-commerce. For practitioners, our findings highlight the concerns and issues of customers, which are valuable for strategy formulation in m-commerce.

Keywords

Mobile commerce, value-focused thinking, work system framework

INTRODUCTION

Mobile e-commerce, or simply "m-commerce" refers to e-commerce transactions conducted through wireless, Internet-enabled devices such as cellular phones and personal digital assistants (PDAs) (Ghosh and Swaminatha, 2001; Coursaris, Hassanein, and Head, 2003; Liang and Wei, 2004; Lee and Benbasat, 2004). Examples of m-commerce include mobile banking, mobile stock trading, and mobile ticketing.

M-commerce is the mobile variant of e-commerce (van de Kar, 2000) or a natural extension of e-commerce (Coursaris et al., 2003). Since it is an extension of e-commerce, m-commerce shares some commonalities with e-commerce. M-commerce, however, is not synonymous to e-commerce, neither is it simply another e-commerce channel. M-commerce presents some unique characteristics and features that can provide customers with added values and benefits such as anytime and anywhere access, the capability to pinpoint mobile devices' locations for personalization and localization, and the functionality to access information at the point of need (Tang and Veijalainen, 2001; Siau, Lim and Shen, 2001). M-commerce presents a new channel/medium for commerce.

For m-commerce to become a viable means of doing commerce and to gain widespread adoption, it is important that vendors understand and focus on the "values" of m-commerce from the customers' perspectives; that is, what are customers' overall assessments of m-commerce, and what do customers expect from m-commerce?

On the academic side, we need to develop theories, frameworks, and models to understand m-commerce. We also need empirical evidence on m-commerce issues, and not mere speculation and conjecture.

In an attempt to fill these gaps, this research examines the values of m-commerce from the customers' perspectives and compares the differences between the values of m-commerce and e-commerce. The Value-Focused Thinking approach (Keeney, 1992, 1999), which provides a systematic way to articulate and organize values, is adopted to determine the values of m-commerce to customers and to define the relationships among those values.

LITERATURE REVIEW

The promising future of m-commerce is driven by its unique features (Cane, 2000; Southward, 2001; Siau et. al. 2001; Sharma and Deng, 2002) not available in traditional e-commerce, thus providing added value and benefits to m-commerce users. These features include ubiquity, personalization, flexibility, and localization.

Anckar and D'Incau (2002) presented a framework which identifies the value-adding features of m-commerce. They made a distinction between the value that is offered by the wireless Internet technology itself – wireless value – and the value emerging from the actual mobile use of a device – mobile value (Anckar and D'Incau, 2002).

In spite of the advantages and values that m-commerce can provide, there are a number of inherent limitations related to mobile devices and mobile services.

Usability is considered as the biggest source of frustration of mobile Internet users (Venkatesh, Ramesh and Massey, 2003) and has impeded consumers' acceptance and use of m-commerce. Although mobility is a key advantage, the user interface of mobile devices is far from ideal and is suffering from some drawbacks when compared to Personal Computers, such as small screens and small key pads, and complicated input mechanisms (Siau et al., 2001; Lee and Benbasat, 2004).

There are also technical restrictions related to mobile services, which add new challenges for m-commerce. Customers are concerned about new security and privacy

risks – especially with wireless medium and devices (Ghosh and Swaminatha, 2001; Coursaris et al., 2003).

Due to the page limit, only a portion of the literature review is presented in this extended abstract.

THEORETICAL FRAMEWORK

A work system is "a system in which human participants and/or machines perform business process using information, technology, and other resources to produce products and/or services for internal or external customers" (Alter, 1999). An information system is "a work system whose internal functions are limited to processing information by performing six types of operations: capturing, transmitting, storing, retrieving, manipulating, and displaying information" (Alter, 1999). As a special form of information systems, e-commerce can be categorized as a work system (Alter, 2001). Since m-commerce is considered as an extension of e-commerce, the vocabulary and concepts that apply to work systems can also be applied to m-commerce.

The work system framework (Alter, 2002), depicted in figure 1, defines the elements that should be included to study and understand work systems. The elements of a work system can be used to organize one's understanding of the potential benefits and capabilities of m-commerce. Hence, we will use this framework to explain the elements of our research findings. In figure 1, the trapezoid surrounding business processes, participants, information, and technologies indicates that those four elements constitute the system performing the work. The work system's outputs are the products and services received and used by its customers.

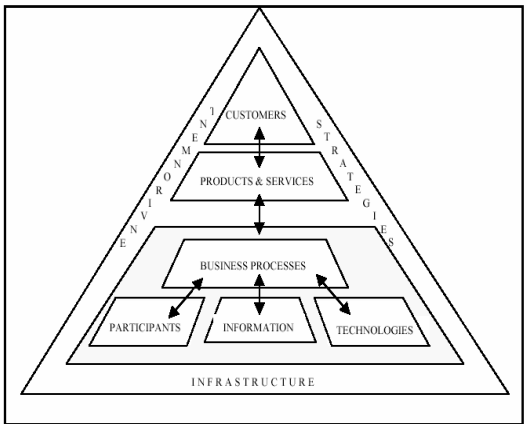

Figure 1: The work system framework (Alter, 2002)

The work system framework defines the elements that constitute m-commerce work systems and shows the relationships among those elements. This framework suggests that in order to achieve the fundamental performance variable – customer satisfaction, the other elements, which are integral parts of work systems, would directly or indirectly influence the perceptions of customers with regard to m-commerce. The four main elements of m-commerce work systems – business processes, participants, technologies, and information – affect products and services provided or facilitated by m-commerce, which in turn, influence the customers of m-commerce work systems.

RESEARCH METHODOLOGY

We captured the values of m-commerce to customers by directly eliciting these values from current and potential m-commerce users. But values are not naturally combined into cohesive categories with clear indications of the relationships among them (i.e., which specific values relate to other values and why). Keeney's (1992) Value-Focused Thinking approach will help to resolve these problems. Value refers to the principles for evaluating the desirability of possible alternatives of consequences (Keeney, 1992). Value-Focused Thinking is fundamentally about deciding what is important and how to achieve it, and attempts to define essentially what decision makers (i.e., m-commerce users) care about. It provides a systematic approach for articulating and organizing values, which leads to a more complete set of alternative solutions and a clearer understanding of how each alternative contributes to the achievement of objectives (Keeney, 1992).

Value-Focused Thinking includes a process for identifying objectives. Keeney (1992) defined objectives as a statement of something that one desires to achieve, which can be characterized by three features: a decision context, an object, and a direction of preference. There are several popular techniques that can help stimulate the identification of possible objectives (Keeney, 1992): developing wish lists, identifying problems and shortcomings, alternatives, and consequences.

Objectives consist of fundamental objectives and means objectives. Fundamental objectives are concerned with the ends that decision makers value in a specific decision context; means objectives are methods to achieve ends (Keeney, 1992). Keeney (1992) suggested that means objectives can be differentiated from fundamental objectives by using the "Why is that important" (WITI) test. For each identified objective, asking "Why Is That Important?" yields two types of possible responses. One is that this objective is one of the essential reasons for interest in the situation. This is called a fundamental objective. The other answer is that an objective is important because of its implication for some other objectives. This is called a means objective.

DATA COLLECTION AND PROCEDURES

A total of 39 subjects were interviewed using the Value-Focused Thinking approach. Each interview lasted about one hour. All subjects are mobile device users who have at least two years of experience with e-commerce.

The data collection processes are described as follows:

Identifying the values: The subjects were asked to comment on the important values that they perceived in m-commerce. The interview began with general questions such as "Have you used your mobile devices to conduct e-commerce transactions?" and "What are the reasons for your use or non-use of m-commerce?" This was followed by a number of probes that were used to gather information on various aspects of m-commerce. Two techniques were adopted from Value-Focused Thinking approach to elicit values - "wish list" and "problems and shortcomings." By asking questions such as "If there were no limitations, what are the values you wish m-commerce can bring to you?" and "What are the current problems or shortcomings of m-commerce?", we collected the values of m-commerce.

Convert user input into objectives: Following the interviews, the objectives gathered from all the subjects were combined and put together. Because the objectives presented by the interviewees were in various forms, it was necessary to convert them into a common form. According to Keeney (1992), an objective is characterized by three features: a decision context, an object, and a direction of preference.

Distinguish between fundamental objectives and means objectives: This process involves further refinement to clarify the structure of the objectives in the decision context. We separated the means objectives from the ends objectives through the "Why Is That Important" test.

Build a means-ends objective network: This step linked the means and ends objectives by creating a means-ends objectives network.

RESULTS

We organized the derived means and fundamental objectives into a means-ends objectives network (see Figure 2). The results and discussions sections are significantly shortened due to space constraint.

DISCUSSIONS

Mapping means-ends objective network to elements of work system

In this section, we compared our research findings with the work system framework (Alter, 1999, 2001, 2002). The idea is that our findings should correspond to the components in the work system framework. If this is the case, it would provide confidence in our results.

According to Alter's (1999, 2001, 2002) Work System framework (discussed in the theoretical framework section), "customers" receive products and services from the work system. The quality or performance associated with products or services has direct influence on the customers, thus, directly affecting customer satisfaction – the fundamental performance variable for "customers" (Alter, 2002). This point is echoed in our research results. Subjects viewed "maximize customer satisfaction with m-commerce" as the overall objective, and there are six fundamental objectives that help to achieve this overall objective: maximize convenience, maximize efficiency, ensure security, ensure privacy, ensure product/service quality, and minimize cost. These six fundamental objectives are measures of products and services of m-commerce: e.g., how convenient and efficient are the m-commerce services to the customers?

From the interviews, we derived a total of 24 means objectives. They are the "means" to provide added values and benefits to customers, thus, the means to achieve the six fundamental objectives. Because the elements of a work system can be used to organize one's understanding of the potential benefits and capabilities of m-commerce, these means objectives can be categorized into the elements of a m-commerce work system. The four key elements in the work system (Alter 2002) – business processes, participants, information, and technologies – constitute the system performing the work. These elements will directly influence the output of the system, products and services, which in turn influence customers' satisfaction. Table 1 categorizes the objectives according to the elements of the work system framework.

Products & Services	Fundamental objectives: Maximize convenience Maximize efficiency Ensure security Ensure privacy Ensure product quality Minimize cost
Business Process	Maximize real-time customer services Maximize accessibility of m-commerce Maximize personalization Enable localization Maximize comparison-shopping Minimize cost of mobile services Ensure privacy policy Maximize protection of personal info.
Information	Maximize information quality Maximize real-time alert of information
Technology	Increase speed of mobile commerce Ensure ease of search Maximize display quality Maximize ease of use Maximize technical support Assure secure system Optimize website interface design Improve input interface design Improve output interface design Maximize bandwidth Maximize functionality Maximize coverage area Maximize connectivity Maximize mobility

Table 1: Classification of objectives based on the work system framework

Although participant is one of the key elements of the m-commerce work system, it was not explicitly presented in

our means-ends objective network. This is not surprising as the objectives were derived from interviewing current and potential m-commerce customers. From the customers' perspectives, they are not concerned with the participants of the m-commerce work systems (e.g., programmers or marketers). The participants are 'hidden' from the customers.

CONCLUSIONS AND CONTRIBTUION

The means-ends network derived from this study provides a model on the values of m-commerce from customers' perspectives. The network also reveals the means-ends relationships among these objectives – i.e., how one objective can be achieved via other objectives.

The results are of interest to both researchers and practitioners. For researchers, the means-ends objective network serves as a conceptual model to guide future research and as a foundation for further theoretical development. Future research can work on validating, extending, and enhancing this means-ends objectives network. For practitioners, the means-ends objective network highlights the issues and values that are of concerned to customers of m-commerce, and this information is valuable and useful for formulating m-commerce strategy.

REFERENCES

1. Alter, S. (1999) A general, yet useful theory of information systems. *Communications of the Association for Information Systems*, 1, article 13.
2. Alter, S. (2001) Are the fundamental concepts of information systems mostly about work systems? *Communications of the Association for Information Systems*, 5, article 11.
3. Alter, S. (2002) The work system method for understanding information systems and information system research. *Communications of the Association for Information Systems*, 9, article 6, 90-104.
4. Anckar, B & D'Incau, D. (2002) Value creation in mobile commerce: Findings from a consumer survey. *Journal of Information Technology Theory & Application*, 4, 1, 43-64.
5. Cane, A. (2000) More than mobile, Financial Times, retrieved from World Wide Web: http://www.ft.com/specials/sp9686.htm
6. Coursaris, C., Hassanein, K., and Head, M. (2003) M-commerce in Canada: an interaction framework for wireless privacy, *Canadian Journal of Administrative Sciences*, 20, 1, 54-73.
7. Ghosh, A. K, and Swaminatha, T. M, (2001) Software security and privacy risk in mobile E-commerce, *Communications of the ACM*, 44, 2, 51-57.
8. Keeney, R.L. (1992) Value-focused Thinking, Cambridge, Massachusetts: Harvard University Press.
9. Keeney, R.L. (1999) The value of Internet Commerce to the customer, *Management Science*, 15, 4, 533-542.
10. Lee, Y.E. and Benbasat, I. (2004) A framework for the study of customer interface design form mobile commerce, *International Journal of Electronic Commerce*, 8, 3, 79-102.
11. Liang, Ting-Peng and Wei, Chih-Ping (2004) Introduction to the special issue: Mobile commerce applications, *International Journal of Electronic Commerce*, 8, 3, 7-17.
12. Southward, I. (2001) Dial M for mobile, *Financial World*, January, 19-49.
13. Sharma S. and Deng, X (2002) An empirical investigation of factors affecting the acceptance of personal digital assistants by individuals, *Proceedings of the Americas Conference on Information Systems*, 1892-1834.
14. Siau, K., Lim, E. and Shen, Z. (2001) Mobile commerce: promises, challenges and research agendas, *Journal of Database Management*, 12, 3, 3-10.
15. Tang, J., and Veijalainen, J. (2001) Using agents to improve security and convenience in mobile e-commerce, *Proceedings of the 34th Annual Hawaii International Conference on System Sciences*.
16. van de Kar, E.A.M. (2000) Development of business models for WAP services. *Proceedings of Americas Conference on Information Systems*, 793-796.
17. Venkatesh, V., Ramesh, V., and Massey, A.P. (2003) Understanding usability in mobile commerce, *Communication of the ACM*, 46, 12, 53-56.

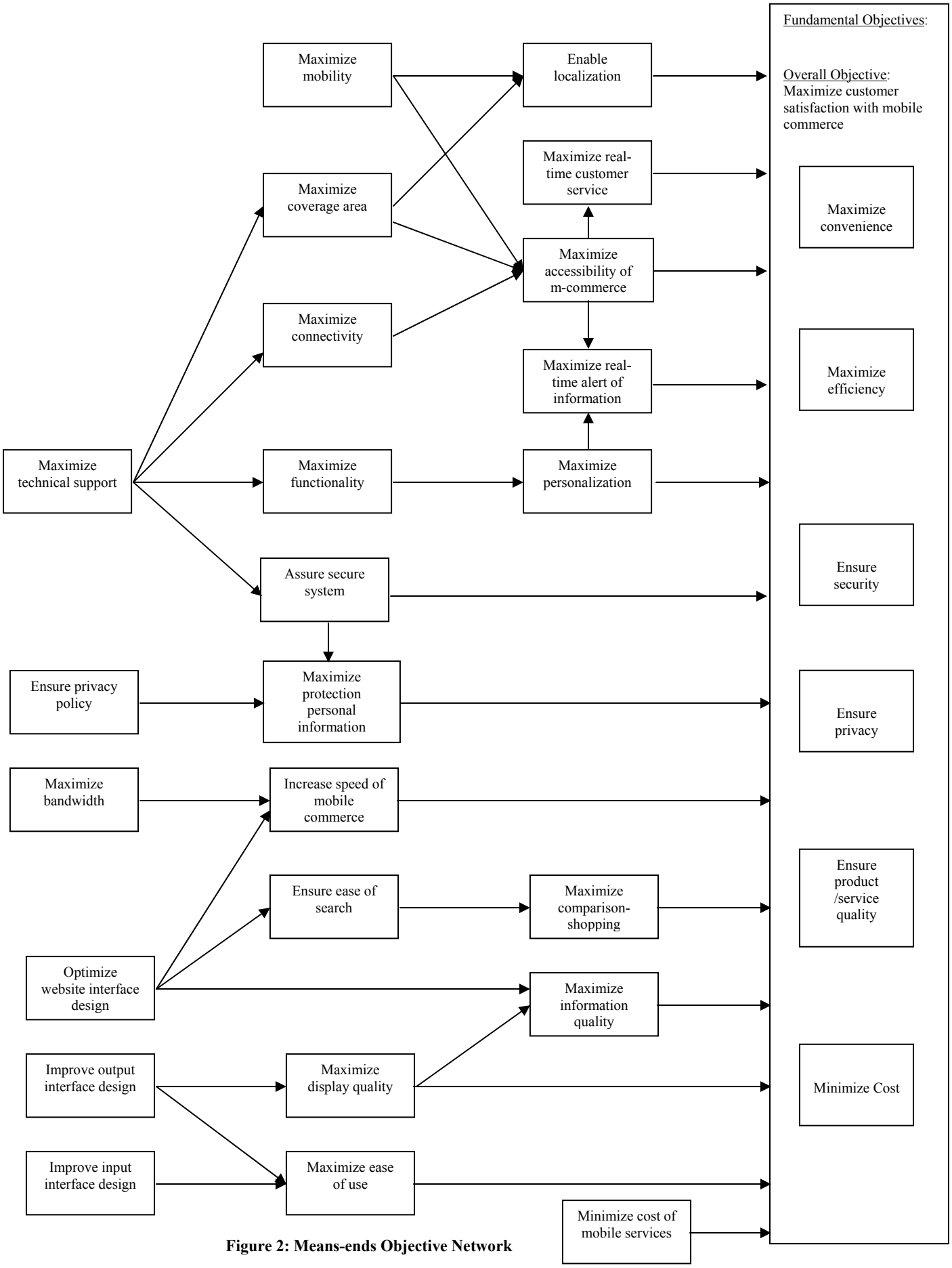

Figure 2: Means-ends Objective Network