

## Evolution of Business Model from WWW to WWW

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**Abstract:** This paper studies on new business model based on 5G mobile wireless multimedia internet networks. The 5th generation networks (5G) will be completed wireless communication networks, which bring us a real wireless world - World Wide Wireless Web (WWW). We integrate the current existing e-business model and the 5G real wireless networks to propose a new business model for requirement of mobile business in future. The mobile business model will be measured through creating a simulation system.

**Key words:**

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### INTRODUCTION

The exponential growth of the Internet and the proliferation of cellular mobile systems and WLAN systems throughout both home and business applications generated both competition and cooperation among the different systems (Abdullah Gani, *et al.* 2008). In the near future, multimedia applications which are mainly achieved by wired and fixed internet users will be achieved by mobile internet users as well (Al-Shawabkeh, *et al.* 2007). Thus, as main collaboration for traditional business and e-business, mobile business can be possible in future.

Traditional business model, a main business model at last years, plays a key role in society (Harmon, 2003). It is not only a business model, but also a leisure model. People in supermarket face-to-face select whatever they want. They enjoy this kind of purchasing procedure. Walking on inside the products frame, viewing the exhibitions, chatting with friends and relaxing with the window-shopping and all of these are a kind of leisure model. Furthermore, traditional business is an opened model for everybody. No need computer, no need internet and handset, even no any cents customers still can visit those supermarkets and doing window shopping for relaxing and enjoying their holiday.

Of course, e-business is a new business model which plays a funny role in current existing society (Bagchi and Tulske, 2000). Customers can stay in their house to purchase whatever they want, no need to go to supermarket if they don't like to go outside (Williams, *et al.* 2006). E-business is based on computer and internet networks. Those customers who are satisfied with this condition can have e-business. Therefore, e-business is not suitable for all of customers, even it is quite easy and convenient (Trkman, *et al.* 2005).

As a new business model, e-business is an evolution of relationship between customers and Sales Companies. Customers make purchase are not based on real product, but a specification of the products. The sales companies establish connectivity between customers and database of their products. This new relationship drives a new evolution of infrastructure management and financial aspects for sales companies. Therefore, customers' relationship, infrastructure management and financial aspects are main challenges for e-business (Mutula and van Brakel, 2006).

These challenges will be solved by new technologies future. The next generation wireless mobile multimedia internet networks integrate with current existing cellular networks, Wi-Fi networks and fixed internet networks to supply mobile multimedia applications for customers. Both of capacities and data rates are significant enhancement, mobile business will be possible in this case [Alexander Osterwalder and Yves Pigneur, 2002).

In mobile business mode, multimedia networks are a real-time wireless system. Customer can visit not only the store of sales companies, but also the manufactories of any product that customers want. The processing for the products are

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visible and the function of the products are introduced by engineer. The products design can be visible and introduced as well, even in virtual companies (Business Process Modelling Notation, 2008).

In mobile business mode, customer can make purchase much more convenient and easy (Anderson, *et al.* 1998). Mobile devices are much cheaper than computer and they can move freedom. The following scenario is presented to clarify the model. Miss. Latifa just finishes her works and drives her car home. Her boyfriend will come to meet her and she promise to cook Paris coffee for him tonight. But no coffee maker is in her house and she doesn't know how to use it. She switches on her mobile device and purchases a coffee maker. The manufactory engineer makes a demo for her and teaches her how to use it to cook coffee. When she reaches home, the coffee maker has arrived as well. Actually, this is her first time to use coffee maker, she never has experience. Once she tries to cook it, it seams not easy. She switches her mobile device on again and the manufactory engineer teaches her step by step. They really enjoy the communication, a happy experience.

After having the Paris coffee, Miss. Latifa and her boyfriend would like to watch movie. They select all of theater in their city and list the playing movie; finally they choose one movie from a theater. All of they need to do are to pay online and then, the movie play in her mobile device. Miss Latifa and her boyfriend stay in a VIP room - their house, watching the movie.

When the movie finished, her boyfriend would like to go to beer bar, but Miss Latifa would like to go to beach. Right now it is a challenge for the couple, since they can go to one place at the certain time. The necessary associate has to be done, whatever the result is, one of them has to be give up his or her idea. For in love couple, that is so sad.

In mobile business mode, this is not an issue. They can continue stay in their VIP room and enjoy beer bar and beautiful beach. Miss Latifa can switch on her mobile device selecting any beach that they would like to enjoy. The date is 24 December, merry chrisms anywhere, She firstly is visiting peaceful square, cold weather and hot people there. Then she comes to the Crete island of Greece, romantic beach make her so happy. Finally, she arrives in Puket of Thailand, hot weather and hot people there, a hot world. She prefers the puket beach and joins them for funny.

Her boyfriend switches his mobile device selecting any beer bar that he would like to enjoy. Obviously, he is a leisure guy, but enjoys his life. He comes to Star Buck firstly, joins them at once, even he has Paris coffee. After that, he comes to a beer bar. Many people are there, he tries to look for a guy to chat, but so crowed. Nobody can hear his voice. Rock singers are working hard and disco music so mad. It seems that everybody is high there.

Once they come out from their world, they return to their VIP room again – their house.

This is the mobile business model for future.

## **MATERIALS AND METHODS**

Mobile business is based on mobile multimedia internet network and e-business model.

### ***Mobile multimedia internet network:***

Nowadays, wireless technology is getting popular and important in the mobile telephone network and the Internet field which have altered the industry and people's life (3GPP2, 2006).

Actually, in their beginnings of usage, Internet and mobile telephone were primarily limited to academic and scientific institutions because of high cost. Today, the widespread use of the Internet for communications, file transfer and World Wide Web (WWW) connectivity is commonplace for most business and home users. Just as there has been an unstoppable growth in the Internet, the number of mobile telephones has similarly advanced at an amazing pace.

Mobile networks have experienced three generations of its life (3GPP2, 2006). The first generation is an analog system which is to be used for public with voice service only; the second generation is based on digital technology, which can support text messaging. Its success and the growth of demand for online information via the Internet prompted the development of mobile wireless systems with improved data connectivity, which ultimately lead to the latest third generation (3G) systems. For third generation networks, although the coverage and the quality of the services both have increased dramatically, but as it was not within the original scope of the design of mobile networks, indoor coverage and data capacity are still significantly limited. WLAN systems were designed for indoor, data traffic and have demonstrated their ability support the needs of limited mobility indoor clients. For these reasons, many supported the eventual convergence of the two communications networks to provide better services such as larger capacities and higher data

rates and improved coverage for their users (Jatinder Pal Singh, *et al.* 2007). The standards developing bodies attempted to define standards for the interoperation of the two systems (Yu Zheng, *et al.* 2005) and several researchers thought to determine the best methods to interwork the two systems (Xichun Li and Rosli Salleh, 2007).

As the mobile telephone and Internet proliferate, researchers and service providers have attempted to integrate them. These attempts to integrate data services into mobile networks have brought the limitations of both the Internet and the mobile network into sharp focus. The Internet's best effort model is limited in its ability to support the real time constraints of a voice conversation. While, the mobile telephone network's low data rate is not sufficient for web browsing or large file transfers. Ongoing research is aimed at improving Quality of Service (QoS) for the Internet and increasing data rates on mobile networks (Rosli Salleh, *et al.* 2008).

The 3<sup>rd</sup> Generation (3G) wireless mobile internet networks have get ready to live up to its performance in computer networking and mobile device area, which is limited access voice quality and up to 2M bit/sec for data rates. The 4<sup>th</sup> Generation (4G) wireless mobile internet networks combine current existing 3G cellular networks and Wi-Fi networks with fixed internet to support wireless mobile internet as the same quality of service as fixed internet, which is an evolution not only to move beyond the limitations and problems of 3G, but also to enhance the quality of services, to increase the bandwidth and to reduce the cost of the resource. The 5<sup>th</sup> wireless mobile internet networks are completed wireless communication without limitation.

**E-business model:**

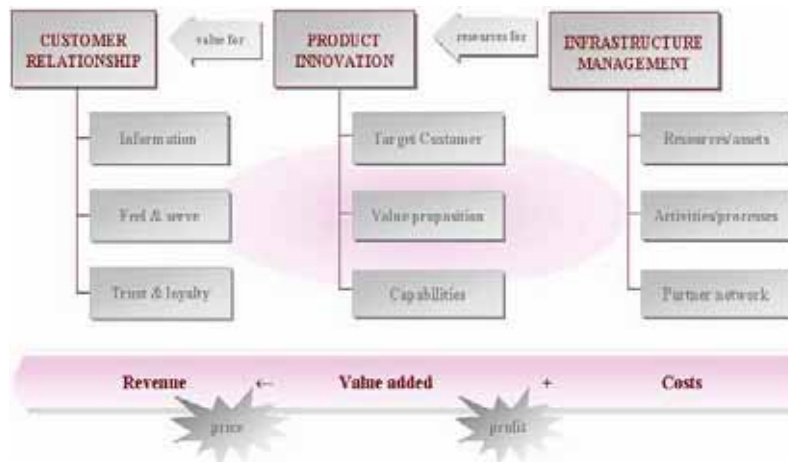
E-business model is used for modeling e-business which can a firm to structure its organization in a way to become more efficient, more flexible and responsive to customer demand, to forecast possible future scenarios and therefore to stay competitive in the Internet era. In (Magali Dubosson-Torbay, *et al.* 2002; Bertolazzi, *et al.* 2001), the authors design, implement and measure their e-business model which is made with four components. They are product innovation, customer relationship, infrastructure management and financial aspects presenting as following Figure1.

**Product innovation:**

Product innovation indicates that the value a firm can offer to its customers. The main elements are the value proposition a firm wants to offer to specific target customer segments and the capabilities a firm has to be able to assure in order to deliver this value presented in Figure 2.

**Customer relationship:**

The importance of customer relationship potential is focused on products, value creation processes and exchange patterns between different actors. However ICT (Information and Communication Technology) offers a whole new range of opportunities to exploit existing customer relationships by getting a feel for the customer's desires, serving him and developing an enduring relationship with him, which illustrated in Figure3.



**Fig. 1:** E-business model frame (Bertolazzi, *et al.* 2001).

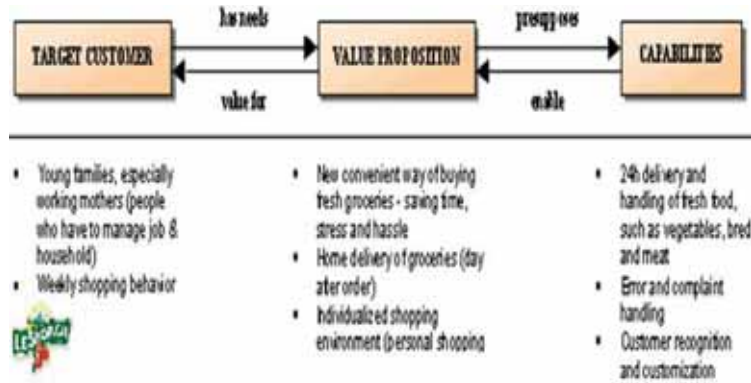


Fig. 2: Product innovation (Bertolazzi, et al. 2001)

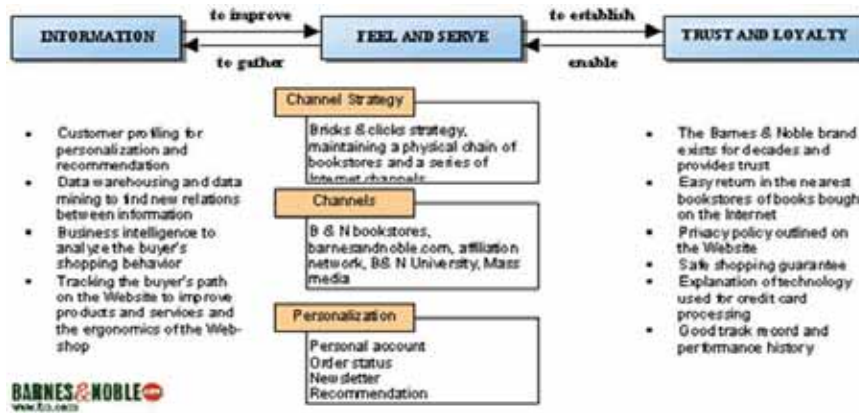


Fig. 3: Customer relationship (Bertolazzi, et al. 2001)

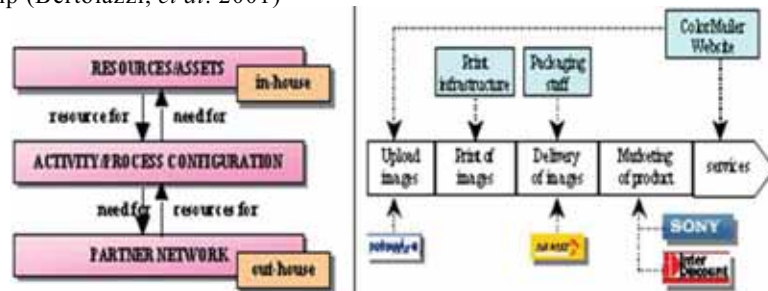


Fig. 4: Infrastructure management (Bertolazzi, et al. 2001)

**Infrastructure management:**

The infrastructure component describes the value system configuration that is necessary to deliver the value proposition to target customer segment. This processing is infrastructure management illustrated as follows in Figure 4:

**Financial aspects:**

The financial perspective also belongs in the e-business model framework, which is so important in e-business. Because no e-business if no financial transaction. Financial aspects can be understood as costs required to get the infrastructure to create value and as revenues of sold value. The difference between revenues and costs determines the profitability of a company.

## RESULTS AND DISCUSSIONS

We combine the next generation mobile multimedia internet networks and e-business model to propose mobile business model (Peterovic, *et al.* 2001). In this section, we present mobile business model design, implementation and measurement.

### **Mobile business model design:**

Mobile business model design is based on the three ideas as follows:

- Mobile multimedia internet (MMI)-mobile business has to be supported by mobile multimedia internet networks. Once the new technology is living up for utilization, mobile business shall be occurred. In other words, the new technology drives new economy and business;
- E-business model-ICT has defined e-business model which accepted by industry and discussed by academic researchers. It is not necessary for mobile business to follow e-business model, but the model can be reference architecture for mobile business; and
- Transaction-e-business model gives a common understanding of a specific domain by defining its elements and the relationships between these elements. We think that the rigorous and formalized business model approach is one key word-transaction, whatever the traditional business, e-business and mobile business.

Therefore, mobile business model is neither a description of a complex social system itself with all its actors, relations and processes, nor it describes the logic of a “business system” for creating value, that lies behind the actual processes. Even we haven’t understood a business model as the conceptual and architectural implementation of a business strategy and as the foundation for the implementation of business processes. All of these definitions are standing in company side to consider that how company can make profit from market through e-business mode. Obviously, customer is key component in mobile business model and transaction is only way what happens there. It is user demands drive product innovation and financial aspects, but not a firm to make a strategy for developing market. Thus, mobile business model is presented as in Figure 5, which includes MMI, customer relationship, financial aspects and product innovation.

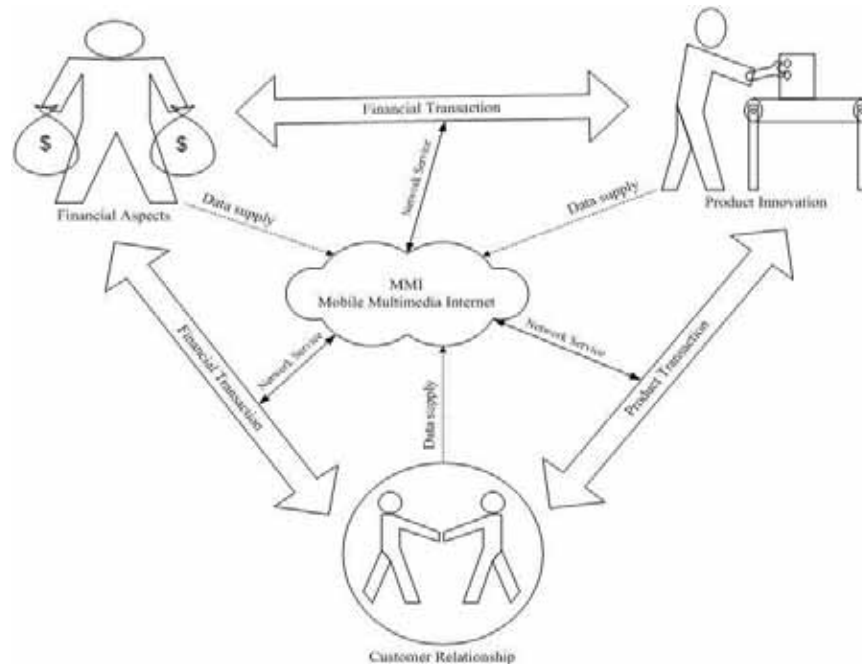


Fig. 5: Mobile business model

***Mobile business model implementation:***

Both of traditional and E-business modeling has similar goals to enterprise modeling in general. Modeling helps firms develop business visions and strategies, redesign and align business operations, share knowledge about the business and its vision and ensure the acceptance of business decisions. Therefore, a business model is nothing else than the architecture of a firm and its network of partners for creating, marketing and delivering value and relationship capital to one or several segments of customers in order to generate profitable and sustainable revenue streams. Obviously, all of these business models are based on a firm profit, not on customer demand. We propose mobile business model which focuses on customer demand. However, customer is a key component in the mobile business model, not firm profit. Furthermore, transaction is main processing in the model. The detailed implementations are presented as follows:

***Product revolution:***

The product component of e-business model framework describes the value a firm wants to offer its customers. Actually, when we talk about the product within both traditional and e-business models, the product is visible and deliverable. In other words, a customer books product online from a firm, the firm then delivers their product to the customer. The payment is done online as well. In this case, the products are not including those which are invisible or undeliverable, such as service or smile.

Mobile business is a new business model which is a new life as well. The product component in mobile business model is including all which can be enjoyed by customers, such as e-beer bar, customer can relax there, or a car park, customer can access his mobile device to select a nearest car park having empty unit for his car, or cinema, customer can watch movie anywhere, anytime and anyhow. It seems that everything can be produced supplying to customer in mobile business model. This is the item what we called product revolution.

***Customer relationship:***

Actually, customer relationship is a new revolution in mobile business model. In traditional business model case, customer goes to Wall Mart or JUSCO or Carrefour to buy beer and pays in counter by cash or credit card. In e-business model case, customer books online and pays online by credit card in their house, the beer may not necessary from Wall Mart or JUSCO or Carrefour, a firm just delivers the beer to the customer following the given address-home or office. In mobile business case, customer doesn't know where the beer is. The mobile multimedia internet supply transactions only. A nearest firm will deliver the booked beer to the customer. The customer may at anywhere. Thus, the customer relationship component is a key component in the mobile business.

***Financial aspects:***

Mobile business combines traditional business and e-business. E-business is eBuy and ePay. Mobile business can be eBuy, but not necessary ePay. The following scenario can clarify the perspective. Customer goes to a beer bar. He can select a beer bar from the city's entire beer bar which can be visible by his mobile device. Some of beer bares are quiet and just couple chatting there, some of beer bars are so hot, rock music and disco game. All of them are presented in his device at real-time. He chooses a hot beer bar and books a seat through his mobile device during on his way. Before he reached the booked beer bar, he has to park his car. He lists the nearest park around the beer bar and finds a unit for his car parking. All of these processing are visible and completed through his mobile device. After he enjoyed his beer, he paid by mobile device for beer and by cash for car parking.

***Mobile multimedia internet:***

Traditional business and e-business are focus on firm's developing business visions and strategies. The main component is firm and the processing is to develop market. The mobile business model focuses on customer. Customer demand is key idea and transaction is main processing for the entire mobile business related model. Whoever delivers, wherever the products are and however the products deliver to customer will not be important issue. Since customers always select the best products and services at real-time.

Mobile business model is much different with e-business in this point. E-business must have infrastructure management component to manage the entire business processing, since all of this processing is based on a firm. The

firm delivers products and charges from customers. Once the customer booked products from a firm, the firm delivers the products and charges for the customer after received order record. In other words, both the products and services are from the firm for the customer.

In mobile business model, each task is divided by many firms which are redistricted for mobile multimedia internet provider (MMIP). MMIP manages entire transaction and it is the customer demand drives all transactions.

**Mobile business model measurements:**

Mobile business model is based on mobile multimedia internet (MMI). The mobile multimedia is a research item for next generation wireless systems. Therefore, the mobile business model can be measurement on simulator only (Bosilj-Vuksic, *et al.* 2002). As the simulation environment, we select ns2 Java version network simulator. The Java Network simulator (JNS) is chosen due to its flexibility and extensive model library sets. Furthermore, the JNS allows developers to simulate designed model in a controlled environment. JNS then produces a trace file (same format as NAM trace files) which can be viewed in a network animator such as Javis (<http://jns.sourceforge.net/> 2008).

In order to do this measurement testing, it is necessary to configure Java Network Simulator environment. Simple network of four nodes is established within the JNS. Our testing is based on the simple network design as shown Figure 5. In the testing system, Node0 denotes to product revolution, Node1 denotes to customer relationship, Node2 denotes to MMI and Node 3 denotes to financial aspects. The test results are presented in Figure 6 and Figure 7 as following:

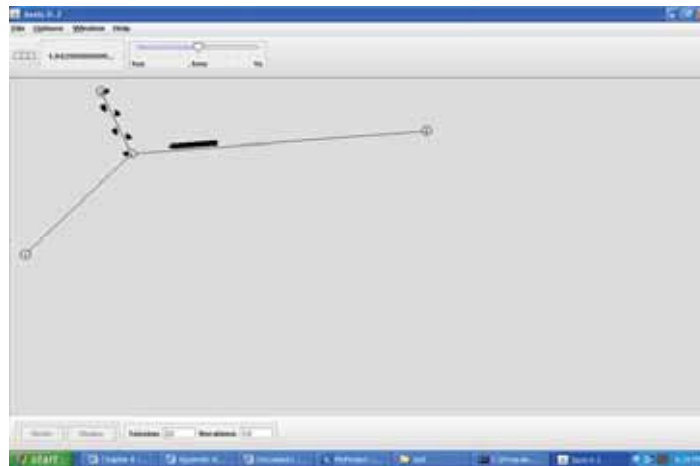


Fig. 6: Product information delivers to MMI

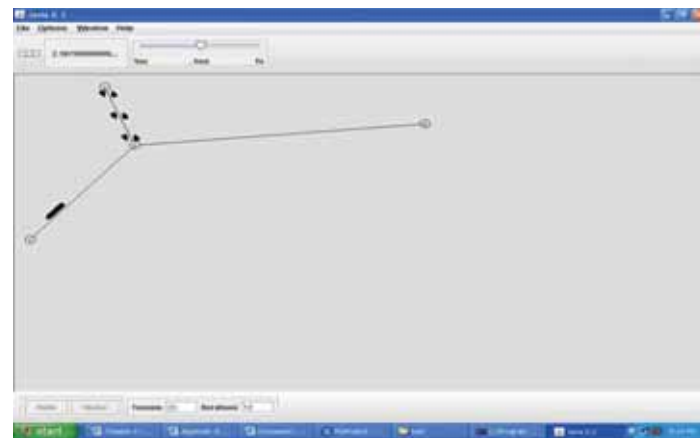


Fig. 7: Product information delivers to customer from MMI

The Figure 6 above shows that once the product revolution receives a request from customer, the product revolution sends a reply to financial aspects through MMI for validating. The validating result returns to MMI. During these transactions, the MMI plays a control center role. Actually, in mobile business model case, all transactions must go through MMI. The MMI provides not only product information, but also transactions platform.

After the financial aspects validate successful, the reply will be send to customer shown in Figure 7. When the customer receives a reply from MMI, his transaction is completed. The transaction includes: the customer sends request to MMI firstly and then, MMI checks product for the customer. Once MMI receives the product is ready for the customer, a financial transaction for validating shall be done. Finally, the reply returns to the customer for fulfill his request. After finishing all of these transactions, a mobile business is completed.

## **CONCLUSION AND FUTURE WORKS**

In this paper, the mobile business model has been defined to response for implementation and measurement of future business. Mobile business model is based on new technology, especially the next generation mobile internet networks, which combine traditional business model and e-business model. However, mobile business is a revolution of business model.

Since the next generation mobile multimedia is a research item in academy. Therefore, a scenario-based forecasting approach could be helpful during defining a strategy of adoption, deployment and management of a business model (Gulati, *et al.* 2000). Based on the idea we defined mobile business model which integrates mobile multimedia and e-business.

Further research in progress, based on this paper, is a field study for observing, analyzing and cataloguing typical business models in a knowledge base. The final objective would be to computerize this base and to specify a decision support system for helping business model creators to design, critique and simulate new business models.

Simulation based on the mobile business model framework could help answer the following questions: what is mobile business? How it works on future? Why revolution? Who can benefit from mobile business?

Mobile business is a revolution of new business model. Thus, the outcomes of this paper should help the managers to design a new business model by using the suggested framework and by which, asking the right questions, such as what is exactly my value proposition? How do I get a good feeling of the needs of my target market? To deliver the intended added-value to the market, what would be the required and most appropriate resources and assets?

The mobile business model does not consider issues such as congestion relief, re-negotiated QoS, or the movement pattern of the mobile user. In future, there is a need to develop a new detection algorithm that can support the broad level of network integration promised by the next generation wireless system and mobile business model.

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