The Integration of Emerging Market Subsidiaries in the Global Product Development:
A Case Study of Carmakers in Brazil

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グローバル製品開発における新興市場子会社の統合
—ブラジルにおける自動車企業を事例として—

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Abstract
This study aims to identify the reasons why transnational companies integrate their subsidiaries in their global product development (GPD) activities. Some hypotheses were derived reviewing many experts' researches in the field of GDP which was basis for the literature review. Those literatures about the explanation on the adoption of a decentralized GDP process, which means, a process that involves not only the headquarters but also the subsidiaries, affirms that, in general, decentralization occurs aiming to achieve a greater proximity with local markets and/or to search for local technologies and knowledge which are not available in the headquarters (or the development center) considering the global strategy of current automobile industry. The analysis was conducted based on case studies in automobile assemblers and auto-parts manufacturers that have headquarter in Triad market and facilities in Brazil. A questionnaire was developed based on the literature review and on the three hypotheses that would be the factors that lead to the decentralization of GDP (Corporate Internal Factor, Subsidiary Internal Factor and External Factor to the Company). The interviews were conducted in the two distinct groups of carmakers in the Brazilian Automobile Industry, first and new comers, in order to identify the reasons why these two distinct groups have adopted different product development strategy (centralized and decentralized strategy).

Keywords: Global Product Development, Global Strategy, Automobile Industry

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I. Motivation for the Research

In the last decades, the car industry was shaken up by the idea of a “global industry” producing a “global car”, that is, a vehicle that could be conceived once to be simultaneously produced and sold no matter where. Indeed, in the beginning of the 1980’s, Theodore Levitt (1983) claimed that firms could manufacture and sell standardized products world-wide in order to guarantee more efficiency and competitiveness; according to Levitt, this could be made possible due to a trend towards a homogenization of markets, which would overcome national and cultural differences, different tastes or different standards. Thus, the main rationale was that a “global product” — a “global car” in the case of the automobile industry — could lead to economies of scale in production and product development. From the point of view of the car assembler’s units in emerging markets, the arrival of the “global car” paradigm largely meant a shrinkage of their engineering structure, as concentration of product development activities in one “global R&D center” — almost always located near the firm’s headquarters — was the “one best way”. This was the case to many Brazilian car assemblers’ subsidiaries, as shown, for instance, in Quadros and Queiroz (2000). The centralization of global product development represented a major concern to emerging markets, since the existence of local engineering team in the subsidiaries, with the responsibility of developing products aiming the local market, may increase the local industry’s engineering competences through spillover effects. Downsizing of local engineering has impacts on the local units’ long-term survival as well — it is easier to shut down a simply productive facility than a development center, which may own some competences that are important to the company as a whole.

At present, we may notice that the “global car” concept has changed, and, although the word “global” is still used, it is now a fact in almost all major car assemblers that a real “global” car is impossible to exist; though the diffusion of information technology and the liberalization of markets have contributed to some changes in tastes and preferences, national and cultural differences persist and are not likely to disappear so easily (Carneiro-Dias and Salerno, 2003). Nevertheless, product development structure had already changed, global R&D centers had already been built, and the roles played by emerging markets in this structure are not the same as they were ten years ago. One question arises under this panorama: What are the factors to lead for a decentralization of development work from the headquarters to the subsidiaries?

II. Hypothesis for the Research

The decision about whether to integrate or not emerging market engineering in the GPD activities follows a rationale related to the competitive strategy of the company to the different markets in which it competes; in the segments where products
demand much adaptation in order to fit local market requirements, decentralizing product development may signify lower costs and development time. Integration also depends on the attributes presented by the subsidiaries, as long as these attributes are considered as relevant ones to the company’s competitive strategy: the subsidiary’s engineering competence, the market knowledge, the importance and sales volume are the main attributes to be observed in this research. The decentralization of engineering activities also depends on the relationship between the headquarters and the subsidiaries, which allows the attributes to be recognized, and on the actions of external agents (as host and home governments, free trade agreements, universities and research centers), that may promote decentralization of GPD activities if they are perceived as contributing to the company’s competitive strategy.

Finally, the way labor is internationally divided in the GPD activities are related to the phases of the product development process and to the adoption of some product policies such as the usage of platforms and derivatives and the modular design¹ (Ibusuki and Kobayashi, 2008).

Some hypotheses were listed below that would be the factors that lead to the decentralization of GPD or by means the integration of subsidiaries capabilities in the GPD:

Corporate internal factors:
- Company profit strategy regarding its product portfolio (e.g. cost or differentiation);
- Company product strategy in terms of its base structure (e.g. local or global strategy, platform strategy, module development);
- Global market strategy in terms of its prioritization to enter new markets or keep competition level in the current markets.

Subsidiary internal factors:
- Product strategy in terms of its headquarter follow strategy (e.g. local or global platform, derivative or adaptation, partial module development);
- Subsidiary performance, not only financial (cost competitiveness) but also technical competencies as well rapid adaptation to corporate strategy;
- Availability of strong competition as well as partner (suppliers);
- Relationship between headquarter, since good relation attract more investment especially in terms of global division of labor (resource allocation between the busi-

¹ Platforms are the basic vehicle structure such as chassis, body-in-white and power-train which requires huge development effort, so standardization leads to development cost reduction. Derivatives are adaptations done on peripheral parts of the platform in order to attend local unique requirements. Modular design concept facilitates the adaptation of platform concept to local derivatives due to its development concept based on modular interchangeable components. For details see chapter III. Literature Review - Product Strategy (Platform, Derivatives, Adaptation, Modularization).
ness units).

External factors to the company:

• Strategic importance of the host country to the company (e.g. future sales volume, labor costs, investments, free trade agreements);
• Country host government subsidies to instill subsidiaries growth;
• Host country population skills and access to research centers/universities.

III. Literature review

The literature review was organized based on the hypotheses listed before in order to create specific know-how to further elaborate the questionnaire and validate it through the case studies.

For the first hypothesis (Corporate internal factor), the theory about company strategy was investigated considering Boyer and Freyssenet (2002) profit strategy theory. For the second hypothesis (Subsidiary internal factor), the product strategy theory was revised based on Consoni and Quadros (2006) and Muffatto (1999) investigation, trying to link the platform strategy and its variants like derivative or module development which support the decentralization of product development to the subsidiary. For the third hypothesis (External factor to the company), the market strategy theory was investigated considering the different trade barriers among the regions and its liberalization to commercial trade with other countries/region based on three types of emerging market structure proposed by Freyssenet and Lung (2000). Finally, to approach these three global strategies, a Global Product Development Organization is proposed considering the revised peer literature of Chiesa (2000), Clark and Fujimoto (1991).

Company Strategy (Profit Strategy)

Boyer and Freyssenet (2002), whose analyze is based on firms from the automotive sector, show six possible sources of profit linked to the production of goods and services: economies of scale (that reduce unit costs), diversity of products, quality of products (which allows higher prices), innovation (that assures, at least for some time, a first-mover advantage), productive flexibility (which allows to adjust costs according to the variations in demand) and permanent reduction of costs, aiming to maintain profit margins. These six sources of profit may be combined, in order to be exploitable, generating six possible "profit strategies". The "profit strategies" are: di-

2 Profit Strategies can be linked to Productive Models of Automotive Industry as follow: diversity and flexibility (Taylor model, order made production currently more applicable to some truck makers); quality (model not yet available but applicable to companies like Mercedes-Benz, BMW, Volvo); volume (Ford model); volume and diversity (Sloan model - GM); innovation and flexibility (Honda model) and permanent reduction of costs (Toyota model).
versity and flexibility (production and offer of different models aiming to respond to
distinct market needs, and an internal capacity of adjusting costs according to the de-
mand); quality (production and offer of luxury models, distributed world-wide); vol-
ume (production and offer of high volumes of a standardized product, achieving
economies of scale); volume and diversity (combination of economies of scale on not
visible parts and economies of scope on visible parts of the product); innovation and
flexibility (profits coming from innovative models, and an ability of changing produc-
tion rapidly if the product is not successful) and permanent reduction of costs
(through a permanent concern on reducing costs at constant volumes, exploiting other
sources of profits only if they do not increase costs, avoiding to take risks).

Given these considerations, we may think that different product development
structures will have positive or negative impacts on the main strategy of the firm, de-
pending on which is this strategy. Considering the six profit strategies proposed by
Boyer and Freyssenet (2002), a centralized product development structure may have a
positive impact on the “quality” profit strategy and on the “volume” profit strategy —
as it reduces development costs and time; on the other hand, the same structure may
have a negative impact on the “diversity and flexibility” and on the “volume and
diversity” profit strategies — as it increases development time. This is so because in
the “quality” as well as in the “volume” strategy, products are conceived to be real
“global”, that is, to be commercialized in the different markets without major adapta-
tions; in those cases, “real global”, standardized products may exist, and their develop-
ment may be done in a unique center.

In the other two profit strategies mentioned above, profits are generated through
diversity, which means production and commercialization of different products — or,
at least, adapted products. Then there may be a development center, responsible for
the basic development; but the capacity of development center is limited, and, if modifi-
cations and adaptations on the “basic” product are centrally made, an excess of tasks
may occur, generating queues — and rising development costs and time. A decentral-
ized development structure offers more liberty in allocating tasks, even if it raises
costs due to doubled investments; it is a more flexible structure.

In the “innovation and flexibility” profit strategy — where innovation and prod-
uct development activities play an important role —, products should answer to new
demands from consumers. Hence, it is fundamental to know exactly what are these
new demands and how these demands evolve — a direct contact with the consumers
is then preferred.

Considering the “permanent reduction of costs” profit strategy, where innovation
is avoided, product differentiation is restricted to the market needs; decentralization
due to market needs is not an imperative. Scanning units may collect information
about local consumers and transfer them to central product development structure — unless local markets are extremely important and considerably different from the headquarters’ one.

Therefore, decentralization of product development activities due to market proximity and technological sourcing is important to some of the strategies, but not to all of them; in other words, decentralization driven by one or both of these two conditions will be adopted only if it contributes to the firm’s profit strategy. Obviously, in all these cases local markets are important to increase company’s returns, otherwise firms would not operate in these markets — but decentralization is likely to occur only in some of the six cases, due to the difference in the product policies of each profit strategy.

**Product Strategy (Platform, Derivatives, Adaptation, Modularization)**

In the automobile industry, a global product is normally based on a global platform that requires huge effort of development (basic parts of the vehicle such as chassis, body-in-white and power-train). Based on this platform, its derivatives are developed with less development effort to derive special application variants for each market (e.g. low cost model or special variants like pickup/sedan/sport-wagon/SUV). In some markets such as Brazil, even with some basic adaptation normally done by the headquarters, the subsidiaries development is required for local requirement adaptation such as parts material, road condition (suspension), fuel quality or specification (gasoline with ethanol mixture, flex-fuel). These modifications are known as tropicalization in the Brazilian market (Ibusuki and Kaminski, 2007).

Regarding the adoption of a platform and derivatives policy, we assume that platforms are more likely to remain centrally developed, while development of derivatives may be decentralized towards foreign units. The reasons are as platforms may be seen as the “first steps” in the development of a product family, with derivatives being the “final steps”. According to some studies (Muffatto, 1999), much of the development of a derivative may be conducted independently from the development of a platform; since the platform is the center of a product family, and therefore has much to do with the long term strategy of the company, its development is likely to stay centralized in the main product development center. Indeed, the choice of the platform’s basic technologies and the markets the platform shall supply through its derivatives are decisions made centrally. Conversely, derivatives are much more linked to local markets; consequently, in order to fit markets expectations and characteristics, its development should be conducted in a more decentralized way, involving engineering and marketing from local markets.

Generalizing from Consoni and Quadros (2006), we can identify five main steps of
technological and engineering competencies developed by foreign subsidiaries of automotive transnational companies:

a. Nationalization of components: increase of local content;
b. Adaptation of models from foreign platforms to domestic market features and regulations, through incremental innovation and re-styling (known as Tropicalization);
c. Partial derivative projects from global platforms for regional markets;
d. Complete derivative projects from global platforms for regional or global markets;
e. New platforms and vehicle architecture, worldwide product.

The issue may be raised on the relation between this articulated taxonomy and the traditional adaptive versus asset-seeking dichotomy. The levels (a) and (b) correspond to different degrees of typically adaptive strategies, including re-engineering of foreign platforms. Levels (c), (d) and (e) imply the presence of asset-seeking motivations by transnational subsidiaries. However, it suggests continuity between different levels, consistent with an evolutive approach\(^3\). Therefore, this approach seems to be especially appropriate for the case of automotive industry in emerging markets, where the most part of the firms are subsidiaries of transnational companies, the need for adaptation to market specificities is crucial, and the transition between different levels of technological activities is a common feature.

Muffatto (1999) describes that modularization can also be seen as being complementary to setting up platforms since it allows the product to be differentiated to a high degree and thus meet varied customer requirements.

The "modular" product and design may facilitate a decentralization strategy, since it may not be necessary to develop every part at the same place. Given the main characteristics of each module, its development may be done in a black box way. Even if there is co-design or grey box development — that is, suppliers’ participation in the design process —, this does not mean that all the development activities must be realized altogether — actually, the development of each module, independent by definition, may be carried out in parallel processes, thus reducing the time-to-market of the final product.

The existence of a modular product facilitates co-design itself, as it is much more complex for the assembler to co-ordinate the work of different suppliers developing hundreds of isolated parts, which should after be put together by the carmaker, than to co-ordinate the design of a few modules by a few suppliers. The modular product

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\(^3\) Evolutive approach considering that adaptations are only minor changes which leads to product improvements (e.g. cost and weight reduction) and, in opposite, new platform and vehicle architecture development or derivative projects are kind of full model changes implementing latest innovative technological development (e.g. new power-train or chassis which defines the vehicle concept itself).
reduces the number of interfaces that must be managed by the assembler.

In which refers to the specific needs and preferences of different markets in opposition to a global, standardized product, the adoption of modular design may be a way to obtain "the best of two worlds". Modular design helps to maintain the advantages of a global product and at the same time to respond to the requests of the different markets, due to the possibility of creation of some common modules which will be shared among several different models; the differentiation itself may also be made through the design of different modules. Modularity also makes it easier to locally adapt some of the modules without changing the basic vehicle concept. Therefore, if there is any need of centralization in the product development, it does not come from modularity; on the contrary, modularity itself makes it easier to de-concentrate and, maybe, to profit from any competitive advantage on design that may exist in the headquarters or subsidiaries of suppliers and carmakers.

**Market Strategy (PAM, IPM, ERM)**

Concerning emerging markets, a variety of configuration can be seen which affect directly the strategy of transnational companies regarding product trade and development strategy due to the following reasons:

1. Domestic market protection by high import taxes;
2. Liberalization of automotive trade between countries of a defined region, increasing barriers to inter-regional trade;
3. Liberalization of automotive trade in a global economy but limited through Trade Related Investment Measures (TRIMs) or local content requirements and foreign exchange balancing obligations that contravene the General Agreement on Tariffs and Trade (GATT) on national treatment and quantitative restrictions.

According to Freyssenet and Lung (2000), this policy aims the internal market protection avoiding undermine by imports, mainly in order to ensure local employment. These common policy aims have been pursued in quite different ways in different countries. Three types of emerging markets were identified: Protected Autonomous Markets (PAM), Integrated Peripheral Markets (IPM) and Emerging Regional Markets (ERM). Following are the characteristics of each group and countries which fits to it:

1. Protected Autonomous Markets (PAM):

The PAMs are those countries which continue to provide strong protection to the national market and domestic industry. The clearest cases are China and India. Both countries have liberalized policy, particularly with regard to the participation of foreign companies in the automobile industry but protection remains strong. The policy regimes in force at the end of the 1990's maintain high tariffs of quantitative restrictions on built-up vehicles, CKD and components. Through this high barrier,
automotive policies aimed to build up a domestic industry by attracting foreign capital to a protected domestic market, and the government closed off many of the channels that had been used to import passenger cars.

In both countries, the need for protection arose from the inefficiency of the domestic motor industry. The Chinese passenger car industry was both technologically backward and highly fragmented in the late 1980's. A large number of companies produced outdated models at low volume, and the industry was completely incapable of meeting the increasing demand for cars. In India, the car industry was small and inefficient, and as well very fragmented.

Given the large potential size of both markets, both countries were able to maintain a high degree of protection for the national market while attracting considerable investment from transnational car companies.

2. Integrated Peripheral Markets (IPM):

Mexico and Eastern Europe have taken a completely different route to developing the auto industry — integration with their Triad neighbors. In case of Mexico, the NAFTA agreement has both recognized and reinforced the integration of the Mexican motor industry with the United States and Canada. In Eastern Europe (Poland, Hungary and Czech Republic), the motor industry has been restructured and increasingly integrated with the European Union following the collapse of the Soviet bloc. In both cases, the late 1990's was a transition period towards complete integration into the production and sales network of IPM's Triad partners.

In both Mexico and Eastern Europe, governments have looked to regional integration and FDI (Foreign Direct Investment) to provide scale and efficiency. This certainly helps to reduce inefficiencies in the motor industry. Governments expect to generate investment and employment in labor-intensive activities in the short-term, and hope that eventually higher-skilled jobs will also be created.

3. Emerging Regional Markets (ERM):

An alternative form of regional integration is the development of regions consisting solely of emerging markets. This section considers two countries, Brazil and Thailand, which have formed part of Mercosur and ASEAN respectively. Both countries have sought to increase the efficiency of their motor industry by reducing protection and increasing competitive pressures and by using access to the domestic market as a lever to promote investment by transnational companies. In both cases, regional integration schemes are designed to increase scale, but this has been much more effective in Mercosur than in the ASEAN region.

The three types of emerging markets previously discussed influence directly the different way of transnational companies strategy with regards to the decision to implement production units (to overcome trade barriers and high tariffs), but as well the
decision to implement development centers in this subsidiaries since success on the trade barrier leads to higher sales volume in the protected region, which means additional development expenses would be allowed to develop local specific models as we will present in the case of popular car in Brazil. One exception would be the higher interventionist policy of China requiring foreign companies to have minority joint-venture with local Carmakers since it could lead to break intellectual property rights of technology by development of "copy" product by its own partner, launching similar product as competitor.

Global Product Development Organization (Phases and Structure)
In the previous sections, we discussed some reasons why selective decentralization occurs in product development activities. Our goal in this section is to discuss how this decentralization occurs, that is, which is the actual international division of labor within the GPD structure. We will consider two dimensions in this analysis: the different stages in the product development process and the division of organization structure.

Starting from the international division of labor according to the different stages in the product development process, we will adopt Clark and Fujimoto's (1991) definition, which establishes that there are four main phases in the development process: concept definition, product planning, product engineering and process engineering. Although this definition considers product development process as a linear one, Clark and Fujimoto stress that product development is more likely to be a cyclic process, with feedbacks among the stages. From the point of view of international division of labor, we propose that early phases (concept definition and product planning) are more often centralized in the main development center, while the last stages (product and mainly process engineering) are decentralized towards foreign units. One explanation is that early stages, specially the concept definition, deal with long-term strategic issues, which have impact not only on the future of each unit, but on the future of the whole corporation. Another reason is that when there is a main development center, it often has more experience and technical background; it dominates the most important technologies and has contacts with all the other product development units, acting as a "hub".

Besides these two explanations, concentration of concept definition and product planning activities in the main center may be justified by the power relations inside the company, since in these two stages some decisions are made which defines the whole future of the vehicle and its way of competition — consequently, its market success or failure. From the point of view of power distribution, early stages are more important than the later ones, thus there is an interest in maintaining these phases in
the center. In order to guarantee that local conditions and preferences will be taken into account during these phases, local technical people may be allocated to the center; their function will be to inform central designers about the attributes the product must have with the aim of being successful in local markets.

Decentralization of later stages – product and process engineering – has minor impacts on the power distribution among the units; at the same time, it makes it possible to speed up the development process – as we discussed before, with more engineering centers, there is more liberty of allocating development activities, reducing queues. The decentralization of process engineering is also important to speed up local production – local process conditions are considered in the moment of the development, and errors may be reduced.

Development phase is a high determinant of when a subsidiary is integrated in a new product development. Many subsidiaries are integrated only in the production phase since they are only production units. But in some cases, the integration of subsidiaries in the product development is required in order to reduce launch time to the market, reduce cost by integration of subsidiaries competencies and cheaper development costs, and mainly by direct translation of customer requirements to the product development.

According to Chiesa (2000), many different kinds of organizational structures can be seen, depending on the strategy of each company:

- Subsidiary as only market data gather: this is a typical subsidiary that only has participation on the product development by sending its market requirements to the development center; main focus is production of already developed products;
- Subsidiary as development contributor: in this case, the subsidiary has competency for product adaptations and/or development of derivatives for its market;
- Subsidiary as development partner: the subsidiary is a partner of the development center, by carrying the responsibility for global module development or derivatives that will be sold in global markets.

IV. Research methodology

In order to understand the current company’s competitive strategy on the field of GPD, the proposed research aims to investigate the rational segmentation of workforce among the headquarters and its subsidiaries in the product development process through organized interviews.

The analysis was conducted based on case studies in transnational carmakers and auto-parts manufacturers that have headquarters in Triad market and facilities in Brazil, as well institutes that could give insights about external factor influences.

In the Brazilian automobile industry, two distinct groups of companies can be
identified:

- First comers: entered the market by 1950-1970; decentralized product development including local suppliers; complete product portfolio including entry models; production for local as well export market; main players: VW, GM, Ford, Fiat.
- New comers: entered the market by 1990 after the New Automotive Regime (market trade liberalization); centralized product development with only small adaptation of global vehicles; limited product portfolio (main focus mid-range products); main players: PSA Peugeot-Citroen, Renault/Nissan, Toyota, Honda.

The study will focus on new comers mainly compound by Japanese carmakers since, although their outstanding performance internationally, in Brazil it is still far behind its competitor positioning at a modest 6th position in case of Honda followed by Toyota on 8th position. Since Brazil is one of the key emerging markets for the automobile industry, lacking behind in this market penetration could be very risky in its future market expansion. Also Brazil is turning recently in one of the key markets for low cost vehicle product development, so would be interesting to understand the strategy of the main players in terms of GPD and check how the Japanese carmakers are moving to catch-up this delay in this region.

Samples:

The study was conducted from the following sequence:
1. Study on the history and background of host country automobile industry;
2. Careful analysis on the current situation on the field of GPD based on literature analysis;
3. Derive questions for the interviews based on the evidence from the literature analysis;
4. Conduct full interviews to the target group in each location respectively with Headquarter in Triad market and Subsidiary in Brazil as well its key Supplier and External Organization such as Automobile Association and Universities (the interview was conducted on the management level, 2 to 3 respondents from each group of company, focus on the department of Engineering, Procurement and Marketing);
5. Analyzing data: qualitative analysis, and cross-check / filter in order to avoid personal opinions by checking consistency with other interview results;
6. Link results of the survey with the proposed hypothesis;
7. Conclusion and proposal of improvement model.

Research Questions:

A questionnaire was prepared for the interviews based on the literature review with 5 alternative answers, from A to E, which was ordered assuming more centralized
strategy as alternative answer A and less centralized, by means decentralized strategy, as alternative answer E. The questionnaire was answered by four different target groups:

1. Subsidiary: answered the complete questionnaire;
2. Headquarter: answered only the Corporate internal factor questions;
3. Supplier: answered only the Subsidiary internal factor questions;
4. External Organization (Automobile Association and University): answered only the questions related to External factor to the company.

The objective was to try to identify the gaps between the different stakeholders, mainly subsidiary understanding against other stakeholders (headquarter, supplier, external organization) in order to cross-check what are the differences among first comers and new comers on the three hypothesis worked out that led to a complete different strategy on the GPD at subsidiary's host country. Following are the questions asked to the respondents:

I. Corporate internal factor
1. Please indicate the company's profit strategy in the global market:
2. Which markets are the main important ones for the company expansion?
3. Which one do you think is the main motivation to the company to decide to enter a new market?
4. Which segment do you think is the company's main strategy with the global product (same vehicle sold in different markets)?
5. How is organized the product development in the company?

II. Subsidiary internal factor
6. What are the main contributions of the subsidiary for the global product development?
7. Which kind of product development activities are done locally in the subsidiary?
8. In which phase of product development the subsidiary is integrated?
9. Which subsidiary's competence is the most important one for the integration in GPD?
10. What are the key criteria for the decision to source from local supplier?

III. External factor to the company
11. How is the importance of local host country industrial policies in the decision to allocate R&D center?
12. What kind of incentive is the most important one for the subsidiary to develop local technology?
13. On the other hand, which one is the less important one for the subsidiary to develop local technology?
14. Which market structure is the main focus for the company product development?
15. How is the importance of local university or research centers in the decision to allocate R&D center?

V. Case-study

The Brazilian automobile industry today is compound by:
• 16 Manufacturers (thereof 11 passenger car manufacturer)
• 27 Plants
• Production capacity: 3.5 Million (2007)
• 7th World largest production: 3.0 Million (2007)
• Responsible for 18% of Brazilian Industrial GDP
• In 2007, 4 big companies dominated more than 80% of the domestic market-share (first comers), 12 other companies for remaining 20% of the market (mainly new comers)

Table 1: Production and Sales volume of Brazilian automobile manufacturers

<table>
<thead>
<tr>
<th>Manufacturer</th>
<th>Passenger</th>
<th>Commercial</th>
<th>Total Production</th>
<th>Share %</th>
<th>Export</th>
<th>Share %</th>
<th>Domestic incl. import</th>
<th>Share %</th>
<th>Market Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiat</td>
<td>717,839</td>
<td>0</td>
<td>717,839</td>
<td>24.1%</td>
<td>102,638</td>
<td>13.0%</td>
<td>607,599</td>
<td>25.0%</td>
<td>1</td>
</tr>
<tr>
<td>Volkswagen</td>
<td>796,961</td>
<td>47,217</td>
<td>844,178</td>
<td>28.4%</td>
<td>304,929</td>
<td>36.6%</td>
<td>576,688</td>
<td>23.7%</td>
<td>2</td>
</tr>
<tr>
<td>GM</td>
<td>576,952</td>
<td>0</td>
<td>576,952</td>
<td>19.4%</td>
<td>131,507</td>
<td>16.7%</td>
<td>446,455</td>
<td>20.5%</td>
<td>3</td>
</tr>
<tr>
<td>Ford</td>
<td>206,117</td>
<td>27,120</td>
<td>313,237</td>
<td>10.5%</td>
<td>106,243</td>
<td>13.3%</td>
<td>265,678</td>
<td>10.9%</td>
<td>4</td>
</tr>
<tr>
<td>Peugeot Citroen</td>
<td>119,439</td>
<td>0</td>
<td>119,439</td>
<td>4.0%</td>
<td>12,083</td>
<td>1.6%</td>
<td>121,421</td>
<td>5.3%</td>
<td>5</td>
</tr>
<tr>
<td>Honda</td>
<td>106,027</td>
<td>0</td>
<td>106,027</td>
<td>3.6%</td>
<td>22,831</td>
<td>2.9%</td>
<td>85,749</td>
<td>3.5%</td>
<td>6</td>
</tr>
<tr>
<td>Renault</td>
<td>97,489</td>
<td>0</td>
<td>97,489</td>
<td>3.3%</td>
<td>36,966</td>
<td>4.6%</td>
<td>73,523</td>
<td>3.0%</td>
<td>7</td>
</tr>
<tr>
<td>Toyota</td>
<td>56,974</td>
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<td>20,793</td>
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<td>72,081</td>
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<td>Daimler</td>
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<td>67,360</td>
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<td>27,260</td>
<td>3.5%</td>
<td>54,211</td>
<td>2.2%</td>
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</tr>
<tr>
<td>Mitsubishi</td>
<td>26,844</td>
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<td>26,844</td>
<td>0.9%</td>
<td>0</td>
<td>0%</td>
<td>26,844</td>
<td>1.2%</td>
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<tr>
<td>Nissan</td>
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<td>5,509</td>
<td>0.7%</td>
<td>11,908</td>
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<td>0.4%</td>
<td>3,723</td>
<td>0.5%</td>
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<td>17,765</td>
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<td>7,641</td>
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<td>Iveco</td>
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<td>2,505</td>
<td>0.3%</td>
<td>2,714</td>
<td>0.3%</td>
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<td>Agrale</td>
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<td>0.2%</td>
<td>1,660</td>
<td>0.2%</td>
<td>3,507</td>
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<td>International</td>
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<td>0%</td>
<td>1,144</td>
<td>0%</td>
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<tr>
<td>TOTAL</td>
<td>2,751,722</td>
<td>185,426</td>
<td>2,937,150</td>
<td>100.0%</td>
<td>780,179</td>
<td>100.0%</td>
<td>2,429,764</td>
<td>100.0%</td>
<td>-</td>
</tr>
</tbody>
</table>

* incl. Light Commercial vehicles; Source ANFAVEA 2008

First comers:

In contrast, product strategies adopted by the major car assemblers located in Brazil (VW, GM, Fiat and Ford) have been less centralized. These corporations have been manufacturing and assembling cars in Brazil since the 1950’s, and have kept a relatively stable and strong position in the Brazilian car market. In 2007 they
accounted for approximately 80% of the Brazilian car market (domestic sales of nationally manufactured and imported vehicle), while their output (2.5 million units) represented 82% of domestic production (ANFAVEA, 2008).

During the phase of import substitution industrialization and protected internal market, these assemblers built local autonomous areas of product engineering for designing and developing products specifically focused on the local market, often adapted from European and North American old versions. Domestic sales volume was sufficient to maintain these activities in Brazil, although at a level of technological sophistication which was considerably lower than that of European counterparts.

However, with trade liberalization and greater integration into global strategies commanded by parent companies, such subsidiaries have substantially changed their product and product development strategies in Brazil. They have redefined the way their products were conceptualized, designed and engineered, in the sense that assemblers sought cost reduction through elimination of asset and task duplication, particularly regarding technological facilities and engineering staff. This move has had significant implications for the organization of local engineering activities. In this respect, the traditional Brazilian car assemblers were divided into two contrasting groups. While from the beginning of this phase Fiat and GM have been pursuing a rather decentralized product strategy, VW and Ford (the latter more clearly) have initially pursued a centralized strategy, which has been recently subject to major revision.

GM do Brazil is the most clear-cut case of decentralizing path. In the 1990's GM do Brazil accumulated local technological competencies based on the design of regional derivatives such as the Corsa sedan and pick-up and the Astra sedan. The combination of capabilities and technical infrastructure in the GM Brazilian subsidiary together with the volume of popular car sales in the domestic market created the pre-conditions for the development of the Blue Macau Project. This project gave birth to the Celta model, a subcompact car derived from the Corsa platform, with substantial modifications and re-design. GM Brazil, specially its engineering team, had a major participation during all product development stages of the Blue Macaw project. Thus, the Celta vehicle was specifically planned and designed for the Brazilian market and GM Brazil coordinated all the development process.

These previous experiences and the capabilities accumulated have assured GM do Brazil a significant role in product development activities. This has recently been reinforced in the process of conceptualizing, developing and launching in 2002 the minivan Meriva, the most recent vehicle of GM brand in Brazil. The case of Meriva has been considered a new phase in terms of product development mandate, not only for GM do Brazil but also in the context of the Brazilian automobile industry. Firstly because it
is a global concept and project proposed by the Brazilian subsidiary and later incorporated in the GM's European product portfolio (thus inverting the knowledge flow, in this specific case). Secondly because it has been the first product development project located in the country which has involved a thorough re-engineering of the original platform (Corsa), including the original dimensions.

All stages of development occurred under the GM do Brazil responsibility. According to Clark and Fujimoto's (1991) typology, these stages include conducting concept studies, building models, testing prototypes, solving problems in pilot plants and getting the car ready for commercial productions. Even thought GM Brazil had been worked integrated with Opel (subsidiary of GM in German), the coordination of the Meriva project was under responsibility of the Brazilian staff. The size of the Meriva project justified the allocation of an exclusive development team to this project.

Fiat is also an interesting case of decentralized trajectory. Fiat do Brazil has been engaged in designing derivatives from the Uno platform. Another example is related to the 178 Project, the Palio platform. That project was specifically designed for emerging markets according to their specific needs and conditions of production. Although the 178 Project was developed under the coordination of Fiat Italy, the Brazilian engineering team had an integrated role during all this process, specifically in the final stage of development, during the design of its derivatives sedan, wagon and pick-up.

The combination of local capability in product development and the attainment of sales leadership in the Brazilian automobile market had contributed to Fiat increasing technological activities in Brazil, including some of the more complex ones. Recently Fiat Corporation announced that Fiat Brazil would assume the mandate for the complete development of vehicles manufactured and marketed in the country. This means that all the phases of product development will be performed in Brazil, from design and product concept definition to production process.

A quite different situation was found in relation to VW and Ford. Due to the 1980's crisis in Brazilian economy and stagnation in the domestic demand for cars, VW and Ford subsidiaries in Brazil merged into a joint venture named Autolatina, in 1986. VW held 51% of the shares and Ford 49%. Autolatina was an ad hoc outlet to the crisis, aimed at increasing economies of scale and reducing fixed costs by sharing platforms and power-trains. In 1994, trade liberalization and the new pattern of competition (previously discussed) had brought the Autolatina arrangement to an end. Following this both VW and Ford adopted substantial changes in their local product strategies. VW do Brazil had pursued a product strategy aimed matching requirements of the internal market, with strong local engineering and technical facilities. Until 1990, VW was the carmaker located in Brazil which was most advanced in terms of local
technological activities, designing and developing products specifically for Brazilian conditions. The case of the Gol model was the most illustrative (best seller vehicle in the Brazilian market). Nevertheless, with the end of Autolatina VW do Brazil abandoned the strategy of developing products locally. Actually, this was in line with the VW headquarter's resolution to adopt a unique global product strategy for all its subsidiaries in the world. According to such policy, all vehicles launched in Brazil should be derived from a global project and adapted only to match most critical local technical requirements. The local product engineering team was afraid to be made redundant on the grounds that a large local product development unit was not necessary anymore under the new directive.

More recently, however, VW decided to revert (at least partially) to the opposite direction and maintain the engineering team and technological facilities in Brazil. The recently product launched was Fox (project named Tupi), a local development by VW do Brazil specifically designed for emerging markets, although some units were also exported to Europe. Fox is a derivative from the PQ 24 global Platform, on which the new Polo has been built. In addition, VW Brazil accumulated considerable competence in developing small, efficient and cheap low powered engines, incorporating the turbocharger technology. As a result of such reversion in product development strategy, VW do Brazil has recently expanded its engineering team.

Yet, the clearest contrast to GM's and Fiat's strategies is Ford's. This has been the car assembler located in Brazil that has taken the centralized product strategy further. During the period of protected market, Ford do Brazil accumulated know-how for designing local models. After the end of Autolatina, in 1994, the Brazilian subsidiary was reintegrated into the global strategies of the Ford Corporation, namely the Ford 2000 Program. As a result, Ford abandoned completely its local product strategy approach in Brazil and dismantled its product engineering area. That strong centralized strategy advanced in such a way that all vehicles Ford launched in Brazil needed to be adapted in the USA or Europe (this was the cases of Fiesta and Ka vehicles). However this has proved to be an expensive and inefficient strategy, even clearer so after the problems Ford faced in the development of the Brazilian derivatives from the Amazon project. The original plan was centralizing the whole project in Ford's England technology center, including the design of derivatives for emerging markets.

Brazilian engineers were expected to participate marginally, providing inputs related to market requirements. However, it became clear along the project that the differences between emerging market and Europe cost and technical requirements were so huge that they could not be dealt within a unique project. The Amazon project split led to the transfer of responsibility for the Brazilian derivatives to Ford US, which sub-contracted most of the job to engineering services suppliers. The overall
result was a major delay in the Brazilian launching of the new Fiesta and the consequent (and further) reduction in Ford do Brazil’s market share. However, after recognizing that the absence of local support to product development was behind Ford’s continuous losses in the Brazilian market, Ford seems determined to reverse this situation and reconstructed its Brazilian engineering area. Ford do Brazil had hired product engineers again; some of them have been involved in adaptation of the Amazon platform for the design of a sport utility car (EcoSport) which was an innovative vehicle to the Brazilian market targeting a niche market (SUV—Sport Utility Vehicle) not yet explored by its competitors.

New comers:

At first place, we could notice some similarities between product strategies adopted by the new comers, that is, Toyota, Honda, PSA Peugeot-Citroen, Renault/Nissan and Daimler in the passenger car segment (this last one stopped local sales of local produced cars) and Mitsubishi in the light commercial vehicle. Although some differences in terms of their trajectory and amount of local investment, all entrants have launched products in the Brazilian market which have not only been conceptualized and designed for mature markets, but whose re-engineering (adaptation to local technical and taste conditions) has been carried out abroad (either in Europe, US or Japan). The main reason behind extreme centralization of product development and product policies is the low scale of new comer operations. These car assemblers have moved into Brazil recently and, due to their lower local output and sales volume (in comparison with traditional players), the Brazilian operation can not “pay” for local technological activities and product development in Brazil.

In 2007, the output of new comer assemblers represented 16% of total output in the Brazilian automotive industry and their domestic sales (including nationally manufactured and imported vehicles) represented roughly 18% (ANFAVEA, 2008).

Furthermore, all activities performed by these car assemblers are mostly oriented to small adaptation in product or process, to nationalization of components and mainly to technical contact with their local suppliers. For instance, Toyota has tried to equalize the supply of Brazilian auto parts according to Japanese standards while Renault has tried to adapt to Brazilian auto parts and local materials, which are very different from French ones.

For more complex technological activities, new comers have counted on major R&D centers abroad. The same applies to adaptation required in manufacturing process, in general related to lowering the use of automation technologies in the original process projects, due to the fact that Brazilian plants operate at much lower output volumes.
Any significant product modification, involving more complex technological adaptation, must be approved by headquarters. Thus it is clear that affiliates of new comer assemblers in Brazil are subject to a lower degree of autonomy in comparison with their more established competitors. In spite of such limits regarding decisions on products and technological activities, Brazilian subsidiaries of new comers have been given the role of center of manufacturing and sales for Latin American countries. Brazilian units have been responsible for the coordination of their regional activities, especially when there is more than one plant in the Latin American region. Moreover, the responsibility of Brazilian units includes technical support to other LA units.

To summarize our findings for this group, the new comers have strongly pursued centralized product strategies in Brazil. The vehicles they have launched in Brazil were developed in their headquarters, going through only small adaptations to Brazilian conditions, adaptations which have also been engineered abroad.

Competences for Product Development

Laplane & Sarti (2004) argue that the specialization model for production is a key element in the strategy of building competitive advantages, by means of the combination of economies in scale (volume) and scope (variety). Brazilian production is regional and concentrated in small sized (compact) vehicles. Using the platforms for compact cars, a whole family of vehicles with a greater degree of sophistication and of motorization has been produced and offered for different uses and segments to internal and external markets.

Some arguments in favor of this specialization model can be emphasized. Firstly, this strategy is more adequate for the standard of income and demand profile in Brazil and region. Secondly, these vehicles have greater fuel efficiency and a smaller maintenance cost. In third place, these vehicles have a higher nationalization rate. This stimulates local production of car parts and reduces the pressure on imports of raw materials and components. In fourth place, specialization ensures a more adequate technical scale of production, which constitutes a fundamental factor for international competitiveness.

The decision of companies to specialize in the supply of compact vehicles, in accordance with the demand profile and the lower purchasing power, confirms the strategy of preferentially producing for the domestic and regional market. Beside this, it is worthwhile noting that this strategy was to a large extent stimulated and induced by public policies negotiated within sectoral arbitration committees, in which a differential tax basis was adopted according to the degree of motorization, the “popular cars”, vehicles with an engine capacity of less than 1,000cc.

Furthermore, analyzing the experience of the four main carmakers, four areas of
specialization and excellence may be pointed out.

1. Small engines, up to 1000 cc: due to the dominant share of subcompact cars in the domestic market, the Brazilian car makers developed their competences in the design of small and efficient engines, with greater power than the previous generation. This segment has been stimulated by the policy of tax incentives to have a low price and low powered car segment (popular car);

2. Flexible engines and related power-train: stimulated by Brazilian energy policies of diversification implemented since the 1970's, Brazilian subsidiaries of assemblers and suppliers have co-designed the so-called “flexfuel” system, which can use both traditional gasoline and ethanol, or a proportion of both. Flexfuel engines, introduced in 2003, rapidly became the domestic standard. Consequently, the share of flexfuel vehicles reached 70% of the Brazilian market in 2007. The forecast is that in the future Brazilian carmakers will no more produce traditional gasoline cars;

3. Local materials: less expensive or more adequate to local needs, tastes, income and fuels. It is the case of plastics, alloys, and power-train components adapted to the use of ethanol. Assemblers' material laboratories are mostly oriented to make research on the resistance to oxidation and corrosion, as the Brazilian fuel, with ethanol in its composition, is much more corrosive than gasoline. The material labs also support R&D on material replacement and solutions aimed at reducing the cost of entry level vehicles;

4. Suspension: more robust suspension modules, adapted to rough road conditions and local ways to use vehicles, have been developed. Some suppliers have global technological competencies in this area.

VI. Survey results
First comers:
    Corporate Internal Factor:

    Latin America is considered one of key market; Company profit strategy is clearly focused on permanent cost reduction, but since to reach it volume scale is a must (market size), also it was possible to be identified volume and diversity strategy focusing on complete portfolio including Popular cars (1000 cc engine); rapid introduction of Fuel Flex technology (gasoline and ethanol flexible engine) result of decentralized R&D which could catch-up the local market needs; local derivative from global platform (sedan, pick-up, station wagon) including tropicalization (adaptation to local condition, taste, cost).

    Subsidiary Internal Factor:

    Main contribution of subsidiary for GPD as development partner specially for suspension (durability to hard road condition) and rubber parts (dust protection);
specialized on development of local derivatives based on global products considering local market know-how and technology; installed new factories on the country side to update production process for global cars with key suppliers (industrial condominium); Co-design with core tier supplier specially for tropicalization and niche technology development but as well for cost reduction.

External Factor:

Local industrial policies are well utilized specially in terms of trade barriers benefiting from local production instead of utilizing imported parts which carry high import taxes impacting the cost competitiveness; utilize the tax incentives as well focusing in the popular car segment as pointed as the most important incentive; market focus is the regional protected market (Mercosur) so product development is focusing regional needs considering as well local engineering work-force through partnership with local universities.

Table 2: Survey results for the First comers group of respondent

<table>
<thead>
<tr>
<th>Corporate level strategy</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
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<tbody>
<tr>
<td>1. company profit strategy</td>
<td>quality</td>
<td>volume</td>
<td>innovation</td>
<td>variety</td>
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<tr>
<td>2. important markets</td>
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<td>ASEAN</td>
<td>ERs</td>
<td>subsidies</td>
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<td>infrastructure</td>
<td>ITA</td>
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<td>medium sedan</td>
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<td>niche</td>
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<td>adaptation</td>
<td>decentralized</td>
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<tr>
<th>Business unit level strategy</th>
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<th>B</th>
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<th>E</th>
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<tr>
<td>6. main contribution of subsidiary for GDP</td>
<td>market data gather (input for the headquarters GDP)</td>
<td>development contributor (adaptation of already developed product/module)</td>
<td>development partner (adaptation of new product/module)</td>
<td>development partner (development of new product/module)</td>
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<tr>
<td>7. type of development done locally</td>
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<td>tropicalization</td>
<td>derivative for local market</td>
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<td>8. phase of PD subsidiary is integrated</td>
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<td>process engineering</td>
<td>testing prototype</td>
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<td>9. which competence is important</td>
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<td>faster response</td>
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<td>10. reason to source from local supplier</td>
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<td>time-to-market</td>
<td>cost</td>
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<tr>
<th>Functional level strategy</th>
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<th>B</th>
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<th>D</th>
<th>E</th>
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</thead>
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<tr>
<td>11. local industrial policies importance</td>
<td>not relevant</td>
<td>less important</td>
<td>neutral</td>
<td>important</td>
<td></td>
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<tr>
<td>12. most important incentive</td>
<td>reduced interest loan</td>
<td>investment subsidy</td>
<td>tax reduction for R&amp;D spent</td>
<td>local regulation</td>
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<td>13. less important incentive</td>
<td>tax reduction for niche segment</td>
<td>local regulation</td>
<td>tax reduction for R&amp;D spent</td>
<td>investment subsidy</td>
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<td>14. focus market structure</td>
<td>small niche</td>
<td>open globally</td>
<td>Integrated peripheral</td>
<td>protected autonomous</td>
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<tr>
<td>15. local university importance</td>
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<td>less important</td>
<td>neutral</td>
<td>important</td>
<td></td>
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</table>

(Shaded one) Corporate internal factor, Subsidiary internal factor and External factor. Subsidiary point of view
(Grey field) Corporate internal factor: Headquarter point of view; Subsidiary internal factor: Supplier point of view; External factor: Automobile Association and local University point of view

New comers:

Corporate internal factor:

Mainly focus on mid-range cars with clear focus on differentiation through quality even more than the home country strategy which is focused as well on volume expansion (except Renault and Peugeot have launched Popular cars trying to expand market-share); Follow strategy (e.g. market entry following direct competitors utilizing
from local subsidies) due to perception of low priority to the company expansion in the local market although knowing future market potential; Global cars with following adaptations: downgrade for cost reduction (decontenting) and tropicalization to adapt for local conditions mainly done at headquarters' development center.

Subsidiary internal factor:
Main contribution of subsidiary for GPD perceived as market data gathering to the headquarter development or adaptation for nationalization although small adaptation are done locally (e.g. minor tropicalization); subsidiary are integrated mainly on process engineering phase although minor testing of prototype are done locally; introduced new production models with suppliers in the new factories including Global tier suppliers from home countries; Co-design with core tier supplier done mainly at the headquarter but some local suppliers are integrated to speed time-to-market and reduce cost.

Table 3: Survey results for the New comers group of respondent

<table>
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<tr>
<th>Corporate level strategy</th>
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<th>C</th>
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<tbody>
<tr>
<td>1. company profit strategy</td>
<td>quality</td>
<td>volume</td>
<td>cost</td>
<td>innovation</td>
<td>rarity</td>
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<td>2. important markets</td>
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<td>Eastern Europe</td>
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<td>medium segment</td>
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<td>niche</td>
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<td>decentralized with adaptation</td>
<td>centrally with adaptation</td>
<td>decentralized with locally</td>
<td>central coordination decentralized</td>
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<td>development partner (development of new product/module)</td>
</tr>
<tr>
<td>7. type of development done locally</td>
<td>nationalization</td>
<td>tropicalization</td>
<td>derivative for local market developing prototype product engineering vehicle concept</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. phase of PD subsidiary is integrated</td>
<td>homogenization</td>
<td>adaptation</td>
<td>cheaper cost</td>
<td>market know-how technology</td>
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<tr>
<td>9. reason to source from local supplier</td>
<td>quality</td>
<td>time to market</td>
<td>repat</td>
<td>innovation</td>
<td>flexibility</td>
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<td>neutral</td>
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<td>very important</td>
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<td>investment subsidy</td>
<td>tax reduction for R&amp;D</td>
<td>local regulation</td>
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(Gray field) Corporate internal factor, Headquarter point of view, Subsidiary internal factor, Supplier point of view, External factor, Automobile Association and Local University point of view

External factor:
Local industrial policies are not well utilized since many parts are imported carrying high import taxes impacting the cost competitiveness; utilized the investment incentives to build-up new plants on the country side; although local regulation incentives are perceived as important by local point of view but not well utilized (e.g. popular car segment); focus of the subsidiary is the open globally market so product
development is focusing on global communalization consequently local engineering work-force is not so relevant.

VII. Conclusion

There are clearly distinct characteristics among the two groups of automobile manufacturers in Brazil. A summary of it is as follow:

First comers: carry product decentralized strategy associated with product policies more oriented to local/regional market needs. It implies a kind of organization of product development in which the main functions of car assemblers are structured according to regional spaces, which are inter-related but keeping a certain degree of autonomy. Diverging from the centralized strategy, the decentralized policy contributes to increasing local engineering staff and upgrading local technological activities and competencies.

New comers: carry product centralized strategy implying a single global product policy, in which the most significant activities of product development (platform and its derivatives) are centralized abroad, not in Brazil. This means that car assembler subsidiaries tend to adapt vehicles to local markets without making use of complex knowledge, promoting only minor changes in the final product. As a consequence, local adaptations as well as local technological activities tend to be reduced due to the tendency of increased homogeneity of markets and their products.

Considering the results of the survey, it was possible to identify clearly that there are some gaps between New comers Subsidiary and other stakeholders understanding (Headquarter, Supplier, External Organization). Main reason for it, which we could identify in the interviews are the different Corporate Strategy understanding to the local market. For instance, subsidiary local management perceives their mother company strategy is mainly focused on quality, but the real strategy is to gather sales volume. Than the dilemma arises since following First comers strategy, it was clear that in order to gather market-share, entry on the popular car segment is a must since it covers around 60% of total market-share; it means local adapted products are necessary. Question of whether “the egg or the chicken comes first”. But looking the latest new comers movement, it seems they understood that additional sales volume or market-share will only come with product adapted to local market needs: PSA Peugeot-Citroen has just established new R&D center in Brazil with the objective to be the number fourth on sales volume; Toyota just started the construction of it's new plant in Sorocaba city, State of Sao Paulo, for the new low cost car segment to be launched world-wide; Nissan in partnership with Renault has launched several vehicle in the popular car segment; Honda is looking as well for a world-wide low cost global car and is looking to Brazil as one of key market for its production center.
References
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