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THE AUTOMOTIVE INDUSTRY IN TRANSITION? ANALYSIS OF THE POSITIONING OF THE NATIONAL SUBSIDIARIES OF THE AUTOMAKERS FACING THE CHALLENGES OF SUSTAINABLE URBAN MOBILITY IN BRAZIL

A INDÚSTRIA AUTOMOTIVA EM TRANSIÇÃO? ANÁLISE DO POSICIONAMENTO DAS SUBSIDIÁRIAS NACIONAIS DAS MONTADORAS FRENTE AOS DESAFIOS DA MOBILIDADE URBANA SUSTENTÁVEL NO BRASIL

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Abstract: Challenges related to mobility have generated a number of discussions among all sectors of society and have exerted a decisive influence on the decline in people's quality of life. At the heart of this discussion is the increasing difficulty in accessing the services and opportunities present in cities due to the barriers imposed by current urban mobility standards. Based on the understanding that the use of the current model of urban mobility is a very complex issue, since it is rooted in culture in some societies, the research uses a qualitative approach through a multi-cases study (AB Volvo; Daimler AG, Fiat Chrysler Automobiles, PSA Peugeot Citroën SA, Renault SA, Volkswagen Group AG) to assess how the national automotive industry is positioned from a transition process in which urban mobility has been facing, in which sustainability is also a requirements of society. The framework provided by the MultiLevel Perspective (MLP) approach provides a theory that conceptualizes global dynamic patterns in socio-technical transitions by combining concepts such as trajectories, schemes and niches, and institutional theory from the positioning of players in contexts that are formed from their own actions.

Keywords: Urban mobility. Carsharing. Electromobility.

Resumo: Desafios relacionados à mobilidade geraram uma série de discussões entre todos os setores da sociedade e exerceram uma influência decisiva no declínio da qualidade de vida das pessoas. No centro desta discussão está a crescente dificuldade em acessar os serviços e oportunidades presentes nas cidades devido às barreiras impostas pelos atuais padrões de mobilidade urbana. Com base no entendimento de que o uso do atual modelo de mobilidade urbana é uma questão muito complexa, uma vez que está enraizado na cultura em algumas sociedades, a pesquisa utiliza uma abordagem qualitativa por meio de um estudo de múltiplos casos (AB Volvo; Daimler AG, Fiat Chrysler Automobiles, PSA Peugeot Citroën SA, Renault SA, Grupo Volkswagen AG) para avaliar como a indústria automotiva nacional está posicionada a partir de um processo de transição em que a mobilidade urbana tem enfrentado, em que a sustentabilidade também é uma exigência da sociedade. A estrutura fornecida pela abordagem MultiLevel Perspective (MLP) fornece uma teoria que conceitua padrões dinâmicos globais em transições sociotécnicas, combinando conceitos como trajetórias, esquemas e nichos, e teoria institucional, a partir do posicionamento de atores em contextos que são formados a partir de suas próprias ações.

Palavras-chave: Mobilidade Urbana. Carsharing. Eletromobilidade.

1 INTRODUCTION

The automobile industry created the assembly line and automobiles as a product of mass consumption, being the most important industrial sector of the twentieth century. And it can be considered the archetype of the pattern of economic development that the world lived in that period. However, since the beginning of the 21st century, this industry has been considered by some as an environmental villain, from a perspective of an inefficient means of transport both in terms of the use of energetic matrices and socially, causing air pollution and congestion in large and medium-sized cities.

From the outset of its activities with the Ford Motor Company plant in 1903, the automotive industry has alternated several highs in sales with overwhelming crises over the business. However, none of them put the future of this industry in question as the current discussions.

In many situations, the technologies present returns at increasing rates as they are used: the greater the use, the greater the gains in scale. With this, certain technology is dominant, precisely because it has become efficient over time.

Through this process, often an environmentally superior technology can disappear or find no place in the market. In addition, technological interdependence means that the expansion of a new technology requires complementary changes in other parts of the system, which requires high investments. The interests of groups that benefit from the present technological system usually resist the introduction of technologies that are not compatible with the existing technological system (Unruh, 2000, 2002; Unruh & Carrillo-Hermosilla, 2006).

According to Dijk and Yarime (2010), two other types of technological lock-in still act to perpetuate a technological standard of internal combustion engine: the consumer itself and the current regulation. Overall, the vast majority of consumers is satisfied with the dominant pattern of the combustion engine and can be divided into two groups: those who are looking for a car with sufficient performance at an affordable price and those who prefer to pay for expensive motor vehicles more powerful.

But definitely this is not a matter of waiting and seeing where it will come. Players can interfere in this way. Investors, governments, research institutes and industry

professionals can then, in an integrated way, evaluate future scenarios and thus take positions in the face of transitions to new emerging business models.

Several authors (Geels & Schot, 2007; Markard, 2011; Markard, Raven, & Truffer, 2012) point out that a transition is a set of processes that lead to a fundamental change in socio-technical systems. This transition involves long-range changes across different dimensions: technological, material, organizational, institutional, political, economic and sociocultural. In addition, transitions involve a wide range of actors and usually unfold over considerable time. In the course of a transition new products, services, business models and organizations emerge, partly complementary, partly replacing existing ones, and consumer perceptions of what constitutes a given service or technology change substantially. Therefore, the article proposes to analyze the position of the national subsidiaries of the automakers facing the challenges and the transition to the sustainable urban mobility in Brazil.

The article is organized as follows. In section 2, the conceptual bases for the transitions and the multilevel perspective. Section 3 presents niches for the transition to sustainable urban mobility: electromobility, carsharing and intermodal transport. Section 4 presents the research methodology, and section 5 presents the results of the positioning of the national subsidiaries of the automakers. Finally, in section 6 conclusions are presented, pointing out some limitations and suggesting further research study.

2 TRANSITIONS AND THE MULTI LEVEL PERSPECTIVE

The MLP approach, in general terms, explains technological transitions through the interaction of the dynamics at three different levels: niches, regimes and landscape (Geels, 2002, 2004; 2005a; 2005b). The landscape can put pressure on existing schemes and open windows of opportunities for niches and contribute to fundamental changes in socio-technical regimes.

According to Markard, Raven and Truffer (2012), the interest in the MLP and the theoretical and empirical progress in this area are increasing. In addition, there is still much to learn from established theories and approaches in other scientific disciplines

including, for example, sociology, management studies, economic geography, and political science.

Geels (2002; 2004; 2005a; 2005b; 2010; 2011) by means of several published works is considered the main reference for the development of MLP. In general terms, the MLP distinguishes three levels of performance: niche, socio-technical regime and socio-technical landscape. Geels (2005b) explains that the basic ontology behind this perspective stems from three interrelated dimensions: socio-technical systems, that is, the tangible elements needed to fulfill social functions; the social groups that maintain and reproduce the elements and connections of socio-technical systems; rules (understood as regimes) that guide the activities of actors and social groups.

According to Geels (2002; 2004), the elements and connections of socio-technical systems do not exist automatically, but are created, reproduced and refined by social groups. The actors inserted in these social groups act in the context of social structures and formal, normative and cognitive rules. For the author, rules form a coordinating context that guides action. On the other hand, the rules are reinforced and changed by actions. Rules do not exist in isolation, but are linked together by means of routines called "regimes."

According to Geels (2005b), Nelson and Winter coined the term "technological regimes", which refer to the cognitive routines that are shared in a community of engineers in their Research and Development (R&D) activities. Through their coordinating effects, "regimes" create relative stability at the sectoral level and lead to incremental innovation along technical trajectories.

For Geels (2002, 2004), the concept of a technological regime can be extended to "socio-technical regimes" by including additional social groups as researchers from other areas, users, policy makers and specific social groups, as well as engineers. Although these social groups have relative autonomy in a process of technological transition, they interact and form networks with mutual dependencies. In this way, the activities of social groups are aligned with each other. And precisely this intergroup coordination is represented with the concept of socio-technical regimes.

The socio-technical regime is the meso level in MLP. By providing guidance and coordination for the activities of relevant social groups, socio-technical regimes are responsible for the stability of existing socio-technical systems.

According to Geels (2005b) there is a wide discussion in the literature about rules that contribute to the stability of existing socio-technical systems such as legally binding contracts, cognitive routines, essential skills and competences, lifestyles and user practices, favorable institutional arrangements and regulations, among others. Existing systems are even more strongly stabilized through social relations. In this way, it is understood that actors and organizations are embedded in interdependent networks, which represent a kind of "organizational capital" and create stability through mutual expectations of roles.

Organizational commitments and interests of existing organizations also contribute to the stability of the existing socio-technical system. In addition, actors who hold more power in this network may try to repress innovations through market control or political lobbying. Industries can also create special organizations to lobby in their favor, such as industry associations.

It is important to stress that the stability addressed in the MLP is not a synonym of inertia, but rather a representation of a dynamic stability, which means that innovation still occurs but is incremental in nature. Thus, as Geels (2005b) mentions, due to stabilization mechanisms, it is difficult to create radical innovations in socio-technical systems.

The micro level in the MLP is composed of niches, which represents an important locus of radical innovation. For Geels (2002, 2004, 2005b), since the performance of radical innovations is initially low, they cannot compete immediately in traditional regimes markets.

In this way, niches act as "hatcheries" for radical innovations, and may take the form of small niche markets, with specific selection criteria that are different from the existing regime. Or they may take the form of technological niches, where resources are provided by public subsidies or private strategic investments. These can be R&D projects, but also experimental projects, involving heterogeneous actors such as users, producers, public authorities, among others (Geels, 2002, 2004, 2005b).

Through the niches it is possible for a new technology to survive and develop in isolation, gradually building social networks and developing the coordination of activities by rules and perceptions. The social networks around new technologies are small and the rules are diffuse and unclear (Geels, 2005b).

Actors work in different directions, exploring different trajectories. In this sense, niches are important because they provide space for learning processes in various dimensions, such as technology, user preferences, regulations, infrastructure and symbolism (GEELS, 2005b).

The macro level in the MLP is formed by the socio-technical landscape, which refers to broader aspects of the exogenous environment that affect the development of a system. According to Geels (2002, 2004, 2005b), the "landscape" metaphor is used because of the literal connotation of "rigidity" and includes the material aspect of society such as the spatial arrangements of cities (roads, infrastructure electrical, among others).

In this way the landscape forms "gradients" for action, from which it is difficult to divert, since they are beyond the direct influence of the actors and cannot be changed at will.

The relationship between the three conceptual levels can be understood as an aligned hierarchy. For Geels (2005b), the key point of MLP is that transitions occur through the interaction between processes at different levels. Thus, according to Geels and Schot (2007), Geels (2002, 2004, 2005b) in the MLP several phases are distinguished in a dynamic process of transitions.

In the initial phase, radical innovations emerge in niches, often outside or outside the existing regime. The network formed among the actors at this stage is unstable and fragile. There are no stable rules (for example, a dominant design or project) and there may be several technical projects competing with each other. Actors improvise and get involved in experiments to design the best project and find out what the users want. The networks that carry and support innovation are small and precarious. Innovations do not yet pose a threat to the existing regime (Geels, 2002, 2004, 2005b; Geels & Schot, 2007).

In the second phase, innovation is used in small market niches, which provide resources for specialization and technical development. The new technology develops its own technical trajectory and rules begin to stabilize (for example, a dominant project).

Users accumulate experience with the new technology and are able to articulate their preferences. From this, there are associations of class, user clubs, among others, that even begin to lobby pro-technology. However, innovation at this stage does not yet pose any major threat to the existing regime, which is rooted in many aspects (institutional, organizational, economic and cultural) (Geels, 2002; 2004; 2005b; Geels & Schot, 2007).

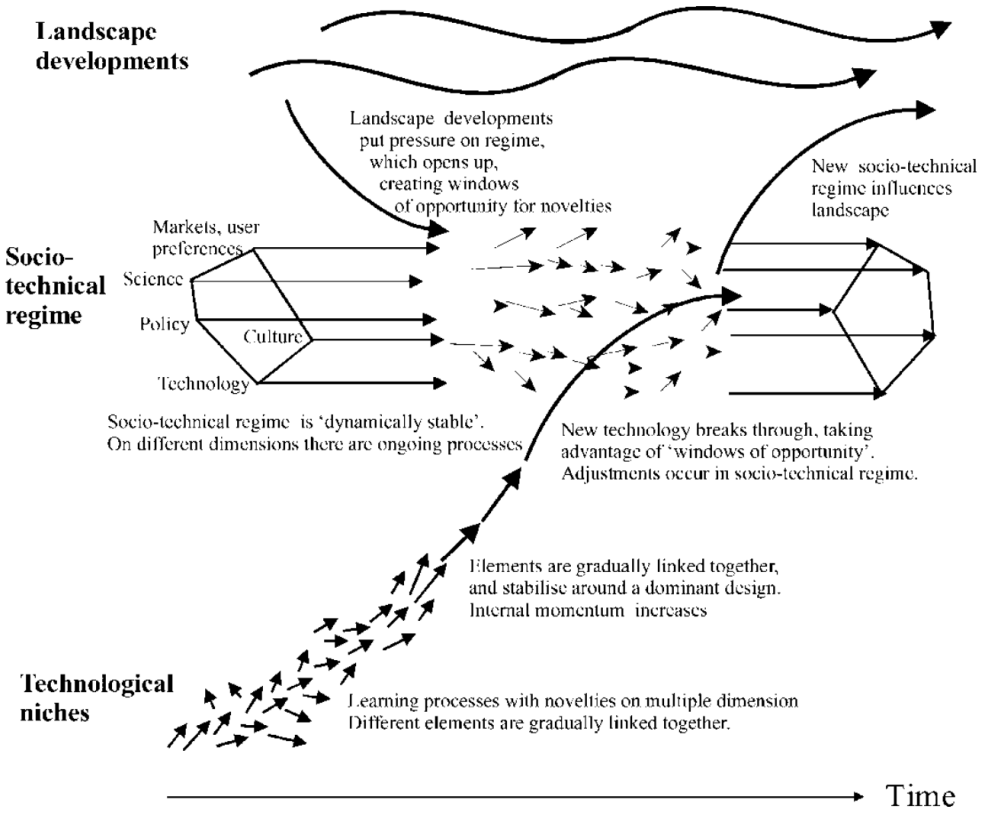
New technologies may even remain stuck in these niches for a long time (decades), especially when they face severe incompatibilities with the regime. In turn, while the regime remains stable, niche innovations have little chance of spreading more broadly. The third phase is characterized by the wide insertion of new technologies and competition with the established regime. This stage depends primarily on actions structured in the niche. Improvements in price/performance, support from powerful actors who invest in their financial, organizational or political capital to stimulate the development of new technology and help overcome the resistance of other social groups are important factors to be practiced (Geels, 2002; 2004, 2005b; Geels & Schot, 2007).

On the other hand, in addition to the niche's own ability to develop external circumstances at the regime and landscape levels are also crucial for this third phase, where windows of opportunity for the niches are opened. These windows arise when tensions occur between elements of the socio-technical regime, that is, when the activities of social groups become misaligned (Geels, 2002; 2004; 2005b; Geels & Schot, 2007).

An important reason for these tensions is that social, cultural or economic changes in the landscape can put pressure on the regime. Another factor that triggers these tensions is that the existing regime is put to the test by growing internal problems that cannot be solved by incremental improvements. Pressures in the regime can be even more intense by rigid regulatory measures and user preference changes (Geels, 2002, 2004, 2005b; Geels & Schot, 2007).

Figure 01 summarizes and presents the steps previously discussed regarding the dynamics of transitions in socio-technical systems from the MLP.

Figure 01 - Dynamics of transitions in socio-technical systems from MLP.



Source: from Geels (2002) and Geels and Schot (2007).

3 NICHES FOR THE TRANSITION TO SUSTAINABLE URBAN MOBILITY

Public interventions stimulate experimentation, and by putting guidelines, local governments create the market that allows first-generation vehicles to be tested. The experiments allow companies to capitalize on their testing and learning experiences, enabling them to test new economic models, improve the product and offer mobility services and contribute to their evolution (Vervaeke, 2012).

For Dijk and Montalvo (2012), each new vehicle or engine is seen as a project with revenues and costs. Each project/product needs to achieve some return on investment in order to be approved. While production investments in a new product technology or in a particular niche have no prospect of profitability, an automaker will evidently wait until the right time.

Aligned with the perspective of the niches, some authors (Harman, Veeneman, & Harman, 2012; Parkhurst et al., 2012; Dijk, Orsato, & Kemp, 2013) present an analysis of sustainable urban mobility initiatives in three different ways: electromobility: development and mobility, and the production of vehicles powered by electric motorization, hybrid electric vehicles (VEH) or pure electric vehicles (VEP); carsharing: car-sharing schemes in short-term car rental, usually charged per hour; intermodal transport: management systems of integration of different modes of transport in a single trip.

3.1 Carsharing

Carsharing is a flexible, on-demand vehicle rental program that allows you to rent for a certain period of time every day unless vehicles are already booked. Over the past decade, vehicle sharing has been gaining attention among transport planners and companies who see vehicle sharing as a means to realize their interests, that is a new market for revenue generation (Kim, 2015, Namazu et al., 2018).

Although some of the characteristics of vehicle sharing have changed over the years, it still operates in a membership-based model, which includes insurance coverage and usually implies an annual fee and tank filling, at the cost borne by the sharing company when the fuel is low. Unlike most vehicle rentals, the carsharers do not enter into a separate contract whenever they use a vehicle (Schwieterman & Bieszczat, 2017).

The key elements that fueled the growing popularity of carsharing include the savings in relation to vehicle ownership and perceived environmental benefits. As vehicle operating costs (fuel and parking) and maintenance (insurance and regular vehicle check-up) have increased, sharing has become an effective way to reduce existing and potential owner spending, while maintaining the benefits of the mobility option (Kent & Dowling, 2013, Kim, 2015).

According to Schwieterman and Bieszczat (2017), the presence of automakers in vehicle sharing apparently stimulated competition and innovative pricing strategies, such as differentiated rates for time spent driving versus time parked. In the authors' perspective, car companies are interested in sharing the vehicle as an incremental measure to prepare for possible changes that could occur with the widespread deployment of autonomous vehicles, for example.

It is also important to highlight the presence of hybrid electric vehicles and more recently electric vehicles composing fleets of carsharing. Shaheen & Cohen (2013) predicted the expansion and integration of alternative technologies for the composition of these fleets. According to the authors, the literature suggests that policies that focus on these niches have been shown to be more efficient. However, according to Clewlow (2016), although there are policies that link vehicle sharing to hybrid or electric technologies, there is relatively little research investigating the use of such vehicles and the extent to which their exposure through sharing leads to greater adoption.

3.2 Electromobility

Due to the increased interest in electric vehicles, several surveys have been developed to evaluate the feasibility of an electric vehicle compared to an internal combustion. To compare, surveys vary in terms of technological development to the business model (Wells, 2013, Fontaínhas, Cunha, Ferreira, 2016; Rudolph, 2016).

Wu et al. (2015) in their work depart from the assumption that the electric vehicle is perceived as more expensive than the internal combustion vehicles because of its higher initial cost from a total cost of ownership perspective (which includes the initial investment and the operational cost of using the vehicle during the useful life). For the

authors, from this context, it is important to note that cost efficiency in relation to internal combustion vehicles will increase in the future, however, in the short term, internal combustion remains the best option for consumers.

On the other hand, many governments see the use of electric vehicles as an important way to meet their environmental goals. The absence of greenhouse gas emissions can contribute to lower local air pollution and, with a greater share of renewable energy sources in the production of electricity, electric vehicles can also contribute to reducing global transport emissions (Jensen & Mabit, 2017).

However, the environmental impact of large-scale adoption of electric vehicles is still not as clear as, according to Jensen and Mabit (2017) it cannot be assumed that internal combustion vehicles will simply be replaced by electric vehicles and that behavior consumption of drivers would remain the same.

Currently, to get the benefits of the electric vehicle, the consumer must accept a limited driving distance between shifts and the loading time, depending on the available facilities where the vehicle is parked, it may take several hours to reach full capacity.

However, it is important to emphasize that the attention called by Christensen, Wells and Cipcigan (2012) is still valid: the authors argue that innovative business models involving the electric vehicle, in the case of their research, the implantation of electric vehicles and the use of renewable energy systems, while mutually supportive and contributing to broader policy goals for reducing carbon emissions, may still fail in the face of entrenched practices. For the authors, at the theoretical level, innovative business models need a broader perspective beyond the typical value creation, understanding the structural impediments to technological and organizational innovations.

3.3 Intermodal Transport

In relation to intermodal transport, it is understood as the articulation between various modes of transport, in order to make the operations of displacement of an individual faster and more efficient. It is important to emphasize that there is no single market for intermodal transport but a configuration of different markets with different requirements and profiles of quality criteria.

According to Flodén and Williamsson (2016) it can be argued that intermodal transport constitutes a type of service innovation. In this sense, introducing innovations is fundamental for the development and competitiveness for the companies that work in the area.

On the other hand, intermodal transport is promoted through policies that are addressed at all levels of society. Thus, the role of intermodal transport policies is to ensure the environment for a smooth functioning of the market, to maintain a complete multimodal transport network and to promote its optimized use to minimize environmental externalities (Flodén & Williamsson, 2016).

Intermodal integration, unlike conventional transport, involves the integration of different modes and actors. It also involves, in addition to the physical interrelationship between modalities, the integration of responsibilities, knowledge, schedules, freight collection and other expenses.

In addition, in this context there are also other large players, such as Deutsche Bahn, for example, and there are also other actors involved in intermodal integration. The fact remains that the initiatives of the automotive industry have still been shy in relation to intermodal integration.

In this way, from a perspective of the development of intermodal integration, it is pertinent to reflect on the role that those involved can play. Who is in control of actions? Are companies such as Deustch Bahn, which operate in different manners, prepared to incorporate the use of the car and the bus in their operational activities? Are the automakers willing to act as a supplier partner in this chain?

These are also unanswered questions for the literature on urban mobility. The use of information technology is a fundamental factor for the development of a service that integrates modalities and this fact puts even more pressure on automakers in terms of intermodal integration.

4 RESEARCH METHOD

Yin (2001) defines the case study as an empirical investigation that investigates a contemporary phenomenon within its real-life context, especially when the boundaries

between phenomenon and context are not clearly defined or when facing a unique situation in which there will be many more variables of interest than data points.

It was methodologically opted for Brazil versus the countries of the automakers' matrices even with the inherent limitations, given the overly open relationship for this discussion. The cases selected are Daimler AG, PSA Peugeot Citroën S.A., Volkswagen Group AG, FIAT Chrysler Automobiles and Renault S.A. The criteria established for the choice of cases analyzed were: the relevance and the number of actions in progress or already carried out in terms of sustainable urban mobility, access to results obtained through consultations with various means of dissemination (interviews, corporate reports and information in institutional sites), in addition to investments announced in expansion of the productive park in Brazil.

The Sustainability Reports of all automakers were analyzed for three years: 2014 to 2016. In addition, the Brazilian subsidiaries of the automakers studied were interviewed. Frame 01 presents the list of interviewees for the automakers surveyed.

Frame 01 - List of interviewees in the automakers surveyed

Automaker	Function carried out by the interviewee
Daimler/Mercedes	Manager of Business Innovation Brazil. Interview accompanied by the Press Office of Mercedes Benz do Brasil
Volkswagen Automobiles	Corporate Strategy Manager
Peugeot	Director of the Cidade em Movimento Institute (City in Motion Institute, founded and financed by Peugeot). General Manager of Research and Advanced Engineering
FIAT	Specialist in Future Insights, linked to the Product Planning and Strategy Board Experimental Engineering Manager
Renault	Executive Director of the Renault Institute and Manager of Social Responsibility and Sustainable Urban Mobility

Source: own elaboration

In addition, some documentary studies were carried out through registries carried out by different bodies such as the National Automobile Manufacturers Association (ANFAVEA), the Brazilian Association of Automotive Engineering (AEA) and the National Union of the Component Industry for Automotive Vehicles (SINDIPEÇAS), as well as

academic productions and articles in professional journals and online material on specialized media in the automotive industry.

To help answer the questions raised by this article, the authors interviewed actors involved in some way in electromobility, carsharing and/or intermodal transport technologies such as industry policymakers, automakers, and first-tier suppliers in the automotive industry. The criteria used for the selection were mainly access to these actors and their involvement in efforts to design and use the benefits of the sustainable urban mobility.

5 CASES STUDIED

5.1 *Carsharing*

Daimler's Car2go is a reference

Daimler's car2go initiative is the most consolidated among all of the automakers surveyed. The company of the group Daimler loses in number of partners only for the American ZipCar, according to the own automaker.

The company's bid is to reach 10,000 Smart model units in 50 cities in North America and especially in Europe from the expectation of the potential European growth of the current 700,000 users to 15 million in 2020, according to the automaker.

Daimler understands that car2go is an additional business model and does not affect Daimler's core business, but understands that it is an important business opportunity for Daimler.

According to the positioning of the automaker, the business is embedded in the Daimler value chain, from production and automotive financing to consumer services and after sales, as well as being an opportunity to show the Smart brand to potential customers.

The understanding of the automaker in relation to the strategy that carsharing either enters as a new business model or inserts itself as a means of disclosure for new sales of a particular brand of company is relevant in the long run.

By the time the automaker seems to experience the market yet without a definite bet for which way to go. Additional businesses such as mytaxi are also being tested by the company.

Peugeot also seems to bet on the carsharing market with the Mu by Peugeot programs and the corporate share your fleet also with the goal of consolidating the business for the year 2020. Mu by Peugeot brings the integration of the car with the rental of bicycles or scooters.

It is interesting to note that the Mu by Peugeot program had a greater impact in Germany than in France. Regardless of the Paris market being dominated by another group competing with Peugeot, the expansion of the business, which could have taken place in other French cities, occurred more intensively in German cities.

On the other hand, the other German operator, Volkswagen seems to be losing the race in relation to carsharing. With a program with a smaller number of users compared to Daimler and Peugeot, Quicar Program still seeks to enter the market through cooperation agreements with private entities.

FIAT's Enjoy program also seems to be pursuing market consolidation, although it has a larger number of subscribers than Volkswagen, for example, this is not synonymous with active users. Another experimental program of the company, FIAT Likes U, has been used in several Italian universities, but also is configured as an experimental activity. Renault begins to structure its carsharing program with pilot projects in both France and Italy.

In this sense, it can be seen that in Europe, carsharing, although still in the process of structuring and diffusing the concept, has become a reality. Countries such as Germany and France are in a more advanced stage in the big cities, however, the somewhat optimistic expectation of the automakers in relation to the great expansion of use is for 2020.

If this expectation is confirmed, Daimler will take the lead in consolidating car2go so far. However, in 2011, Deutsche Bahn rehearsed an agreement, which did not take effect, with Peugeot for carsharing services. Such a partnership could change the entire configuration of an automaker's leadership for this business model.

Thus, it is understood that it is still an open market and there is no single business model and that these vary according to the needs and territorial and technical disposition of the region in which the company (assembler or other operator) intends to act.

Automakers act in a variety of ways, creating specialized versions of their own cars and producing specific services based on market needs. The challenges, however, are still large, especially with legislation that varies from region to region.

The fact that the automakers feel difficulties in dealing with the guarantees and with the respective insurance for the users, since the use of the service is very variable according to the type of customer, collaborates to increase the difficulties and challenges of insertion in this business.

Carsharing has not yet attracted interest from subsidiaries in Brazil

If on the one hand the business model starts its first steps in Brazil, in Europe it is already a reality. In Europe, car sharing systems are strongly associated with electromobility, but also in many cases in the traditional mode of combustion engines.

Almost all the automakers surveyed have their carsharing program through electric cars (Daimler and car2go, Peugeot and Mu by Peugeot, Volkswagen and Quicar, FIAT and Enjoy), but only Daimler achieved a consolidation of concept like that of Autolib' in Paris.

Brazil seems to be inspired by the European initiatives, but it is at an embryonic stage in relation to the diffusion of the concept and formulation of legal and economic bases for this business model.

Those who have led this process are the prefectures of large Brazilian cities, such as Curitiba, Rio de Janeiro, Fortaleza and Recife. It is interesting to note that these initiatives at the municipal level are being developed by other Secretariats (Special Projects, Public-Private Partnerships) and not by the Transport Secretariat, which would be expected in terms of mobility.

It is also important to stress that the automakers do not seem to have an interest in coordinating the consortia formed, a fact corroborated by the only notice consolidated so far in Fortaleza, which received a single proposal from a national company linked to mobility, Serttel Ltda.

The low adhesion to open calls until the moment of data collection in the research, as in Curitiba and Rio de Janeiro, also reinforces this perception.

5.2 Electromobility

Worldwide they all have projects, but the market did not react as expected

In electromobility, in relation to the automakers surveyed, Daimler seems to develop more projects outside Brazil, especially in Germany. Renault has been looking for some initiatives abroad, although it has lost the point of its partnership with Bolloré in the project Autolib '. FIAT, Peugeot and Volkswagen have invested in the development of products for electromobility, but are initiatives with less impact in the market.

Based on interviews and data collected, it is understood that an important element for the development of electromobility in the country, coupled with the use combined with carsharing, are the public policies that stimulate the use of technology.

In Europe, the increasing adoption of electromobility is a result of the strength of legislation and regulation of the government public sector, based on good environmental practices.

For the Brazilian reality, it is perceived that the immediate and massive adoption of this technology is still distant, due to several factors, especially due to technological, productive and market limitations. However, it is important that the domestic automotive industry also invest in order to ensure future competitiveness in this technology.

However, in this sense, neither the automakers' own strategies nor the technology incentive policies seem to converge favorably in Brazil. Chinese automakers have invested heavily in research for electromobility and its application in public transport. It even started its activities in Brazil with the inauguration of a BYD factory. Thus, for the Brazilian subsidiaries of traditional automakers, it is important to plan and exercise new business models and partnerships, and evaluate innovative options in development or means of consolidating electric motors.

Brazil is still off the electromobility route for automobiles

Comparatively, electromobility is more present in Europe and has been structured to become a reality. In Brazil, the combustion engine still dominates and initiatives aimed at electromobility are still derisory and there is little interest in investing outside combustion, even though all the subsidiaries surveyed present at least one electric car model in the respective matrices.

The initiatives evidenced in Brazil were in the form of pilot programs and developed in a timely manner, much more associated with perseverance and individual efforts to formally structure a program aiming at long-term goals.

These initiatives in Brazil are associated with public initiatives, such as the EcoElétrico pilot of the city of Curitiba in partnership with the consortium Itaipu Binacional, or in relation to tax exemptions for the electric car, as was the case of the city of São Paulo.

Renault seems to have only the name associated with the project with the consortium Itaipu Binacional to a partnership and technological interest of fact. In the same way, the others have practically no history with electromobility in Brazil and also have not sought partnerships.

Small businesses and startups are building on this technology and, despite Gurgel's failure in the past, the current context of electromobility is different and potentially promising. On the other hand, the Brazilian Electric Vehicle Association (ABVE), founded in 2006, has made a growing exposition of its ideas and advocates the immediate adoption of this technology in the country.

According to ABVE, calling a hybrid electric as vehicle hybrid shows more a marketing approach to technique, since purely electric traction is only symbolic in this technology, considering that the old combustion engine remains present, guaranteeing performance and autonomy.

However, it is important to emphasize that these actions, at least, play an important role in spreading the concept in the country, that is, the population, suppliers and political sphere start to be environmentally friendly and develop technologies that can enable the development of technology in the country. In addition, it is not only the development of the product technology that deserves attention, the infrastructure is an important element in this discussion and, in Brazil, it is still all imported.

5.3 Intermodal transport

Technology exists, but there is no coordination between the actors

Regarding integration with other modes, Daimler is ahead because it has invested more in communication applications such as the moovel, although it has competition from Citroën Multicity.

However, these investments in applications aimed at intermodal integration do not constitute an effective action of these automakers in relation to the coordination of the chain and the actors involved in intermodal integration.

Even in the development of these applications, automakers are no exception to the widespread use of programs provided by Google and other companies in the information technology industry.

The list of apps that propose to integrate some or several modes is extensive and varies in its most different levels of detail and comprehensiveness. However, it is important to emphasize that the modal integration is not only for information management, in which applications are decisive elements in this process, but it is a process that goes far beyond this aspect.

Intermodal integration, in fact, involves strategies among actors to achieve the goals of improving logistics and transportation activities. It was not possible to show this positioning of the automakers in the matrixes operating in Europe as well as in the subsidiaries operating in Brazil and even less in the sense of promoting the coordination of actions between the different modalities.

The infrastructure offered by the public and private sectors also condition the use of modalities, facilitating their integration or not, as well as legislation and investments to access and flow people and products.

With the growing discussion on sustainable urban mobility, a number of actors are moving. Intermodal integration is a great opportunity to expand in terms of business model without investments in the development of new technologies.

The companies surveyed, in turn, did not present any initiative in this regard, even though it holds technology and product of the main means of transport in the world. In

Europe, they have focused more on the technological development of the automobile and products associated with the vehicle's communication technologies.

With this, it is possible to identify products such as moovel and mytaxi (Daimler), Multicity (Peugeot) and FIAT Likes U (FIAT) that much more resemble an information manager to an effective coordination of the links during a trip that requires different means of transport and integration at the operational level and in the management of the resources involved.

However, it is possible to identify other players with potential for infrastructure and consolidation in their business that can take on this leadership role.

In addition to Bolloré itself, Deustch Bahn in Germany has expanded and intensified the coordination of projects involving the integration of modalities without the presence of the automakers as partners in these initiatives.

8 CONCLUSIONS

Understanding strategic differences between headquarters and subsidiaries is a theme that has long been studied by the academy and is still relevant due to the economic importance of the sector and the importance of developing local technologies and capacities to consolidate the technological infrastructure in the country.

Traditionally oriented to the tropicalization of products, the issue of urban mobility still does not raise the interest of the policies of the subsidiaries researched in Brazil. In the last two decades the automotive industry installed in Brazil has consolidated itself as a consistent regional production platform and consumer vehicle market. The sector also benefited from economic growth during this period and with the improvement of the economy there were large investments in the sector by the parent companies.

On the one hand, Brazilian subsidiaries increased production capacity and continued to incorporate new technologies into their products. On the other hand, there was an increase in imports, which helped to consolidate new brands, which, in turn, created conditions for these new entrants to settle in Brazil.

However, in the development of initiatives related to sustainable urban mobility, the country has not been able to keep pace with the dynamics of the countries of the

northern hemisphere. The defensive positioning of the subsidiaries of the researched automakers in Brazil was evidenced by the incipient amount of projects aimed at sustainable urban mobility.

If the analysis expands to the political, economic and socio-cultural dimensions there are significant differences between the countries involved. Germany and France appear to be better placed in the context of sustainable urban mobility. Italy seems to have woken up to the subject later.

It is also perceived that, while a path to sustainable urban mobility is not explicit, the efforts of global automakers have focused on the development and enhancement of product technologies at the expense of the rational use of the automobile.

Although it was possible to demonstrate the consensus of the national subsidiaries that the solution for sustainable urban mobility in cities is not only the automakers, but a systemic solution, it is clear that there is a gap to be discovered and filled by the Brazilian auto industry itself and other sectors related to transport and throughout society for the coming decades.

In Brazil, this gap appears to be even greater and not only in terms of product development, but it will also require efforts and creativity in the innovations for the Brazilian subsidiaries of large automakers around the rational use, more efficient and integrated and more sustainable for all.

Carsharing is a niche for automakers and a possible integration of cars with public transport (acting directly with buses) does not seem to be a relevant issue at the moment. The largest evidence has focused on incremental innovations in combustion engine technologies, although electromobility is gaining ground and competing with the product in question is the bus.

In Brazil, on the other hand, being the main difference in the role of subsidiary, the defensive role played by these automakers is strongly associated with the focus on the stable market, that is, the sale of products containing internal combustion engine technology.

Several proposals, solutions and models have arisen in this debate and the great question for the present research is that all these measures promote an opportunity window in the dynamic stability of the current regime, with great impacts for the automotive

industry. In Brazil these debates are manifested more by the saturation of public roads to an environmental awareness on the part of government and society or by the perspective of the automakers in expanding business models and markets.

Thus, in the short term, it is perceived that the automotive industry did little for urban mobility in Brazil, based on isolated initiatives that replicate certain actions at the European level of the headquarters. However, the perspective of growth of the niches addressed in research has generated the concern on the part of the Brazilian subsidiaries and, especially when the product is the bus, it is perceived a greater intensity in the search for solutions.

The issues related to intermodal integration, with the integration of routes and fares in public transport and cargo transfer centers, related to the aspects of passenger transport, involve and interact directly with the implementation of the structural or main road network of the exclusive routes for cyclists and pedestrians. Connectivity can play a key role in the future of urban mobility by facilitating the sharing economy, not just carsharing, but integration with bicycles, BRTs or the metro-rail network, providing different options for commuting in cities.

The MLP approach (GEELS, 2002; 2005a; 2005b) is useful, despite the limitations, to explain the technological transitions to sustainable urban mobility through the dynamic interaction of niches, regimes and landscape. The landscape can put pressure on existing schemes and open windows of opportunities for niches and contribute to fundamental changes in socio-technical regimes.

In this context, the MLP shows an analytical framework for the understanding of a dynamic process of transitions, through which new business models and products can be debated incrementally or radically. With this it is possible to go beyond the focus on technological changes or the particular characteristics of the automotive industry only. The possibility of including the geographical context expands the discussion to the differences between the opportunities for niches and how each context influences the dominant regime.

Some pressures from the landscape are more evident, such as the Euro I to VI regulatory norms in Europe or the Proconve in less rigidity in Brazil, the oscillation of the

oil price, the explosion of the use of the information technologies and/or the change of behavior consumers.

Finally, when focusing the automakers, the article brings another look at the MLP: that of the actors involved in the transition process. Research involving MLP has focused on political and macroeconomic analyzes, relegating a minor role to the actors in the process.

The research shows that the actors involved, the automakers, have different strategies and try to influence at all times the policies of energy matrices and incentives for certain technologies. Particularly, this is a relevant point since the ability and political and economic power of the automakers to implement innovative strategies and influence the institutions and markets is relevant in the discussion.

The coexistence of different regimes in the same industry is also a point to be developed in the MLP framework and that the research brings contributions. It is important that the automotive industry consider the possibility that there will not be a single dominant project and that in different countries or regions different local projects may survive or even thrive.

The Brazilian case, one of the countries with the greatest diversity of energy matrices, presents a greater availability of different propulsion technologies, a fact that further increases the uncertainties for the automotive industry. Until a dominant system is set up it is possible that different regimes can coexist. Hybrid technology involving ethanol and electromobility, which manifests itself in public transport, configures a unique case for the national reality, for example.

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