# What's So Different About the Mobile Internet?

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The mobile Internet, defined as wireless access to the digitized contents of the Internet via mobile devices, has advanced significantly, both in terms of its user population and its technology. Recent research suggests that the number of mobile Internet users in the world will grow 18-fold between 2000 and 2005, to about 729 million [5]. The number of people using the mobile Internet already exceeds those using the stationary Internet in Japan [3]. In South Korea, the number of people owning a mobile phone is 29 million (64% of the total population), the number of mobile Internet subscribers is estimated to be about 18 million (39% of the total population), and more than 3.5 million people are already using a 2.5G mobile Internet service, CDMA-1x, with a speed of 2.4Mbps [8].

The rapid growth of the mobile Internet has significant implications for e-businesses. However, we cannot simply transfer the rules of the stationary Internet to the mobile Internet "game" because the mobile Internet differs significantly in various aspects from the stationary Internet. Hence we need to analyze the characteristics of the mobile Internet and their impact on e-business.

This study investigates the business implications of the mobile Internet from the user's perspective. In three consecutive large-scale surveys conducted in Korea, the effects of the characteristics of the mobile Internet on business users were identified. The business implications of the mobile Internet were then compared with those of the stationary Internet, and their divergences analyzed according to the characteristics of mobile Internet systems.

## Characteristics of the Mobile Internet

The characteristics of the mobile Internet can be understood from three different perspectives: user, environment, and system [4].

First, from the user's perspective, mobile Internet devices are usually more personal and individual than stationary Internet devices [9]. It is not uncommon for people to share their desktop computers, whereas it is very rare for them to share mobile Internet phones. Therefore, the mobile device always carries its user identity.

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Second, from the environmental perspective, mobile Internet systems usually provide instant connection to the Internet, which enables users to access the Internet anywhere and anytime [10]. A mobile Internet system is portable and always available. By contrast, stationary Internet systems are not usually movable and require long preprocesses, such as booting up, which usually take more than a few minutes.

Third, from the system's perspective, most mobile Internet systems, especially cellular phones, have a lower level of available resources compared to those provided by the stationary Internet. While mobile Internet devices are very portable and handy, they have smaller screens, less convenient input/output facilities, and lower multimedia processing capabilities than do desktop computers, for example.

## Three E-Business Domains (3C)

Before we investigate how, from these perspectives, the characteristics of the mobile Internet impact on e-business, we need to categorize e-business into three main domains: commerce, communication, and content.

First, e-business in the commerce domain involves trading various products which can be classified into two categories according to the level of perceived risk: low-risk vs. high-risk [1]. The perceived risk is high when product categories are expensively priced, technologically complex, and characteristically different across brands, such as jewelry and clothes [2]. The low-risk product category includes less expensive and more standardized goods, such as books and CDs.

The perceived level of risk has been found to affect the user's information search behavior [11]. Users are motivated to acquire additional information when the perceived risk is high, whereas they do not feel much need for extensive information on low-risk products.

Second, e-businesses in the communication domain provide people with diverse communication services which can be classified into two categories according to the time dimension: synchronous and asynchronous [6]. Communication services that enable users to interact simultaneously are referred to as synchronous services, while communication services which allow people to communicate at different times are labeled asynchronous services. For example, email is a typical asynchronous service; chatting is regarded as synchronous.

Finally, e-businesses in the content domain provide various information contents which can be classified into two categories according to the level of information intensity [12]. Contents that require a large amount of information to be delivered at one time are referred to as high-intensity contents, whereas those that do not require a large amount of information delivery are referred to as low-intensity contents. For example, characters or humorous items downloaded do not need to deliver heavy amounts of information, because the information that the contents have to deliver can be condensed into a picture or small piece of textual information.

## Survey

Three consecutive online surveys were conducted in South Korea in the years 2000 and 2001.[1] The first survey was conducted a few months after the initial introduction

[1]More detailed statistics about the surveys can be found in [4].

of the mobile Internet, the second was conducted eight months later, and the third after another eight months ($T_1$=April, 2000; $T_2$=December 2000; $T_3$=July 2001). In the first survey, we asked respondents for their favorite services in each of the three major e-business domains on both the mobile Internet and the stationary Internet. In the second and third surveys, we asked the same questions, but only concerning the mobile Internet.

Whether or not all the respondents actually used the Internet was verified before the surveys with the cooperation of the Korean mobile telecommunication carriers. A total of 12,129 mobile Internet users participated in the first survey, 8,761 participated in the second, and 6,929 in the third. Most respondents were between the ages of 18 and 23 (44.6%), followed by those between 24 and 29 (27.3%), those over 30 (12.3%), those younger than 18 (13.5%), and those over 40 (2.5%). In terms of gender, more male respondents participated in the survey than female (64.2% male, 37.7% female).

## Business Implications for the Commerce Domain

Results from the three surveys on the purchase of preferred products through the stationary and mobile Internet are presented in Table 1. The preferred products are sorted according to how frequently they were mentioned in the respondents' answers. As you can see in Table 1, preferred services are different for the stationary and mobile Internet. For example, people preferred to buy CDs and videotapes through the stationary Internet (16.5%), while they preferred to buy movie and concert tickets through the mobile Internet ($T_1$=24.0%; $T_2$=11.5; $T_3$=15.2%).

In order to identify common trends, we classified preferred products into two groups according to the level of perceived risk. Books, CDs, videos, movie and concert tickets, stationery, and home appliances were put into the low-risk group, whereas the high-risk group included clothes, furniture, cosmetics, perfumes, household items, jewelry, watches, cars, motorcycles, and banking and securities items. As shown in Figure 1, an interesting contrast was observed between the mobile and stationary Internet. In the low-risk product category, the percentage of users preferring the mobile Internet is significantly higher than of those preferring the stationary Internet (average 82.4% for the mobile Internet from the three surveys, vs. 77.3% for the stationary Internet from the first survey). Therefore, it is clear that in the case of low-risk products, customers seem to prefer the mobile Internet to the stationary Internet.

We may attribute the differences between the stationary and mobile Internet in the commerce domain to the systemic and environmental characteristics of the mobile

| Rank | Stationary Internet | | Mobile Internet (T1) | | Mobile Internet (T2) | | Mobile Internet (T3) | |
|---|---|---|---|---|---|---|---|---|
| | Items | % | Items | % | Items | % | Items | % |
| 1 | CDs /Videos | 16.5% | Movie/Concert Tickets | 24.0% | Movie/Concert Tickets | 11.5% | Movie/Concert Tickets | 15.2% |
| 2 | Books | 13.4% | CDs/Videos | 19.4% | Books | 11.1% | Books | 6.9% |
| 3 | Movie/Concert Tickets | 12.4% | Transportation Ticket | 15.6% | Transportation Ticket | 8.6% | Computer H/W | 5.0% |
| 4 | Computer H/W | 8.6% | Books | 12.4% | CDs/Videos | 7.4% | CDs/Videos | 4.9% |
| 5 | Computer S/W | 8.0% | Flowers | 7.0% | Cosmetics | 6.3% | Cosmetics | 4.5% |

**Table 1.** Preferred products in the commerce domains.

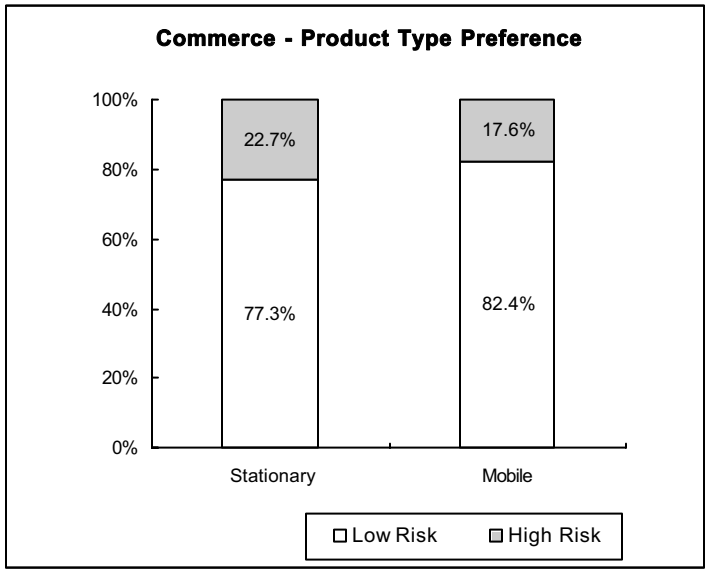


**Figure 1.** Product type in the commerce domains.

Internet. Compared to the stationary Internet, the mobile Internet is limited in terms of available resources. When purchasing low-risk products, customers could maximize convenience, despite limited information acquired from the mobile Internet [2]. However, in the case of high-risk products, uncertainty resulting from limited information may outweigh the acquired convenience, forcing customers to search for additional information through the stationary Internet. The higher preference in low-risk products can also be attributed to the instant availability of the mobile Internet. In many cases, people buy products through the mobile Internet for convenience. The advantage of the mobile Internet will increase when the resources are available to make all products handy to the user whenever they need them.

## Business Implications for the Communication Domain

Results of the preferred types of communication services are presented in Table 2. Preferences for various communication services provided by the stationary and mobile Internet are very different. Email is the preferred communication service on the stationary

| Rank | Stationary Internet | | Mobile Interent (T1) | | Mobile Internet (T2) | | Mobile Internet (T3) | |
|---|---|---|---|---|---|---|---|---|
| | Items | % | Items | % | Items | % | Items | % |
| 1 | E-mail | 69.3% | SMS | 51.3% | SMS | 47.2% | SMS | 52.3% |
| 2 | Chatting | 15.8% | E-mail | 31.1% | E-mail | 24.6% | E-mail | 34.3% |
| 3 | SMS | 8.6% | Chatting | 5.9% | E-Card | 9.7% | Voice Mail | 4.5% |
| 4 | Board | 4.2% | Board | 3.6% | Voice Mail | 9.1% | Chatting | 4.1% |
| 5 | Voice Mail | 0.9% | Voice Mail | 2.3% | Chatting | 4.8% | Board | 2.2% |

**Table 2.** Preferred services in the communication domains.

Internet (69.3%), whereas SMS is the more preferred service on the mobile Internet ($T_1$=51.3%; $T_2$=47.2%; $T_3$=52.3%).

In order to identify the basic difference between the stationary and mobile Internet, we classified various communication services into two groups according to synchronicity as shown in Figure 2. Asynchronous services include email, boards, and SMS, while synchronous services include instant messaging, chatting and so on. The results indicate that a significantly higher percentage of mobile Internet users use asynchronous services (average 89.5% from the three surveys), than do stationary Internet users (83.1%).

The higher percentage of synchronous services accessed by mobile Internet users can be mainly attributed to the high popularity of SMS on the mobile Internet ($T_1$=51.3%; $T_2$=47.2%; $T_3$=52.3%). We may explain the differences between the stationary and mobile Internet in the communication domain based on two characteristics of the mobile Internet. First, the environmental characteristic allows mobile Internet users to be instantly connected to the Internet over time and place. Second is the personal characteristic of mobile Internet users to carry their devices with them and not share them with others. Because mobile Internet users always carry their own devices with them, they can continuously interact with incoming messages. Senders can be confident that outgoing messages will reach recipients directly, and that receivers can access the messages instantly. Receivers can get a quick notice as soon as messages arrive, then review the contents instantly and respond to senders easily by pressing the "Reply" button which is provided on most mobile Internet browsers in Korea. The receiver does not even have to log in to an ISP or type complicated return addresses. This is a distinctively favorable benefit for mobile Internet users, because input facilities of mobile Internet systems are cumbersome. Consequently, a recent survey result in Korea found that 24% of survey respondents describe their mobile devices as an "SMS machine." Those respondents were found to receive incoming messages and reply to them constantly in almost real-time [7].

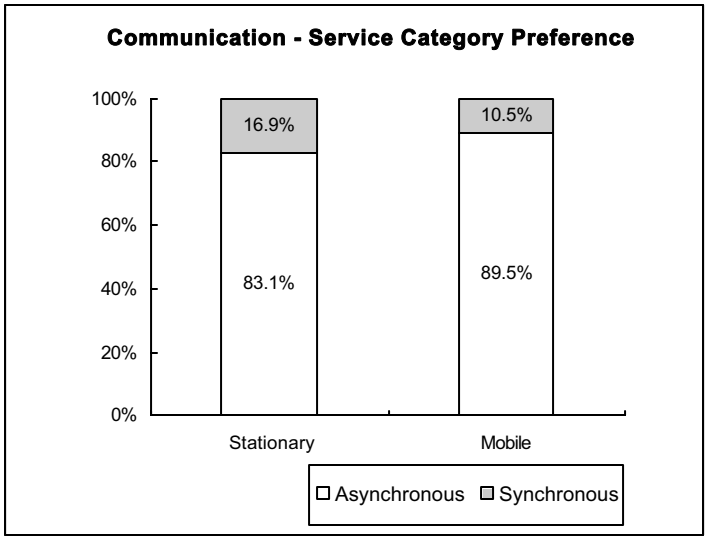


**Figure 2.** Service type in the communication domains.

## Business Implications for the Contents Domain

We asked what kinds of content respondents preferred on both the mobile and stationary Internet. As Table 3 shows, preferred content was different according to which kind of Internet access was chosen. News, movie information, and shopping-related information are highly preferred on the stationary Internet (9.5%, 9.0% and 7.3%, respectively), whereas melody downloads ($T_2$=15.3%; $T_3$=19.2%) are popular on the mobile Internet.

In order to analyze the underlying differences between the stationary and mobile Internet, we classified various content into low-intensity or high-intensity groups, as shown in Figure 3. For example, humor, news, free coupon, melody, and character downloads are categorized as low-intensity content, while online games, educational services, legal information, investment information, and so forth, are categorized as high-intensity. On average, 61.2% of respondents answered that they frequently

| Rank | Stationary Internet | | Mobile Internet (T1) | | Mobile Internet (T2) | | Mobile Internet (T3) | |
|---|---|---|---|---|---|---|---|---|
| | Items | % | Items | % | Items | % | Items | % |
| 1 | News | 9.5% | Humor/Cartoon | 10.0% | Melody * | 15.3% | Melody * | 19.2% |
| 2 | Movie | 9.0% | News | 9.9% | Character * | 9.6% | Character * | 16.2% |
| 3 | Humor | 7.4% | Movie | 9.5% | Weather | 7.3% | Movie Info. | 6.4% |
| 4 | Shopping Info | 7.3% | Online Game | 6.5% | News | 7.2% | News | 5.8% |
| 5 | Entertainment | 7.2% | Location-based Info | 6.5% | Sports/Entertainment | 6.1% | Weather | 5.8% |
| 6 | Online Game | 6.9% | Entertainment | 6.5% | Humor/Cartoon | 5.8% | Location-based Info. | 4.9% |
| 7 | Leisure/Travel | 6.3% | Fortune Telling | 6.4% | Fortune Telling | 5.3% | Online Game | 4.7% |
| 8 | Free Gift/Coupon | 5.9% | Traffic Information | 5.7% | Free Gift/Coupon | 5.3% | Entertainment | 4.4% |
| 9 | Education/Dictionary | 5.8% | Stock/Investment | 5.5% | Online Game | 5.1% | Free Gift/Coupon | 4.1% |
| 10 | Fortune Telling | 5.3% | Leisure/Travel | 5.2% | Movie/Concert | 4.6% | Fortune Telling | 4.1% |

**Table 3.** Preferred contents in the content domains.

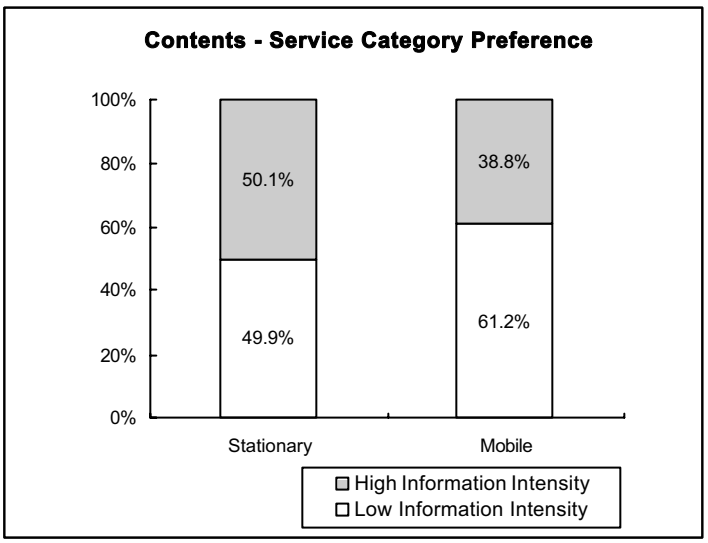


**Figure 3.** Content type in the content domains.

accessed low-intensity content on the mobile Internet, such as humor and melody downloads. However, only 49.9% of the stationary Internet respondents reported using low-intensity content.

The results as shown in Figure 3 imply that the different usage pattern for information content may be a result of system and user characteristics. High-intensity content, such as on-line games and education services, were less preferred on the mobile Internet than on the stationary Internet. This may be because downloading high-intensity content can exceed the capacity of the mobile Internet, which usually has a low processing capability. Or it may be that the amount of information sought cannot be adequately delivered on such a tiny screen. Interestingly, the majority of low-information intensity content which respondents chose to access via the mobile Internet contained simple multimedia or textual information, such as melodies, character downloads, or weather reports. Moreover, this content tended to be closely related to the privacy of the mobile Internet device. Downloaded melodies or characters are mainly used to represent facets of one's identity to others, and location-based information is usually customized to the current user contexts. These results may relate to the more personal characteristics of the mobile Internet, in that mobile Internet users prefer to access more personalized services in the mobile content business.

## Conclusion and Discussion

The mobile Internet system differs from the stationary Internet system. First, the mobile Internet system usually offers a lower level of available system resources. Second, it provides instant connectivity, which makes it possible to use the mobile Internet at the moment of need, anywhere and anytime. Third, it is more personal than the stationary Internet.

These characteristics of the mobile Internet may have a considerable influence on the preference of customers for services across the three major business domains. In the commerce business, customers prefer to buy low-risk rather than high-risk products for several reasons. First, mobile systems cannot provide enough of the information needed to lower the uncertainty associated with most high-risk products. Second, users can get low-risk products conveniently with minimal search costs. In the communication domain, mobile Internet users prefer to use SMS services, because of the instant connectivity and privacy provided by those systems that offer a convenient real-time communication method. In the content domain, customers prefer low-intensity content. Due to low-resource availability, mobile Internet systems cannot provide a high level of information processing. At the same time, customers prefer more individually customized content on the mobile Internet because its personalization level is higher than that of the stationary Internet.

We cannot directly apply these results to other countries and cultures. However, we believe that since Korea is one of the most active mobile Internet markets, our study will prove to be the basis for tracking the growth of the mobile Internet and finding the direction it should be heading in for the future.

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