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A Survey Study on Consumer Perception of Mobile-Commerce Applications

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Abstract

Mobile commerce (m-commerce) can have an important influence on business and society in the future. Hence, m-commerce developers and practitioners must understand consumers' perception of m-commerce applications in order to better design and deliver m-commerce service. This paper studied Chinese consumers' perception of m-commerce applications by using the survey methodology. Firstly, 44 mobile applications were adopted on the basis of related study work, and then the web-based questionnaire was employed for obtaining online Chinese consumers' importance ratings with regard to each mobile application. The survey result is helpful for both academics and practitioners to better design innovative and satisfying m-commerce applications.

Keywords : M-commerce; consumer perception; questionaire; mobile applications; importantce ratings;

1. Introduction

In recent years, Internet providers have been increasingly interested in supporting users' activities in the mobile environment. With the rapid development of communication technologies, various kinds of mobile applications have become popular. Using mobile devices like cell phones or palmtops, people play games, check e-mails, surf and even check prices on the stock market. As a revolutionary technology, mobile computing enables us to access information anytime anywhere even in the absence of physical network connections [1]. Yang [2] indicated that there are currently 94.9 million m-commerce users worldwide in 2003 and the segment is expected to grow to 1.67 billion by 2008. However, one of the major challenges confronting both m-commerce developers and practitioners is the need to know consumers' perception of m-commerce applications in order to better design and deliver m-commerce service. In this

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paper, a survey methodology was employed for investigating consumers' perception of m-commerce applications in china.

The reminder of the paper is organized as follows; firstly, the related study is summarized in Section 2. In Section 3, 44 mobile applications are adopted for the survey on the basis of the existing literature. Next, the survey methodology is introduced in details in Section 4; then survey results are characterized based on the statistical data in Section 5; the last section includes some conclusions.

2. Related work

Mobile devices have been the fastest adopted consumer products of all time with more mobile phones shipped annually than automobiles and PCs combined [3]. However, just as is the case for e-commerce in the early years when its unique characteristics were not well understood, m-commerce is in very early stages of development now and little is known about factors that influence consumers' attitudes and value perceptions about them [4-9].

While a growing body of literature has pointed out the main value-added elements of m-commerce, the primary drivers for adopting and intending to adopt mobile services remain unclear [10,11].

Current e-commerce providers, engaged through mobile devices, will find advantage in developing unique m-commerce value propositions founded upon the specific dimensions of "always on," location-centric, convenience, customization, and identifiability [12]. These features, which are not available to traditional e-commerce, are discussed below.

1 "Always on": Because of its inherent design, a mobile phone can be "always on" and is always portable. This permits its users to engage in activities such as meeting with people or traveling while conducting transactions through their Internet-enabled mobile devices.

2 Location-centric: Not only does a mobile phone go everywhere, GPS may also be constructed to recognize where the phone is and to personalize the available services accordingly. Knowing the location of the Internet user creates a significant advantage for m-commerce over wired e-commerce. Utilizing this technology, m-commerce providers will be able to better receive and send information relative to a specific location.

3 Convenience: People will no longer be constrained by time or place in accessing e-commerce activities. Rather, m-commerce could be accessed in a manner that may eliminate some of the labor of life's activities. For example, consumers waiting in line or stuck in traffic will be able to pursue favorite Internet based activities or handle daily transactions through m-commerce applications. Consumers may recognize a special comfort that could translate into an improved quality of life. By making services more convenient the customer may actually become more loyal. Consequently, communication facilities within m-commerce are key applications for the delivery of convenience.

4 Customization: Mobile phones have a much higher penetration than PCs, so m-commerce producers can be more creative and customizable in designing segmented, lifestyle tools. For instance, using demographic information collected by wireless service providers and information on the current location of mobile users, more targeted advertising can be done. The advertising messages can be customized based on information provided by consulting the user at an earlier stage or by the history of users' purchasing habits.

5 Identifiability: A mobile phone has a built-in ID to support secure transactions whereas a PC is virtually anonymous. Mobile devices are typically used by a sole individual, making them ideal for individual-based target marketing. Through GPS technology, service providers can accurately identify a user. Mobile offers the opportunity to personalize messages to various segments, based upon time and location, by altering both sight and sound.

3. Two - level evaluaiton index system

In this paper, 44 consumers' mobile applications are adopted for the survey on the basis of the literature [13]. The list of 44 consumers' mobile applications is shown in Table I.

Table 1 List of Consumers' Mobile Applications

44 Consumers' Mobile Applications
1. Booking travel tickets through Internet
2. Buying a drink from a vending machine and billing it to the mobile device
3. Calendaring and alerting Internet services (not using internal mobile functions)
4. Conducting advanced banking services (e.g., loan negotiations, ordering credit cards)
5. Controlling home appliances (heating system, car, etc.) through remote activation
6. Chatting with others on the Internet
7. Checking in airport without physical documents (e.g., mobile passport)
8. Filling out and sending damage reports (notifications of claim) to insurance companies
9. Finding the location of a new/used car of certain model, color and features
10. Formatting website for display on mobile device
11. Issuing electronic payment in physical shops
12. Listening to music from the Internet, including downloaded MP3 songs
13. Managing in-house and inventory-on-move
14. Managing personal appointments and meetings through Intranet /Internet
15. Performing routine banking services (pay bills, check account, etc.)
16. Paying a parking ticket on the spot
17. Playing interactive games on the Internet
18. Posting or viewing on-line classify ads
19. Reading and receiving news (through subscription service or browsing)
20. Reading downloaded e-books
21. Reading or sending messages from/to a specific newsgroup
22. Receiving an alert notification from an online travel company about a new lower fare
23. Receiving personal advertisements
24. Receiving personalized shopping offers
25. Receiving time sensitive discount tickets from physical store (e.g., e-coupon based on upcoming sales)
26. Receiving location sensitive discount tickets from physical store (e.g., e-coupon from a nearby store)
27. Receiving time-sensitive information regarding weather reports, financial information, traffic information, etc.
28. Reporting (transmitting information) emergencies based on location (e.g., roadside assistance, accidents, etc.)
29. Reserving a restaurant table
30. Searching for specific information on the Internet
31. Sending or receiving e-mails
32. Sharing digital files or personal information online with friends, family, or strangers
33. Shopping for goods on the Internet (books, flowers, groceries, etc.)
34. Surfing the Internet casually
35. Taking part in Internet auctions
36. Tracking the location of product and services that are needed, including finding goods, boxes, people, etc.
37. Trading stocks and initiating a request to have the money transferred
38. Transferring money from a preconfigured bank account

39. Using directory services (e.g., google search, yellow pages, etc.)
40. Using Internet search engines (e.g., yahoo, lycos, hotbot, etc.)
41. Viewing or sending pictures via the Internet
42. Watching video clip from the Internet
43. Working with the mobile device in traffic jam, airport, or conferences
44. Transmitting (automatically) emergencies information (e.g., personal assistance, roadside assistance, etc.)

4. Methodology

In this section, the research methodology is reported as the following.

In this study, an online questionnaire was employed and invited online customers who have mobile phone with Internet access filled the related questions. By using the survey instrument, online customers could express their opinions and views concerning their perception of m-commerce applications. 124 online customers from china participated into the online survey, hereinto valid respondents are 102. Respondents' demographics are presented in Table2.

Table 2 Respondents' Demographics

Demographics	Mean
Age	31.2
Male/Female	66/36
Number of times used the mobile phone for Internet access per day	3.48

In addition, the majority of respondents are employees (nearly 48 percents), 19 percents of respondents are students, nearly 15 percents of respondents are managers, and the remaining respondents are self-employed persons or others. Respondents' career statistics result is presented in Figure. 1.

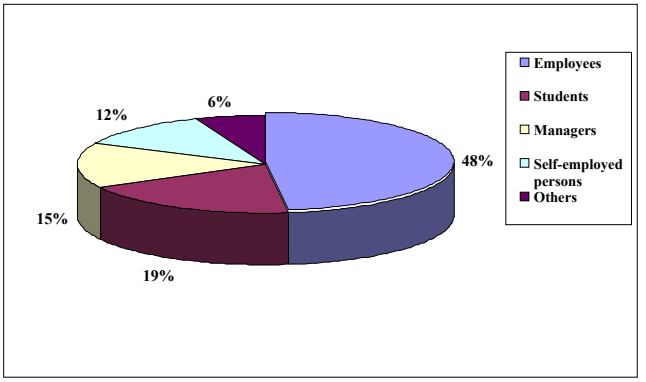

Figure. 1 The pie chart of respondents' career statistics result

Survey research methodology is employed in this study. The questionnaire contained ten-Point Likert-scaled questions. The scale used went from 'one' (not important) to 'ten' (very important). These respondents were asked to respond to the 44 listed mobile applications on how important the activities are to consumers when using mobile commerce services.

5. Survey results

Here suppose that the importance degree or weight of each respondent is the same. Reponses to the questionnaire were analyzed statistically, the mean value can be calculated as

$$\overline{x}_i = \sum_{k=1}^{m} x_{ik}\ ,\ i = 1, 2, \ldots, n\ ; \tag{1}$$

where x_{ik} denotes the score value rated by customers with respect to the ith mobile application, $\overline{x}_i$ is the average score of the ith mobile applications, m is the number of investigated customers, n is the number of mobile applications.

The standard deviation of importance of each mobile application can be calculated as

$$s_i = \frac{1}{m}\sum_{k=1}^{m}\sqrt{(x_{ik} - \overline{x}_i)^2}\ ,\ i = 1, 2, \ldots, n\ ; \tag{2}$$

where s_i denotes the standard deviation of importance of the ith mobile applications rated by customers. The survey result is shown in Table 3,

Table 3 The Survey Results of Mobile-Commerce Applications

Rank	Mobile-Commerce Applications	Average Score	Standard Deviation
1	Searching for specific information on the Internet	**8.87**	**1.43**
2	Sending or receiving e-mails	**8.64**	**1.61**
3	Using Internet search engines (e.g., yahoo, lycos, hotbot, etc.)	**8.59**	**2.12**
4	Reading and receiving news (through subscription service or browsing)	**8.43**	**2.09**
5	Sharing digital files or personal information online with friends, family, or strangers	**8.31**	**1.81**
6	Using directory services (e.g., google search, yellow pages, etc.)	**7.78**	**1.32**
7	Receiving time sensitive discount tickets from physical store (e.g., e-coupon based on upcoming sales)	**7.68**	**1.27**
8	Chatting with others on the Internet	**7.63**	**2.51**
9	Reporting (transmitting information) emergencies based on location (e.g., roadside assistance, accidents, etc.)	**7.56**	**2.64**
10	Receiving time-sensitive information regarding weather reports, financial information, traffic information, etc.	**7.50**	**2.33**
11	Transmitting (automatically) emergencies information (e.g., personal assistance, roadside assistance, etc.),	**7.43**	**1.91**
12	Reading or sending messages from/to a specific newsgroup	**7.32**	**1.89**
13	Managing personal appointments and meetings through Intranet/Internet	**6.9**	**2.03**
14	Performing routine banking services (pay bills, check account, etc.)	**6.83**	**1.61**
15	Shopping for goods on the Internet (books, flowers, groceries, etc.)	**6.64**	**2.25**
16	Listening to music from the Internet, including downloaded MP3 songs	**6.57**	**1.73**
17	Issuing electronic payment in physical shops	**6.53**	**1.35**
18	Transferring money from a preconfigured bank account	**6.49**	**2.17**
19	Playing interactive games on the Internet	**6.47**	**1.75**
20	Reading downloaded e-books	**6.38**	**1.79**

21	Surfing the Internet casually	**6.12**	**1.99**
22	Receiving an alert notification from an online travel company about a new lower fare	**5.89**	**2.58**
23	Booking travel tickets through Internet	**5.84**	**1.84**
24	Checking in airport without physical documents	**5.49**	**1.79**
25	Receiving location sensitive discount tickets from physical store (e.g., e-coupon from a nearby store)	**5.42**	**1.65**
26	Filling out and sending damage reports (notifications of claim) to insurance companies	**5.21**	**1.96**
27	Tracking the location of product and services that are needed, including finding goods, boxes, people, etc.	**5.12**	**2.48**
28	Reserving a restaurant table	**5.09**	**1.78**
29	Paying a parking ticket on the spot	**5.08**	**2.51**
30	Viewing or sending pictures via the Internet	**5.01**	**2.68**

As shown by this table, mobile-commerce applications were evaluated as very important (average score > 8.0); (2) mobile-commerce applications falling in the average range (average score from 6.0 to 8.0) and (3) mobile-commerce applications exhibiting limited importance (average score from 5.0 to 6.0). The survey results suggest that Chinese consumers prefer using mobile phones for information searching, among the top five mobile applications which were evaluated as very important (average score > 8.0), the top four are searching for specific information on the Internet, sending or receiving e-mails, using Internet search engines, reading and receiving news. These top-ranked applications were generally accompanied by consumers' sense of "always-on" and convenience. On the contrary, all the respondents demonstrated the actual transactional m-commerce applications, such as issuing electronic payment, transferring money from a preconfigured bank account, or performing routing banking services did not rank very high. The concerns about security and privacy of Mobile transaction could be the obstacle for customers' using the mobile applications.

6. Conclusion

There is an increasing interest on m-commerce and its related subjects; however, the consumers' perception of mobile applications is a less concerned issue. The aim of this work was to investigate how the consumers perceive the m-commerce applications in China. The survey results show Chinese consumers prefer more the mobile applications with convenience and "always on". These results can be useful to m-commerce developers and practitioners to better understand m-commerce from the point view of customers, as well as to better design innovative and satisfying m-commerce applications for meeting customers' needs.

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