



Mobile Commerce and National IT Infrastructure

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ABSTRACT

This paper deals with the relationship between national IT infrastructure and m-commerce. There have been arguments for the existence of similar relationship such as the one between IT infrastructure of an organization and e-businesses and another one between national IT infrastructure and e-commerce. This paper gives an empirical evidence of the existence of such relationship between national IT infrastructure and m-commerce by presenting resounding success of m-commerce in Korea. By investigating the advancement of Korean national IT infrastructure, the paper provides convincing argument that the matured components of national IT infrastructure such as wide-spread high-speed/wide-bandwidth Internet/nationally saturated usage of mobile phones/mobile phone payment system that connects utility of mobile phones and the Internet constitutes the fertile soil for growth and success of m-commerce.

1. INTRODUCTION

Mobile commerce has become one of the fastest growing new businesses in the Internet-based commerce. With the advent of successful e-commerce ventures around the world, I became interested in the relationship between success of e-businesses and the national IT infrastructure of the country where the particular e-business originated; even though there are many globalized e-businesses such as amazon.com, the initial success of the firm in its own country determined future expansion. Weil and Vitale (2001) proposed the relationship between Internet infrastructure and success of e-businesses. They proposed that there was a direct relationship between Internet infrastructure and the success of e-businesses. In this paper we posit that national IT infrastructure which includes national Internet infrastructure should play a critical role in fostering the success of e-businesses including mobile commerce. We examine empirically this proposition by presenting the example of success of mobile commerce in Korea where national IT infrastructure is well advanced to support and foster all kinds of e-businesses including mobile commerce.

2. NATIONAL IT INFRASTRUCTURE

There are studies conducted on IT infrastructure including national IT infrastructure. IT infrastructure of an organization or corporate IT infrastructure can be defined as following: physical components such as hardware, software and network facility plus human components such as human expertise, manuals, and corporate IS culture constitute IT infrastructure of an organization (Broadbent & Weil, 1998). Jeong et al. (1996) defined national IT infrastructure with the similar principle that Broadbent and Weil have used for the definition of corporate IT infrastructure as following: physical components such as computers, peripheral equipments, telecommunication networks, software, and other relevant electronic goods in the nation plus human components such as IT educational level of countrymen and degree of development of IT-relevant industry.

3. NATIONAL IT INFRASTRUCTURE AND E-COMMERCE

Based on this definition, Lee (1999a) infers that development of national IT infrastructure is critical for the success of e-commerce since e-commerce

requires adequate telecommunication networks plus high usage of computers and the Internet as well as people's skill and willingness to use the Internet in their everyday lives. In Lee's case study (Lee, 1999b), it was suggested that the reason that the Korean e-commerce firm failed as a business was largely due to lack of advanced national IT infrastructure in Korea in those years. But Lee (2001) also pointed out that Korean government was determined to invest in building national IT infrastructure as a long-term project, which has been actualized currently in 2002. The resolve of Korean government which spent billions of dollars to create high-speed wide-bandwidth such as ADSL networks for all homes in the country paid off handsomely by flourishing IT industry where many so-called dot-com companies have become very profitable ventures in recent years.

4. NATIONAL IT INFRASTRUCTURE OF KOREA

The success of implementing advanced national IT infrastructure is well documented by a Korean government publication such as the IT white paper of Korea (NCA, 2002). According to the white paper, 97% of all households in Korea have some way of connecting to the Internet and 60% of all households in Korea access the Internet through ADSL. Not to mention all the businesses regardless of size that are connected to the Internet through T1/2/3 lines, it is simply remarkable that Korea has achieved the highest saturation rate of high speed Internet in the world exceeding the US. In terms of ownership of computers at home also reaches 97%. The Korean government also invested heavily on IT education to eradicate computer illiteracy and to educate highly skilled professionals. Thus we can posit that physical and human components of national IT infrastructure are well advanced in Korea. This environment produced a boom in e-commerce industry starting in the year of 2000 and many companies not only earned large revenue but also high profits too.

5. MOBILE COMMERCE AND NATIONAL IT INFRASTRUCTURE

Here we propose a novel theory on the relationship between national IT infrastructure and e-commerce. The focus here is on mobile commerce or m-commerce which is a subset of e-commerce that uses mobile telecommunication networks and equipments to conduct business over the Internet. Our proposition is as following:

Proposition: National IT infrastructure in support of mobile Internet fosters m-commerce.

We present a case study of an m-commerce firm as the evidence to support this proposition. The national IT infrastructure in support of mobile Internet means wide-spread use of cellular phones which use Internet protocols. The phenomenal growth of ownership of cellular phones in Korea was not a government initiative, rather a private industry-driven one. Due to highly efficient electronics industry which was able to manufacture low-cost/high-capacity cellular phones, Korean public quickly adopted the use of cellular phones in their everyday lives. The white paper tells that close to 90% of all adults now own a cellular phone, which makes Korea as the country with highest ownership of cellular phones country in the world. This is another side-effect of the advanced national IT infrastructure which includes development of IT-related industry. Thus we can posit that Korea has the national IT infrastructure that

fully supports mobile Internet; the mobile telecommunication networks plus almost entire population with cell phones. This infrastructure surely fosters the growth and success of m-commerce.

6. OVERVIEW OF MOBILE COMMERCE

The mobile commerce market is growing rapidly worldwide. For American domestic market, according to Yankee Group (Anonymous, 2002) 15 billion will be spent on mobile commerce by a market of 50 million wireless phones by 2006, and 20% of all Americans who own mobile phones which are more than a quarter of all American mobile phone users will use wireless devices to authorize payment for premium content and physical goods. What is noticeable in the Yankee Group Report is that it predicts no cannibalization of existing payment methods and foresees an expanded market for mobile commerce. The most prevalent payment method is to use a credit card on the wired web page. However people can now access the Internet through mobile phones and use their credit cards to pay for whatever service available. While using a mobile phone, a new payment was conceived by Korean researchers, which is to use the mobile phone itself as the payment device instead of using a credit card. There are many instances where using a credit card is not appropriate or unaccepted. For example, very small amount payment (say, less than 10 dollar) inhibits people to use a credit card and at the same time, credit companies might refuse processing of the very small amount payment. In addition, in some cultures, using credit cards on the Internet is still regarded risky. Korean researchers at the companies like Mobilianz, Inc. devised a system where the mobile phone users make purchases on the Internet and the bill will be accrued with the mobile phone fee, thus the user will pay for the product or service when the next mobile phone bill is due. This form of payment simply revolutionized the Korean m-commerce by allowing customers to purchase many products and services using their mobile phones, which, in fact, led to quick expansion and rising revenue for the companies which provide products and services. Most of these companies which benefited by the new payment scheme are content-providers such as providers of online game and movies, which were priced at the very small amount per usage. Thus a lot of people didn't bother to write down their credit card details to purchase these services and for them, using the mobile phone as the payment system was a very convenient way of paying for these contents.

7. THE CASE OF MOBILIANZ, INC.

The subject firm, Mobilianz, Inc. is a Korean firm that processes cell phone-based payment on the Internet (Mobilieranz, 2002). This firm has become very successful in terms of generating revenue in just two years. The quick growth of this firm is due to the fact that people in Korea who now had access to the high-speed and wide-bandwidth Internet at home as well as at work wanted to see movies and to play games but didn't want to pay with a credit card mostly because the small amount of payment discouraged the use of the credit card. Unlike the US where ADSL lines still not completely replaced old coaxial cable lines, Korean public could use ADSL service at a very cheap rate thanks to government effort to foster the Internet usage which resulted in the action by the government-owned monopoly, Korean Telecom's installation and provision of such service at the cheap rate. Thus Korean public were ready to watch movies in flawlessly moving images and play games in realistic sound and images even at home without worrying telecommunication bills. However the usual payment methods that excluded the use of credit cards largely due to security concern as well as lack of availability of credit cards in general were cumbersome. For example, wiring money to the web site owner company's bank account was most widely used. E-cash was used as an alternative to the wiring. However this form of payment also initially requires wiring money through the bank to purchase the e-cash. Therefore when people realized that they could pay the small amount of money for a movie on the web site through their cell phones, it was just matter of time that everybody jumped on the wagon and started to use cell phones as the payment method to pay for everything from movies/flower delivery/game playing/sending cards instead of all existing alternative payment methods. In other words, Mobilianz, Inc. is a part of national IT infrastructure where its software fills the gap between the mobile telecommunication networks and cell phones. Now that the national IT infrastructure for mobile Internet was ready, the growth of Internet content providers happened. One of clients of Mobilianz is NHN corporation where games are provided over the web sites which can be displayed on the cell

phone. The firm reported phenomenal growth in revenue after they introduce the cell phone payment method amongst other options. Nowadays most of transactions are paid through cell phone method using Mobilianz' system (NHN, 2002).

8. CONCLUSION

Koreans in general do not trust the security aspect of Internet transactions, thus mobile phone payment system looked secure since payment will be done after the service is rendered. Thus the proposition that national IT infrastructure drives the development of m-commerce is confirmed here. The mobile phone payment system plus mobile phones plus high-speed/wide-bandwidth Internet which comprise the national IT infrastructure for m-commerce were developed well enough to support the rapid growth of mobile commerce in Korea. This development of all the necessary components of national IT infrastructure for m-commerce in Korea is truly unique since no other country was able to achieve this. Other countries including early leader in e-commerce such as the US are lagging behind since not all the components for m-commerce are ready. For example, still the number of mobile phone users is 1/3 of the entire adult population of the US while in Korea nearly 99% of all adults have mobile phones. Thus the US does not meet the first component requirement for m-commerce-supporting-national IT infrastructure. Furthermore, the high-speed/wide-bandwidth Internet is not yet widely used at many homes in America since the implementation was done by private companies which often demanded high installation fees as well as usage fees. In Korea, thanks to the government initiative to install and provide high-speed/wide-bandwidth Internet such as ADSL to every home in the country, it is now estimated that close to 80% of all Korean households have ADSL connections; this was possible since the nationwide network connection was constructed by a government-owned company, Korean Telecom which was able to install and operate the high-speed/wide-bandwidth network at a very cheap rate. Not only most households in Korea now have the access to the realistic movie streams as well as vibrant game animations, but also they pay very little for the usage of the infrastructure. Here we can posit regarding the critical success factors for m-commerce as following:

The success of m-commerce is critically dependent on

1. High-speed/wide-bandwidth Internet connection available to most citizens of the nation at an affordable rate
2. Saturated mobile phone ownership and extremely frequent usage of mobile phones throughout the entire citizenry of the nation
3. Payment system that connects the utility of the mobile phone and the Internet together for the whole nation

The last item amongst 3 critical success factors for m-commerce success that is the mobile phone payment system is not obviously developed yet in the US since the two other factors are not well matured yet. However in Korea, the mobile phone system that combines the strength of maturity of 2 other factors was implemented and started to produce very positive results for m-commerce such as contributing to boost the revenue of content providers of games and movies. Thus we can conclude that the proposition: **National IT infrastructure in support of mobile Internet fosters m-commerce** has been supported empirically using Korean evidence.

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