

# CREATING VALUE USING MOBILE TECHNOLOGY IN BRAZIL

## *A Case Study in a Brazilian Airline Company*

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Abstract: The growth of mobile telephony in Brazil have been enabled the development of mobile business applications. These solutions create some strategic opportunities for Brazilian companies to mitigate structural gaps using a new platform to connect a wide number of customers. The aim of this research is to verify: (a) the possibility of achieve a competitive advantage developing an innovative mobile application (b) the opportunity to create sustainable strategic value with this solution. If the issues “a” and “b” are truth, the mobile is contributing to a unique strategic positioning for the airline company analysed on case study.

## 1 INTRODUCTION

Mobile telephony has offered many features, but it mainly transformed transactions that require direct and agile communication. Such features caused deeply impacts on the customer’s behavior (Baloco, Mainetti & Rangone, 2006). On this scenario, an increasingly number of companies is looking for ways to create strategic value by using mobility as a new communication channel.

This paper aims to verify: (a) if a Brazilian airline company acquired competitive advantage and (b) created sustainable strategic value by using mobile phone application.

Contribution of information technology (IT) to business was analyzed trough the following references:

- Four eras of IT: Zwass (1998);

- Impact of IT and Internet on strategy: Porter & Millar (1985), Porter (2001), Tapscott (2001);
- Virtual value chain: Rayport & Sviokla (1995);
- Mobile applications, Baloco, Mainetti & Rangone (2006);
- The value creation on e-business: Amit & Zott (2001).

A case study was conducted to analyse the propositions (a) and (b). The case refers to deployment of the first mobile check-in project on a Brazilian airline company that enables the delivery of the boarding pass on the passenger mobile phone through an internet request.

The innovative project is on pilot stage since October 2008 in the major Brazilian airports: two airports in Sao Paulo (Congonhas and Cumbica); two in Rio de Janeiro (Galeão and Santos Dumont); one in Minas Gerais (Confins) and one in Distrito

Federal (Brasilia). The experimental stage objective is to mature processes and technology, to know the passenger's experience in order to turn it even better, to identify the system's flaws and finally, among other things, it will allow a broader analysis of the project.

## 2 CREATING VALUE WITH e-BUSINESS AND MOBILE

### 2.1 Internet and Mobile as an Strategic Tool

Zwass (1998) traced the evolution of information systems in four eras: (i) Operational support, from 1950 to 1970 decades; (ii) Administration support, from 1970 to 1980; (iii) Strategic tool, from 1980 to 1990; (iv) Ubiquitous computing, since 1990. The fourth era is recognized by the electronic integration, the power of processing is not restricted to computers but any kind of devices connected to the Internet.

In order to highlight the role of information technology in competition Porter & Millar (1985) explored the "value chain" concept: *"A company's value chain is a system of interdependent activities, which are connected by linkages. Linkages exist when the way in which one activity is performed affects the cost or effectiveness of other activities...Careful management of linkage is often a powerful source of competitive advantage because of the difficulty rivals have in perceiving them and in resolving trade-offs across organisational lines"*.

The virtual integration promoted by the Internet introduced new concepts to the competition. Rayport & Sviokla (1995) referred to the physical world of resources that managers can see and touch as the "marketplace", and the virtual world made of information as the "market space". For example, banks provide services to customers at branch offices in the marketplace as well as electronic online services to customers in the market space.

For the authors, the traditional value chain model treats information as supporting element of the value-adding process, not as a source of value itself. Company's managers look at far more possibilities for creating and extracting value thinking in terms of virtual value chain and physical value chain than they would have by considering exclusively the traditional value chain. For instance, Federal Express created value for its customers allowing them to track packages through the FedEx website

on the Internet.

The market space promotes a virtual integration of the industry agents. In such markets as burgeoning national economy without a physical infrastructure connecting the agents, a virtual platform can be created first. For example, the China Internet Company developed a network of Internet sites for forty industrial cities. The network provides multimedia documents that describe a wide range of products, a complete catalogue of Chinese laws to trade and export, a translation service, and news. These services and information were not available before because the Chinese did not have an adequate physical infrastructure. In the case analysed, new connections among the agents of the industry will be enabled by the Internet integration.

Rayport & Sviokla (1995) highlighted five implications of the virtual value chain for management:

- Digital assets, unlike physical ones, are not used up in their consumption;
- New economy of scale;
- New economy of scope;
- Transaction cost compression;
- Shift from supply-side to demand-side thinking.

Porter (2001) considered the Internet as the best IT platform to create a unique strategic positioning because its architecture and standards make it possible to build truly integrated and customised systems that reinforce the fit among activities.

Tapsco (2001) is even more emphatic, claiming the Net is much more than just another technology development. The Internet enabled a "New Economy" for this author. The strategists will no longer look at the vertically integrated corporation as the starting point for creating value. Rather, they will start with a customer value proposition and they will identify discrete activities that create value and parcel them out to the appropriate web partners.

Despite the relevant role of e-commerce applications, Turban, Rainer, Potter (2003) pointed other ways to create value through the Internet as customer support, collaboration with other companies, e-learning and intranet. The authors called e-business the wide range of business applications through the Internet.

### 2.2 The Role of Mobile Applications

The mobile technology expanded the Internet domains to the ubiquitous computing claimed by Zwass (1998). The portable devices allowed a lot of new uses of TI. Baloco, Mainetti & Rangone (2006) detailed the main mobile commerce (m-commerce)

applications:

- Sales Force Automation (SFA)
- Field Force Automation (FFA)
- Supply Chain Management (SCM)
- Fleet Management (FM)
- Operations support
- Customer Relationship Management (CRM)
- Mobile and Wireless Office (MWO)

Service providing in e-business demands an intense association between the supply chain players. A unique strategic position may emerge from the links between these players (Porter, 2001).

### 2.3 Creating Value in e-Business

Researching companies over the world, Amit & Zott (2001) detected four sources of value creation through the Internet:

- Efficiency – composed by cost reduction, information exchange optimization between company and costumers, supply chain integration.
- Complementarities – created when a set of components worth more than the sum of each component separated. Companies can combine their won products and services or extend the complementarities to other partners on the supply chain.
- Retention – prevents customers and strategic partner's migration to other competitors. Customer familiarity with e-business interfaces and unique applications tend to leverage the loyalty.
- Innovation – Traditionally, new products and services. On the Internet, may be a change on the way of transaction. For example: eBay introduced auctions between costumers in large scale (C2C) allowing low price products commerce between individual costumers.

These sources of value will be used to verify how the airline company created value in e-business applying the mobile solution.

## 3 CASE STUDY

### 3.1 Research Methodology

In order to investigate the development of competitive advantages by mobile telephony, the methodological approach was case study and one company was selected due to the existence of a main project based in this kind of technology. The development of the case study comprised three

major processes: information gathering, analysis value creation, and consolidation of the study. The activities permitted the identification of competitor views, market structure, and internal vision for each analysed industry:

Information Gathering: (i) internal environment: in-depth interviews were performed with professionals of different areas the company (Yin, 1991). Most strategic areas were selected, according to relation with mobile solution. Examples of these areas include: Operations, Information Technology, Marketing, and Customer Service Department. The interviews covered comprehensive levels in the organisation in order to allow the mapping of different views on operational restrictions and enhancements. Therefore, subjects at the operating level as well as upper management were interviewed. (ii) External environment: analysis of trade publications, industry websites and competitor companies, best-of-class features of international companies, public government records.

Value creation: as a result of the case study, some considerations about the value creation of mobile solution will be presented.

Consolidation: analyses of the impact of the new strategic positioning in the business results.

### 3.2 Mobile Industry in Brazil

80% of mobile phones in Latin America are concentrated in six countries, by decreasing order: Brazil, Mexico, Argentina, Colombia, Venezuela and Chile. Brazil is the largest market, going from 102,047,000 mobiles at 1<sup>st</sup> quarter of 2007 to 140,789,000 at 3<sup>rd</sup> quarter of 2008 (Teleco, 2008).

Prepaid mobile phones in Brazil are responsible for much of the growth of mobile telephony. They began to be marketed in 1998 reaching 80.8% of mobile phones in 2005. According to Anatel (Teleco, 2008) this number grows to 81% of mobile phones in Brazil, these phones represent a density of 79 mobile phones per 100 habitants. This is not a uniform distribution, being larger on South and Southwest and smaller on North and Northwest regions of the country.

Growth of mobile phones in Brazil is larger than the broadband internet, as shown on table 1.

Population quickly accepted the mobile telephony and some services were naturally absorbed by this communication channel, such as alerts, several types of transactions, payments, localization, among others.

As the majority of Brazilian uses prepaid cell

phones, it demands a different solution approach. Users choose prepaid plan by economic reasons and because they are simpler. Plans which include data transfer packages and provide e-mail and internet access are still expensive for most people. In other countries which already have the mobile check-in solution, boarding pass delivery is made through e-mail message, as users have data transfers packages, they can receive this information on the phone. In Latin America context the delivery has to be done through SMS, so everyone can receive the boarding pass.

Table 1: Evolution of connection types (IBGE, 2007).

Millions	2003	2004	2005	2006	2007
Landline phones	39.2	39.6	39.8	38.8	39.3
Mobile phones	46.4	65.6	86.2	99.9	121.0
Paid TV	3.6	3.9	4.2	4.6	5.3
Broadband	1.2	2.3	3.8	5.6	7.7
Internet users	-	-	32.1	32.8	39.0

### 3.3 Mobile Check-in Solution

In 2008 the IATA associated airlines developed the capacity of 2D barcode generation (bi-dimensional) in the boarding passes. Aggregated to mobile technologies is possible to deliver these barcodes on the passenger's mobile phones that use the airline transportation service. The Japanese airlines JAL and ANA offered this service, but Japanese technology works only on Japanese networks and mobile phones. In some countries, there is an integrated solution with m-payment systems, the mobile solution starts earlier, when the ticket is bought. In Japan this kind of solution is being replicated to other transportation companies like subways and trains.

Mobile check-in is offered as a benefit to ease service delivery to the passenger. After purchasing the ticket, the passenger receives the localizer. With this code, access the airline website and chooses the mobile check-in. The passenger provides his personal information, reserves the seat and finalizes the transaction. Up to two hours before the flight, the passenger receives in the mobile phone a message containing the 2D barcode and the flight details like date, time, departure gate and seat (figure 1). The passenger is not additionally charged by using the mobile check-in.

Mobile check-in uses specialized technologies both the most used internet and software development technologies.



Figure 1: Received message.

Designed to generate more economy to the air transport industry, better convenience to the passenger and more flexibility to the airports, the International Air Transport Association (IATA) issued a policy (Resolution 722 c/ATA Resolution 20) requiring that all associated air companies use boarding pass containing 2D barcodes (BCBP). Up to the end of 2010 all boarding passes should have this barcode.

By choosing the mobile phone check-in, users can receive two types of message. On the first case, the user receives a message with the bi-dimensional barcode in an image format (Binary SMS) in addition to text. On the second, users receive a regular text message with a hyperlink to access the barcode image through a mobile internet connection.

- Binary SMS: it's a kind of SMS which allows the delivery of 2D barcode as an image. This kind of message is delivered through two distinct protocols. The NSM (Nokia Smart Messaging) is a protocol recognized by most of the mobile devices (Nokia, Motorola and Sony Ericsson). The E-SMS (EMS) is recognized by other sort of mobile devices (LG, Samsung, Siemens and some Motorola);
- Message with link: can be SMS link or WAP push, these options work like a contingency to mobile devices that do not support binary SMS, like Apple iPhone some models of BlackBerry, HTC and HP. But in this case, the solution depends on the availability of mobile internet connection at the airport.

Studies show more than 60% of the message traffic analyzed on this case is based on NMS format.

The mobile check-in involves an intense association with the following players:

- Airline: provides access to reservation system through APIs allowing the user to visualize the unreserved seats and choose yours. Before boarding, the airline is responsible for the passenger identification procedure, like

- traditional check-in made in Brazil;
- Mobile Phone Operators: responsible for message's delivery to its customer's mobile phone. As this is a pioneer project in Brazil, some operators needed to adapt your platforms to allow the delivery of binary SMS.
- Integrator: owner of integration platform, responsible for messages delivery to all mobile phone operators. The integrator is also responsible for the project's approval within each mobile phone operator. In Brazil, this is a mandatory procedure for message's delivery other than peer-to-peer messages;
- System developer: responsible for mobile check-in system, it develops the application which communicates with airline back-end's system, delivers the code on the integrator's platform and generates managerial reports.

### 3.4 Results

Although the project is considered on pilot stage, it is possible to analyze the early results. The mobile solution is implemented since October 2008 in the main Brazilian airports. The airline company did not advertise the solution in any kind of mass media. The mobile check-in communication is enabled on the website and it is also disseminated through buzz between consumers.

The airline company is monitoring three factors to determinate the best moment to roll-out the check-in solution: supply-chain capacity including airports and telecom operators; passenger's satisfaction and return on investment.

Airports infra-structure in Brazil is near a collapse because of passengers' growth in the last years without adequate investments on capacity increasing. It is not unusual for a Brazilian passenger wait more than one hour in a check-in queue, beyond the uncomfortable experience there is a real risk of flight missing in some cases.

Other airline companies provide special services for high level consumers; these clients use differentiated queues to avoid the long wait. This kind of expensive service is not a possibility to the analyzed airline company because of its aggressive trade-offs to low the ticket costs. In this scenario, the mobile solution is a relief to their passengers because they can by-pass the queue using their cell phones.

Despite the scarce communication, the mobile check-ins grew 74% since its implementation (figure 2). This growth is generated by frequent flyers and new users who know the service by other user's indication. A quality analyze was undertaken to

know better the passenger experience, it indicated the majority of the passengers approved the mobile check-in. It is considered easier and quicker than the regular way, although consumers observed the airline company employees do not know the mobile check-in operational details yet.

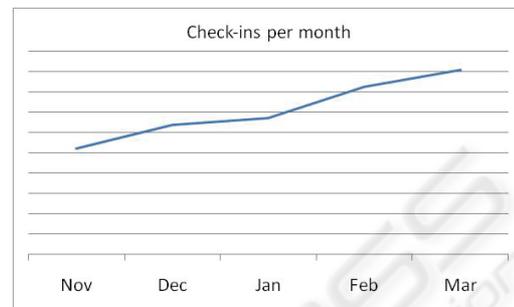


Figure 2: Mobile check-ins evolution (scale was omitted for confidentiality purposes).

Other issue faced by users is to select the correct brand/model phone on mobile check-in process; it causes problems to identify what kind of message should be delivered, so a web page containing a guide was published, and the device can be identified using a picture for comparison.

Considering the financial perspective, the airline company achieved an outstanding operational cost reduction. The traditional check-in cost is about US\$ 8.00 while the mobile check-in can save up to 70% of this value. This reduction became reliable the project roll-out, the unique factor is delaying this launch is the airports infra-structure.

Although the airport can also be benefited because of higher flexibility to use the physical space (eg. some check-in stations can be converted into luggage delivery), it is not equipped with modern devices to read the cell phone bar codes in order to allow the passengers entering on the gate. The company handled this issue providing stations to the passengers print the check-in tickets before flight.

Other constraint is the difficulty of a major cell phone operator to adjust their systems to support the mobile check-in. As soon as this operator supports the solution, its roll-out will be performed.

### 3.5 Project Evolution

The mobile check-in project is still an innovation in Latin America, but there is no guarantee it will be a differentiated solution on the future. Considering this changing environment, the airline company is studying new technologies to maintain the

innovative pace.

Multimedia Messaging Service (MMS) and Location-Based Service (LBS) technologies can add significant evolutions to the project. The MMS is a delivery option to devices unable to handle binary SMS, but the delivery of this kind of message is not yet supported by all mobile operators companies in Brazil. The LBS enables the passenger localization.

The company defined some opportunities to continue providing a differentiated service to their consumers:

- Delay alerts and weather conditions on arrival;
- Possibility of including miles through SMS message to a Frequent Miles Program, receiving a SMS reply with the miles balance just after the inclusion;
- Sending SMS with cancelled flights or new boarding instructions;
- Possibility to selling the seat of the passenger that is not in the airport area, for example, 30 minutes before the flight.

## 4 CONCLUSIONS

The analyzed solution generated a competitive advantage to the company (Porter & Millar, 1985; Porter, 2001). This can be concluded based on the fact of any other Brazilian airline company is offering, or even planning, this kind of solution. Although the company is aware about the copy risk, it is preparing to launch new features, in order to take advantage of its pioneer position.

According to Amit & Zott (2001) view of sources of value, the airline company created strategic value as follows:

**Innovation** – Beyond the fact of the mobile check-in became an innovation in Brazil nowadays. The mobile platform will continue to produce a lot of new features as related on project evolution. These possibilities give the opportunity to the airline company to build a visionary position based on innovation.

**Efficiency** – The presented solution decreased in 70% the cost of check-in operation. Additionally, the check-in process became more flexible, reducing queues and easing the passengers flow on the airport.

**Retention** – Passengers experience more comfortable services, saving time and getting precise information about check-in. As other companies do not offer this service, it is expected the application increase the customer loyalty.

**Complementarities** – Integrating the mobile phone operator to the supply chain of airline, the analyzed company created a new way to add value to its processes, giving benefits to all involved players.

According to the case study results, the hypothesis (a) was verified because until this moment the company achieved a competitive advantage based on the mobile application (b) but it is difficult to verify whether this solution will sustain a strategic position as the other players can launch similar solutions.

The future steps of this competition motivate new analyses in order to develop new studies aiming to design a more complete scenario of mobile contribution to competition in Brazil.

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