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# Mobile Business: Characteristics, Advantages and Strategies

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## Abstract

The introduction of Internet technology has led to the business revolution, the so-called e-business. As a consequence, the e-business led the surprising economy booming for certain years. However, in the last few years, e-business also led to a global economy recession. The rises and falls of e-business raise curiosity to researchers for further investigation on the impacts of Internet technology on the business operations. What goes wrong with e-business becomes an interesting question, and deserves in-depth investigation.

In this paper, we give the definition of mobile business and construct its advantages. We analyze why e-business did not perform well in the last few years by showing how traditional Internet users were blocked by corporate firewalls from interactions with e-business.

Based upon transaction cost theory, we decompose transaction cost into analytical components: transportation cost, information cost, telecommunications cost and management cost, and therefore, derive the profit realization equation. We then use this profit realization equation to analyze how mobile technology impacts business operations.

As a result, this paper provides an analytical framework for enterprises implement mobile business and reengineer business operations. The enterprises can therefore set up corporate strategy to restructure the enterprise resources to build superior core competence and enhance corporate competitive advantages.

## 1. The Rises and Falls of Internet Economy

The introduction of Internet technology has led to a brand new way that business communicates. As a consequence, business operations changed accordingly, and led to the new way of business operations and strategies, namely, e-commerce, and furthermore, e-business.

The evolution of Internet and e-business has not only greatly innovated the way we operate business, but also dramatically revised the way we evaluate the stock values in global market. Due to the revolutionary value changes, the Internet technology and e-business has gained global attentions, and has been studied by researchers on how they impact the existing and future businesses.

Recently, after the global economy recession and the so-called DOTCOM bubble, the e-business has been

severely reviewed. Since then, people are trying to find out what goes wrong with Internet and e-business. Nevertheless, e-business has always been a critical factor reshaping the way business operates.

## 2. The Synergy of Mobile and Internet Technology

Due to the Internet revolution, each business can globally reach all the supply resources and global market demands with fingertips. Enterprises began to compete in global bases, and therefore, intensified global competitions. As a consequence, enterprises must find more efficient ways for business operations.

The usages of mobile phones (Stallings, 2001; Fitzgerald and Dennis, 2002) freed enterprises from having employees working in offices and waiting for clients to call in. Therefore, enterprise may send employees out to meet the potential suppliers and to really on site qualify the services or product quality; and to take care of the customers face-to-face for better customer satisfactions. Even if face-to-face is not possible, the mobile phones give employees mobility to move from one place to another to concurrently schedule, handle and process simultaneous business events.

While the employees are away from office, how about the support information for business execution and decision-making? Calling back to the office for information could do it, of course. However, the enterprise can do better by retrieving information and work instructions over Internet via mobile devices. In other words, mobile employees do not need to travel back and forth between offices and the meeting locations, and hence dramatically save traveling times, and reduce the setup times between activities. The number of accomplished activities, such as sales, purchases or customer cares, can be greatly increased. Therefore, the synergy of mobile and Internet technology innovates a new form of business operation — the mobile business.

## 3. The Characteristics and Advantages of Mobile Business

To better describe mobile business, we call the old style e-business the *traditional e-business*, or *fixed-business*. In fixed-business, enterprises started to

build web sites that store business related information and business operation processes. These web-based information and business processes are the keys to the evolution of e-commerce.

Given the technology advances (Stallings, 2001; Fitzgerald and Dennis, 2002), Internet mobile phone is available in the market. With the integration of Internet and mobile phone into business operations, for example, *I-mod* (Takeshi, 2000), the mobile business is created. Mobile business is then an extension over fixed-business with mobile Internet communications technology. In other words, the fundamental differences between mobile business and fixed-business are the mobility and always-online capabilities. (For convenience, we use mobile phone to mean Internet mobile phone for the rest of this article.)

To be specific, we define mobile business as follows:

**Mobile Business:** a business that utilizes the mobile and Internet technologies, and empowers the employees with mobility and always online to access business intelligence and mission processes.

Therefore, the mobile business enterprise must be on Internet, and has a databases to store business intelligence and mission processes. Also, the employees are mobile, and maybe the offices are mobile, too. The employees are free to travel without losing the connectivity with the enterprise. In other words, mobile business can be characterized by the following three characteristics:

- (1) *Mobility*: Mobile employees, and the offices too, are the trend of contemporary enterprises.
- (2) *Always Online*: employees, offices and enterprise body are always online, connected together, and ready to communicate with each other.
- (3) *Online Business Intelligence and Process*: The business intelligence and processes are electronically stored in the business system, and can be retrieved via Internet by mobile phones.

The mobility characteristic of mobile business comes with the innovation of global mobile phone systems. It is known that mobile phones are lightweight and small enough to be carried around *anywhere* at *anytime* (May, 2001). It is also known that the mobile phones are much easier to use than PCs, and could be described as a device for *anybody*. The always online and Internet enhancement allow the owner to retrieve information and business processes over Internet. Therefore, the add-on of mobile phones gives the following advantages to business operations.

- (1) **Anybody**: The mobile phone is easy to use for anybody, not just young kids but also easy to use for old ones or even busy business executives;
- (2) **Anytime**: The mobile phone is always accompanying with the owner at anytime;
- (3) **Anywhere**: The mobile phone is always accompanying with the owner in anywhere;
- (4) **Any information**: With business Internet enhancement, the mobile phone is able to communicate with Internet devices, client PC,

server and others, through certain format or protocol translation, to retrieve any information;

- (5) **Any process**: With built-in enterprises' mission processes on line, mobile phone can assist employees to follow the procedure to accomplish given mission;
- (6) **Mission-trigger operation**: to be described in the following section.

#### 4. Mission Sequence and Mission-Trigger Operation

A mission is an attempt to accomplish a goal. And each mission can be successfully accomplished if each of the following steps is realized:

- (1) Right person carries out this mission,
- (2) At right time,
- (3) In the right place,
- (4) With sufficient information on hand, and
- (5) With process assistance for decision-making or taking actions to execute the mission process.

For convenience, we call the above *Mission Sequence*.

An execution of business mission (or activity, task, assignment...) is called *mission-trigger* if the mission can be automatically triggered to execute by an associated mission sequence. A mission-trigger operation can be stated as an automated execution of mission operation, and can be depicted by the following figure:

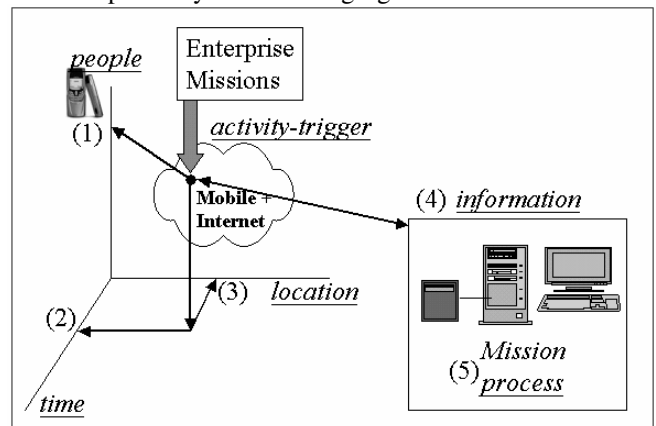


Figure 1: The Mission Sequence and mission-trigger operation

With mobile business technology, the business operation systems can automatically help (1) identify available qualified responsible persons (2) at anytime (3) in anywhere, and can trigger the designated persons to (4) retrieve sufficient information, and (5) furthermore assist the person with predefined mission process to accomplish the mission. We therefore claim that mobile business can be of mission-trigger characteristics.

There are lots of examples for mission trigger operations in the mobile business environment. For example, in parcel pickup and delivery service industry, we may have each service truck equipped with a GPS

system and mobile connection device. Then, once receiving a service request to pick and deliver a package, the dispatching center can identify the most appropriate vehicle near by the pickup location at that time, pass to it customer service information, and assist to perform the service with predefined procedures.

Corporate with better competitiveness, of course, may have better capability to realize the mission. Let  $r$  be the possibility of accomplishing a given business mission. Furthermore, let  $r_b, r_t, r_w, r_i, r_e$  be the probability of the right person, right timing, right place, right information and right procedure assistance to execute the mission, respectively. Then, we have the following competitive factor equation:

$$r = r_b r_t r_w r_i r_e$$

It is worthwhile to point out that if the possibility of each of the 5 factors is increased by a factor of 2, then the total possibility is improved by a factor of  $2^5=32$ , which is a significant improvement to corporate profit generation.

The advantages of mobile business imply that each of  $r_b, r_t, r_w, r_i, r_e$  may approach to 1 and hence increase the possibility of successfully accomplishment of business missions. The mission trigger operation can be effectively implemented especially if mobile technology is deployed, and is very important for contemporary enterprises competing in the intensifying competitive global market. The mission-trigger operation is an automated execution of business mission, and therefore is an ultimate advantage of mobile business that is never available before.

## 5. What Goes Wrong with Traditional e-Business?

For a long time, the introduction of Internet really empowered the business and the employees. It is expected that e-business is a *friction-free* economy. That is, with very little marginal cost, there will be immense volume of products or services out there in Internet market waiting for consumers to acquire, or for providers to supply. Therefore, industrial analysts believed that the e-business will revolute the business operations and dramatically promote business productivity. Therefore, e-business led to a booming global economy.

However, investors gradually realized that the promising DOTCOM enterprises do not overturn the traditional business. The e-business does not have enough momentum to generate profit, and finally, led to a global economy slum. Why does not the immense friction-free equilibrium quantity get realized in practice? To answer what the traditional e-business goes wrong, our analysis of mobile business advantages provides fundamental insights.

Traditional e-business has PC (or notebook PC) as the only Internet connection device. First of all, PC is complicated to use to most users, and therefore, not suitable for everybody. PC is not convenient to carry while traveling. So, PC is not anytime accompanying with the user. Even if the PC is with the user, it is not everywhere

turned on ready for use. PC allows user to access any information over Internet, of course, but not always online for access. Furthermore, PC is usually blocked out from business process by enterprise firewalls in order to prevent from non-business activities usages. Therefore PC is of less possibility of the mission-trigger advantage as well.

From commerce viewpoint, sales or services delivery are the basic transactions for enterprises to make profit. Consider a given e-commerce transaction to be accomplished. At the first glance, it seems that PC can help the buyer to access the information, and the automated e-process can assist the buyer to step through and complete the order placement. But, PC limits itself to comprehensive users, and is not easy to configure for Internet access. Even in the office, the only official available access tool is the office PC that certainly should be *blocked out* by corporate firewalls to prevent from unauthorized usages. Therefore, the most B2C activities have been blocked out and could not be realized. As a consequence, B2C e-commerce did not do well in the past.

However, B2B has always been very successful, and help enterprises reengineer the corporate. Although with only fixed-Internet connections, the introduction of Internet technology effectively coordinates the needs between the supplier and the business purchaser through fixed-location authorized business operations.

## 6. The Realization of Business Transactions

We have demonstrated how traditional e-business being blocked from timely matching the supply and demand for successful transactions in the B2C marketplace. However, how does mobile business overcome these obstacles? We will answer this question based upon transaction theory (Coase, 1937) and mobile business advantages.

Based upon transaction theory, a business operation can be viewed as a collection of business transactions, each of which is aimed to generate profits for the enterprise. Each business transaction can be decomposed into sub-activities, and be described by the following transaction model and transaction costs:

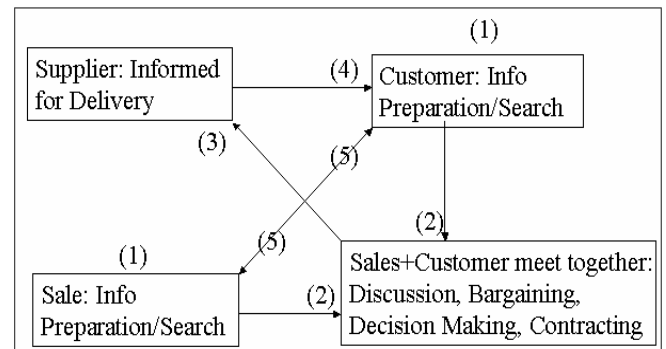


Figure: The transaction model with sub-activities and transaction costs

- (1) *Information searching*: Each customer searches for in-depth information about desired products/services and each sales agent searches for potential customers. During the process, we call this transaction cost the *information cost*,  $c_i$ , which includes both search cost and document preparation cost in a transaction.
- (2) *Negotiation and decision making*: With some information on hand, the customer and the sales agent communicate with each other either via telecommunications or via traveling to face-to-face meet-together for further discussion. In this phase, the sales agent and the customer discuss the case, negotiate for the prices, make decisions on appropriate choices, and finally settled with a contract. Besides the time spent in the process, the transaction costs involved are *transportation cost*,  $c_t$ , and *telecommunication cost*,  $c_v$ .
- (3) *Informing the supplier*: When the transaction reaches an agreement, the supplier, if needed, will be informed via transportation contact, telecommunication informing or digital document/data exchanges. The transaction costs involved are transportation cost ( $c_t$ ), telecommunication cost ( $c_v$ ), and information cost ( $c_i$ ).
- (4) *Services/products delivery*: The supplier delivers the services/products to the customer to fulfill the purchase transaction. The transaction costs involved are transportation cost ( $c_t$ ), telecommunication cost ( $c_v$ ), and information cost ( $c_i$ ).
- (5) *Transaction management*: During all process phases, it is enterprise's responsibility to monitor and administrate all activities in order to follow the transaction requirements. When the transaction service is fulfilled, it is enterprise's responsibility to maintain the customer's satisfaction. These transaction costs are the policing cost and enforcement cost, and will be denoted by *management cost*,  $c_m$ . The management cost covers the sales labor costs in our analysis for convenience.

Based on the above analysis, the total transaction cost,  $c_T$ , consists of the following components:

$$c_T = c_t n_t + c_v n_v + c_i n_i + c_m (t_a + t_l)$$

where,  $n_t$ ,  $n_v$ , and  $n_i$  are the frequencies of transportation, telecommunications and information retrieval/preparation costs, respectively, and  $t_a$  is the active processing time and  $t_l$  is the time lost during the transaction process.

According to the transaction model, the total realized profit can be described by the following equation:

$$\pi = (p - c_p - c_T) r q$$

where,

$\pi$  : the total profit of all e-business transactions

$p$ : the sales price

$c_p$ : the product cost

$r$ : the probability to realize a transaction and close the deal

$q$ : the potential quantity of transactions to the enterprise

In other words, the total realized profit equation could be restated as follows:

$$\pi = \{p - [c_p + c_t n_t + c_v n_v + c_i n_i + c_m (t_a + t_l)]\} (r_b r_t r_w r_i r_e) q$$

## 7. How Mobile Technology Impacts Business Operations

Recall that mobile technology provides us with anybody, anytime, anywhere, any information, any process and mission-trigger advantages. These advantages empower both suppliers and customers to reach each other without been blocked-out. Given the above stated profit realization equation as well as the mobile advantages, therefore, we may analyze how mobile technology impacts business operations.

**Mobile Business Strategy 1: Reducing transportation activities** by utilizing mobile communications, mobile Internet information retrievals and process assistances.

First of all, we have analyzed the transaction costs and classify them into four categories, namely, the costs of transportation, telecommunications, information and management. Among these costs, traditionally, the information cost is the most expensive one, and transportation cost is the least, i.e.,  $c_i \gg c_v \gg c_t$ . Therefore people tend not to use technology.

However, with given Internet and mobile phone infrastructures development, the transportation cost becomes the most expensive one, and is significantly higher than those of telecommunications cost and information cost. For instance, transportation cost of each round trip tour to see a customer in Taipei City, besides about forty minutes or more time lost, is about 300 dollars. However, each 20-minute mobile call costs about 150 dollars, and the information retrieval cost is significantly less. In other words,  $c_t \gg c_v \gg c_i$  if mobile business is adopted. Therefore, it is not only clever to reduce the frequencies of each cost, but also clever to further replace transportation frequencies by telecommunications or mobile Internet information retrievals.

**Mobile Business Strategy 2: Reducing active processing time and eliminating time lost** by meeting customers at effective location, closing the deal in an efficient manner and greater customer satisfaction, and utilizing unavoidable traveling time for other transactions scheduling or coordination by mobile communications.

The time required to accomplish a transaction is another important factor to reduce the transaction cost. One can reduce the active processing time,  $t_a$  and the time

lost  $t_l$  with mobile technology. Anybody (either sales agent or the customer) can prepare sufficient information back and forth over Internet, anytime, anywhere, and settle the deal much more effectively. This will greatly reduce active processing  $t_a$ . As to the time lost, choosing an appropriate location with the customer with mobile technology for better communications and sufficient information, then one can concurrently coordinate simultaneous transactions to reduce the time lost dramatically, and furthermore gives much better customer satisfaction.

**Mobile Business Strategy 3: Mobile technology gives much better possibility** of getting the right persons, at right timing, in an appropriate location with right information to assist and settle down business contracts.

As described earlier, the probability of having a transaction to be successfully accomplished is  $r = r_b r_t r_w r_i r_e$ , where  $r_b, r_t, r_w, r_i, r_e$  are the probability of the right persons, right timing, right place, right information and assistance to execute, respectively. The third area to improve the business operation is to increase each of the probabilities by utilizing mobile technology.

It is worthwhile to point out that if the possibility of each of the 5 factors is increased by a factor of 2, then the total possibility is improved by a factor of  $2^5=32$ , which is a significant improvement to corporate profit realization.

**Mobile Business Strategy 4: To increase realized transaction quantity and to lower unit cost** can be achieved by adoption of mobile technology.

The last part in the profit realization equation is the realized transaction quantity. Note that the maximum quantity that a corporate can serve is the total working hours divided by the total processing time for each transaction. Denoted by  $T$  the working hours per month, then the maximum quantity that the corporate can serve per month is given by

$$r q = T / (t_a + t_l).$$

In other words, the shortened processing time significantly increase the capability of product selling. Furthermore, note that the product cost  $c_p$  is a function of realized transaction quantity  $r q$ , due to quantity discount:

$$c_p = f(r q),$$

where  $c_p$  decreases when  $r q$  increases.

With mobile business advantages, it is much easier to realize transaction quantity. An enterprise hence may expand the transaction volume easily, especially if the others have not yet done so. For newly startup mobile business, it is easier to reach critical amount of business transactions, and hence help entrepreneur. Given increased realized transaction quantity, therefore, it is easier to accumulate bargaining powers for discounted volume cost  $c_p$ .

**Mobile Business Strategy 5: Mobile business is a must to competitive corporate.** Because mobile phones are easy to use to anybody, the assigned mission can trigger the

responsible persons to execute accordingly. As a consequence, every competitive corporate will adopt mobile technology into operations, due to intensifying global competition.

Another fundamental question is: what are the prerequisites or sufficient conditions for an enterprise to adopt mobile technology to turn into a mobile business?

In traditional e-business environment, the implementation of e-business requires a lot of obstacles, such as highly educated computer employees and customers, only office or certain restricted places are equipped with internetworking infrastructure, etc. In mobile business, the capable persons are expanded those who use mobile phones, which is about 10 more time of PC users. Because of this anybody advantage, it is 10 times easier to hire qualified employees. Furthermore, it is easier to have a qualified CEO for such mobile business strategy planning and implementation as well.

Finally, substituting of above equations,  $r q = T / (t_a + t_l)$ , into the profit realization equation, we have

$$\pi = \{ p - [c_p(q) + c_t n_t + c_v n_v + c_i n_i + c_m (t_a + t_l)] \} (r_b r_t r_w r_i r_e) [T / (t_a + t_l)].$$

This equation states the relevant components that may be used to improve business operations by adopting mobile technology.

## 8. Concluding remarks

In the last decay, the e-commerce just got started, and gave traditional business great competition pressure. However, the Internet customers are usually blocked away from freely accessing and placing purchase orders at wills. On the other hand, the traditional business had already controlled most product supplies, and had tried hard to compete with Internet e-business. As a consequence, the first wave Internet e-business were difficult to realize business transactions, and did not survive to make enough profit. Therefore, most of DOTCOM enterprises were shaken out, and caused global economy recession.

In this paper, we analyze and propose the advantages of mobile business, namely, anybody, anytime, anywhere, any information, any process and mission-trigger. These fortes are available only in the newly developed mobile business environment, and can bypass the problems of being blocked out from realization over the Internet marketplace that traditional e-business had suffered.

The mobile technology significantly impacts business operations, and we can have the following strategies to improve business efficiency. We can utilize mobile technology to help corporate (1) lower all kinds of transaction costs, (2) shorten transaction processing time or time lost, (3) increase the probability for reaching agreement and getting settled with better customer satisfactions, and therefore (4) can handle more customer requests and lower the unit product cost. Furthermore, due to the easy to use/implement nature, mobile technology

can be easily adopted by most corporate, and hence (5) the mobile business adoption is a must to modern business operations.

This paper provides a framework for enterprises to utilize mobile technology and reengineer business process. Top management can therefore set up corporate strategies to restructure the enterprise resources, build superior core competence, and enhance compete in the global market.

## References

- [1] Coase, R. H., "The Nature of the Firm", *Economica*, Vol. 4, 1937.
- [2] Fitzgerald, J. and Dennis, A., "Business Data Communications and Networking", John Wiley & Sons, Inc., 2002.
- [3] May, Paul, "Mobile Commerce: Opportunities, Applications and Technologies of Wireless Business", Leviathan Publishing Company, 2001.
- [4] Stalling, W., "Business Data Communications", Prentice Hall, 2001.
- [5] Takeshi, Natsuno, "i-Mode Strategy", NIKKEI BP PLANNING, Inc., Tokyo, 2000.