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The role of information and communication technology in the transformation of consolidated business model: A study of taxi cooperatives in Brazil

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Abstract

The first radio taxi service in Brazil was created in Curitiba in 1976. The business model used that time was still in place until the creation of taxi service online applications for mobiles in 2012. Taxi cooperatives and associations saw their traditional business model being run over by the new technology. The final objective of this investigation is to verify how the cooperative business models adaptation happened in an innovation scenario generated by the use of technology. In this first work is presented a description of the changing face of how taxi cooperatives in Brazil operate before and after the proliferation of taxi mobile apps. A qualitative study was undertaken in Sao Paulo – biggest city in the country – and Curitiba – first Brazilian city with a radio taxi association. Among the interviewees there were taxi service customers, taxi drivers, cooperatives and taxi service online app companies' representatives. Changes generated by the new technology were mainly perceived on customers' value aggregation and on cost model. The transition from one model to another had many steps and not all cooperatives went through all of them. The duration of each one also varied among the cooperatives analyzed. Special attention was given to the steps that allowed the transition from one model to another.

Keywords

Taxi Online Service Applications; Taxi Cooperative; Information and Communication Technology; ICT; Business Model; Brazil.

1. Introduction

Geolocation applications are having its use increased in order to help users to move in cities, locate more accurately addresses, identify traffic congestion routes or even locate an available taxi nearby. Radio taxi cooperatives are having their business transformed by this innovation with transformation on their business model. It is known that innovation requires the adoption of new business models structured for technology sharing, resulting in activities and capabilities remodeling (Gambardella & McGahan 2010). The adoption of this technology is bringing both intended and unintended outcomes. These outcomes demand understating of mechanisms and the context in which they operate. The understanding in this environment is yet developed, hence deserves attention. In this context, the research problem was outlined in terms of verifying how the cooperative business models adaptation happened in an innovation scenario generated by the use of technology. The research question that guides the work is: How do the business model changed and what are the phases of changes? In this first work is presented a description of the changing face of how taxi cooperatives in Brazil operate before and after the proliferation of taxi mobile applications.

2. Theoretical Referential

Business models are part of the economic behavior, but only after the advent of the internet in the 90s the concept of business model became predominant (Zott et al 2011). The business model concept has been developed over time, as explained in Figure 1.

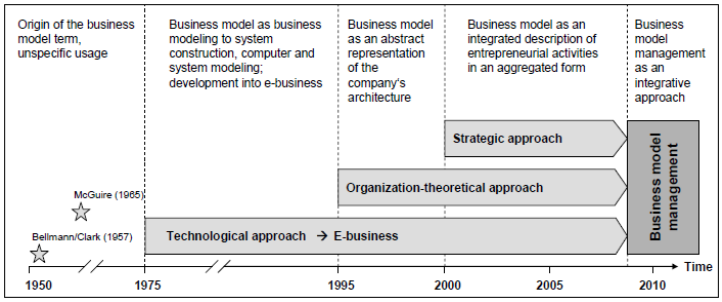

Figure 1 – Business Model Concept Development
Source: (Wirtz 2010)

Several researchers have dedicated themselves to study business models for companies in the digital age (Pateli & Giaglis 2003; Applegate 2001; Afuah & Tucci 2001; Chesbrough & Rosenbloom 2002). In simple words, the term "business model" should represent the rational of how an organization creates, delivers and captures value in order to profit (Osterwalder & Pigneur 2010). There is no unique definition for business model. In academic literature the “business model” concept encompasses the term as a description (Applegate 2001; Weill & Vitale 2013; Magretta 2002), a representation (Morris, Schindehutte & Allen 2005; Schafer, Smith & Linder 2005), an architecture (Dubosson-Torbay, Osterwalder & Pigneur 2002; Timmers 1998), a conceptual tool (George & Bock 2011; Osterwalder 2004), a method (Afuah & Tucci 2001; Rappa 2010), a framework (Afuah 2004, Venkatraman e Henderson 1998), a pattern (Brousseau & Penard 2006), and a set of components (Hedman & Kalling 2002; Seelos & Mair

2007). The business model definitions presented differ on characteristics, components and relationships. Given the absence of a single concept, the definitions were analyzed aiming to identify the dimensions involved: the most referenced ones include profit and potential benefit - or aggregated value - followed by competitive advantage, business logic, company structure and structure elements relationships. Other dimensions are referenced but less frequent.

As per Zott et al (2010), two factors called academic attention: the emphasis on the strategy in competition: competitive advantage and perceived value, so that the concept of business model focuses more on cooperation, partnership and creation of value (Magretta 2002; Makinen & Seppanen 2007; Mansfield & Fourie 2004); and the emphasis on value proposition and customer (Chesbrough & Rosenbloom 2002; Mansfield & Fourie 2004), because it connects the technical potential with achieving an economic value. Osterwalder and Pigneur (2010) presented the concept that encompassed nine blocks of information: Customer Segments block - represents the different group of customers the company serve - Value Propositions block - describes the company deliveries that create value for the different customer segments - Channels - characterize the company communication with the customer to deliver value proposition - Customer Relationships block - summarize the relationship types that the company establishes with the customers - Revenue Streams block - represents the cash a company generates from customers - Key Resources block - shows the most important assets required to make a business model work - Key Activities block - represents the most important actions a company must take to operate successfully - Key Partnerships block - encompass suppliers and partners that support the business model work – and Cost Structure block - consolidate all costs incurred to operate a business model.

2.1. Referential Model for Analysis

A multilevel conceptual infrastructure proposed by Pozzebon et al (2009) meet complex interactions, and different levels between individuals, social groups, organizations and networks, at a community and society level in the study of technology-in-practice. It has four core concepts: technology-in-practice, negotiation mechanisms, social groups and interpretative frames, which are interconnected by three different dimensions: context, process and content. The context dimension refers to a social environment where the technology is being implemented and used. It includes the identification of different and relevant social groups and the technology view for each social group, allowing the recognition of shared and conflicting perceptions, expectations and interests, which is named as interpretative frames. It also supports the identification of benefits, strengths, problems and barriers of technology use. The process dimension refers to the understanding of how social groups influence and are influenced by the negotiation process of implementation and use of a new technology. It supports the analysis of how different social groups and interpretative frames influence in the negotiation of implementation and usage of technology. Different interests, perspectives and conditions in which social groups interact with the technology will influence the process and results. In this scenario, the content dimension presents the result technology-in-practice from the negotiation process, the technology characteristics and intended and not intended consequences. Besides the three dimension of analysis, the infrastructure combines four main concepts: Social Groups - refers to a group of people who share a set of assumptions about a specific subject of interest - Interpretative Frames - refers to interests, assumptions and expectations that people have about a

technology, including not only the nature and function of the technology itself, but also technology usage conditions, habits and consequences - Mechanisms - refers to the understanding of how social groups influence the negotiation process for the implementation and use of technology – and Technology-in-Practice - refers to the technology as a response to the intentional and unintentional consequences and characteristics generated by negotiation. It may arise from the way people redefine the meaning, properties and applications of a particular technology.

3. Methodological Proceedings

The study has a qualitative research strategy. The research employs a qualitative approach to understand the transformation of taxi cooperatives business model in Brazil which was undertaken in the last quarter of 2014. The research methods selected were aligned to the research question, considering that a qualitative approach would better fit the context analysis, since the transformation process is not yet concluded but is also in progress.

Semi structured interviews complemented with literature review and documental analysis were used to collect the data for analysis. Curitiba and São Paulo cities were selected for analysis based on their importance in the country and for the taxi business. Curitiba had the first radio taxi service available in Brazil in 1976. According to URBS (Urbanização de Curitiba S.A.), entity responsible to manage and administrate the taxi services in Curitiba, the volume of available taxis in December, 2014 was 2,999. São Paulo was selected as it is the biggest city in the country and due to be the top 10 most populous urban areas, according to ONU report. According to DTP (Public Transportation Department), there are around 33,000 taxis in the city. In the cities selected, taxi cooperatives and associations were analyzed.

The interviewee categories selection was based on a stakeholder analysis. The fact that they are involved in the transformation process, assign validity and credibility to the study. The thirty-one interviews, in which 16 were in São Paulo and 15 in Curitiba, encompass the different social groups: standard cooperative (3), taxi drivers (11), customers (16) and city hall (1). It was also used a TV show session and a conference, both with taxi service online application founders, to fulfil the taxi service online application business model description. The interview set of questions were based on the categories identified among the different business model definitions and expanded to consider the nine additional blocks of Osterwalder and Pigneur (2010) definition. This process ensured the particular views from each interviewee were captured for analysis. All response were recorded, transcript and uploaded in Atlas TI® which facilitates a content analysis, ending in 535 quotations, grouped into 153 categories. The interview data were analyzed by the authors in accordance with the dimensions proposed by the theoretical framework. Multiple analyses of data collected were necessary to obtain the correct interviewees understanding. The process started with a full read of all interview transcriptions, followed by the appliance of content analysis on Atlas TI tools carrying out a transformation from individual quotations into blocks of similar content. Initial dimensions were those proposed by the multilevel conceptual framework followed by the identification of business models dimensions in the literature review. At this stage, different group segments interpretation was merged and new result set was generated. After this, it was enriched with the analysis of academic papers, media communication, and internet research results, ensuring data triangulation to confirm the

results. Finally, a result categorization review was necessary to guarantee that they really represented the grouped perceptions.

4. Results and Analysis

Based on the data obtained and aiming to better represent the business model under analysis, the original business model was presented through their components – those that appear as a result of the research done. In the sequence, a comparative analysis was undertaken with the new business model in place for the taxi cooperatives aiming to highlight the changes on previous components. An additional business model that emerged from the analysis was also analyzed from the interviewees' perspective. Special attention shall be given to the steps that allowed the transition from one model to another.

In the original and traditional taxi business model in place since 1976, the service is almost a commodity service, with no much service differentiation among the cooperatives or association. Table 2 presents the interviewees' perception and understanding in relation to business model. The business model components are those that emerged from the analysis. Last column shows some quotations extracted from the interviews, selected during the analysis.

Components	***Category***	***Quotations***
Customer Segment	✓ Corporate customers	✓ "Cooperative attended more corporate and did not attend much personal requests" (I29)
Value Proposition	✓ Customers have the cooperative as a reference; ✓ Traceability of cooperative records; ✓ Security;	✓ "I like the cooperative to know where I go to and when I came back" (I6) ✓ "In case you had any problem with the taxi driver, you have where to complaint"(I1) ✓ "If you forget something, you can call the cooperative and they will know which car you were and will find it for you" (I5)
Channels	✓ Telephone	✓ "The way customer used to contact the cooperatives was by telephone" (I3)
Customer Relationship	✓ Trust; ✓ Security; ✓ The customer contact with the cooperative attendance is well received; ✓ Loyalty between taxi driver and customer	✓ "The customer benefit is that they trust in the cooperative" (I5) ✓ "[…] with the cooperatives I feel myself more secure" (I12) ✓ "I prefer to wait to be attended and talk with the attendant" (I6) ✓ "I have customers that call every day and I have the priority to attend them" (I4)
Cost Structure	✓ All costs is considered as to the cooperative	✓ "There is a total cost […], it encompasses all the costs related to Anatel, building, employees, everything" (I30)

Table 2 – Original Business Model Components Analysis

Starting 2012 the taxi service online app proliferation came to directly change the business model in place and in an attempt of minimizing some complaint raised from the model. Two of

the most significant complaints include the customer difficulty to contact the cooperatives in rush hours and the inaccuracy estimated time to taxi got its destination, reaching sometimes, more than four times the original estimated time. The arrival of these apps, from cooperative point of view, was initially understood as modernity. It seems that they were being knocked down by the technology. This was ignored for around six months, but the apps started to give significant discounts to the customers and did not charge the taxi driver for the run. At this stage the movement of customers and even taxis to start using the apps were perceived by the cooperatives. Regulators began to be pressured by cooperatives and started to fine taxi drives that made use of these apps. Without legal support, regulators had to retreat and change their behavior. App's market share started to be significant and the cooperatives had to be more aggressive on their response to keep themselves profitable. Taxi drivers where highlighted about the benefits the cooperatives aggregated to them. Cooperatives apps were launched. This was enough to reestablish taxi drivers association that was canceled, but not to attend customers' complaint for reasonable time to be attended. It is expected to early 2015 the launch of a collaborative cooperative solution in a way that if the cooperative is not able to attend the customer in a reasonable time – the car shall be no more than 3 kilometers from the destination – the call will be shared with other cooperatives in other to keep the focus on better attending the customer.

The taxi drivers became aware of the apps mainly through the media and taxi colleges; notwithstanding some apps representatives personally went to talk with the taxi drivers. This meant extra money to them, and positive experience from taxi drivers started to disseminate among them. None reported resistance from their cooperatives for their use of apps. From the customer's perspective, the movement was still simpler. They became aware from the media and friends, and started trying the new application as an alternative to their complaints about current model quality services. As a result of this movement, values, propositions, relationship and other business model components had to be reassessed. The taxi cooperative presented itself with a different way to make business, with different ways to delivery different value propositions to customers. Table 3 shows the differences on the traditional and new business model in place.

Components	***Category changes***	***Quotations***
Customer Segment	Customer segment did not changed from the original, but was expanded to include: ✓ Personal customer; ✓ Younger people with access to the services.	✓ "We opened our app for personal customer but it is around 2 or 3% of our request total volume" (I33) ✓ "We have now younger people that make use of tables and smartphones" (I24)
Value Proposition	Additional value propositions were incorporated: ✓ More accurate estimated time for customers to wait for the taxi; ✓ Reduction in the time between the taxi call and arrival; ✓ Strengthening the cooperative as a reference for customers;	✓ "[…] with the app they can quickly inform me where the car is and the information is more accurate" (I6) ✓ "I believe it is generally faster" (I22) ✓ "[…] the cooperative service is much more agile with the apps" (I6) ✓ "I give cooperative preference because they have a physical place" (I12)

Channels	✓ Mobile apps ✓ Tablet apps	✓ "[…] with the modernity, they use tablet, smartphones" (I24)
Customer Relationship	The main change in this component is that habit of contacting a cooperative is now one of the reasons for the relationship maintenance.	✓ "Yes, it is mainly due to the habit"(I1) ✓ "[…] so much I use the taxi, they became my personal friends" (I2) ✓ "I still use the cooperative services because I already used before" (I21)
Key Activities	This is a new dimension in the model. And two activities deserves attention: ✓ Collaborative cooperative solution launch ✓ Calls are now distributed based on the distance until the destination	✓ "[…] the service amount increased a lot after we agreed to share the requests among five other cooperatives" (I5) ✓ "The idea is to faster attend the customer. In case we have high demand and cannot attend, the request is transferred to other cooperative sharing application" (I24)
Cost Structure	Cost reduction is based on app service requested	✓ "The use of these apps reduced the cooperative costs" (I5)

Table 3 – New Business Model Components Analysis

Still a result of all these movements, a new business model was introduced, leaded by the customer use of apps, to call for the service. This new business presents significant changes on most of the business model components and co-exists with the new version of traditional cooperatives. In table 4 components' characteristics are presented.

Components	***Category changes***	***Interviewee comments***
Customer Segment	✓ Main focus on personal customers ✓ Customers of all cooperatives without restriction This new customer profile has shorter distance average. The taxi must make more runs to get the same financial results.	✓ "[…] we started to attend more personal people after the online app" (I8) ✓ "[…] the use of app opened a new customer segment perspective" (I3) ✓ "[…] the use of taxi app enable us to attend customers from other regions and other cooperative services"(I3) ✓ "[…] currently the app's customer request shorter distance runs, what means inferior amounts from those calls if compared with cooperative calls"(I27)
Value Proposition	The apps show trustful information and localization of both customer and taxi driver ensuring security and reliability; ✓ Customer can monitor the taxi assigned to attend its request ✓ Decrease of lead time	✓ "[…] you know the car and the driver that will attend your request. You know where it is and how long will take to arrive" (I14) ✓ "[…] you have a clear view of how long will take until your taxi arrive" (I15) ✓ "I could see the taxi path" (I18) ✓ "I have more security as I receive more information about the taxi and taxi driver that will attend my request" (I7)

	for a taxi	
Channels	✓ Mobile apps ✓ Tablet apps	✓ "[…] with the technology innovation, they use tablet, smartphones" (I24)
Customer Relationship	✓ Current customer moved to mobile or table app ✓ Customer directly contact the taxi driver	✓ "With the app we have a prompt response" (I14) ✓ "[…] the customer has my phone number and if necessary contacts me directly" (I4) ✓ "Many customers I used to attend in the cooperative just moved to the app" (I4)
Revenue Streams	✓ With the lead time reduction between customer contact and taxi attendance, more runs can be done; ✓ Taxi downtime reduction; ✓ Intelligence improvement to distribute customer' requests	✓ "[…] mainly when returning. If it is long distance run, you somehow, manage to return with another customer" (I12) ✓ "The process of the attendance makes notes of the address and find an available car in the destination requested…it was too long. Now the automation helped a lot" (I3) ✓ "Now you must be in a maximum of 3 kilometers away from the destination to be scheduled to attend the request" (I23)
Key Activities	✓ More taxi availability ✓ Assurance that customer would be attended and customer request would not be canceled	✓ "Many times the customer believed the cooperative would take too long to attend its requested and called more than one"(I30) ✓ "Now it's easier and safer to get a car anywhere" (I7)
Key Partners	✓ ICT companies to ensure internet availability	
Cost Structure	✓ Taxi driver is charged per run ✓ Better taxi cost understanding ✓ Significant reduction on entry barrier	✓ "If you stay fifty days on vacation and do not work in this period, you have nothing to pay for" (I23) ✓ "you will pay for the service you used"(I23) ✓ "[…] to start working with apps you do not have to pay a fee, as you have to do with cooperatives" (I23)

Table 4 – Application Business Model Components Analysis

Information and Communication Technologies (ICT) have made significant contributions to business innovation. Business organization must attend the customer needs and ICT comes on this direction to support the business on this objective. Despite the definition of business model or even the methodology used, the study presented in this paper reveals how consolidated business model can be transformed by the use of Information and Communication Technologies (ICT). The use of apps can put company service available for other customer segments, improve value proposition, make possible the use of new delivery channel, stablish different relationships with the customers, emerge with key activities and reduce – or even simplify – cost structure.

5. Conclusions

The study aimed to verify how taxi service consolidated business model is being adapted to support a scenario of innovation created by the use of information and communication technology. It is visible that the taxi service online app proliferation transformed the way taxi cooperative and associations had been providing the service. Results shows that aggregated value to customers and cost structure review seem to be the main focus of the change. Customers visualized an opportunity to have their needs attended. Taxi drivers, not understanding the rationale of cooperative cost distribution, recognized in this movement the opportunity to understand what are they paying for. With mobile taxi app adoption by customers and taxi drivers, the traditional cooperative and association had to review stablished business model in place. ICT may be used to leverage the business if the business model structure can revised. This is particular relevant for business that makes use of little technology – with significant opportunities to improve – and for market segments of commodities deliveries. ICT may be the difference to keep or not the business running. The study may be improved with the inclusion of new cases of study and the use of different business model concepts generating new component dimensions of analysis may be other dimension of improvement.

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