Monash University

Faculty of Arts

Technological trajectories in peripheral integration processes.
The case of multinational companies in the MERCOSUR automotive space

by

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Thesis

Submitted on January, 30th 2014 in total fulfilment
of the requirements of the degree of
Doctor of Philosophy

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Abstract

In March 1991, in the context of an ambitious programme of market-oriented structural reforms, Argentina, Brazil, Paraguay and Uruguay launched the MERCOSUR integration process. One of the initiative's main purposes was to promote an endogenous process of technological change in member countries. In the context of greater opening to international trade and capital flows, subsidiaries of multinational companies (MNCs) were expected to play a crucial role in achieving this goal as 'carriers of modernisation', bringing up leading-edge knowledge embedded in goods, services, practices and people with 'spill over' into backward economic structures.

The thesis contributes to the understanding of the actual technological behaviour adopted by MNCs operating within MERCOSUR and of its effective contribution to the process of technological change in member countries. Focusing on the case of the automotive industry in the two largest countries –i.e. Argentina and Brazil–, it specifically addresses three issues: i) the evolution of the technological strategy adopted by carmakers from the date of creation MERCOSUR's creation; ii) the evolution of the division of labour among subsidiaries in Argentina and Brazil; iii) the role played by state agents –as regulators of the integration process– and corporate agents –parent companies and subsidiaries– in shaping the two above mentioned issues.

The proposed analytical framework relies on a variety of conceptual insights found in the evolutionary approach to economic development; the management and economic literature on MNCs; and interdisciplinary studies on global production networks. The study uses an original multiple embedded case study research design that facilitates the examination of subsidiaries from a network perspective and brings out their interrelation with respect to technological behaviour.

From the cross case comparison, some general conclusions are drawn. Firstly, a technological gap between parent companies and subsidiaries in MERCOSUR crystallised in an intra-firm centre-periphery type of division of labour. Although, subsidiaries in the region managed to assume more knowledge-intensive responsibilities within the corporation, this gap seems to be a structural feature of the MNCs network structure. Moreover, parent companies retained great power to regulate the technological learning process of peripheral subsidiaries which in the final analysis are shown to have had very little autonomy.

Secondly, there were limitations to MNCs bringing about technological change in a balanced manner. The hierarchical nature of the MNC network ended up being replicated within the MERCOSUR automotive space: Brazilian subsidiaries adopted a higher hierarchical position within the intra-region division of labour assuming more knowledge-intensive responsibilities than their Argentinian counterparts.

The study concludes that the market-driven multi-level regulatory framework adopted to 'govern' the MERCOSUR automotive space did not develop the tools to foster an endogenous process of technological change in the region. In fact, it favoured the consolidation of the hierarchical division of labour between Brazilian and Argentinian subsidiaries, division inconsistent with the principle of 'balance' to which MERCOSUR member countries were committed.

Statement of Originality

This work contains no material which has been accepted for the award of any other degree or diploma in any university or other institution. To the best of my knowledge and belief, it contains no material previously published or written by another person, except where due reference is made in the text of the thesis

I give consent to this copy of my thesis, when deposited in the University Library, being made available for loan and photocopying, subject to the provisions of the Copyright Act 1968.

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Signed:

Martín Obaya

Date: 30th January, 2014

Acknowledgments

The writing of this thesis has followed a long and somehow labyrinth path during which I have greatly benefitted from the support of a large number of people.

First and foremost, a special thanks is due to my supervisors: Dr Natalie Doyle and Dr Paul Kalfadellis. Natalie demonstrated her support for my ambition to write a PhD thesis by helping me with the scholarship application process, then by showing great interest in my initial research proposal. Throughout the candidature she helped me deal with the day-to-day management of my candidature, keeping me always on track with respect to the rate of progress expected by the university. She also helped me negotiate all the bureaucratic complexities that were rather daunting. In turn, Paul's advice and feedback were invaluable when it came to giving the project a coherent and workable form.

From the very beginning my supervisors helped me put some order in the variegated and confusing ideas I raised in our first meetings. At the same time, they helped me (and pushed me) not to lose sight of the big conceptual issues behind the empirical findings I had gathered. Once the research process came to an end, some of the old ideas (seemingly) dismissed at the start of my candidature thus came up to the surface again giving conceptual coherence to the empirical evidence.

It would have been impossible to complete this thesis without the financial support of the Australian Government and Monash University. In the latter case, I am especially indebted to the Monash European and EU Centre, in particular to its Director, Dr Pascale Winand for encouraging me to join the centre as a PhD candidate. The administrative staffs of the Centre, headed by Kirsten MacLeod, have provided invaluable support. Fellow PhD students as well as colleagues from the Fifth floor of the Building H at the Caulfield campus provided me with the possibility of working in a friendly environment.

One of the main challenges I faced in the four years of my candidature was to carry out fieldwork research in Argentina and Brazil. In this seemingly 'archaeological' enterprise I was assisted by a number of anonymous people from local subsidiaries, business associations and universities. I express my gratitude to all of them, as they found a gap in their tight schedules and provided me with precious research inputs. I regret the fact that they cannot be named individually. I owe a very important debt to Cláudia Banús, from ANFAVEA, who came to my rescue responding to an innumerable number of e-mails and helping me in finding statistical information. My greatest appreciation must also go to Flávia Consoni who helped me in many different ways during those years, in particular when it came to organising some interviews in Brazil

This thesis has greatly benefited from the feedback received from a large number of people. In particular, I would like to thank the colleagues participating at the Globelics PhD

Academy, the Globelics Conference and the Gerpisa Colloquium, where preliminary findings of the study were presented and discussed.

I am particularly grateful to my fellow student, officemate and friend Alfonso Martínez Arranz. Our friendship oscillated between long hours of heated discussions –usually silenced by the threats of neighbouring officemates– and more relaxed social meetings. With great generosity, for which I will always be thankful, Alfonso introduced me to his wide group of friends in Melbourne, which then became mine as well: Joe, Zeke, Cam, Kim, Laura, Lulu, Lily, Matteo and Francesca. Other friends have also made our stay in Australia wonderful: Pino, Claudia, Diego, Sandra, Fabio, Angie and Kevin.

Our life in Melbourne would not have been so great without the warming friendship of Oscar Zentner and María-Inés Rotmiler. We lived in their cosy 'stables', just opposite the marvellous Botanical Gardens, which we enjoyed for more than two years as our magnificent 'backyard'. Having raised a family and spent half of their life in Australia, Oscar and María-Inés still bear the cultural imprint of Buenos Aires in their bones and made us really feel at home.

On the other side of the pole, back in Buenos Aires, my deepest gratitude goes to Lorenza Sebesta and Luciana Gil, from the Punto Europa office at the University of Bologna, Buenos Aires campus. Somehow, this thesis is but the corollary of years of collective –and, sometimes heroic– work and intellectual discussion fostered by our small centre. Lorenza, in particular, did not only pave my way to Australia, but also introduced myself into the academic world widening the scope of my intellectual interests.

To my friends in Argentina I offer my deepest gratitude. In particular: Damián, Emi, Gustavo, Javier, Mariano, Martín, Nano and Tincho (as well as their families in a continuous process of expansion). In ways that perhaps they themselves are unaware of, I benefitted from their energy which empowered me to reach the end of the process.

My deepest heartfelt thanks to my family for their unconditional love, support and patience. My parents, Ricardo and Cristina, taught me the values of honesty, hard work and respect which I have tried to follow in my life. The energy my brother and sister, Julián and Mariana, put into following their dreams has been a source of inspiration for me. My extended family –grandparents, uncle, aunts and cousins– and Susana also helped me reach the final goal.

Finally, my love and final thanks goes to Carla. She knows better than anyone how much effort and fun the 'Aussie experience' involved for the two of us. This would not have been possible without her adventurous spirit, loving support, wisdom and infinite patience. My gratitude goes well beyond her support to finish the thesis and cannot be expressed in words.

Notwithstanding the foregoing, in the end, writing is an intimate act and individual enterprise. I am thus solely responsible for any errors in this thesis.

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List of abbreviations

ACE	Acuerdo de complementación económica (ALADI)
ADEFA	Asociación de Fábricas de Automotores (Argentina)
ALADI	Asociación Latinoamericana de Integración
ANFAVEA	Associação Nacional dos Fabricantes de Veículos Automotores (Brazil)
ASEAN	Association of Southeast Asian Nations
BA	Business Association (Interview code)
BNDES	Banco Nacional de Desenvolvimento Econômico e Social (Brazil)
CA	Corporate Affairs (Interview code)
CKD	Completely-knocked-down operations
Ciadea	Compañía Interamericana de Automóviles (Francocars)
Cofal	Compagnie Financière pour L'Amérique Latine (Francocars)
DARP	Direction des Avant-projets, de la Recherche et des Prestations (French for Direction for Project Proposals, Research and Service Provision ; Francocars)
DDIV	Direction du Développement de l'Ingénierie des Véhicules (French for Direction for Vehicle Engineering Development ; Francocars)
DIMAT	Direction d'Ingénierie des Matériaux (French for Materials Engineering Division of Francocars; Francocars)
ECLAC	Economic Commission for Latin America and the Caribbean
EU	European Union
FC	Francocars (Interview code)
FDLA	Francocars Design Latin America
FDI	Foreign Direct Investment
FTA	Francocars Technologies Americas
FTX	Francocars Technologies Centres

GDP	Growth Domestic Product
GFE	Groupes Fonction Élementaires (French for Groups for Basic Functions; Francocars)
GFS	Groupes Fonction Série (French for Groups for Series Functions; Francocars)
GFSA	Groupes Stratégie Fonction Amont (French for Upstream Strategy Group, Francocars)
GPNs	Global Production Networks
GVCs	Global Value Chains
HQ	Headquarters
IMV	Innovative International Multi-purpose Vehicle project
IC	Italocars (Interview code)
ISI	Import Substitution Industrialisation Strategy
MERCOSUR	Mercado Común del Sur (Spanish for Southern Common Market)
MITI	Ministry of International Trade and Industry (Japan)
MNCs	Multinational Companies
NC	Nipponcars (Interview code)
NAFTA	North American Free Trade Agreement
OICA	Organisation Internationale des Constructeurs d'Automobiles (French for International Organization of Motor Vehicle Manufacturers)
PA	Purchasing area (Interview code)
P178	Project 178
PIEC	Programme for Integration and Economic Cooperation
PROC	Process engineering (Interview code)
PROD	Product engineering (Interview code)
ROW	Rest of the world
RQ	Research question
S	Specialist (Interview code)

SADC	Southern African Development Community
SKD	Semi-knocked-down operations
TMP	Tax on Manufactured Products (Brazil)
TCGS	Tax on the Circulation of Goods and Services (Brazil)
TC	Technological capabilities
UK	United Kingdom
US	United States
VLE	Vehicle Line Executive (Italocars)
WTO	World Trade Organization

Editorial notes

Citation of interviews

The present study makes extensive use of interviews as source of information. Each interview has been identified with a code which is used for in-text citing. The list of codes can be consulted in Table A-1 (p. 303). Codes indicate the name or type of the organisation, the field of specialisation of the interviewee, and a number identifying the interview.

Translation of texts quotes

Face-to-face interviews have been carried out in English, Italian, Portuguese and Spanish. Quotes included in the text have been translated by the Author –with the obvious exception of those originally conducted in English.

In the case of quotes from newspapers, books and other sources of information, translations are indicated with the expression 'own translation'.

Referencing figures, tables and boxes

Figures, tables and boxes included in this study have been referenced using the number of the chapter/letter of the appendix in which they are included, and a number.

For the sake of readability, figures in Chapter 4 have been included in a special Appendix at the end of the chapter (Appendix 4.1). The justification for this editorial choice lies in the fact that since figures provide information on the whole period examined in this study (1991-2011), references to the figures repeat across all the sub-sections of Section 4.2, covering the evolution of the MERCOSUR automotive space.

In order to keep information close to the analysis carried out in the corresponding chapter this special appendix was not included in the separate Appendices section at the end of the thesis.

Newspapers' articles references

The newspapers' articles quoted in this study have been extracted from the database: Emerging Markets Information Service. As the information is not provided by the database the page number of the articles could not be referenced in the bibliography.

Introduction

In March 1991, Argentina, Brazil, Paraguay and Uruguay signed the Treaty of Asunción giving birth to the Southern Common Market (MERCOSUR). As proclaimed in that founding document, the main goal of the integration agreement was to promote, in its member countries, *economic development with social justice*. Signatory countries committed themselves to carrying out the process based on the principles of "gradualism, flexibility and balance" (*ACE Nº 18 – 1991 (ALADI)*). In the words of the Economic Commission for Latin America and the Caribbean (ECLAC), economic integration in the region was then conceived as a tool to change "production patterns with social equity" (ECLAC, 1994: 157). In a nutshell, this implied a progressive specialisation in economic sectors with a greater capacity to generate and spread technological change.

It is worth noting that MERCOSUR was not an isolated initiative but, in line with the Latin American tradition since post Second World-War World times, constituted one of the pillars of a more comprehensive development strategy (Magariños, 2005). On this occasion, MERCOSUR was launched in the framework of a broader process of market-oriented structural reform programmes adopted by countries of the region –the so-called Washington Consensus reforms (Williamson, 1990).[1] The reforms entailed an accelerated process of unilateral trade opening, the removal of controls on international capital flows, and the privatisation of most state-owned companies, among other measures (Katz, 1996). Summing up, structural reforms dismantled the foundations of the import substitution industrialisation strategy (ISI) of economic and social development which had been in force in these countries for more than fifty years (Thorp, 1998).[2]

Conceptually, the economic reform agenda was based on neo-classical ideas which had gained force since the 1970s. These ideas informed the neo-liberal wave which spread out from the United States (US) and the United Kingdom (UK) to the rest of the world in a few years (Rodrik, 2011). In brief, the neo-liberal conceptual frame assumed that the private sector was, under any circumstance, more efficient that the public sector and that, once deregulated and liberalised, the market would make an 'efficient' allocation of resources that would 'maximise' the overall well-being of the society.

As a result of the Washington Consensus reforms, multinational corporations (MNCs), which had historically had a dominant presence in MERCOSUR member countries –in particular in Argentina and Brazil (De Paiva Abreu, 2000; 2005; Fritsch and Franco, 1991; Katz and

[1] For an analysis of the political process for the implementation of structural reforms in various Latin American countries, see Torre (1998).
[2] From the 1970s, this policy had experienced some significant pitfalls that "generated costly disequilibria, such as the appearance of huge fiscal deficits, high and variable inflation, the worsening accountability of public firms, negative real interest rates, the arbitrariness of effective protection and too many microeconomic decisions centralized by national authorities" (Ffrench Davis, 2000: 5).

Kosacoff, 1989)– gained even more presence in the domestic economic structure (Chudnovsky, 2001; Kosacoff and Porta, 1997; Kulfas *et al.*, 2002; Stumpo, 1998).

Dynamics observed in South America were not independent from processes which had been developing in the international arena for some years already. Since the 1970s, MNCs had consolidated an uncontested dominant position in far-reaching functionally integrated networks which expanded globally –the so-called global production networks (GPNs) or global value chains (GVCs). MNCs progressively strengthened their power to coordinate the activities carried out within GPNs in which a variety of agents participated. GPNs accounted for a growing share of the creation of value and knowledge, and controlled the mechanisms for its geographical distribution at global level (Coe *et al.*, 2008; Ernst and Kim, 2002; Gereffi, 2005; Gereffi *et al.*, 2005; Gereffi and Korzeniewicz, 1994; Henderson *et al.*, 2002).

The business strategies pursued by MNCs and the patterns of interaction with external agents had critical implications for the geographical distribution of those capabilities that allow countries to effectively advance in a process of technological change. As a consequence, the role of MNCs became crucial in accomplishing the aspirations of technological progress in MERCOSUR member countries.

Against this backdrop, economic integration in MERCOSUR cannot but be examined in the light of the two profound transformations pointed out above: the emergence of GPNs in the world economy and the adoption of market-oriented reforms which, among other goals, aimed at integrating the domestic economies into those networks. MERCOSUR was therefore a clear example of what the ECLAC referred to as 'open regionalism', that is:

> [...] a process of growing economic interdependence at the regional level, promoted both by preferential integration agreements and by other policies in a context of liberalization and deregulation, geared towards enhancing the competitiveness of the countries of the region and, in so far as possible, constituting the building blocks for a more open and transparent international economy (ECLAC, 1994: 2).

The statement above clearly shows the subordination of the regional process to the aspiration for a "more open and transparent international economy", as mainly sponsored by the US and the European Union (EU). In particular, the subsidiaries of MNCs were expected to play a double role in this open regionalism scheme. Firstly, subsidiaries would be the pivotal agent amalgamating the national economic structures into a single regional market place. The consolidation of such a market where goods could be freely traded would favour the adoption of specialisation strategies among subsidiaries located in different member countries and the expansion of intra-regional trade flows. Furthermore, through the construction of MNC-led regional nodes of GPNs, linkages with other domestic agents would be diffused (ECLAC, 1994; IADB, 2002).

Secondly, against the background of a more open economy subsidiaries would operate as 'carriers of modernisation'. They would bring to the South American 'peripheral' region modern consumption and capital goods, world class manufacturing practices, managers educated in top business universities, and so forth. The virtues of leading-edge knowledge embedded in goods, services, practices and people would, as it was expected, 'spill over' into backward economic structures through different mechanisms: competition, collaboration, training, etc. (ECLAC, 1994; IADB, 2002).

More than 20 years after the signing of the Treaty of Asunción, this study aims to contribute to *the understanding of the actual technological behaviour adopted by MNCs operating within MERCOSUR and its effective contribution to the process of technological change of its member countries*. In this regard, empirical evidence –mostly from the automotive industry– shows that in the last few years an embryonic and hitherto poorly explored phenomenon has taken place.[3]

On the positive side there is the fact that some subsidiaries in MERCOSUR have progressively managed to assume more knowledge-intensive responsibilities within their corporations. And this has contributed to the local accumulation of technological capabilities. Nonetheless, contrasting these positive observations is also the fact that upgrading experiences have almost exclusively concentrated on the Brazilian territory. As a result, an incipient hierarchical division of labour between subsidiaries located in Brazil and those sited in other member countries seems to have been occurring (Chudnovsky and López, 2006).

The diffusion of this divergent technological trajectory and hierarchical organisation among subsidiaries operating within the region would certainly pose a serious problem for the evolution of the integration process and, more importantly, for the prospects of the economic development of the smaller member countries. As MNCs play a dominant role in the technologically dynamic sectors which countries aspire to specialise in, the concentration of virtuous capability-accumulation processes in one single territory (i.e. Brazil) may result in a divergent path of economic growth among the member countries, and in the articulation of a centre-periphery division of labour within the region.

In this framework, two questions appear as being particularly relevant: first, to what extent have subsidiaries of MNCs really operated as 'carriers of modernisation'; second, to what extent did the particular intra-regional division of labour among subsidiaries contribute to a balanced distribution of the benefits of technological progress, as stated in the Treaty of Asunción,.

Almost naturally emerging from these two questions a third one springs to mind: what were the driving agents shaping the behaviour of MNCs in the region? That is, to what extent did subsidiaries have the autonomy to adopt their own technological strategies? What kind of power did parent companies retain to control business activities overseas? In which way did the regulatory framework adopted by governments affect the technological behaviour of MNCs in the region?

These specific problems are clearly related to fundamental matters which have occupied the mind of scholars concerned with development issues for more than sixty years. Which should

[3] As pointed out, most empirical evidence in this regard is from the automotive sector. (See, for instance, Amatucci and Mariotto (2012); Balcet and Consoni (2007); Carneiro Dias *et al*. (2011); Consoni (2004); Consoni and Quadros (2006b); Ibusuki *et al*. (2012b).

be the driving agents of economic modernisation in peripheral countries? What are the potentialities and limitations of relying upon MNCs to lead such process? What is the role of the state in encouraging the modernisation of the economic structure? What are, in particular, the opportunities and threats posed by collective regional projects to the modernising aspirations of individual member countries?[4]

It is clear that the mechanisms that shape the global division of labour have evolved since the emergence of the global economy –either from a long-term or a short-term perspective of the globalisation process (Braudel, 1985; Súnkel and Paz, 1970; Wallerstein and Hopkins, 1982). Peripheral areas are not, as in the first half of the 20th Century, characterised by its industrial backwardness and the prevalence of primary activities within their economic structures. And, industrialisation is not necessarily the means to economic development. As a matter of fact, richer countries have experienced in the last decades an accelerated transition towards a services-centred economy (Dicken, 2011). However, the question of the generation and geographical distribution of the benefits of technological change remains at the centre of the development puzzle. Concepts such as centre and periphery, for instance, must be redefined in the light of the new geography moulded by MNCs-led GPNs. And the new forces driving the generation of knowledge and its geographical diffusion in the world economy should be explored in order to open new avenues for countries to escape the underdeveloped trap.

This study addresses these issues focusing on the examination of the automotive production network in MERCOSUR. For various reasons, this industry provides a fertile ground analysis.[5] Firstly, because although being a mature industry, it is one of the sectors which dominates expenditure intensity in R&D at a global level (Department for Business Innovation & Skills, 2010). Secondly, because it is an industry that has a long tradition in the region traceable back to the 1950s and in which member countries in the past accumulated engineering capabilities (López *et al.*, 2008). Thirdly, because in the last decade the region has become one of the leading producers and consumption centres in the world.[6] Currently, the production of vehicles in the region is completely controlled by MNCs, and top leading global carmakers have manufacturing presence in the MERCOSUR territory. Most of them have subsidiaries in Argentina and Brazil and adopt regional-scope strategies around the MERCOSUR 'automotive space'.[7] Last but not least, member countries of MERCOSUR, and in particular Argentina and Brazil, have given special treatment to the automotive industry coordinating their policies, the ultimate goal being the establishment of a common

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[4] In Latin America, these issues have been particularly studied within the sphere of the ECLAC and the so-called Latin American structuralist school. For a review of this intellectual framework and how it approached the issues pointed out above, see Bielschowsky (1998); 2009); Rodríguez (2006).

[5] A more detailed analysis of the characteristics enumerated here can be found in Chapter 4.

[6] On average, during the period 2009-2011, the two countries together accounted for over 5% of the world production, becoming the sixth largest vehicle manufacturer. Source: International Organization of Motor Vehicle Manufacturers (OICA, acronym for the French name of the organisation by which is commonly known).

[7] In Argentina, there are nine companies that produce cars and light commercial vehicles: Fiat, Ford, General Motors, Honda, Mercedes Benz, PSA Peugeot Citröen, Renault, Toyota and Volkswagen (Source: ADEFA). In Brazil, there are ten companies that are currently manufacturing cars and light commercials: Fiat, Ford, General Motors, Honda, Hyundai, Nissan, PSA Peugeot Citroen, Renault, Toyota and Volkswagen (Source: ANFAVEA).

automotive policy. As will be seen in greater detail in empirical chapters, for instance, the liberalisation of intra-regional trade flows was conditional on maintaining the trade balance within some specific limits; and on complying with minimum level of localisation or auto parts.

Building upon the discussion above this study addresses three specific research questions:

- *Research question 1* (RQ1)*:* How did the technological strategies of automotive MNCs operating in MERCOSUR evolve between 1991 and 2011?

- *Research question 2* (RQ2)*:* How did the division of labour in product engineering activities between the subsidiaries operating in Argentina and Brazil evolve between 1991 and 2011?

- *Research question 3:* What was the role of the state agents and MNC agents (parent companies and subsidiaries) in defining the technological strategies of carmakers in MERCOSUR (RQ1) and in shaping the division of labour between subsidiaries operating in Argentina and Brazil (RQ2)?

The thesis examines three cases studies of automotive MNCs with subsidiaries operating in Argentina and Brazil. As will be further explain in Chapter 3, one of the original contributions of this study is the methodological approach it adopts.[8] Subsidiaries are examined as part of a functionally integrated global network with a regional node in MERCOSUR. This allows for a better understanding of how the technological behaviour of subsidiaries is interrelated and how labour is organised at the regional and global levels, compared to traditional comparative approaches.

- *Delimiting the object of study*

The first limit which is worth pointing out is that the analysis of the MERCOSUR automotive network carried out in this study is exclusively focused on carmakers and does not include the analysis of the whole value chain of production. Therefore, the examination of the technological behaviour of suppliers remains outside the boundaries of the study. Likewise, the study only covers activities related to the production of cars and light commercial vehicles. This excludes other activities which are generally carried out by large automotive MNCs, among which are: the production of trucks, buses, agricultural or other type of machinery, tools or capital goods; the participation in automotive sport, in financial activities; and so forth.

The analysis is also restricted to the examination of product engineering activities. Other areas explored in the innovation literature, such as process engineering or organisational innovation, have not been addressed here. Although the importance of this type of activities

[8] See Chapter 3, pp. 54-55.

cannot be neglected, the bulk of R&D expenditure and strategic challenges and priorities of carmakers are currently focused on the development of product innovations (EUCAR, 2011). This is the reason why, this area of strategic importance has been chosen as object of study.

From a conceptual point of view, this study is concerned with the technological behaviour of MNCs within the whole MERCOSUR area. However, the structural and regulatory characteristics of the automotive industry in the region require that study be limited to Argentina and Brazil. Whilst Paraguay does not manufacture vehicles, in Uruguay production volumes are very low. In this country, production is usually carried out by companies which operate as completely-knocked-down (CKD) operations[9] with licensees from original brands (López *et al.*, 2008) –for instance, at the moment, the Chinese Chery. On average, between 2009 and 2011, Uruguay produced almost 8 thousands vehicles per year (Uruguay XXI, 2013). Although important for the country, the figure is negligible compared to 4 million vehicles jointly produced in average by Argentina and Brazil during the same period.[10]

In what regards the timeframe of this study (1991-2011), the analysis covers the years from the signing of the Treaty of Asunción giving birth to MERCOSUR to the year previous to the start of fieldwork research activities in March 2012. The starting point is also justified by the fact that in 1991 and 1992, Argentina and Brazil, respectively, put in place national policy initiatives which signalled the beginning of a period of significant enlargement, modernisation and regional integration of the automotive industry (see Chapter 4).

As explained in greater detail in Chapter 3, the selection of companies to conduct the cases studies sought to cover a diversity of situations with regards to: i) the history of the company in Argentina and Brazil; ii) the relative size of the company in the two countries; iii) the product policy followed by the company; iv) the corporate organisation of R&D activities.[11] The most important pre-condition for companies to be selected was that they had subsidiaries operating in Argentina and Brazil. No conditions were put with respect to the country of origin of the firm. After reviewing specialised literature and conducting interviews with specialists and managers of business associations, three companies were selected: Italocars, Francocars, and Nipponcars[12]. Communication with senior managers of the Corporate Affairs area of the subsidiaries was established to require authorisation to carry out the investigation.

Finally, it is worth stressing that the study is constrained to the examination of the technological behaviour adopted by carmakers. The analysis of the outcomes of this behaviour in terms, for instance, of profits, market-share, wages and so forth, remains outside of the boundaries of the study. References to these issues made across the study only have the purpose of illustrating specific situations.

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[9] Companies carrying out CKD operations are responsible for the final stage in the production of a vehicle. They assemble kits containing systems and sub-systems of the vehicle which are produced overseas and exported to the final assembling point.
[10] Source: ADEFA and ANFAVEA.
[11] See, in particular, pp. 56.
[12] Written authorisation has been provided by companies and interviewed managers to report the findings of the research project. However, in order to comply with the standards in research ethics of Monash University, companies will not be identified by their names.

- *Organisation of the thesis*

The thesis is organised in three main parts. The first one, covering Chapters 1 to 3, is devoted to the presentation of the analytical framework and the research design. The second one corresponds to Chapters 4 to 7 where empirical findings are discussed in detail. Finally, in the last part, covering Chapter 8 and the Conclusion, an analysis of empirical evidence is carried out.

Chapter 1 includes the literature review. The purpose is to gain conceptual insights allowing an analytical framework to be developed to address the research problems posed in this study. The first section offers a critical review of two different frames of analysis dealing with the question of technological change in the economic literature: the neoclassical and the evolutionary approaches. The second section discusses, in particular, how innovation activities are organised within MNCs. Particular interest is paid to the increasing role of subsidiaries within the MNC knowledge network and the consequences of this process on the geographical distribution of technological capabilities. Finally, the last section provides a literature review concerned with the driving agents of technological learning in subsidiaries. In particular, the review deals with the role of public state agents, parent companies and subsidiaries themselves.

Chapter 2 is divided in two sections. The first one offers a brief overview of the process of global restructuring undergone by the automotive industry in the last two decades. Two particular phenomena are highlighted with crucial implications for the understanding of the technological trajectory of the industry in peripheral areas: first, the growing importance of emerging markets –and relative stagnation of Triad countries– in the global automotive map; second, the progressive emergence of regional ‘automotive spaces’ with differentiated consumption patterns. It is shown how this particular evolution affected the intra-firm division of labour in product engineering activities. In particular, it favoured the emergence of a new type of ‘semi-peripheral’ subsidiary with increasing responsibilities within the corporation. In the second section of the chapter, the analytical framework proposed for this study is presented: research questions are discussed; and, drawing on the literature review in Chapter 1, the specific analytical tools to address these questions are examined.

Chapter 3 presents the main elements of the research design. It discusses the characteristics of the original multiple embedded case study approach proposed to address the research questions. Then, it explains the sampling criteria. Thirdly, the sources of information and interviewing strategy are presented. Finally, the strategy for the analysis and cross case comparison is discussed.

As pointed out above, the second part of the thesis corresponds to the presentation of the empirical findings. Chapter 4 discusses the historical evolution of the MERCOSUR automotive space from two different perspectives. In the first section, the evolution of the regulatory framework of the industry at bilateral and national levels between 1991 and 2011 is analysed. The second section examines the configuration of the MERCOSUR automotive network during this period of time from an aggregate perspective. The purpose is to provide an overview of the process of enlargement, modernisation and integration of carmakers around this emerging regional space.

Chapters 5, 6 and 7 present empirical findings on the three companies examined in the thesis: Italocars, Francocars and Nipponcars. An overview of the technological trajectory of the companies between 1991 and 2011 is provided at the beginning of each section. Then, this trajectory is divided into different stages marked by specific ‘milestones’ indicating turning points in the technological strategy of the firm. Information is presented from a chronological perspective and with a great level of detail addressing the three research questions stated above.

The third part of the thesis is devoted to the analysis of empirical findings. Taking into consideration the limitations that the selected research design poses to the possibility of generalising findings, Chapter 8 seeks to develop a more comprehensive understanding of the technological behaviour of MNCs in peripheral regional areas. The chapter is organised in three main sections: the first one explores the difficulties of peripheral areas to put in motion endogenous process of technological change relying upon MNCs; the second explores how structural features of MNC networks favoured a hierarchical division of labour among subsidiaries operating within the MERCOSUR automotive space; and finally, the third section, discusses the limitations of the regulatory framework adopted in the region to address the two above referred problems.

In the Conclusion, the analysis goes back to the discussion developed above in this introductory section, fundamentally, it questions the capacity of regional integration to promote an endogenous process of technological change in a balanced manner relying upon MNCs. Three ‘false promises’ on which the MERCOSUR process was built upon are discussed: the false promise of the globalisation of markets and firms; the false promise of open regionalism as a way to promote modernisation; and the false promise of MERCOSUR as a balanced integration process.

Part I
Analytical framework and research design

Chapter 1 - Technological learning in MNCs and geographical distribution of technological capabilities. A critical review of the literature

This chapter provides a critical review of different analytical approaches dealing with the problem of technological change. The purpose of such a review is to develop in Chapter 2 an analytical framework to examine the research problem outlined in the Introduction. The chapter is organised in three sections. The first one reviews two analytical approaches dealing with the nature and dynamics of the process of technological change: the neoclassical and the evolutionary frameworks; the second section discusses the specific question of how knowledge-creating activities are organised within MNCs; finally, the third section reviews analytical perspectives analysing the driving agents behind the process of technological learning in subsidiaries of MNCs.

1.1. Analytical approaches to the question of technological change

A large number of historical studies have accounted for the positive relationship between technological progress and economic growth (see, for instance, Freeman and Soete, 1997; Landes, 1969; Maddison, 1995). These pieces of work have consistently shown that one of the main driving forces underpinning the increasing prosperity of nations in history has been their capacity to increase their productivity on the basis of a dynamic innovative performance. The expansion of the manufacturing industry since the onset of the industrial revolution has been central in this regard. It has provided fertile ground for the application of scientific advances to production, thus constantly widening the scope to "create new and better ways of doing things and to try them out in practice" (Fagerberg, 2005: 1). Such technological dynamics were at the basis of the sustained growth experienced by early industrialised economies, such as the United Kingdom, Germany and the United States. More recently, a steady and accelerated process of technological change has allowed formerly poor countries –including notably the so-called Asian Dragons [13] followed by other Asian economies–, to achieve remarkable improvements in terms of their economic development (Fagerberg and Godinho, 2005; Fagerberg *et al.*, 2010; Szirman, 2008).

Different analytical perspectives manifest a diversity of views on the *notion of technology*, on the *possibility of codifying and transferring it*, and on the underlying *factors fostering its progress over time*. The framework developed by neoclassical economics has privileged the elaboration of mathematical-formal models to analyse the contribution to economic growth of factors of production and technological progress. As will be seen below, the focus on this research problem by neoclassical economics and the choice for the methodological approach

[13] The expression 'four dragons' or 'tigers' is commonly used to make reference to four Asian countries –Hong Kong, Singapore, South Korea, Taiwan– that experience an accelerated and sustained economic growth between the 1960s (1950s in the case of the Republic of Korea) and the mid-1990s.

have been done at the cost of a deficient examination of the factors affecting the process of technological progress.

The so-called ‘evolutionary’ perspective was precisely developed in order to address the shortcomings of neoclassical economics. This analytical framework has adopted a more realistic approach incorporating, in a less formalised fashion, the examination of the organisational, technical, social and political dimensions of the process of technological change.

With the objective of clarifying some notions that will be used throughout this work, and before engaging into a discussion of the peculiarities of the process of technological change in the specific case of MNCs, it is worthwhile briefly discussing the two aforementioned analytical approaches.

1.1.1. The neoclassical approach to the question of technological change

The model developed by Robert Solow (1956) is considered to be the seminal neoclassical model of long-run economic growth. It maintained the fundamental assumptions of the neoclassical economics of the time: perfect competition and rationality of economic agents, complete information, maximising behaviour, constant returns to scale, and full employment of factors of production. According to the model, the main source of gross domestic product (GDP) per capita growth is the increase in the capital/labour ratio. But as a consequence of diminishing returns to capital, the contribution of this factor to per capita output decreases with the level of capital. Therefore, in the absence of changes in the function of production, the steady state level of capital per capita of the economy (and therefore, the steady state level of per capita output) is determined by the (exogenous) rate of population growth.

However, empirical calculations carried out by Solow (1957) showed that growth in factor inputs (capital and labour) only accounted for a small proportion of GDP per capita growth. The largest share of such growth was explained by the so-called ‘residual’, i.e. by a change not explained by a rise in capital and population. The residual was interpreted as an increase in total factor productivity, resulting from ‘technological change’ –that is, by an improvement in the way inputs were used.[14] Technological change, considered as a variable exogenous to the model, was vaguely defined by Solow as “any kind of shift in the production function” (Solow, 1957: 312).

In essence, the fact that an exogenous variable accounted for the largest part of the rise in per capita output implied that economic growth remained unexplained by the neoclassical

[14] As pointed out by Nelson (1997), other authors that had conducted ‘growth-accounting’ studies before Solow’s calculation of the ‘residual’ had already noticed that growth in output could not be simply explained by total input growth. They attributed the difference to, among other factors, economies of scale, investment in human capital and, as in the case of Solow, technological advance. Nelson argued that the reason for the impact of Solow’s article is “that his analysis was structured by a ‘formal’ theory, whereas the earlier theories were more ‘appreciative’ and therefore looser by the profession” (Nelson, 1997: 40).

model.[15] In order to tackle this shortcoming, the model was progressively refined through a more precise definition of independent variables: it included different types of labour according to educational levels, different types of capital, etc. As a result of a more extensive definition of the production function, the importance of the residual diminished.[16]

For the purposes of this study, it is worthwhile noting that the notion of technology assumed in Solow's model is that of a public good which can be perfectly codified and transferred. As pointed out by Islam (2003), the neoclassical framework considers that: "a) no resources are needed to generate technological innovation; b) everybody benefits equally from it; and c) nobody pays any compensation for benefiting from it" (Islam, 2003: 313). This notion has important implications when Solow's model is extended to a multi-country scenario. These assumptions imply that all countries share in the technological progress equally and, hence, that all can grow at the same rate when the economy reaches a steady state. If, additionally, it is assumed that all countries have the same aggregate production function, the model predicts an identical steady state level of income for all of them (Islam, 2003). This entails that, in the long run, convergence between developed and underdeveloped countries should occur. It is clear, however, that empirical evidence has not supported this conclusion. With the exception of a small group of countries –mainly, but not exclusively located in Asia– a substantial divergence between developed and developing countries has prevailed (Verspagen, 2001).

In sum, original neoclassical models recognised the fact that technical change was the main source of economic growth. However, the fact that it was mainly explained by variables exogenous to the models was considered –even by neoclassical scholars– to constitute a significant shortcoming. This motivated some authors to explore alternative ways to convert exogenous variables into variables endogenously explained by the model; and, thus, try to open what constituted a 'black box' (Rosenberg 1982) for neo-classical economics: that of technological change. The so-called new growth theory resulted from these efforts.

The new formal neo-classical growth models incorporated more 'realistic' assumptions – see, for instance Romer (1986; 1990), Lucas (1988), Grossman and Helpman (1991), Aghion and Howitt (1992), Rebelo (1990). For instance, perfect competition was replaced by imperfectly competitive markets in which increasing returns to scale are allowed. Furthermore, a different notion of technology was adopted recognising that the outcomes of R&D activities can only be partially shared by the whole society. From this conception, it results that the economic

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[15] Even before the publication of Solow's article, this shortcoming had been implicitly acknowledged by Moses Abramovitz (1956). In his review of the state of knowledge of economic theory about the engines of economic growth, he claimed: "Since we know little about the causes of productivity increase, the indicated importance of this element may be taken to be some sort of measure of our ignorance about the causes of economic growth" (Abramovitz, 1956: 11). The work of Solow did not do much to clarify this obscure issue. In this regard, Nelson and Winter (1982) have argued that:

> [i]nstead of reporting to the profession and the public that the theory explained virtually none of experienced productivity growth, the empirical researchers reported their 'finding' that technical change was responsible for 80 (or 85 or 75) per cent of experienced productivity growth (Nelson and Winter, 1982: 197).

[16] Verspagen (2005) argued that the variables incorporated into the new models were interrelated by causal links that were not accounted for by the theory.

benefits derived from innovation can only be partly –and transitorily– appropriated by the firms that generate the innovation. This gives companies the possibility of enjoying a temporary monopoly in the provision of best practice goods that will eventually vanish when a new product is introduced into the market.

In contrast to the earlier neoclassical models in which the economy presumably reached a steady state, the new growth models allowed for perpetual growth given "the presence of increasing returns to scale or externalities which guarantee that marginal productivity in the accumulation of factors does not go to zero when these factors are accumulated" (Freeman and Soete, 1997: 325). Additionally, the new growth models have placed less importance on traditional factors of production and seek to grasp the qualitative nuances that can be observed within each of these factors. In the case of labour, for example, a distinction is made between 'ordinary' labour and 'human capital', the latter being characterised by a major input in R&D (and, therefore, with a higher impact on economic growth). Similarly, in the case of capital, 'physical' capital is distinguished from 'knowledge', which is considered to be more intensive in R&D.

In his critical discussion of the new neoclassical models Nelson (1997) argues that although the adoption of these more realistic assumptions has certainly contributed to improving the explanatory power of the models in regards to the contribution of technical change to economic growth, it has not really involved the development of new ideas. Rather, these changes represent a formalisation of concepts that had already been advanced by authors such as Abramowitz in the 1950s.

Furthermore, Nelson (1997) argues that the new models still suffer from significant shortcomings stemming from overly simple assumptions that prevent them from providing an accurate analysis of the findings yielded by empirical research. Among the most controversial assumptions, the author points out the example of perfect foresight, according to which economic agents have the ability to predict the future value of the variables of the model. This assumption strongly contrasts with the uncertainty that comes with innovation activities, "given the impossibility of predicting accurately the cost and performance of a new artefact, and the reaction of users to it" Pavitt (2005: 88). In the same vein, these models adopt a highly simplified idea of the nature of the firm, which is the innovative agent *par excellence* in contemporary capitalism (Bell and Pavitt, 1993; Fagerberg, 2005). For instance, managerial and organisational aspects of the firm remain uncovered. Finally, it can be pointed out that formal neoclassical models do not provide adequate analytical tools to grasp the influence of institutions on technological innovation and economic growth, in spite of the central role they play in shaping the environment in which economic agents operate (Edquist, 2005; Lundvall, 1992; Nelson, 1997).

To sum up, despite the advances made by the new growth theory significant shortcomings remain, fundamentally stemming from its incapacity to grasp the complex and multi-dimensional nature of technical change. As Dosi *et al.* (2000) put it:

> Innovation […] is intrinsically a matter of specifics and details in its origins and impacts –in inspiration, incentives, products, processes, firms, markets– and innovation does not aggregate

> in any simple way. Nevertheless, the tendency in mainstream growth theory, old and new, has been to try to have it both ways –to acknowledge innovation's centrality to growth but to resist the implication that a better understanding of growth must be grounded in better understanding of the micro level processes that produce economic change (Dosi *et al.*, 2000: 18).

1.1.2. The evolutionary approach: bridging the gap between the micro and macro levels of analysis

By contrast with the neoclassical economics framework, which provides a few models of reference, it is more difficult to clearly identify a discrete 'evolutionary growth model' (Verspagen, 2001). The analytical tools used by this approach are less formalised, giving shape to a more 'eclectic' framework in which concepts are used from economic theory as well as from political, sociological and historical analysis. This allows evolutionary authors to provide a more realistic description and analysis of the mechanisms that regulate the process of technological change.

It is therefore difficult to provide a concise overview of the evolutionary approach. Accordingly, this section will focus on three specific ideas developed within this framework as these provide useful tools to understand how knowledge-creating activities are organised within MNCs. These ideas fundamentally refer to: i) the bounded rationality and heterogeneity of firms; ii) the incremental nature of the process of technological change; and iii), the systemic and historically-bounded character of this process.

- *The evolutionary metaphor: bounded rationality and heterogeneous routines of firms*

Nelson and Winter (1982) made a seminal contribution to the development of the evolutionary theoretical framework. In their work they attempted to close the gap between the analysis of the firm at a micro level and the study of the process of economic growth at sectoral or aggregate level. One of the most significant differences with respect to the neo-classical framework concerns the assumptions made about the conduct of economic agents. In essence, Nelson and Winter (1982) rejected the neoclassical idea of the 'perfect rationality' of economic agents and, drawing on Herbert Simon's (1979) studies, asserted that individuals and firms have 'bounded rationality'. According to Nelson and Winter (1982), reality is too complex to comprehend. Therefore, on the basis of the information they possess, firms make their decisions on the basis of simple rules and procedures, referred to by the authors as 'routines'. In the same vein, Nelson and Winter (1982) deem inappropriate the idea of 'maximising behaviour' assumed by neoclassical models. Rather they maintained that, as a result of the adoption of 'better' or 'worse' routines, the outcomes could be, at best, considered as 'satisfactory' but never 'optimal', as claimed by the neoclassical theory.

Likewise, evolutionary authors also reject the idea of the 'representative agent'. Since firms are inherently different from one another, and there is not a single optimal behaviour, it is assumed that heterogeneity between economic agents prevails. The 'survival' of firms is determined by a selection mechanism that operates through market competition. 'Mutation'[17] –the biological metaphor employed to make reference to 'innovation'– is the mechanism used by firms to survive to the changing conditions of the environment in which they operate. With the objective of improving their performance, firms modify their routines in order to introduce changes in the products they elaborate; in the processes they follow to manufacture those products; and in the organisational structures within which routines develop.

However, mutation is not, as the neoclassical framework suggests, the result of a "deliberated choice from a broad menu of alternatives that some external observer considers to be available opportunities for the organization" (Nelson and Winter, 1982: 134). In fact, "[t]he menu is not broad, but narrow and idiosyncratic; it is built into the firm's routines, and most of the 'choosing' is also accomplished automatically by those routines" (Nelson and Winter, 1982: 134). The evolutionary process is path-dependent as the selection of today's routines is highly conditioned by the routines followed in the past. In sum, from this perspective, it is therefore possible to explain the co-existence of firms operating within the same environment with different technological traditions, routines and strategies.

- *The incremental nature of the technological learning process*

In the traditional view on the process of technological change embraced by the neoclassical framework, the process of technological diffusion entails a sharp distinction between the notion of 'innovation' and that of 'diffusion' (Bell and Pavitt, 1993). Whereas the former essentially corresponds to the generation of new technologies in industrial countries, the latter refers to the transfer of those technologies to less industrialised nations operating far from the technological frontier. Evolutionary students have put into question this differentiation arguing that the dividing line between innovation and diffusion is rather blurry (see, for instance, Bell and Pavitt, 1993).

This observation has relevant implications for developing countries, which in the neoclassical view are seen as passive recipients of knowledge embodied in machinery or codified in blueprints. As a matter of fact, empirical evidence shows that the application of innovations already in use in the 'developed' world new to the firms in developing countries usually requires the introduction of local adaptations of varying degree of complexity which, in themselves, represent incremental innovations. They entail changes in production processes, products or organisational structures. Therefore, developing economies are not doomed to be the passive recipients of technologies developed abroad, but, more promisingly, they are able to develop their own innovations (Bell and Pavitt, 1993; Kim, 1997).

However, in order to be able to introduce these innovations, firms have to acquire some specific skills that will allow them to manage the process of technical change adequately. Evolutionary authors have referred to these skills as 'technological capabilities' (Bell and

[17] The use of terms such as 'mutation' explicitly reveals the connection between the evolutionary economic framework and the evolutionary biology theory on which it draws on.

Pavitt, 1995; Fagerberg and Godinho, 2005; Fagerberg *et al.*, 2010; Kim, 1997; Lall, 1992).[18] More precisely, Bell and Pavitt (1995: 71) defined the 'technological capabilities' as the "domestic capabilities to generate and manage change in technologies used in production" (Bell and Pavitt, 1995). In the same vein, Kim (1997), in his study of the Korean process of industrialisation, refers to them as:

> […] the ability to make effective use of technological knowledge in efforts to assimilate, use, adapt, and change existing technologies. It also enables one to create new technologies and to develop new products and processes […] (Kim, 1997: 4).

The explicit mention of activities such as assimilation, use, adaptation and change correspond to Kim's (1997) conception of the development process as a path that goes from the imitation of technologies generated abroad to the generation of innovations domestically. The latter constituting the final stage in which the firm is finally capable of generating and applying knowledge for the creation of state-of-the-art products and processes.

Drawing on the technological capabilities matrices developed by Lall (1992) and Bell and Pavitt (1995), Figure 1-1 offers a simplified view of the process of accumulation of technological capabilities in firms. The lowest level corresponds to the capacity to conduct basic operative operations and provide support to maintain and improve products, capital equipment, and processes of production. At this level firms are able to operate *within a given technology*. As capabilities increase, firms are able to introduce changes which are initially modest in nature. They might be related, for instance, to the necessity to adapt products in compliance with the local availability of raw materials or to satisfy the particular tastes of domestic clients and consumers; or to adapt the production process to the skills of local workers. As firms accumulate new skills, incremental innovations can become more sophisticated and intensive in knowledge as well as targeting wider markets. In a nutshell, the evolutionary approach conceives the firm as an agent which progressively accumulates capabilities necessary to manage an increasingly complex *process of technological change*. This incremental process is referred to as 'technological learning'.

[18] As the distinction between innovation and diffusion became less strict in the innovation literature, the focus of attention of empirical studies changed. Instead of focusing on the problem of the transfer of technology from industrialised to non-industrialised countries, the literature explored how indigenous capabilities are developed, and how backward nations can master and adapt technology to domestic conditions (Fransman, 1984). Early empirical studies on these issues dealt with the experience of some developing economies, such as Hong Kong, South Korea, India, Argentina, Brazil and Mexico, which were managing to develop indigenous skills to assimilate foreign technology and even to generate incremental innovations. Two large-scale projects were conducted in this field in the 1980s: one directed by Jorge Katz on the metal-mechanic industry in Latin America –see Katz (1986; 1987)–; the other by Carl Dahlman and Larry Westphal on firms located in India, South Korea, Brazil and Mexico (the results have been summarised in summarissed in Dahlman (1982), Lall (1987), Dahlman et al. (1987)). Case studies providing evidence of these experiences can be found in Fransman and King (1984), Katz (1987), Lall (1987), Kim (1997), Katz and Kosacoff (1998).

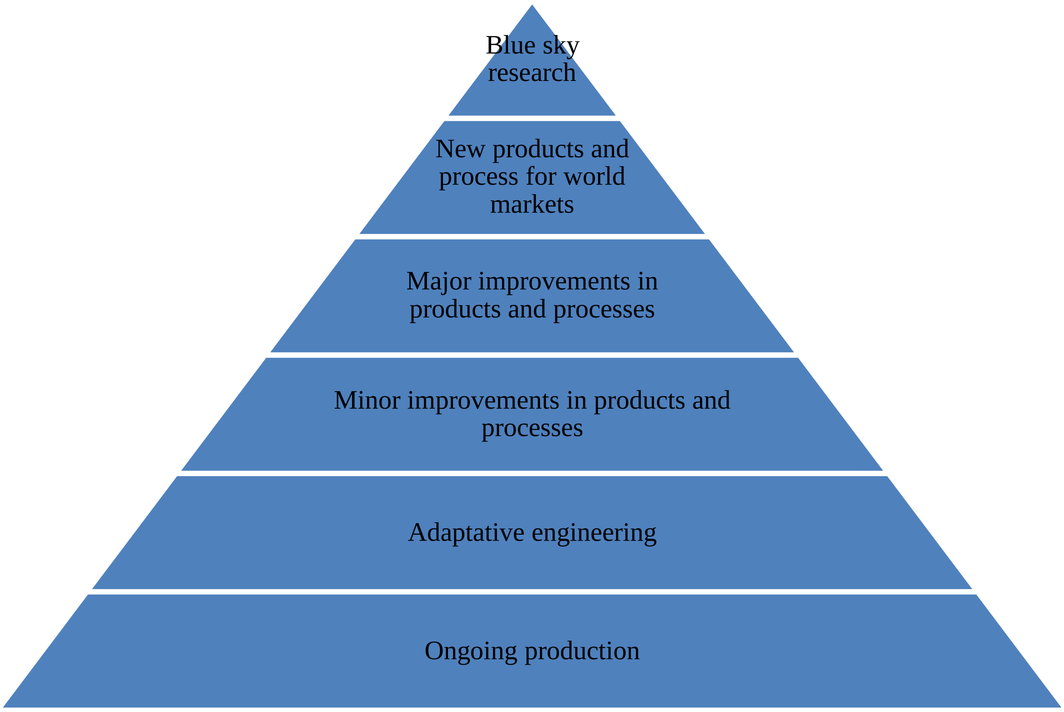


Figure 1-1- Levels of technological capabilities
Source: own elaboration adapted from Hobday (1999)

The path of technological learning, however, should not be understood in deterministic fashion, that is, as an automatic self-sustained accumulation process simply replicating a well-established path first traced by today's developed economies (Hobday and Rush, 2007). As pointed out by Bell and Pavitt (1995): "[capabilities are] based largely on specialized resources [which] need to be accumulated through deliberate investment" (Bell and Pavitt, 1995: 71). The evolutionary literature accounts for different learning modalities carried out by firms to accumulate technological capabilities. In a nutshell, they have been classified in two ideal modes: Science, Technology and Innovation modes (STI); and Doing, Using and Interacting mode (DUI) (Jensen *et al.*, 2007). Whereas the former is based on the production and use of codified scientific and technical knowledge, the latter is an experienced-based mode of learning.

Both scholars and policy makers have primarily focused their attention on STI modalities (Jensen *et al.*, 2007), stressing the limits of doing-based learning. In order to move up in the capabilities ladder, it has been argued, firms need to carry out more knowledge-intensive efforts, typically including different forms of R&D activities (Bell, 1984; Bell and Pavitt, 1993; 1995; Verspagen, 2001). However, from different perspectives, various authors have stressed the role of both intra-and extra-firm interactions to foster the technological learning process –DUI forms of learning– (Dutrénit, 2000; Figueiredo, 2001; Jensen *et al.*, 2007; Kim, 1997; 1999; Nonaka and Takeuchi, 1995). Studies in this field have shed light on the different processes through which tacit and codified knowledge is converted into organisational knowledge underpinning the accumulation of capabilities by firms.

- *The systemic nature of the process of technological change*

The third contribution made by the evolutionary framework which provides useful conceptual insights for the purposes of this study refers to the systemic nature of the process of technological learning. From the evolutionary perspective, even though the accumulation of capabilities is fundamentally carried out within firms, technological learning results from the interaction and collaboration with private and non-private agents (e.g. universities, research institutes) whose behaviour is shaped by a set of historically- and geographically-bounded institutions. This view has given rise to the concept of 'system of innovation' (Edquist, 2005).

Drawing on the early work by Christopher Freeman in the 1980s (Freeman, 1987)[19], the concept of national innovation system was developed in the early 1990s by Bengt-Åke Lundvall (1992) and Richard Nelson (1993). The writings of these authors gave rise to two different streams of literature on this topic. Nelson's research was primarily focused on the empirical study of science and technology organisations, whose "interactions determine the innovative performance of national firms" (Nelson, 1993: 4).[20] Lundvall, instead, claimed that innovation systems encompassed both the organisations that interact and collaborate in the process of learning, and the rules that "provide agents and collectives with guide-posts for action" (Lundvall, 1992: 10). Consequently, his analysis goes beyond the study of R&D activities carried out by specialised organisations. Lundvall incorporates the political and cultural dimensions into the examination of the processes of technological change, arguing that these are important factors in determining the scale, direction, and relative success of innovative systems (Edquist, 2005; Godin, 2007).

This systemic approach to technological change recognises the historically-bounded nature of the learning process. Contrary to the 'timeless' neoclassical models, evolutionary authors maintain that each 'wave of technical change' observed in history is characterised by particular features in what regards, for instance, the characteristics of the most dynamic sectors, the system of training and education, or the dominant infrastructure (Freeman and Soete, 1997).

Nevertheless, it is worth mentioning that the development of the system of innovation approach has mainly built upon the experience of advanced countries.[21] As indicated by Arocena and Sutz (2005), it is difficult to identify the very existence of innovation systems in developing regions such as Latin America from conceptual frames built upon the study of

[19] The concept of 'national system of innovation' or 'national innovation system' was first used by Christopher Freeman (1987) in his analysis of the Japanese fast growth process during the post-World War II era. In his study, Freeman highlighted the importance of the linkages developed between the central government (especially the Ministry of International Trade and Industry, MITI) and Japanese business groups (*keiretsu*), as well as of some specific innovations regarding the system of education, characteristic of the accelerated process of technological change experienced by the country during this period.

[20] Nelson uses the term 'institution' as a synonym for 'organisation'. Lundvall, instead, distinguishes both concepts: he understands 'institution', in North's (1990) terms, as 'rules of the game'; whereas 'organisation' is used to make reference to the players or actors that participate in the game.

[21] An interesting exception is the handbook edited by Lundvall *et al.* (2009) which offers a collection of articles addressing from different angles the question of innovations systems in developing countries.

richer economies. In this region, spending in R&D is low, reliance on local knowledge institutions is limited, and the dependence on foreign embodied science and technology is high. In this environment, it is very difficult to diffuse micro-innovative strengths across the national system which by contrast remains encapsulated and isolated. Interestingly, Arocena and Sutz (2005) point out that the productive specialisation of Latin American economies, its particular insertion into the world economy –essentially as exporters of natural resource-based products– , and the extended presence of MNCs, do not contribute to promoting the endogenous generation of knowledge. On the contrary, these characteristics create conditions for a larger reliance on imported technology (Arocena and Sutz, 2005).

A systemic examination of technological learning experiences in developing nations requires the adoption of a more comprehensive framework, which takes into consideration the examination of more traditional industrial policy tools generally disregarded by mainstream innovation system approach (ECLAC, 2012). Since the post-World War II era, developing countries have opted for different industrialisation strategies –e.g. import substitution, export-led growth– which made intensive use of trade, monetary and fiscal tools (Amsden, 1989; Kim, 1997; Ranis, 1984; Wade, 1990). Although the evolution of economic multilateral institutions in the last decades has progressively set limits to the use of these policy tools (Rodrik, 2011), developing countries have maintained some autonomy in this field and still use them to promote the accumulation of domestic capabilities (Cimoli *et al.*, 2009a; ECLAC, 2012).

From the same comprehensive perspective on innovation systems, numerous authors –especially in Latin America– argue that the analysis of technological change in developing countries should also incorporate the examination of the macroeconomic dimension (see, for instance, Cimoli *et al.*, 2009b; Cimoli *et al.*, 2009c; ECLAC, 2012; Ocampo, 2005). Building upon the experience of developed economies with more stable macroeconomic environments, mainstream studies on innovation systems have generally neglected this dimension of analysis.

Literature on the macro-micro linkages in developing countries has collected empirical evidence showing that certain combinations of macro policies “are bound to suffocate industrial development and sterilize most opportunities of success of more technology- and industry-oriented polices” (Cimoli *et al.*, 2009b: 11). For instance, in the experience of the Southern Cone countries of South America during the 1990s, the preference for fixed exchange rates, trade opening and the liberalisation of capital accounts proved to be discouraging for the incorporation of local knowledge and the accumulation of capabilities (Cimoli and Katz, 2003). Moreover, developing countries have, since the late 1970s, become more vulnerable to a reversal in the direction of capital flows which generated sharp fluctuations in aggregate demand and exchange rates. Such vulnerability negatively affected the technological behaviour of domestic agents, inducing “long term ‘defensive’ and opportunistic attitudes at the level of individual firms” (Cimoli and Katz, 2003: 8).

In this section, three basic characteristics of the process of technological change have been briefly examined in the light of the evolutionary approach. This analytical framework offers powerful analytical tools for a more comprehensive examination of the capability accumulation process than that made possible by neoclassical economics. However, as has been pointed out above, the generation of technological capabilities within MNCs and their distribution among their various sub-units assume particular features which deserve to be examined with special attention. Learning processes in these organisations are conditioned by the existence of complex intra-firm hierarchies and power relations. At the same time, the trans-national nature of MNCs implies that their various sub-units are embedded in different host environments affected by specific systemic conditions.

With the objective of developing a framework to examine the specificities of the process of accumulation and the drivers of the geographical distribution of technological capabilities in automotive MNCs operating in the MERCOSUR, the next section will be devoted to a critical review of some analytical approaches that have dealt with these particular issues.

1.2. MNCs as leading drivers of the process of technological change. Accumulation and geographical distribution of technological capabilities

In the years that followed the end of the World War II, MNCs consolidated as the most prominent form of business organisation (Dicken, 2011). The expansion experienced by this economic agent has entailed that a growing share of the production and distribution of goods, services, financial resources and knowledge in the world remains under control of a highly complex and hierarchical organisation. The modalities through which MNCs have organised their business activities as well as the geographical scope of their operations have evolved over the years. Adjustments have largely responded to changes stemming from the normative and technological spheres.[22]

In the last thirty years, the evolving organisation of MNCs activities has given rise to the so-called global production networks (GPN). GPNs, themselves under the leadership of MNCs, are defined as "the globally organized nexus of interconnected functions and operations by firms and non-firm institutions through which goods and services are produced and distributed" (Coe *et al.*, 2004: 471). An increasing number of activities began to be outsourced by MNCs to external agents –including suppliers, universities, and governments, among others– with whom MNCs have progressively woven close-knit webs bound by a diversity of contractual arrangements. The emergence of GPNs is clearly reflected in the nature of international trade flows: for instance, commerce in intermediate inputs has grown extraordinarily as a result of the geographical fragmentation of the chain of production; likewise, the share of imported inputs in exported goods is much larger now than in the past (OECD, 2013a).

But the emergence of GPNs has not only affected the geographical scope of manufacturing and trading activities. The innovation process within MNCs also experienced significant alterations. Until around the mid-1980s, highly vertically integrated and hierarchical forms of organisation prevailed. Typically, knowledge-intensive activities were carried out by the parent company in its home country; subsidiaries were conceived as mere 'implementers' with minor adaptation responsibilities. Since then, MNCs have *adopted more decentralised forms of organisation to manage their innovation activities*. This evolution has implied, at

[22] With respect to normative changes, since the 1970s the world economy has experienced, at different levels of governance, a process of profound liberalisation of the flows of goods, services and capital (Eichengreen, 1996; Rodrik, 2011). This process progressively initiated in the 1960s, when the institutional framework which regulated the world economy accelerated the process of liberalisation. This was essentially the result of the effective implementation of the multilateral trade system after the Kennedy Round of the GATT. Initiated in 1964, this round of negotiations inaugurated a period of accelerated trade liberalization. This process was in parallel reinforced at regional level by the launch of various economic integration schemes, the most far-reaching in scope and depth being that of the Economic European Community which had been created in 1957. The liberalisation trends in the sphere of trade were later on, during the 1970s and 1980s, accompanied by a loosening of the restrictions and controls applied to financial capital and FDI flows, which dramatically increased international liquidity and reduced the cost of cross-border capital flows (Eichengreen, 1996). The second force, developed in parallel to the former, arose from an intense wave of technological progress in the spheres of transportation and communication. As a result, logistic costs were lowered and transportability of tangible and intangible goods facilitated. These advances contributed to 'shortening' time and distances, opening up new opportunities for the implementation of radical changes in the organization of production at global level (Dicken, 2011).

intra-firm level, the *delegation of increasingly complex responsibilities from the parent companies to subsidiaries overseas*; whereas, in regards to the MNC external network, new forms of outsourcing of innovation responsibilities have been put in place (Castellani and Zanfei, 2006; Schmitz and Strambach, 2009). As a result, MNCs have definitely consolidated as the main generators and organisers of knowledge and innovations worldwide. They control the key mechanisms of accumulation and diffusion of technological capabilities at a global level (Ernst and Kim, 2002).

The next three sections discuss conceptual approaches developed to contribute to the understanding of the process of generation of knowledge within MNCs, and in particular, of the role subsidiaries play in it. In order to put the current technological role of subsidiaries in historical perspective, the first section will examine the dominant forms of internal organisation of knowledge-creating activities within MNCs prevailing until the 1980s. The second section examines the new roles assumed by subsidiaries in the context of less hierarchical forms of organisations, and its effects in terms of the geographical distribution of technological capabilities.

1.2.1. The rigid hierarchies of the 'Hymerian' MNC

The organisational structure prevailing in MNCs until the mid-1980s, approximately, was characterised by the existence of a rigid vertical relationship between the parent company and its subsidiaries. The modes of production, marketing strategies, administrative procedures and technological platforms were determined by the parent company and subsequently transferred to subsidiaries overseas. In this scheme, the role of the latter was basically limited to the implementation of decisions made at and enforced by the upper levels of the organisation (Hymer, 1970).

Under the internationalisation strategies put in place by MNCs during that period, subsidiaries had two chief strategic motivations: firstly, to supply raw materials to the home country (i.e. resource-seeking motivations); secondly, to serve host-markets protected from international competition by high tariff walls (i.e. market-seeking motivations) (Dunning and Lundan, 2008).[23]

The technological competences demanded by this type of activities were rather basic, mostly limited to 'localisation' operations. Some adjustments, for instance, were necessary in order to tailor products and manufacturing processes to specific conditions prevailing in host-countries –e.g. availability of raw materials, skills of workers, labour regulations (Hedlund, 1986). Most of these adaptive activities, however, were far from the knowledge frontier and rarely resulted in the diffusion of knowledge resources across the local productive fabric.

[23] The so-called 'resource-seeking' strategies were the dominant motivation behind foreign direct investment flows to the underdeveloped world between the 19th century and the early 20th century. 'Market-seeking' strategies diffused between the 1940s and the 1970s, and still today are the main goal of many MNCs subsidiaries (Dunning and Lundan, 2008).

During this period, horizontal relationships between fellow subsidiaries scattered around the globe were almost non-existent. Against the background of a world economy characterised by the existence of high transportation costs, high trade barriers and local content requirements, subsidiaries virtually operated as watertight compartments. Hence, intra-firm linkages were almost exclusively limited to dyadic relationships with their headquarters (Hymer, 1971).

Drawing on the work of Chandler and Redlich (1961) on the multidivisional firm in the United States, Stephen Hymer (1970; 1971) examined the intra-firm division of labour between the various ‘sub-units’ of the MNC. He identified three different levels of activity in the corporate hierarchy of the MNC: the lowest level (III) corresponded to the management of day-to-day operations; level II was concerned with the coordination of the activities corresponding to level III; and level I, the apex of the pyramid, concerned the overall corporate strategy, goal determination and planning. Hymer’s stratified view of the corporation therefore relied on a clear distinction between strategic and knowledge-creating activities, on the one hand, and operational activities, on the other (Hymer, 1971).

When analysing the geographical distribution of such corporate hierarchy, Hymer showed that the higher the activity level the more geographically concentrated it was. Accordingly, level I activities were established in a few political, financial and cultural centres of power. Level II activities were generally located in large cities with a large availability of white-collar workers and communication systems. Finally, lower levels activities were spread out in peripheral regions depending on the resource endowments –raw materials and labour– and prevailing conditions in the host-economy –i.e. the domestic market.

Hymer analysed how the progressive enlargement of MNCs on a worldwide scale impacted on the international division of labour and, consequently, on the ability of underdeveloped countries to acquire the capabilities necessary to initiate a path of sustainable economic growth (Hymer, 1970; 1971; 1979). In a nutshell, he argued that there was a correspondence between the highly stratified internal structure of the MNC –referred to by him as the ‘microcosm’– and a hierarchical division of labour among the locations where the firm carried out its operations –the ‘macrocosm’. As Cantwell and Zhang (2009) clearly and succinctly put it:

> Inferring from the microcosm to the macrocosm, Hymer believed that the centralization of control within the MNC would lead to centralization of control within the international economy. Thus, geographical specialization would come to reflect the hierarchy of MNC corporate decision-making. With the increasing dominance of MNCs in the international economy, Hymer was concerned that the existing elements of inequality and dependency would be reinforced and perpetuated and peripheral regions might become locked in permanently (Cantwell and Zhang, 2009: 50-51).

Hymer argued that the conditions which favoured the functioning of this system and its reproduction over time were facilitated by the governments of the home countries of the MNCs. They actively supported the geographical expansion of their companies and, at the same time, sought to create a global institutional framework conducive to such expansion –

pushing, for example, for the removal of regulations restricting foreign direct investment flows and the reduction of trade barriers (Hymer, 1971). In this way, innovation activities, one of the critical sources of economic dynamism, were kept under lock and key within the boundaries of developed economies and remained completely outside the control of underdeveloped countries.

It is worth noting that Hymer's findings are closely connected to conclusions drawn by the world-system approach (for, instance, Wallerstein, 2004; Wallerstein and Hopkins, 1982), or the Latin American structuralist school of thought (Bielschowsky, 2009; Rodríguez, 2006). Sharing some common analytical tools, the two frameworks have stressed the role of MNCs –and their home countries– as crucial agents contributing to articulating a particular international division of labour which widens the asymmetries between central (or core) and peripheral areas.[24] In brief, core areas mainly concentrate in developed countries and correspond to locations where higher productivity and knowledge-intensive activities, paying greater salaries, are carried out. Peripheral areas are extensive in developing countries and correspond to regions were low productivity activities predominate. One of the crucial characteristics of the core-periphery scheme is the imbalanced geographical distribution of the benefits derived from technological progress in favour of the former.[25]

1.2.2. The internal reorganisation of MNCs: technological learning and subsidiary evolution

- *The redefinition of MNC strategies and the new roles of subsidiaries*

During the second half of the 1980s, the international business literature started to shed light on significant transformations taking place within MNCs and the new roles assumed by subsidiaries (Barlett and Ghoshal, 1989; Ghoshal and Barlett, 1990; Hedlund, 1986; Prahalad and Doz, 1987). The strongly hierarchical image of the MNC depicted by Hymer was progressively replaced by new characterisations. MNCs were now depicted as a 'heterarchy' (Hedlund, 1986), as a 'differentiated network' (Ghoshal and Barlett, 1990), or a 'federation' (Yamin and Forsgren, 2006). New conceptual strands concurred in pointing out that corporate top-down control mechanisms had been relaxed; and a more complex differentiation in the role played by subsidiaries within the corporate network had taken shape.

The internal mutation of MNCs has been largely a consequence of the redefinition of their business strategies and their consolidation as GPN's 'flagships' (Ernst, 2002). As a response to the more open international economy and the technological changes referred above, MNCs developed new strategic motivations for the geographical expansion of their activities that went beyond traditional natural resource- and market-seeking operations. They involved a

[24] For an early study by Latin American structuralism on the role of MNCs in the articulation of the centre-periphery international division of labour, see Sunkel (1973).

[25] This is an extreme simplification of the two analytical approaches referred above which have some important differences among them. For instance, Wallerstein and Hopkins (1982) introduce the concept of semi-peripheral areas, to make reference to locations, which occupy an intermediate position between the two extremes of the system, providing it with more stability.

realignment of functions which resulted in the delegation of more complex and technologically demanding responsibilities to subsidiaries overseas (Dunning, 1998). In order to provide responses to the competitive pressures posed by an increasingly knowledge-intensive economy, MNCs sought to exploit non-tradable, location-specific resources overseas. These resources encompass, for instance, agglomeration economies, organisational capabilities or the presence of technological knowledge built upon some specific resources 'sticky' to the territory. To have access to such resources, MNC required direct presence in territories abroad through the establishment of subsidiaries working in close collaboration with local agents (Dunning and Lundan, 2008).

Even traditional natural resource- and market-seeking strategies used by MNC in the past have adopted new characteristics as against this new contextual framework. Subsidiaries with resource-seeking mandates were given the responsibility of processing natural resources locally and to improve the conditions of transportation of their output, thus generating more opportunities for local technological upgrading.

When the main motivation is to serve markets with final products, MNC strategies have also been largely redefined with respect to previous host-market seeking operations. Subsidiaries now seek to seize the opportunities coming from lower trade barriers and the proliferation of regional integration agreements serving larger markets. With the objective of attaining more efficient scales, *subsidiaries have organised their business activities within regional spaces*. Units operating in different neighbouring locations specialise in complementary lines of production then commercialising products within broader geographical spaces (Dicken, 2011).

Rugman *et al.* (2011) argue that, in order to improve the efficiency of the corporation, MNC rationalise their operations within regional areas, seeking to improve the exploitation of the location advantages offered by each of the member countries. The impact of this reorganisation on the various functional areas of subsidiaries' activities is likely to be asymmetrical: whereas sales departments might be reinforced all across the region; administrative, production, and R&D functions are likely to be concentrated in one or a few locations to secure economies of scale and scope.

In a nutshell, over the last thirty years, subsidiaries have gained more autonomy and have been able to assume more knowledge-intensive responsibilities (Birkinshaw and Hood, 1998a; Castellani and Zanfei, 2006; Ghoshal and Barlett, 1990; Hedlund, 1986; Papanastassiou and Pearce, 2009). The new conceptualisations of the MNC see it as an entity that has "the ability to create global networks, utilise geographical specialized resources and transfer knowledge between different knowledge-creating nodes […]" (Cantwell and Zhang, 2009: 54). From this perspective, rather than controlling a large number of unconnected, submissive and technologically passive subsidiaries scattered around the world, the new role of the parent company is focused on the management of a differentiated network of technologically-active sub-units (Cantwell, 1989; 2009; Castellani and Zanfei, 2006; Narula and Zanfei, 2005). Drawing on their privileged access to location-specific resources, subsidiaries have become important agents to leverage the competitive advantages of the corporation as a whole (Ghoshal and Barlett, 1990).

- *Concentrated dispersion of technological capabilities*

As a result of the redefinition of corporate strategies, subsidiaries have gained participation in the process of knowledge creation, thus being able to accumulate technological capabilities and assume responsibilities of increasing complexity within their own corporation (Papanastassiou and Pearce, 2009). In turn, the technological upgrading of subsidiaries abroad and the closer collaboration they have established with local agents have improved their importance as driving agents of the processes of technological change in host territories (Marin and Arza, 2009).

Conceptually, these are important changes which contrast with the pessimistic Hymerian perspective (see discussion in pp. 23-25) and open up new perspectives for a geographical redistribution of technological capabilities in favour of peripheral countries. In practice, however, the scope of the geographical redistribution of knowledge-intensive activities has been characterised rather by a ‘concentrated dispersion’, to use the expression coined by Ernst (2002).[26] Only a handful of developing countries, mainly located in South East Asia, has really benefitted from the decentralisation of MNC technologically intensive activities. Other areas of the developing world, in contrast, maintain a marginal position within MNC innovation strategies (ECLAC, 2011; UNCTAD, 2005). The vast majority of technologically-active subsidiaries are located in regions that have already achieved relatively high levels of development and possess high degrees of technological capabilities (Cantwell and Iammarino, 2003; Cantwell and Zhang, 2009). As a matter of fact, most MNCs still concentrate the bulk of their most technologically intensive activities in their home country –mainly located in the so-called Triad countries– and are reluctant to perform these activities abroad (Dicken, 2011; UNCTAD, 2005).

[26] Empirical data on the process of geographical decentralisation of innovation activities is rather scarce. There are three main types of data: i) patenting by foreign affiliates; ii) survey-based evidence on R&D location; iii) R&D activities expenditures on MNCs. In this last case, the US is the only country which records data on the foreign R&D activities of their subsidiaries as well as of the activities of foreign subsidiaries in the US (Dunning and Lundan, 2009). Taking as a reference this latter indicator, the UNCTAD (2005) reported that the share of developing countries in the total R&D carried out by US MNCs overseas increased from 7.6% in 1994 to 13.5% in 2002. The difference can be almost exclusively explained by the increase of Asian economies (mainly China, Singapore, Hong Kong, Malaysia and the Republic of Korea) at the expense of EU countries and Japan. The R&D activities of these firms in developing economies are strongly concentrated in five countries that accounted for 70% of the total expenditure in 2002: China, Singapore, Brazil, Mexico and the Republic of Korea. In Latin America –a region that has been losing importance in the group of developing countries hosting R&D activities conducted by US MNCs foreign subsidiaries– 80% of the activities have been concentrated in Brazil and Mexico (UNCTAD, 2005). More recent information on FDI projects related to R&D activities announced for the period 2008-2010 confirms the increasing dynamism of the Asia Pacific region: compared to the period 2003-2005, R&D-related FDI flows to this region increased from 43% to 49%, largely exceeding inflows targeted to Western Europe (24%), and North America (16%). In this regard, Latin American countries did not manage to improve their relative position, as in both periods they attracted little more than 3% of R&D-related flows (ECLAC, 2011).

This geographical concentration of innovation activities can be partly explained by the methods used to measure them. Some authors, claim that the technological behaviour of firms –and subsidiaries, in this particular case– operating in developing countries should not be evaluated on the basis of traditional indicators of technological performance (e.g. patents, R&D expenditure) (see, for instance, Jaramillo *et al.*, 2001). It has been argued that these measures are not able to grasp the type of innovation carried out in these countries, rather based on engineering, design and development activities (Ariffin and Figueiredo, 2006).

Drawing on a more comprehensive technological capability approach (Bell and Pavitt, 1995; Lall, 1992), some authors show how subsidiaries operating in developing countries have been able to incrementally upgrade their technological capabilities. Through some selected case studies they have presented evidence of subsidiaries which managed to advance from simple assembly operations to activities requiring high-intermediate capabilities and, in some cases, advanced innovative skills (see, for instance, Ariffin and Bell, 1999; Ariffin and Figueiredo, 2006; Consoni and Quadros, 2006b; Figueiredo and Brito, 2011; Hobday and Rush, 2007). These types of studies show that subsidiaries in developing countries are not necessarily confined to the performance of very basic assembly-type activities but are capable of developing in-house technological capabilities. Additionally, they show that subsidiaries, as they upgraded their skills, were correspondingly given higher responsibilities by their parent companies.

However, the limited scope of these conclusions should clearly be acknowledged. These investigations chiefly deal with a limited range of ‘successful’ firm-level studies localised precisely in those countries which managed to achieve some appreciable level of technological development in particular areas –e.g. Brazil, Malaysia, and Thailand. Even though they provide valuable evidence about the mechanisms that can foster the accumulation of capabilities in subsidiaries operating in developing economies, they cannot –and do not aim to– provide evidence of a substantial geographical redistribution of technological capabilities in favour of peripheral regions.

1.3. The driving agents of the process of technological learning in MNC subsidiaries

The specialised literature on technological learning in MNCs has sought to understand who the relevant agents in the process of capability accumulation of subsidiaries are, and what their role is in it; or, to put it differently, which agents have the ability of altering the intra-firm division of labour –the ‘microcosm’ in Hymer’s terms–, encouraging the upgrading of some subsidiaries to more knowledge-intensive functions.

As pointed out above, technological learning within MNCs has particular characteristics given by the tensions resulting from the fact that:

- MNCs are *hierarchical organisations* in which parent companies retain a great deal of power largely based on their ability to control the access to strategic resources (e.g. knowledge) by other units of the corporation;

- by its own transnational nature, the various units of the MNC network –i.e. parent companies and subsidiaries– are embedded in *host areas endowed with different resources and regulated by specific normative environments*.

Whereas the corporate organisational dimension tends to favour the concentration of power in *parent companies*, the territorial dimension represents a potential source of autonomy and development –i.e. technological learning– for *subsidiaries*, as they have privilege access to differentiated resources (Ghoshal and Barlett, 1990). The third group of *agents with capacity to affect the evolution of subsidiaries includes the state and its sub-national units*, which are the regulators shaping the institutional frame within which GPNs operate. State agents seek to anchor higher income-generating activities in their territories.[27]

Pedersen (2006) suggests that the state, parent companies and subsidiaries themselves are the three agents with "vested *interests* in subsidiary development and the necessary *power* to influence the process of subsidiary development" (Pedersen, 2006: 6). The variety of agents and interests included in this 'triangle' entails the existence of an intricate network of relations and bargaining processes whose outcomes are "highly contingent and in which the precise geometry of power may well change over time" (Liu and Dicken, 2006: 1231). In this section, different strands of literature dealing with the role and actions of each of these agents will be briefly discussed.

1.3.1. Drivers of their own technological evolution: the growing autonomy of subsidiaries

As seen above (in particular, pp. 25-28), since the mid-1980s, the literature on international business and innovation studies on MNCs has stressed the increasing power gained by subsidiaries to autonomously lead their own evolution and disrupt the then prevailing intra-firm division of labour. The analytical approaches conceiving the MNC as a knowledge network have found that the main source of the autonomy of subsidiaries is the privileged access they have to resources embedded in differentiated economic and institutional domains (Barlett and Ghoshal, 1989; Cantwell and Iammarino, 2003; Cantwell and Zhang, 2009; Castellani and Zanfei, 2006; Papanastassiou and Pearce, 2009).

As Ghoshal and Barlett (1990) put it, the "efficacy of fiat"[28] is particularly limited in the case of multinationals not only because some of the subsidiaries happen to be very distant and resource-rich but, more so, because they control critical linkages with key actors in their local environments, particularly the host government" (Ghoshal and Barlett, 1990: 607). Thus, even though parent companies still enjoy considerable authority, "the existence of such authority does not necessarily lead to fiat as the dominant or even the 'last resort' mechanism of control" , 1990: 607). In the same vein, Yamin and Forsgren (2006) assert that in MNC

[27] There are other groups of agents which have been identified in the literature as influential actors in the process of articulation of GPNs: labour organisations, consumers, and civil society organisations (Coe *et al.*, 2008; Coe *et al.*, 2004). Without denying the importance of these groups, this study will focus on the role of parent companies, subsidiaries and state agents since they have been singled out by specialised literature as the most influential force in the technological learning process (Pedersen, 2006).

[28] Ghoshal and Barlett (1990) use the term "fiat" to refer to the "hierarchical power" within the MNC (Ghoshal and Barlett, 1990: 607).

networks the notion of a strict separation between strategic and operational domains –which prevailed in Hymer's view– breaks down (see pp. 23-25). Although headquarters are typically the most powerful unit within federative MNCs, "strategic power is in fact distributed rather than residing exclusively at headquarters" (Yamin and Forsgren, 2006: 174).

Empirical evidence supports this idea. However, it has been shown that it is especially the access to specific geographically bounded knowledge resources that gives real power to subsidiaries. Territories with a large and well-qualified skilled workforce, good research centres and universities, and an adequate infrastructure –all components of the evolutionary innovation system (see discussion in pp. 19-21)– provide subsidiaries with better conditions to weave dense knowledge-creating networks and upgrade their capabilities (Cantwell and Iammarino, 2003; Cantwell and Zhang, 2009; Castellani and Zanfei, 2006; Papanastassiou and Pearce, 2009).

From this perspective, therefore, subsidiaries operating in these type of environments have gained room to *undergo an autonomous 'creative transition' that allows them to accumulate technological capabilities* (Papanastassiou and Pearce, 2009). Along with this increasing autonomy, they have *more power to negotiate the transfer of resources and the delegation of more knowledge-intensive responsibilities from their headquarters* (Dicken and Malmberg, 2001).

The situation is completely different for subsidiaries operating in environments rich in labour or natural resources which receive efficiency-seeking mandates from their parent companies. The technology used by subsidiaries in these cases is fundamentally developed and provided by other units of the corporation which, at the same time, retain the power to make decisions on the allocation of the products and services they produce and the relationships they establish with other points of the corporation (Papanastassiou and Pearce, 2009). Their differentiated role within the corporation is fundamentally underpinned by the price in the host economy of some specific factors of production. A variation in such price might result in the vanishing of their sources of competitiveness and the allocation of their efficiency-seeking strategic mission to other subsidiaries. In sum, the sources of the differentiated position enjoyed by these subsidiaries within the MNC network are completely external to them: they stem from the juxtaposition of advantages provided, on the one hand, by the technology developed by the corporation; and, on the other, by a specific resource availability offered by the host-environment (Papanastassiou and Pearce, 2009).

1.3.2. Corporate strategy: the relentless power of the parent company

Various authors have criticised the views of the MNC as a differentiated knowledge network in which subsidiaries have autonomy to make decisions on their own technological trajectory (see, for instance (Coe *et al.*, 2008; Dicken and Malmberg, 2001; Geppert and Dörrenbächer, 2011). As the process of subsidiary evolution is conceived as an ideal, a-political process, managed exclusively on the basis of efficiency criteria, the above referred analytical approaches are not able to grasp its inherently conflictive nature.

Despite the growing autonomy of subsidiaries, it is clear that parent companies still maintain a great deal of power to regulate their development process. The capacity of subsidiaries to embark in a virtuous learning trajectory should therefore be analysed by taking into consideration how it interfaces with different dimensions of the corporate strategy which are largely controlled by the headquarters, among them: the technological strategy and level of decentralisation of the process of innovation activities; the degree of differentiation of the product strategy; the internationalisation strategy; and the method used for the allocation of resources and mandates within the corporation (Papanastassiou and Pearce, 2009).

In their study of the technological trajectory of a group of MNC subsidiaries operating in Thailand, Hobday and Rush (2007) observe that the technological strategy and level of decentralisation of this strategy was critical in determining the learning performance of subsidiaries operating in that country. They found that in the case of the analysed subsidiaries, the technological strategy and the type of organisation of R&D activities were largely related to the national origin of the parent company: whereas subsidiaries of Japanese origin exhibited lower levels of capabilities, basically limited to assembly operations; North American and European units, by contrast, had been able to operate with higher autonomy and to acquire more complex technological capabilities.

Ariffin and Bell (1999) studied the technological performance of subsidiaries operating in the electronics sector in Malaysia. They observed that the ability of subsidiaries to build up a basic knowledge base fundamentally depended on the establishment of capability-building links decided by their parent companies. *Only when subsidiaries had attained intermediate innovation capabilities were they able to adopt initiatives with a certain degree of autonomy*.

As will be seen in further detail in Chapter 2, in the specific case of the automotive industry, scholars have clearly showed that the technological strategy and level of decentralisation of innovation activities is closely related to the characteristics of the product policy defined by the parent company (see, in particular, pp. 35-48). The adoption of global platform[29] strategies tends to result in the centralisation of product development activities in one single location, relegating the role of subsidiaries to minor adaptations or assembly operations. By contrast, more differentiated product policies, oriented to offering models tailored to meet the preferences and tastes prevailing in different markets, result in the delegation of more active product development responsibilities in subsidiaries (Jullien and Pardi, 2013).

In the same vein, the objectives and geographical scope of the internationalisation strategy defined at the level of the headquarters is also crucial in determining the scope for technological learning in subsidiaries. Those units located in areas considered to be strategic are more likely to have more room to upgrade their capabilities (Birkinshaw and Hood, 1998b). Once again, this is very clear in the experience of the automotive industry, where parent companies proved to become more open to delegate some product development

[29] The term platform in the automotive industry makes reference to a set of systems and sub-systems shared by a group of vehicles. Although it varies in each case, it is common that platforms include: the chassis and other structural and mechanical components; front and rear axles as well as the distance between them; steering mechanisms; suspension systems; placement and choice of engine and other powertrain components.

responsibilities to those subsidiaries operating in regions –even in developing countries– considered to be strategic for their business goals: the United States in the case of Toyota (Ichijo and Kohlbacher, 2007), Brazil in the case of Fiat (Ciravegna, 2003), and Romania in the case of Renault (Jullien *et al.*, 2012), to mention a few of them.

The allocation of resources and responsibilities among subsidiaries is also centrally managed by the parent company. The methods used by the headquarters to carry out this function range from open request-for-proposal procedures, in which subsidiaries have to compete for new mandates, to more managed competition processes (Birkinshaw and Hood, 1998b). This opens up a process of competition among the MNC sub-units which "manifests itself in terms of social and political processes, such as lobbying, negotiating, and initiative taking, that help to shape a unit's charter" (Birkinshaw and Lingblad, 2005: 675). However, subsidiaries showing a better performance and having accumulated a higher level of capabilities are always in a better position to be given the benefit of more complex responsibilities being delegated to them.

1.3.3. The role of state agents as promoters of subsidiary technological development

As already pointed out, the activities of MNCs are grounded in specific locations. The nation state continues to be the most important bounded territorial form and political structure in which GPNs are embedded (Dicken, 2011). However, both supra-national and sub-national units have gained relevance in the last two decades as regulators of the economic activity (Coe *et al.*, 2004; Dicken, 2011; Yeung, 2009). As asserted by Dicken (2011): "All *global* production networks, by definition, have to operate within *multiscalar* regulatory systems. They are, therefore, subject to a multiplicity of geographically variable political, social and cultural influences (Dicken, 2011).

As leaders of complex GPNs, within which goods, services, financial resources, knowledge and so on circulate across borders (Coe *et al.*, 2008; Henderson *et al.*, 2002), MNC have a preference for flexible regulatory schemes which facilitate the mobility of resources – 'slippery spaces' in the words of Markusen (1996). Such schemes provide more convenient conditions to take advantage of differences in costs, quality and availability of resources among different geographical areas.

On the other end, states and their sub-national units endeavour to capture as much as possible of the value created within their boundaries. With this purpose, they put in place policies and regulations aiming to 'embed' the activity of transnational agents in their territories –i.e. to multiply the direct and indirect spillovers generated by their activity, including the establishment of knowledge-intensive linkages with local agents.

A tension therefore prevails between the 'flexible territories' of multi-locational/transnational agents and the 'fixed territories' of national and local state units (Phelps and Fuller, 2000). Subsidiaries occupy a crucial intermediate position in this scheme, functioning as a sort of interface between these two opposing poles. On the one hand, subsidiaries benefit from liberal schemes allowing for a better interconnection with their own MNC network and other sources of knowledge, goods and services abroad. However, on the other, their own technological development and autonomy can be significantly strengthened by a deep embeddedness in host territories to which they have a privileged access.

Empirical literature confirms this idea, showing that subsidiaries with a better technological performance are those attaining a deep 'dual embeddedness', i.e. in intra-corporate and local knowledge networks. (see, for instance, Figueiredo and Brito, 2011; Giuliani and Marín, 2007; Marín and Giuliani, 2008).

Liu and Dicken (2006) conceive of two types of involvement of MNC subsidiaries in host countries: 'active' or 'obligated' embeddedness. The former generally prevails when the main motivation of a MNC to settle a subsidiary in a given territory is to exploit assets which are widely available in different geographical locations. In this case, the power of states to influence the behaviour of transnational agents to achieve a more profound embeddedness of their subsidiaries in its territory is relatively weak.

'Obligated' embeddedness is likely to occur when MNCs seek to have access to region-specific or state controlled assets which are complementary to their strategic needs, for example: technology, skills, labour, natural resources, or large and affluent consumer markets (Coe *et al.*, 2008; Henderson *et al.*, 2002; MacKinnon, 2012)[30]. In these cases, state agents with the capacity of controlling such resources are in a more solid position to establish criteria MNC have to meet in order to have access and make use of them. The purpose of public interventions is to multiply linkages with the domestic productive fabric, i.e. to attain a more profound embeddedness of subsidiaries. In this process, subsidiaries may find in state agents an 'ally' to promote their own technological development and upgrade their positions within their corporations.

The building of coalitions underpinning a 'deep' embeddedness of subsidiaries in host economies is, however, a highly contested process whose outcome largely depends on the relative power of the actors involved (Yeung, 2009). It requires an 'active intervention' and 'intentional action' of state agents to conciliate the strategic interests of MNCs and local resources (Yeung, 2009). Governments at different levels –ranging from the federal to municipal one– use a wide range of policies and regulations to this end: minimum domestic content requirements, conditional trade policy schemes, knowledge transfer provisions, requirement of joint-venture with local firms, access to subsidised loans for companies using local inputs and capital goods, etc.

Regional integration initiatives, such as the EU, ASEAN or MERCOSUR, can be understood as a form of collective action to 'obligate' MNC subsidiaries to embed in a regional space. The coordination of public initiatives by a group of neighbouring countries strengthens their position to control assets which are strategic for the sustainability corporate business strategies –e.g. access to a large regional market. In the particular case of MERCOSUR, for instance, Argentina and Brazil have agreed on some rules to create a larger car market. In

[30] The notion of 'obligated' embeddedness is similar to that of 'strategic coupling' used, for instance, by other geographers as Coe *et al.* (2004) and Yeung (2009).

order to have access to such markets without tariff restriction, companies have to localise a certain portion of their manufacturing activities in member countries (see Chapter 4, pp. 67-85).

It is worth noting that the degree of embeddedness of MNC subsidiaries in a given territory is not only affected by actions adopted by the host country government. Economic and political processes taking place in other countries or in the global economic as a whole also affect the configuration of the MNC network –e.g. changes in economic regulatory framework, in macroeconomic environment, etc. Hamilton and Gereffi (2009), for instance, argue that the incorporation and upgrading of South Korean and Taiwanese firms in global value chains controlled by US companies, was largely due to changes in the organisation of the retail sector in the US itself. These changes were characterised by new forms of offshoring manufacturing, the emergence of buyer-driven commodity chains and the transformation of global logistics. In this way, the authors somehow challenge –and somehow reverse– the traditional developmental state argument [31] accounting for the success of East Asian economies in the post-World War II era (Amsden, 1989; Evans, 1995; Wade, 1990).

The automotive industry provides abundant evidence in this respect. It has been shown that one of the main motivations for carmakers to expand their production overseas has to be found in the saturation of the car market and relatively low growth perspectives of their home countries in the Triad –in particular in the wake of the crisis of 2009 (see, for instance, Freyssenet, 2009b; Freyssenet *et al.*, 1998; Jullien and Lung, 2011).

[31] The notion of developmental state refers to the role of state agents as leading actors of the development process of late-industrialising countries. The literature has stressed the extensive regulation and planning capacity of state bureaucrats to formulate effective industrial policies to foster economic development. From an empirical perspective, developmental state literature has devoted particular attention to the experience of Asian countries like Japan, South Korea, Taiwan, Singapore; and countries like India and Brazil. In addition to the already referenced pieces of work, see Chibber (2003); Kohli (2004).

Chapter 2 - Developing an analytical framework for the analysis of technological learning processes in automotive MNCs subsidiaries operating in regional integration agreements

The literature review in Chapter 1 discussed different analytical approaches dealing with the question of the creation and distribution of knowledge within MNCs. The purpose of such a critical review was to provide conceptual insights to develop a framework of analysis to examine the evolution of the intra-firm division of labour among subsidiaries of automotive MNCs operating in the MERCOSUR region.

The automotive industry offers a privileged 'laboratory' to explore the technological behaviour and the division of labour among subsidiaries which carry out technological learning within the MERCOSUR integrative project and to better understand what the drivers of such a process are. As will be seen below, regional areas have become the preferred space for carmakers to deploy their business strategies –see pp. 35-48 (see, for instance, the volume by Carrillo *et al.*, 2004). This has not only significantly affected the geographical organisation of their manufacturing and commercial activities of subsidiaries, but has progressively disrupted the intra-firm division of labour in product engineering functions.

After exploring the main aspects of the changing geography of the automotive industry, the second section presents the research questions of this study and discusses the analytical framework that will be used to address them.

2.1 Global restructuring of the automotive industry and the changing geography of the intra-firm division of labour

Since the early 1990s, the organisation of automotive production networks has undergone a major reorganisation (Dicken, 2011; Jullien and Lung, 2011; Sturgeon *et al.*, 2009). The relaxation on restrictions on trade and capital flows created a regulatory environment favourable to their geographical expansion. New consumption and production centres outside the traditional Triad regions emerged. Until then, a small group of countries from these affluent regions accounted for about 75% of total consumption and 85% of production.

The geographical transformation of the car industry also resulted in an expansion of the spatial extent around which the nodes of the global automotive networks are organised. Prevalent forms of organisation of production networks around national spaces were, in most regions, replaced by networks of regional geographical scope (see pp. 36-41). These changes entailed an extraordinary expansion of the scale of production and the emergence of regional 'automotive spaces' with differentiated consumption patterns. This process was further accentuated by the proliferation of liberalisation agreements among neighbouring countries – or the deepening of those already existing–, such as the EU, the NAFTA, etc. (Dicken, 2011; Van Tulder and Audet, 2004).

The strategic response of carmakers to this new scenario was the progressive diversification of their product policy. Specific models or family of vehicles were developed for its exclusive commercialisation in emerging regions. This entailed, in turn, a reorganisation of their intra-firm division of labour. Some selected subsidiaries located in emerging countries assumed more knowledge-intensive product engineering responsibilities and were able to undertake an intense technological learning process.

These changes were not only promoted by regulatory forces, but also by important technological innovations developed by automotive companies. Particularly relevant for our research problem is the increasing use of 'shared platforms' by carmakers[32]: i.e. a range models which use different bodies and are equipped with different features, but share a large number of 'invisible' components (e.g. engine, transmission systems, suspension and exhaust systems, axis).[33] The use of shared platforms allowed carmakers to simultaneously meet two objectives: firstly, to benefit from larger scales of production of generic parts and subsystems; and secondly, to meet a heterogeneous demand from clients with different consumption profiles as defined by their income levels, tastes, etc. (Boyer and Freyssenet, 2000).

2.1.1 Balancing the map: the emergence of new production and consumption centres

Since the early 1990s a group of 'emerging' countries from Asia, Latin America, Central and Eastern Europe has sharply increased its share in world vehicle manufacturing and consumption volumes to the detriment of Triad industrialised countries. As can be seen in Figure 2-1, the sharp rise in the world production of vehicles from 44 million units in 1985 to 84 million in 2012 has been essentially explained by the performance of this group of emerging countries. In fact, the total production of Triad countries fell in absolute terms from 37.8 million to 35.1 million.

[32] Other important technological innovation implemented by the automotive industry during this period is the 'modularisation' of certain components. That is, the development of 'modules', defined as a "group of components arranged close to each other within a vehicle which constitute a coherent unit. A component system is a group of components located trough-out a vehicle that operates together to provide a specific vehicle function" (Dicken, 2011: 340). The diffusion of modular and systems-based architectures favoured an increasing outsourcing of manufacturing activities to external suppliers, which assumed co-design responsibilities with carmakers. As a result of this process, the contribution of suppliers to the total value of the vehicle arose to around 70%-80% (Jullien and Lung, 2011; Sturgeon *et al.*, 2009).

[33] The origins of different vehicle models using the same platform should be traced back to the so-called Sloanian model –after Alfred Sloan, who implemented it during the 1940s as CEO of General Motors (Freyssenet, 2000b).

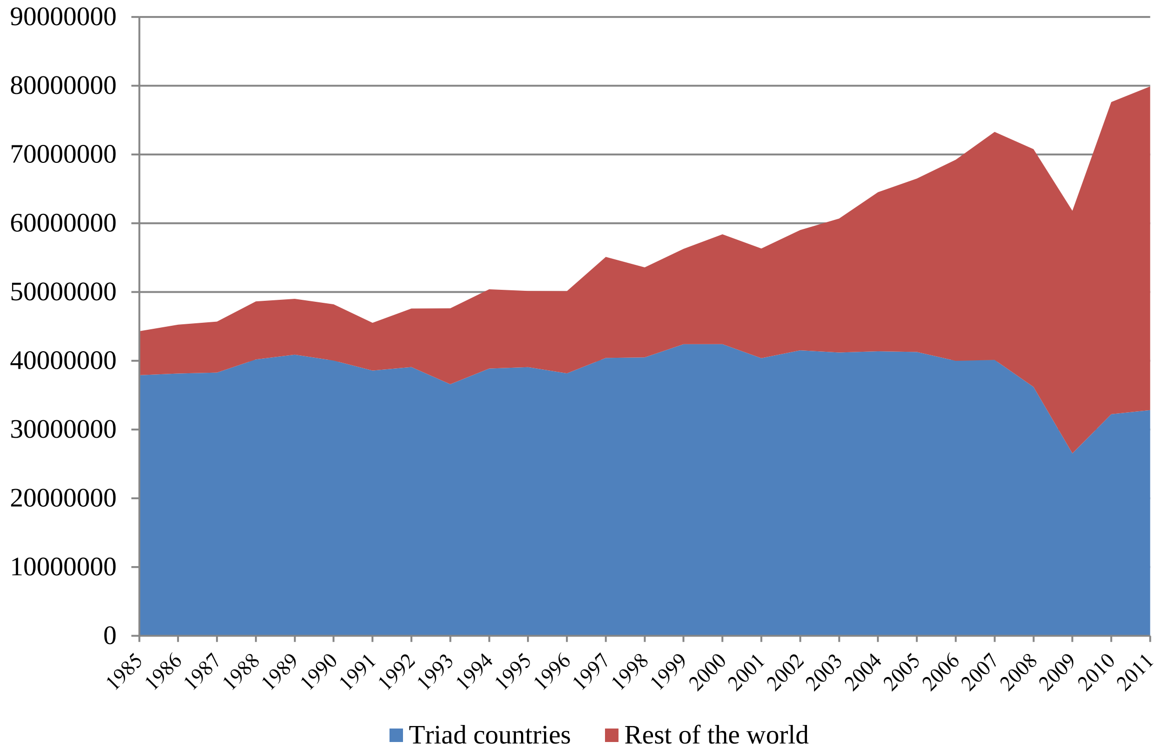


Figure 2-1 - Contribution of Triad countries[34] and rest of the world to the world production of vehicles (units; 1985-2012)
Source: Own elaboration on the basis of data from OICA

As a result, Triad countries, which between 1985 and 1990 explained around 85% of world vehicle production, in 2012 accounted for less than 42% (Figure 2-2). South Korea was the first country which was able to significantly increase its share in the world production, joining the club of major manufacturers during first half of the 1990s. In 1985, this country produced 380 thousands vehicles, and accounted for 0.85% of world production. During the 2000s, its average yearly production was around 3.7 million and its share in world production rose to 5.5%.

The balance between Triad countries and the rest of the world started to change in the early 1990s, especially from 1993. However, the greatest changes took place during the second half of the years 2000. Undoubtedly, the most disruptive event was the extraordinary emergence of China, a country which historically had a marginal role in the global car industry (Donnelly *et al.*, 2010; Liu and Dicken, 2006). Between 1985 and 1990, China was the largest populated country and accounted only for around 1% of world vehicle production. During the second half of the 1990s, its share averaged 3%, and between 2003 and 2008, it was about 9%. The participation of China as a world car manufacturer skyrocketed in 2009 when it jumped to 23% –a percentage around which the country stabilised until 2012.

[34] Figures on Triad nations in this Chapter correspond to the following countries: Belgium, France, Germany, Italy, Spain, United Kingdom, Netherlands, Sweden, Austria, Canada, USA, Japan.

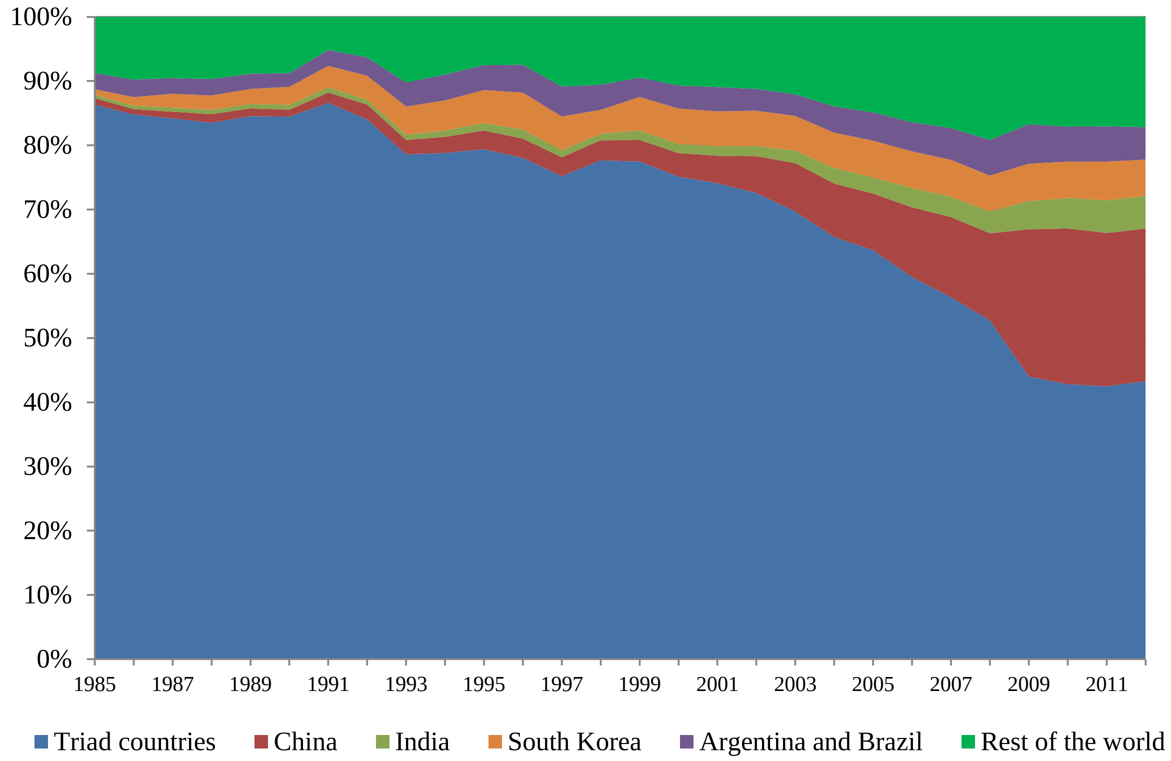


Figure 2-2 – Geographical distribution of world vehicle manufacturing (% of units manufactured; 1985-2011)
Source: Own elaboration on the basis of data from OICA

In Latin America, Mexico was the country with the most prominent growth in the last twenty years. The participation of this country in the world automotive production went from 1% (1985-1990) to 3.3% (2009-2012). The participation of Argentina and Brazil also grew significantly growing from an average of 0.3% and 2.1%, respectively, between 1985 and 1990 to 0.9% and 4.4% in the period 2009-2012. As a result, during the period 2009-2012, the two countries together ranked sixth among car manufacturers in the world.

More recently, during the second half of the 2000s, countries from Europe and South East Asia were also able to increase their importance as vehicle producers. As for the European region, countries like the Czech Republic, Poland, the Slovak Republic, Romania and Turkey all together moved from accounting for around 1.8% of the world production in 1995-2000, to almost 4% in 2009-2012. South East Asian countries, like Thailand and Indonesia, also increased their share from 0.84% and 0.5% (2000-2002) to 2.3% and 1.1% (2009-2012), respectively.

Similar trends can be noticed with regards to vehicle sales. In this case, however, the share of Triad countries was rather stable around 75% until 1999, falling significantly during the 2000s: between 2009 and 2011 these countries accounted on average for around 45% of global car sales.

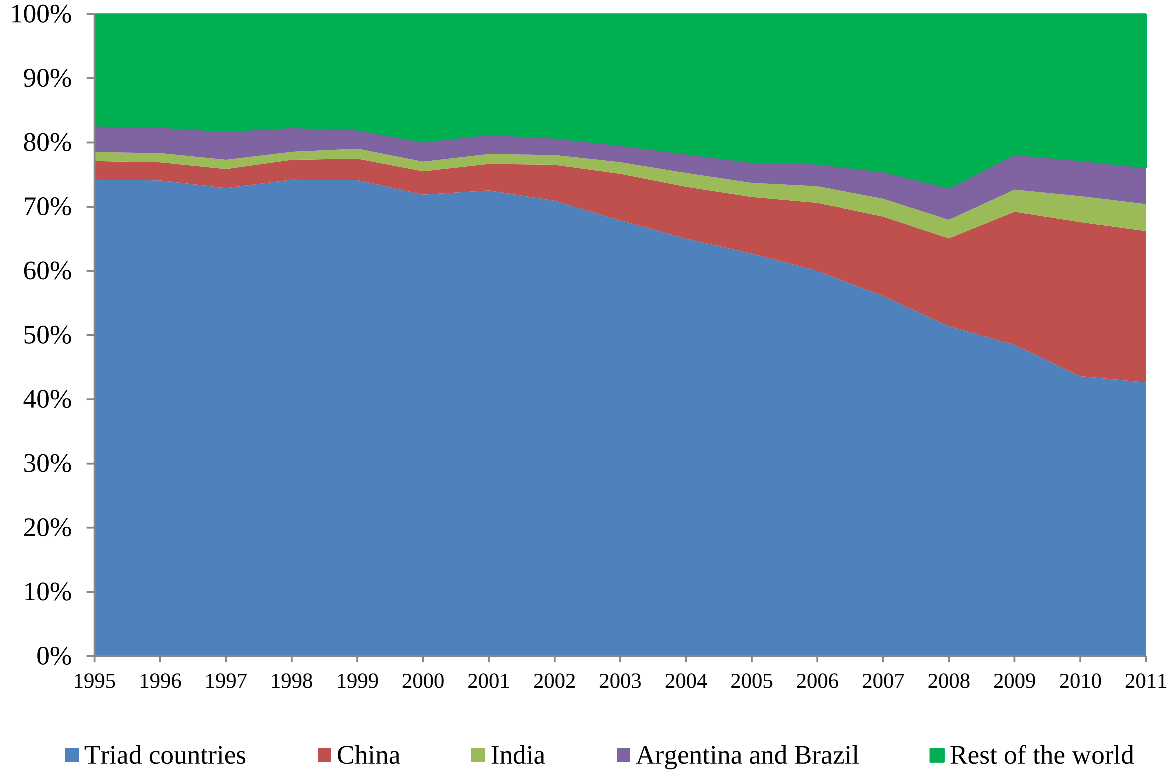


Figure 2-3 - Evolution of the geographical distribution of world vehicle sales (% of units manufactured)[35]
Source: OICA, ANFAVEA

The change in global consumption and production patterns is largely explained by two concurrent phenomena. Firstly, the saturation of Triad mature markets with a very low ratio inhabitants/vehicles (Table 2-1). This means that around 85% of total demand for automobiles in these countries corresponds to replacement demand which is less attractive for carmakers. This type of demand has a slower and more variable growth which can also be more easily postponed (Dicken, 2011). Secondly, the relative acceleration of the GDP growth rates in developing regions (Figure 2-4) with high rates of inhabitants per vehicle (Table 2-1). This resulted in the emergence of a large 'new middle class' with increasing consumption capacity to have access to its first vehicle. The combination of these two trends attracted car manufacturers with market-seeking motivations to settle down in emerging countries which, as seen above, have become simultaneously great consumers and producers of vehicles (Jullien and Lung, 2011).

[35] Sweden has been excluded from the Triad group for the calculation of sales.

Table 2-1
Inhabitants per vehicle
(selected countries and years; 1991-2011)

	1991	1995	1999	2003	2007	2011
United States	1,3	1,3	1,3	1,3	1,2	1,2
Italy	1,9	1,7	1,6	1,5	1,5	1,4
Australia	1,7	1,7	1,5	1,6	1,5	1,4
Spain	2,6	2,3	1,9	1,7	1,6	1,7
Canada	1,6	1,7	1,7	1,7	1,6	1,6
Japan	2,1	1,9	1,8	1,7	1,7	1,7
France	2,0	1,9	1,8	1,7	1,7	1,7
United Kingdom	2,1	2,1	1,9	1,8	1,7	1,7
Austria	2,0	2,0	1,9	1,8	1,8	1,7
Germany	2,0	1,9	1,8	1,7	1,9	1,8
Belgium	2,3	2,1	2,0	1,9	1,9	1,7
Sweden	2,2	2,2	2,1	2,0	1,9	1,9
Czech Republic*	4,6	3,0	2,7	2,5	2,1	2,0
South Korea	10,0	5,2	4,2	3,3	3,0	2,6
China	188,2	115,9	86,2	54,1	28,9	14,4
Mexico	8,4	7,5	6,8	5,5	4,1	3,6
Argentina	**5,2**	**5,9**	**5,5**	**5,5**	**4,8**	**3,7**
Brazil	**11,1**	**10,3**	**8,9**	**8,4**	**7,4**	**5,7**

Source: ANFAVEA. Data on China: own elaboration on the basis of information from ANFAVEA, OICA and World Bank.

* Information about 1991 includes data on the Slovak Republic.

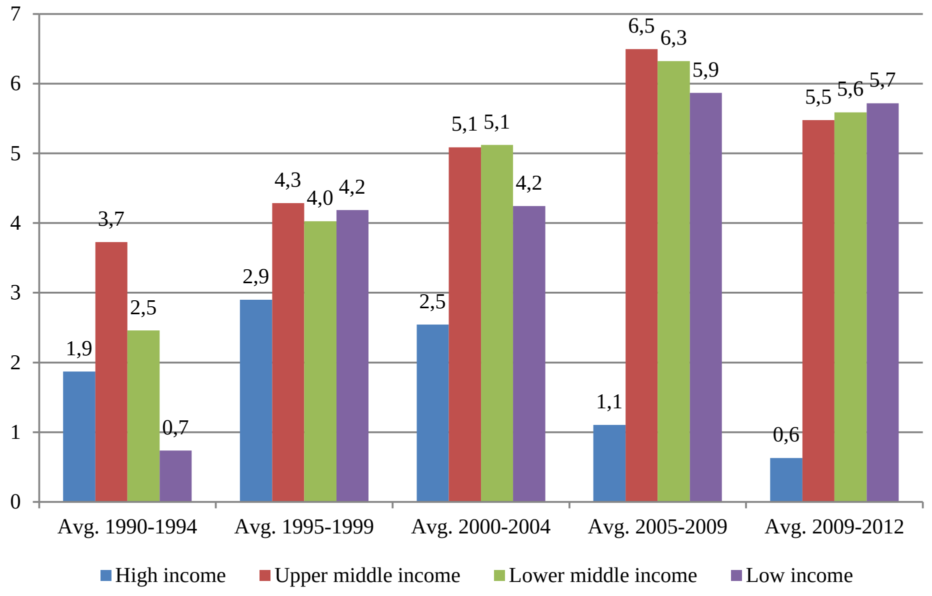


Figure 2-4 – Average GDP growth rates (in %; group of countries as defined by the World Bank; 1990-2012)
Source: World Bank

2.1.2 From national to regional automotive 'spaces'

With the partial exception of Europe, where regional-scope strategies were already put in place in the 1960s, until the 1980s approximately, Triad automotive production networks were mainly organised around national markets (Jullien and Lung, 2011). In brief, this entailed that the chain of production was highly vertically integrated and mostly localised within national boundaries. The bulk of production and sales of automotive companies were directed to their own home countries (Jetin, 2009; Sturgeon *et al.*, 2009). Exports functioned more as a complement to local sales (Jullien and Pardi, 2013).

This was also the case of non-Triad countries. The emergence of new vehicle producing regions in the 1960s –among which notably, Argentina and Brazil– was a result of the first internationalisation wave of carmakers from Triad countries (Freyssenet, 2000b). Attracted by public incentives put in place by governments in these countries to promote the growth of industrial sectors, carmakers established manufacturing facilities in these areas. The promotional regulatory framework required that, in exchange for trade protection and tax benefits, carmakers localised the bulk of production in the domestic market.[36]

Vehicle manufactured and commercialised in non-Triad countries were the same as those developed by carmakers for their own home countries. However, in a context of strong protection of local markets, adaptations to vehicles were introduced in order to comply with the availability of raw materials or with the capabilities of local suppliers. Moreover, changes had to be made to cars to meet the poor road conditions in the territories (e.g. suspension systems). Such product adaptations demanded the existence of local engineering teams which worked with great autonomy from parent companies. The strong segmentation among national automotive production networks caused model to follow their own 'trajectory' in each country. Additionally, as a consequence of their 'isolation' from parent companies, it was common that subsidiaries in developing countries continued producing models which had already been discontinued many years ago in more affluent markets.

As pointed out above, the normative and technological changes developed from the 1970s created conditions for the reconfiguration of existing automobile 'spaces' and the emergence of new ones Humphrey *et al.* (2000) identify three main types of automotive spaces (see below). With the exception of some large protected national markets –in particular China–, regional areas have consolidated as the preferred space for carmakers to organise their production and commercialisation networks (Carrillo *et al.*, 2004; Jullien and Lung, 2011; Sturgeon *et al.*, 2009).

i) 'Peri-central' integration:

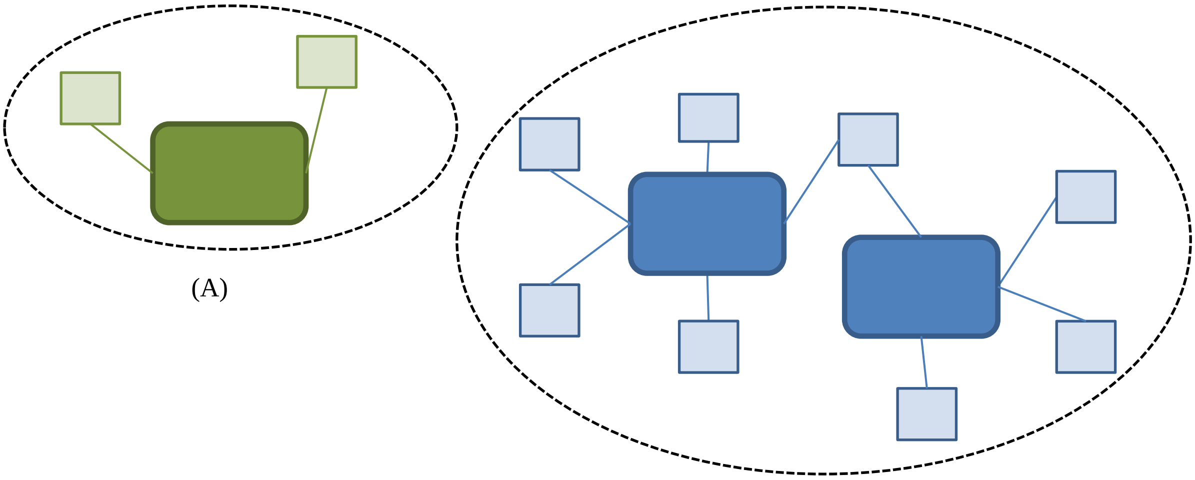
It corresponds to automotive networks organised around one or more countries belonging to the group of Triad nations. Networks are led by MNCs whose main motivation for internationalising their manufacturing activities is to take advantage of differences in wage

[36] See, for instance, Sourrouille (1980), López *et al.* (2008), Bastos Tigre *et al.* (1999).

and capital costs among geographically close countries. In general, countries participating in these types of spaces are members of integration agreements which have removed or substantially reduced barriers to trade flows. A graphical representation of this type of automotive space can be found in Figure 2-5.

In North America, this has been the case of the automotive production network organised within the NAFTA, which includes the US, Canada and Mexico (see Figure 2-5.A). In this case, US companies –in particular Ford (Layan, 2000)– put pressure on the Mexican government to liberalise restrictions and barriers prevailing on the automotive industry so they could delocalise manufacturing activities (Carrillo, 2004).

A similar process of delocalisation of production was carried out by carmakers from Western Europe once former Central and Eastern European communist countries initiated, in the early 1990s, a process of economic structural reforms and –some of them– their accession to the EU (see Figure 2-5.B). Companies like Volkswagen and Renault, for instance, took over firms in the Czech Republic (Škoda) and Romania (Dacia), respectively. Others, like Fiat, expanded their production capacity in countries like Poland. This explains the rise of some countries with a strong industrial tradition dating from the days of the Soviet bloc as new manufacturing vehicle centres.

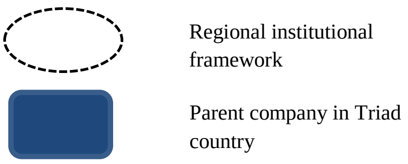


(A)

(B)

Figure 2-5 – Peri-central integration
Source: Own elaboration

References



ii) *Peripheral regional integration*

This type of spatial configuration corresponds to developing regions where automotive MNCs from Triad nations put in place business strategies with the objective of exploiting emerging regional markets (see Figure 2-6 for a graphical representation of this type of automotive space). Subsidiaries located in different countries of the regional area complement their manufacturing activities to attain more efficient scales of production. Production is then commercialised within the region through intra-firm exchanges. It is worth noting that, differently from peri-central regions, in the case of peripheral automotive spaces the leading agent of the network –i.e. the parent company– is located outside of the region's boundaries. As will be seen in this study, this is an important factor conditioning the innovative scope of activities carried out locally.

The construction of peripheral regional areas has been the result of the implementation of deep structural reform policies in developing regions which eased restrictions on capital and trade flows. In most cases, these measures were complemented by: i) national automotive policies providing tax benefits and tariff protection from external competition in exchange for local integration of production; and ii) the implementation of regional integration agreements which substantially lowered or completely removed restrictions on intra-regional trade.

This has been clearly the case of the MERCOSUR area. Here, Argentina and Brazil matched structural reforms with the coordination of their national automotive policies, the objective being of fostering the enlargement, and modernisation of the industry; and, at the same time, the articulation of a regional automotive space (see Chapter 4, in particular pp. 67-87). Similarly, in South East Asia, the largest member countries of ASEAN –i.e. Indonesia, Malaysia, Philippines and Thailand– have, since the 1980s, put in place cooperation agreements to foster the production of auto parts and vehicles in the region.

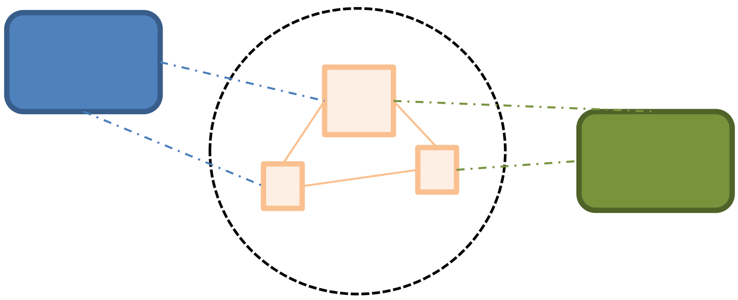
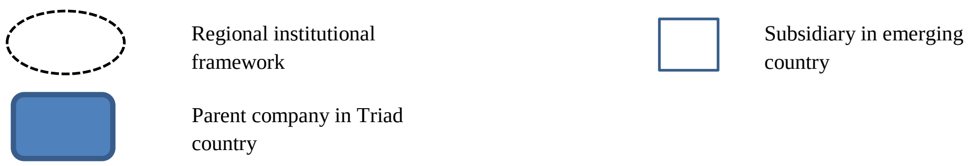


Figure 2-6 – Peripheral regional integration
Source: own elaboration

References



It is worth noting that the two types of automotive spaces described above –'peri-central integration' and 'peripheral regional integration'– overlap with different types of integrative normative frameworks. In some cases, for instance that of ASEAN or MERCOSUR, specific provisions were enacted for the automotive industry, including rules on minimum domestic/regional parts content, intra- and extra-regional commercial exchanges, public sectoral incentives, etc. (Van Tulder and Audet, 2004). As a matter of fact, these regional frameworks have been largely shaped according to the demands of carmakers, which have "been among the strongest lobbyists for regionalism" (Lung and Van Tulder, 2004: 12).

As claimed by Sturgeon *et al.* (2009), in addition to the regulatory considerations, there are some technical and economic reasons favouring the organisation of automotive production networks around regional areas. First, logistics and transportation costs are very high for some of the main parts of the vehicle such as body panels, seats, tires, etc. Second, the wide diffusion of 'lean' production and modularisation techniques since the mid-1980s has contributed to keeping the production close to the point of final assembly. Just-in-time parts delivery, low working inventories and the quick identification of defects are important elements of lean production requiring geographical closeness of assembly and parts production points.

iii) Protected national markets

The so-called 'protected national markets', depicted in Figure 2-7, correspond to the situation of big Asian countries like China and India (in 2012, these countries produced 19 and 4 million vehicles, respectively). The automotive production network in these countries is organised at national level. The large size of domestic markets and the application of regulations protecting them from foreign competition generate conditions for carmakers to organise their commercialisation and manufacturing activities around the national territories. The main objective of companies in these national markets is to exploit the large and growing domestic demand. Subsidiaries have a significant presence in these areas (Figure 2-7.A). However, differently from most peripheral regions, big public and local private domestic car companies exist (Figure 2-7.B) as well as different forms of partnerships between foreign and local companies which are also major producers (Figure 2-7.C). This is the case of Tata, in India, or Chery, Geely, Dongfeng Motor, JAC in China.

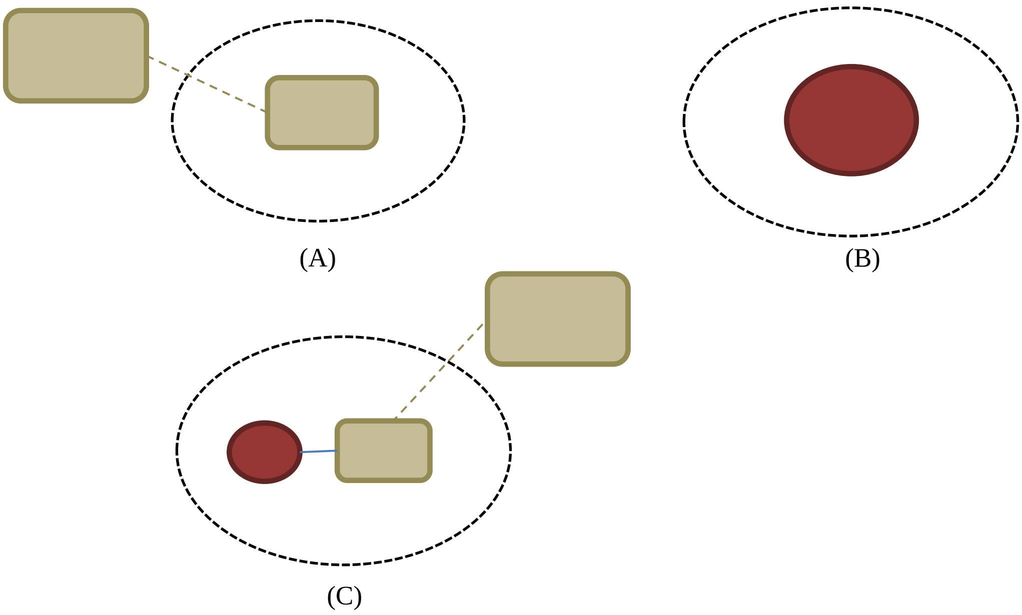
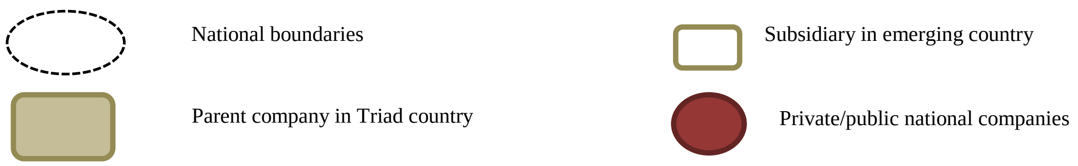


Figure 2-7 - Protected national markets
Source: own elaboration

References



2.1.3 A new role for subsidiaries in a regionally segmented automotive world

Shifts in the global automotive map reflect the internationalisation push of automotive MNCs in the last two decades. As discussed above, this has been a strategic response to regulatory and technological changes. However, internationalisation strategies were far from being homogeneous, in particular with respect to their product policies and the role of subsidiaries.

Initially, in the early 1990s, some companies decided to expand the geographical scope of their manufacturing operations commercialising in emerging countries the same products they had developed for their own home or regional markets (i.e. a home-based product policy). This was the case, for instance of Asian firms like Toyota, or French firms such as, Renault and PSA Peugeot-Citröen. Other companies created global vehicle platforms on the basis of which they developed different models for a variety of destination markets. This was the case, for instance of Ford's CDW27/Mondeo platform. Also in this case, the design and features of models were, however, conceived for markets like Europe and US markets rather than for emerging regions.

In the framework of these types of home-based product policies, only some minor alterations were introduced in developing countries. They fundamentally aimed to comply with domestic regulations and local availability of raw materials. The application of these strategies entailed the concentration of the bulk of product development activities in the parent company. Product engineering teams in subsidiaries, especially those operating in emerging markets, were significantly downsized. Since nationalisation requirements were substantially reduced, engineering efforts in emerging regions were mostly focused on the modernisation and continuous improvement of production processes.

It is worth noting that despite their relative backwardness, the technological efforts of subsidiaries operating in developing countries were more intense in the period 1960-1990 than under global and home-based product policies adopted in early 1990s. Although the latter allowed subsidiaries to manufacture vehicles with higher quality and safety standards, it did so at the expense of local technological efforts.

The particular intra-firm division of labour resulting from this scheme could be conceived as a centre-periphery one (Figure 2-8; a discussion on this issue in pp. 23-25). That is, whereas knowledge-intensive activities with potential to promote technological progress are mainly concentrated in parent companies in home-developed nations, low-knowledge intensive operative activities are performed by subsidiaries overseas.

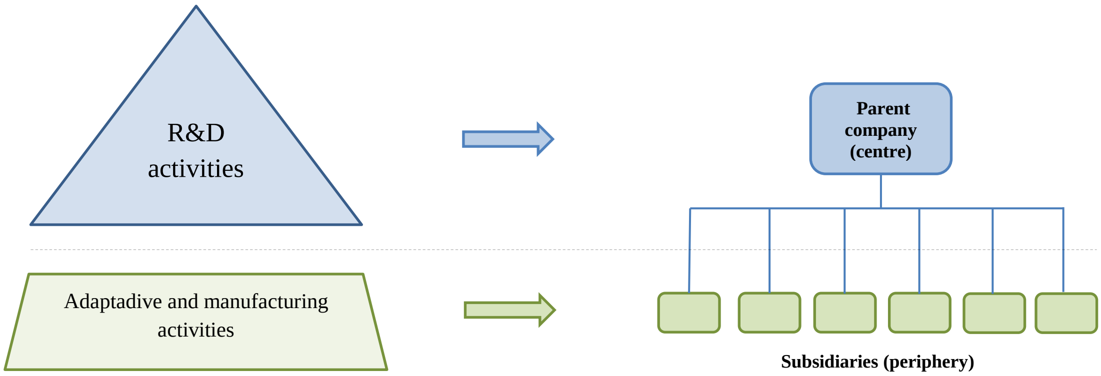


Figure 2-8 - Intra-firm division of labour in automotive MNCs under home-based and global product policies
Source: own elaboration

Over the years, most 'generalist'[37] carmakers started to redefine their product policies. Both global car strategies and home-based product policies proved to be inadequate to gain market share in emerging areas. Conditions of revenue and use in these countries were too distant from those prevailing in affluent Triad home countries. Minor adaptations were not sufficient

[37] Generalist companies produce vehicles for most popular segments. The term 'generalist' is used here as opposed to 'premium' or 'high-end' car manufacturers like Mercedes Benz, Audi, Porsche, etc. Some of the leading generalist carmakers are, for instance, General Motors, Ford, Renault, Toyota, PSA, and Volkswagen.

to increase sales volumes to the point of achieving a sustainable break-even point.[38] The main challenge for carmakers with aspirations to expanding their market-share in emerging markets was to develop cheaper vehicles with lower maintenance costs. However, at the same time, these products had to incorporate higher safety, design and quality standards than the old models produced in the past.

Automotive companies responded to this double challenge by developing models or entire families of low-cost products specifically tailored to conditions in emerging countries (Jullien and Lung, 2011; Jullien and Pardi, 2013). In some cases, these products share platforms with vehicles also commercialised in Triad markets (they are usually referred to as partial or complete 'derivatives'[39]). This is the case, for instance, of the Volkswagen Fox, mainly developed for the Brazilian market on the basis of the platform of the Polo; or the Ford Ecosport which uses the platform of the Fiesta. As will be seen in the case studies examined other companies developed completely new platforms for emerging regions: P178 platform (Chapter 5); Logan platform (Chapter 6), and IMV platform (Chapter 7).

The diffusion of this type of 'differentiated' product policies reflected the existing segmentation of consumption patterns between automotive spaces (Dicken, 2011). This fragmentation was not only a consequence of differences in income levels between Triad and developing countries. Important cultural and regulatory differences persisted between markets making it difficult for carmakers to converge to a single global product policy (Rugman and Collinson, 2004; Sturgeon *et al.*, 2009). For instance, in general, developing countries have more lenient environmental and safety standards; and the quality of roads is usually poorer, making it necessary to introduce adaptations in the body, steering and suspension systems of vehicles.

The 'regionalisation' of product policies led headquarters to get subsidiaries operating in emerging countries involved in product development activities, delegating to them more responsibilities in this area. This allowed companies to cut down development time and costs. Furthermore, local engineering teams proved to be more capable of grasping the tastes of local consumers and, therefore, of developing products better tailored to preferences prevailing in host regions (Quadros, 2009).

The intra-firm division of labour scheme prevailing until then was reconfigured as a result of these changes. A new type of 'semi-peripheral' subsidiary emerged –borrowing the term used by Wallerstein (see discussion in pp. 23-25; in particular, footnote 25 in p. 25). These subsidiaries were upgraded in the corporate hierarchy, assuming more knowledge-intensive product development responsibilities. Moreover, when operating within regional automotive

[38] In short, the break-even point can be defined as the number of units that have to be sold in order to equal total costs with total revenues. In order to lower the level at which this point can be reached, a company can reduce its fixed or variable costs, or increase the difference between the sale price and the variable cost, i.e. the unit contribution margin.

[39] The development of *partial* derivatives involves the transformation of an existing model into a different version: for instance, a hatchback (Fiat Palio) into sedan (Fiat Siena); or a pick-up truck (Corolla) into a SUV (SW4). *Complete* derivatives are entirely new models developed on existing platforms: e.g. Chevrolet Meriva (General Motors) and Volkswagen Fox.

spaces, semi-peripheral units undertook management responsibilities over the rest of the subsidiaries operating in the same region. The reconfiguration of the automotive production network and, in particular, the consolidation of semi-peripheral subsidiaries support the notion of 'concentrated dispersion' (Ernst, 2002) (see discussion in pp. 27-28).

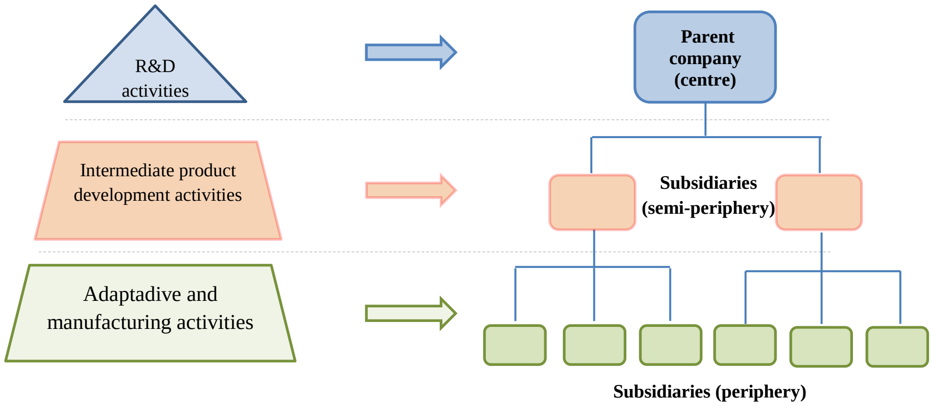


Figure 2-9 – Intra-firm division of labour in automotive MNCs under 'differentiated' product policies
Source: Own elaboration

2.2 An analytical framework for the analysis of the technological trajectory of automotive subsidiaries in MERCOSUR

In this section, the overall research problem presented in the Introduction to this study will be broken down in specific research questions. In the following two sections, an analytical framework for the examination of the research question problems will be presented.

2.2.1 Three specific research questions

On the basis of the critical literature review developed in Chapter 1 and the discussion on contemporary configuration of automotive production networks in this chapter, three specific research questions will be formulated.

- *Research question 1* (RQ1)*:* How did the technological strategies of automotive MNCs operating in MERCOSUR evolve between 1991 and 2011?

- *Research question 2* (RQ2)*:* How did the division of labour in product engineering activities between the subsidiaries operating in Argentina and Brazil evolve between 1991 and 2011?

- *Research question 3:* What was the role of the state agents and MNC agents (parent companies and subsidiaries) in defining the technological strategies of carmakers in

MERCOSUR (RQ1) and in shaping the division of labour between subsidiaries operating in Argentina and Brazil (RQ2)?

The first two questions call for a diachronic analysis of the technological behaviour of automotive MNCs operating in the MERCOSUR region. The first one points to the need to understanding the evolution of the *relative position of subsidiaries established in MERCOSUR within the intra-firm division of labour*. In this context, the term 'technological strategy' is understood as the *degree of innovativeness of the product engineering activities conducted by automotive subsidiaries in the region*. As seen in Figure 2-8 (p. 46) and Figure 2-9 (p. 48), the less knowledge-intensive the nature of the activities carried out by subsidiaries, the lower their position within the intra-firm hierarchy.

The second research question examines the technological trajectory of individual subsidiaries operating in Argentina and Brazil. The purpose is to understand what kind of intra-firm division of labour accompanied the progressive organisation of a regional automotive space in MERCOSUR.

The third question is more analytical in nature. It seeks to understand how three groups of agents which according to the literature are considered to have great influence over the technological behaviour of MNCs affected the technological performance of carmakers in MERCOSUR (see pp. 28-34).

2.2.2 The technological capability framework as a tool for the analysis of the technological behaviour of subsidiaries

The first two questions are closely interrelated. They fundamentally deal with the analysis of the chronological evolution of the technological behaviour of carmakers' subsidiaries in the MERCOSUR region. Whereas the first question refers to the technological strategy adopted by carmakers at regional level, the second one is concerned with trajectory of individual subsidiaries operating in Argentina and Brazil. Whereas the first problem is concerned with the position of the MERCOSUR region within the intra-corporate division of labour, the second one is with the articulation of the division of labour among the subsidiaries operating within that region.

The two questions will be addressed using the technological capabilities framework originally developed by Lall (1992) and Bell and Pavitt (1995) (see discussion in Chapter 1, pp. 23-25). As seen before, the authors developed a taxonomy including an ascending scale of technological capabilities ranging from basic routine production capabilities to advanced innovative capabilities (Figure 2-10). This scale represents the progressive acquisition of more complex knowledge that allows firms to generate and manage processes of technological change in products, processes, organisation, etc. –i.e. the process of technological learning.

This analytical framework provides an incremental perspective on the process of technological learning that goes beyond the binary firm's classification as 'competence-creating' vs. 'competence-user'; or 'innovative' vs. 'non-innovative'. As discussed in Chapter 1, this incremental approach is particularly accurate when it comes to grasping the technological evolution of firms –including MNC subsidiaries– operating in developing countries.[40]

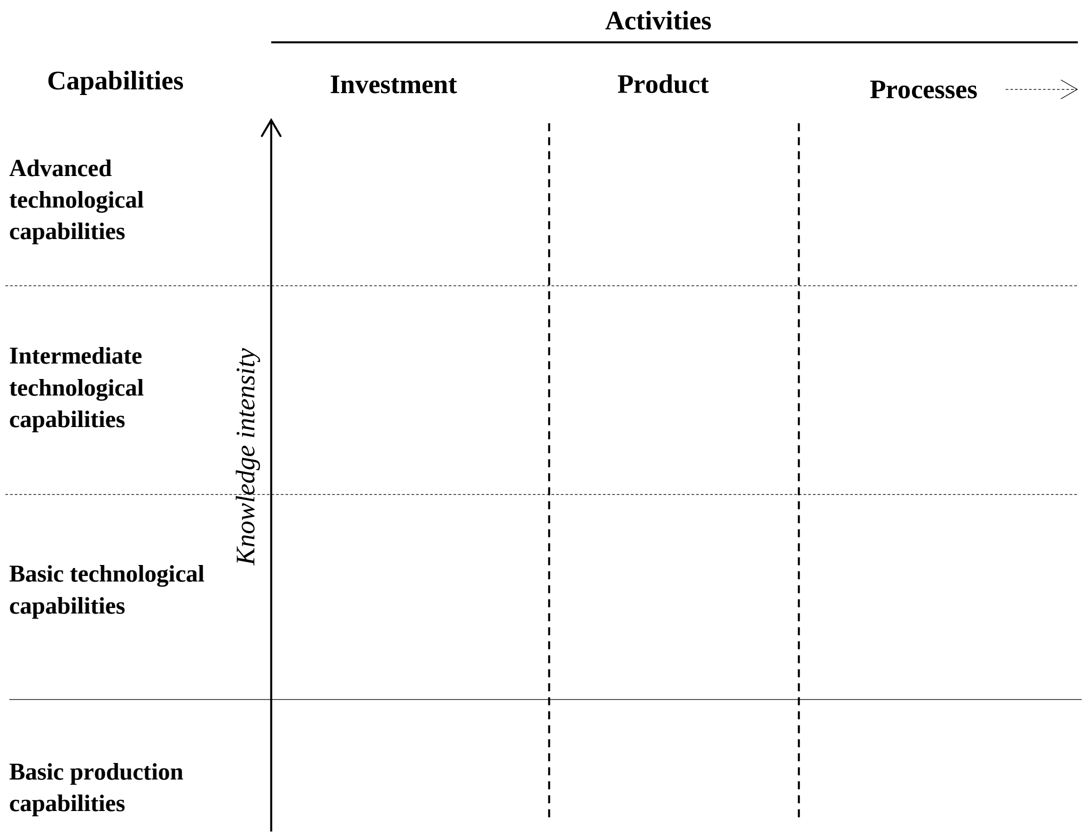


Figure 2-10 – Simplified technological capability matrix
Source: own elaboration on the basis of Bell and Pavitt (1995)

It is worth noting that the technological capability framework draws on the notion of 'revealed capability' (Figueiredo and Brito, 2011). This means that the level of capabilities attained by firms (vertical axis in Figure 2-10) is inferred from the knowledge required by the *actual activities* they carry out. This entails that the knowledge possessed by firms or single workers cannot be grasped by this analytical tool if not effectively applied in actual activities. In the framework of multi-unit organisations such as MNCs –i.e. parent companies and subsidiaries– this approach provides an indication about the *intra-firm division of labour in the sphere of innovation activities* (Figure 2-8 and Figure 2-9, in p. 46 and p. 48, respectively). Likewise, from a dynamic perspective, the process of technological learning of

[40] For some examples of the application of this framework to the study of technological learning in MNC subsidiaries in developing countries, see Ariffin and Bell (1999); Ariffin and Figueiredo (2006); Figueiredo (2003); Figueiredo and Brito (2011); Hobday (1999); Hobday and Rush (2007).

MNC units –i.e. the accumulation of capabilities– reveals the evolution of such division of labour over time.

The matrix of technological capabilities developed by Lall (1992), and Bell and Pavitt (1995) has been adapted here to address the specificities of the research problem and the technological features of the automotive industry. This study is focused on the analysis of technological activities in the specific field of *product engineering activities*.[41] Innovation activities in the field of product development activities have become a central aspect of the technological strategies of carmakers, in particular, as the product life cycle of vehicles has shortened and competition intensified at the global level in the last two decades. The bulk of R&D expenditure and strategic challenges and priorities of carmakers are focused on the development of product innovations (EUCAR, 2011).

An eight-level product engineering capability scale for the analysis of the automotive industry has been elaborated building upon the one developed by Consoni and Quadros (2006b). However, differently from Consoni and Quadros' scale, which grouped product engineering capabilities in basic, intermediate and advanced capabilities, the one used here groups capabilities according to their relative position within the intra-firm division of labour: periphery, semi-periphery, and centre (Table 2-2). The objective of this adaptation is to have a better tool to address the specific research problems posed in this study.

Capabilities of peripheral subsidiaries mainly include operative engineering activities; that is, those related to manufacturing activities and the localisation of auto parts, components and systems. Some minor adaptations of specific parts and restyling of vehicles can also be performed. Semi-peripheral units assume more knowledge-intensive responsibilities, including the development of partial and complete derivatives and, at a higher level, the development of platforms for emerging countries. Finally, subsidiaries and parent companies in the centre conduct consistent research activities on new technologies in the field of safety and security, energy and environment, materials; and the development of new platforms for world markets.

It is worth noting another important difference between this scale and the one elaborated by Consoni and Quadros (2006b). Whereas in the latter the apex of the capability pyramid corresponded to the development of new platforms, the scale used in this study, incorporated a higher stage corresponding to consistent R&D activities. Additionally, at a lower level, the scale in Table 2-2 differentiates between the development of new platforms or vehicles developed for emerging and for world markets.

The reason justifying the introduction of such differences lies in one of the main research concerns of this study, i.e. to understand the relative position of the subsidiaries established in MERCOSUR within the corporate division of labour (RQ1). As will be clearly seen in the empirical part of this study (Chapters 4-7), the incorporation of more knowledge-intensive

[41] Focus on product development and engineering activities has been dominant in the examination of the technological learning experiences of Brazilian automotive subsidiaries. See, for instance, Balcet and Consoni (2007); Consoni and Quadros (2006b); Quadros and Consoni (2009).

activities in the scale enables us to understand the relative backwardness of peripheral and semi-peripheral subsidiaries within the corporate division labour, despite their overall progress in the last decade. Advanced R&D activities (level 8) and the development of global platforms (level 7) are responsibilities which are almost kept under the exclusive responsibility of corporate units established in advanced countries. The absence of these highest stages in Consoni and Quadros' (2006b) capability scale[42] can be explained by the fact that their work is focused exclusively on the analysis of Brazilian subsidiaries and not with the particular position subsidiaries have within the corporation.

Table 2-2
Product engineering capabilities in automotive MNCs

PERIPHERY	1. *CKD assembly operations:* - Replication of fixed product specifications. - Standard quality controls.
	2. *Nationalisation:* - Localisation of parts: search, evaluation, selection and contracting of local suppliers of parts and components. Technical support to local suppliers. - Minor changes in parts and/or components, for instance, in response to local availability of materials or regulations.
	3. *Adaptation/restyling/facelift:* - Adaptations in parts/components to comply with domestic market features and conditions (e.g. suspension, engines). - Restyling/facelifts involving external body and minor adjustment in platforms.
SEMI – PERIPHERY	4. *Development of partial derivatives from existing platforms for regional/emerging markets: Centre of excellence on certain systems/components for the whole corporation*
	5. *Complete derivative projects from existing platforms for regional/emerging markets*
	6. *New platform and family of vehicles for regional/emerging markets*
CENTRE	7. *New platform and family of vehicles for world markets*
	8. *Consistent R&D activities for the development of new products, technology and/or materials using leading-edge technology (engine, driving, braking, suspension, body, electronics, materials)*

Source: own elaboration on the basis of Consoni and Quadros (2006b)

2.2.3 Driving agents of the technological behaviour of subsidiaries in the MERCOSUR automotive space

The third research question seeks to analyse the role of specific 'driving agents' behind the technological behaviour of automotive MNCs in the MERCOSUR region in regards to RQ1 and RQ2. A critical review of the literature has shown that three groups of agents play an important role in the technological trajectory of MNC subsidiaries (see discussion in pp. 28-34): i) the subsidiaries themselves; ii) the parent company; iii) the state and its sub-national units. Building upon such review, Figure 2-11 below indicates the specific actions of these

[42] This is also the case of other studies which used a similar capability scale. See for instance, Amatucci and Mariotto (2012); Balcet and Consoni (2007); Quadros and Consoni (2009).

three groups of agents that will be examined in this study. It is worth stressing that these are not independent actors; rather, they are closely interrelated and mutually dependent. In the case of state agents, inquiry will focus on the efforts to ‘embed’ the activities of transnational companies into local territories.

This inquiry is mainly devoted to the examination of the role of state agents as ‘regulators’ of the MERCOSUR automotive space. That is, as agents with the ability to give shape to the multi-level normative framework within which carmakers articulate regional production networks. Direct negotiations between governments and companies, or lobby activities by business associations on specific issues remained excluded from the analysis. Other aspects, related in particular to the domestic macroeconomic environment or the normative framework in non-member countries or the multilateral arena were incorporated into the analysis as contextual factors when affecting the business strategies of MNCs.

As will be seen in Chapter 4, the process of construction of the bilateral regulatory framework was in constant tension with national and sub-national initiatives (see pp. 67-85). Despite their agreement at bilateral level, the countries continued applying national initiatives pursuing their own objectives. In the case of Brazil, these actions were fundamentally aimed at attracting to its own territory activities with a greater modernisation potential. In the case of Argentina, initiatives sought to avoid the sectoral imbalances that arose from the end of the 1990s.

In regard to the role of parent companies, this study will focus on four interrelated dimensions of the corporate strategy which, according to the literature, affect the technological behaviour of MNC carmakers overseas (see discussion in Chapter 1, pp. 28-34): the organisation of corporate R&D activities; the product policy; the internationalisation strategy; and the strategic motivation of the company in the region.

Finally, this study examines the behaviour of individual subsidiaries in relation to their technological activity. In particular, it seeks to understand the scope for the adoption of autonomous actions in the field of product engineering activities; and how this autonomy is affected by their past performance. It also explores competition and collaborative actions between subsidiaries in the region for the acquisition of corporate resources and mandates.

Figure 2-11
Simplified analytical framework for the analysis of the technological trajectory of automotive subsidiaries in MERCOSUR

AGENTS			ACTIONS	
STATE AGENTS	MERCOSUR		- Regional integration policy (intergovernmental)	
	AR	BR	- Sectoral policy (national/sub-national)	
PARENT COMPANY			- Organisation of corporate R&D activities - Product policy - Internationalisation strategy - Strategic motivation in the region	**TECHNOLOGICAL STRATEGY OF AUTOMOTIVE MNCs AND DIVISION OF LABOUR AMONG SUBSIDIARIES IN MERCOSUR**
SUBSIDIARIES IN MERCOSUR			- Performance of the subsidiary - Autonomous in-house technological efforts - Competition/collaboration for resources and corporate mandates	

Source: own elaboration on the basis of literature review in Chapter 1.

Chapter 3 - Research design and methods

In this chapter the main elements of the research design and methods will be discussed. The first section presents the characteristics of the multiple embedded case studies design. The second one explains the criteria for the selection of cases. Information on the type and source of data is provided in the third section. The last two sections offer an account of the analysis and writing strategy of individual case studies and of the cross case comparison chapters.

3.1 Multiple embedded case study research design

In order to respond to the complexity of the phenomenon under analysis, characterised by the extremely intricate and dynamic ways in which multi-level institutional structures and actor networks are interconnected, a multiple embedded case study research was designed (Yin, 2009). Three automotive MNC with subsidiaries simultaneously in Argentina and Brazil were selected to examine the problem to be addressed in this study: these being, Italocars, Francocars, and Nipponcars.[43]

This type of research is well suited for the examination of real-life organisational phenomena under conditions in which researchers have minimal control (Tharenou *et al.*, 2007; Yin, 2009). Miles and Huberman (1994) point out that case studies allow for a rich description of facts and processes that cannot be adequately grasped by purely quantitative studies. This type of research design facilitates the identification of nuances and 'deviations' from the 'normal' or from expected patterns. Furthermore, it allows for the identification of the sources of such deviations, for instance, *ad hoc* government actions or decisions adopted by local managers.

The choice for a multiple rather than a single case study research design is based on the fact that the former offers more compelling evidence on the phenomenon under analysis and enables the achievement of more robust conclusions (Yin, 2009). In this particular case, the selection of three cases provided for a variety of scenarios which allowed for a more profound understanding of the dynamics governing the trajectory technological of MNCs operating within the framework of regional integration agreements.

The choice of an 'embedded' case study research design is related to the very nature of the research problem addressed in this study and the analytical framework within which it is examined (Miles and Huberman, 1994; Robson, 2002; Yin, 2009). As discussed in Chapter 2, in the last two decades, carmakers have organised their business activities around regional

[43] As pointed out in the Introduction, written authorisation has been provided by companies and interviewed managers to report the findings of the research project. However, in order to comply with the standards in research ethics of Monash University, companies will not be identified by their names.

spaces (see pp. 35-48). Since then, subsidiaries located in countries within those regions have progressively consolidated into functionally integrated networks of production, commercialisation and innovation. The performance of subsidiaries operating within these networks is closely interrelated and cannot be adequately understood through a comparative analysis of individual experiences.

As illustrated in Figure 3-1, the *main unit of analysis* –or 'case'– of the embedded research design corresponds to the *technological strategy and organisation of product engineering activities deployed by the company within the MERCOSUR region between 1991 and 2011*. At a second level, the *sub-units of analysis* (embedded cases) are defined as the *evolution of technological capabilities in product engineering activities* of the subsidiaries established in Argentina and Brazil during the same period of time.

The selected research design is quite original. Most empirical pieces of work on the automotive industry in South America have been mainly concentrated on the national dimension –in particular, the Brazilian one (see, for instance, Amatucci and Mariotto, 2012; Balcet and Consoni, 2007; Carneiro Dias *et al.*, 2011; Consoni, 2004; Consoni and Quadros, 2006b; Ibusuki *et al.*, 2012b; Quadros and Consoni, 2009). Studies dealing with the performance of the automotive sector in the MERCOSUR region as a whole have adopted a comparative approach at the level of member countries, rather than looking to automotive subsidiaries in different locations as part of a functionally integrated network (for instance, López *et al.*, 2008).

A second original feature of this research design is the longitudinal approach to the research problem. Whereas most of the empirical studies referred above are single case or cross-sectional studies, this work tracks the technological performance of selected companies for a period of twenty years, beginning with the launch of the MERCOSUR integration process. This allowed different phases in the technological trajectory of firms to be distinguished and to be related back to the actions adopted by relevant agents.

Figure 3-1 – Embedded case study research design
Source: Own elaboration on the basis of Yin (2009)

3.2 Selection of cases

A *purposive* sampling was used in this study (Miles and Huberman, 1994; Patton, 1990). The construction of the sample was conceptually driven, informed by the existing literature on the topic (Chapter 1), and the theoretical framework of this study (see pp. 48-54). The particular strategy for the selection of cases is referred to by the existing literature as a ‘maximum variation’ strategy (Miles and Huberman, 1994; Patton, 1990). Dissimilar cases were selected with the main objective of exploring whether common patterns of conceptual interest and value emerge from the comparison. As will be seen in great detail in the case studies (Chapters 5-7), the differences among the selected companies relate to:

- the history of the company in Argentina and Brazil;
- the relative size of the company in the two countries;
- the product policy followed by the company;
- the corporate organisation of R&D activities.

In order to be eligible, companies had to meet three pre-conditions. At the time of starting the selection process of the companies, the conditions were met by seven companies:

- to have subsidiaries operating in Argentina and Brazil;
- to produce cars and light commercial vehicles –companies producing only trucks, buses, and agricultural machinery were excluded.
- to have adopted some type of regional strategy;
- to have been established in the region for the greater part of the period covered by the study (1991-2011).

The selection of the companies was carried out on the basis of information gathered from two main sources: i) specialised literature on the evolution of the automotive industry in MERCOSUR (for instance, Balcet and Consoni, 2007; Bastos Tigre *et al.*, 1999; Carneiro Dias *et al.*, 2011; Consoni, 2004; Consoni and Quadros, 2006b; López *et al.*, 2008; Quadros and Consoni, 2009), and ii) interviews and informal contacts with specialists and managers of business associations.[44]

The three companies selected for the cases studies complied with the pre-conditions above and, in accordance with the purposive sample criteria, covered a variety of situations in terms of history, relative size, product policy and organisation of R&D activities. Italocars is a company with a long history both in Argentina and Brazil. It adopted a knowledge-intensive technological strategy in the region which fundamentally concentrated in Brazil. On the other extreme, Nipponcars represents a completely different case. Although having had presence in Brazil for more than three decades, it was only in the mid-1990s that the company decided to establish two subsidiaries in the region with a larger scale and more modern production processes. However, the technological strategy in the region was very conservative. Finally, Francocars occupies an intermediate position. The company was a newcomer in Brazil, but had established in Argentina in the 1960s. The technological behaviour in the region was

[44] A detailed list containing information about the interviews carried out can be found in Appendix A (p. 255).

initially very limited, but the strategy was changed in the last few years in favour of a more knowledge intensive activity.

As will be seen below, face-to-face interviews with senior managers were an important source of information. Before confirming the selection of the cases, authorisation from the company to conduct the interviews was required. Between April and June 2012, communication with senior managers of the Corporate Affairs area of the subsidiaries in Argentina was established to inform them about the characteristics and objectives of the research project, and to require authorisation to conduct the interviews. The managers contact information was provided by business associations, consultants and specialists in the automotive sector. Once the three selected companies were confirmed, conditions of confidentiality, the terms of the interviews and the issues to be addressed were stipulated in agreement with the corporate affairs managers of the respective automotive subsidiaries.

3.3 Sources of information and strategy for the interviewing process

Multiple sources and types of data were used in order to improve the quality of the information and to construct more compelling case studies –see Table 3-1– (Miles and Huberman, 1994; Patton, 1990; Yin, 2009). Data triangulation allowed for cross-checking the consistency of information at different times, providing for the possibility of having different perspectives of the phenomenon under analysis. The use of different data sources also permitted the amplification of information given in the interviews.

Table 3-1
Sources and data of information

Type of data	Source
In-depth interviews with subsidiaries' managers, business associations and specialists	Face-to-face interviews
Articles from newspapers and specialised magazines (1991-2011)	Database: Emerging Markets Information Service (www.securities.com)
Companies' reports	Companies' websites Reports provided by managers
Specialised literature	Monash University library Le réseau International de l'automobile (Gerpisa network)
Statistical data on automotive industry in Argentina, Brazil, and the World	Argentina: Asociación de Fábricas de Automotores (ADEFA) Brazil: Associação Nacional dos Fabricantes de Veículos Automotores (ANFAVEA); Banco Nacional de Desenvolvimento Econômico e Social (BNDES) World: International Organization of Motor Vehicle

	Manufacturers (OICA)
Legislation: Bilateral and MERCOSUR agreements; national legislation on automotive sector	Argentina: Información Legislativa y Documental (Infoleg) Brazil: Rede de Informação Legislativa e Jurídica (LexML) Bilateral and MERCOSUR agreements: Asociación Latinoamericana de Integración (ALADI)

3.1.1 Interviewing process

As pointed out above, face-to-face interviews with senior managers of automotive subsidiaries in Argentina and Brazil were one of the main sources of information. With the objective of making an efficient use of time and budget resources, the interviewing process was divided into two phases. A first round of interviews with subsidiaries and business associations' managers was carried out in Argentina between March and September 2012 (in the cities of Buenos Aires and Córdoba). Managers from subsidiaries in this country provided contact information for managers in Brazilian subsidiaries, thus facilitating the organisation of interviews in Brazil. The interviewing process in Brazil was concentrated in a period of ten days, from 11th to 20th December 2012, in the cities of São Paulo, Belo Horizonte and São José dos Pinhais.

As the first round of interviews in Argentina was more exploratory in nature, it covered a wider range of corporate areas than the interviews conducted later in Brazil. In addition to senior managers from the areas of corporate affairs and product engineering departments interviewed in the two countries, staff from process engineering, and purchasing departments were interviewed in Argentina as well.

A total number of 28 in-depth, open-ended interviews with an approximate length of 60 minutes were conducted in the two countries (a complete list of the people interviewed can be found in Appendix A, p. 303). Interviews were conducted in English, Italian, Portuguese and Spanish. An interview guide was specifically outlined for each meeting containing questions concerning the area managed by the interviewee (a guideline of the interviews with the managers of subsidiaries can be found in Appendix A (p. 306). Questions were prepared on the basis of information collected from company reports, news databases and specialised literature. As time for the interview was limited, questions addressed very specific topics aimed at obtaining information on:

- *Facts* concerning the milestones in the process of product engineering capability accumulation; autonomous initiatives undertaken by the subsidiary to increase its capabilities; the specific delegation of responsibilities by the parent company; evolution of the global strategy of the corporation; relations with parent companies and state agents.

- *Personal experience* of the respondent on the above mentioned events (at the time of the interviews, most managers had worked in different subsidiaries of the company for the whole period covered by the study).
- *Personal understanding and perceptions* about the evolution of the global corporation and, in particular, the subsidiaries operating in the MERCOSUR region.

Interviews were recorded and transcribed verbatim using the software Nvivo.

3.4 Analysing the data and writing up individual case studies

Figure 3-2 shows the various stages of the writing process of the case studies (Chapters 5-7) and cross case study report (Chapter 8). As can be seen, it was not a linear process but an iterative one as each step offered elements contributing to the improvement of the previous one. The fieldwork process resulted in the collection of an abundance of information on the selected companies from a variety of sources of information. As a first step, with the purpose of facilitating its manageability, the bulk of data was loaded into the software Nvivo. Then, information was codified to facilitate data retrieval (Miles and Huberman, 1994). The code list was in fact created before the fieldwork started, on the basis of the concepts and categories of analysis set in the analytical framework –a complete list of the codes is provided in Appendix B. As the fieldwork progressed some codes were redefined, others discarded, and new codes created. The coding process was an early step in the analysis of the data in so far as it allowed for clustering and connecting sentences, paragraphs and information retrieved during the fieldwork process. This facilitated the writing of preliminary versions of case studies as well as the elaboration of matrices and tables for the cross case comparison.

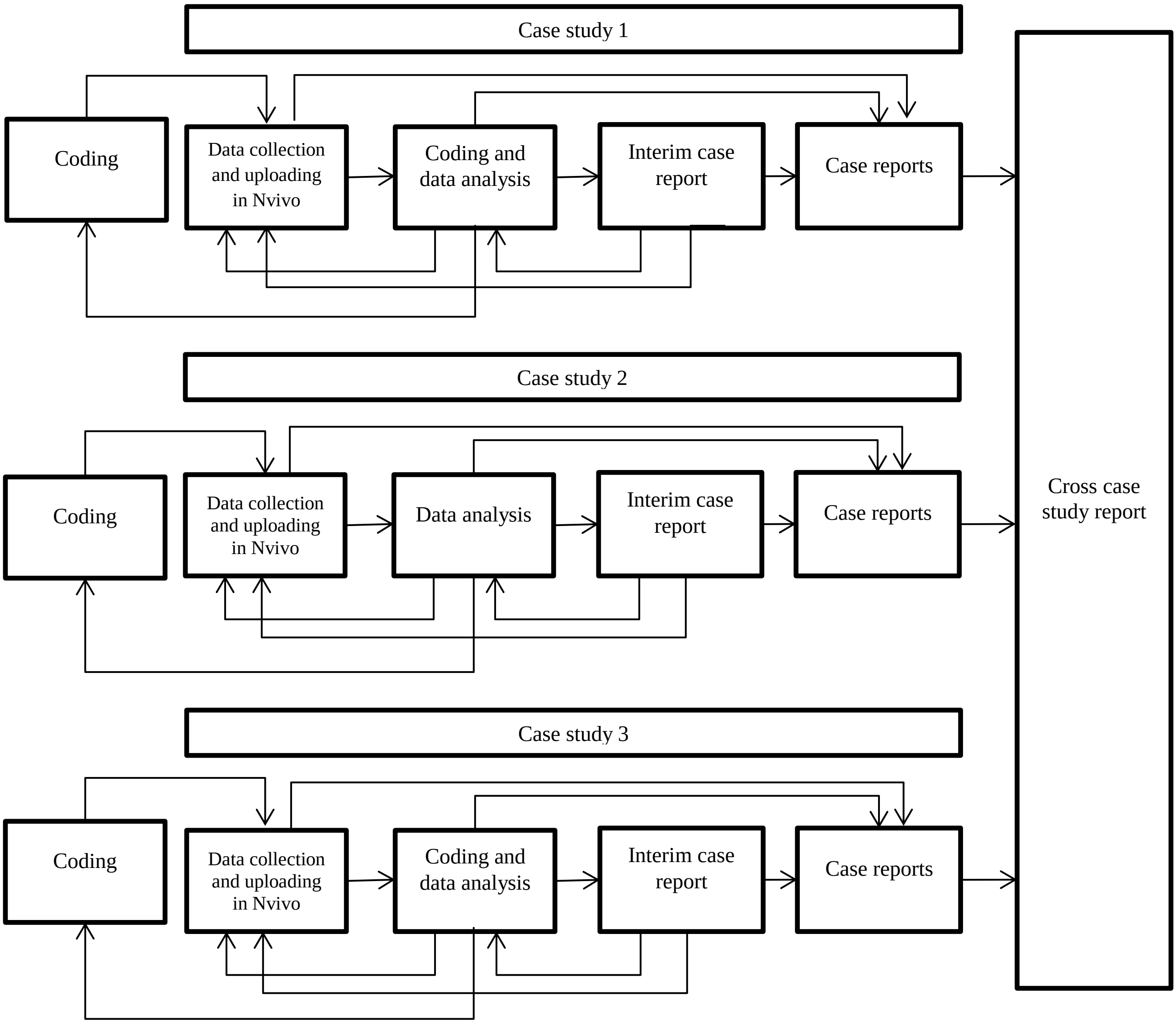


Figure 3-2 – Writing up of case studies
Source: own elaboration

The following step in the analysis of data was the *chronological reconstruction of the regional technological strategy* pursued by companies in the field of product engineering activities between 1991 and 2011 (RQ1). This entailed evaluating the knowledge-intensity of the product engineering responsibilities that were assumed by subsidiaries in the region. The trajectory of each company in the region was divided into different phases. Turning points – or milestones– between phases were marked by changes resulting in –or creating the conditions for– a change in the degree of knowledge required by the activities carried out by subsidiaries in MERCOSUR. For example, milestones included the redefinition of the product policy, the reorganisation of R&D activities, or the performance of specific in-house technological activities in local subsidiaries.

Within the analysis of regional-scope technological strategies, case studies examined the *process of accumulation of product engineering capabilities and the division of labour individual subsidiaries* in Argentina and Brazil (RQ2). Figure 3-3 below provides a model of the timeline used to depict the chronological process of capability accumulation of a carmaker in the region. The degree of knowledge-intensity of the activities carried out by the subsidiaries in Argentina and Brazil is measured on the vertical axis (levels 1 to 8, according to Table 2-2, in p. 52). The horizontal axis of the timeline covers the period under analysis (1991-2011).

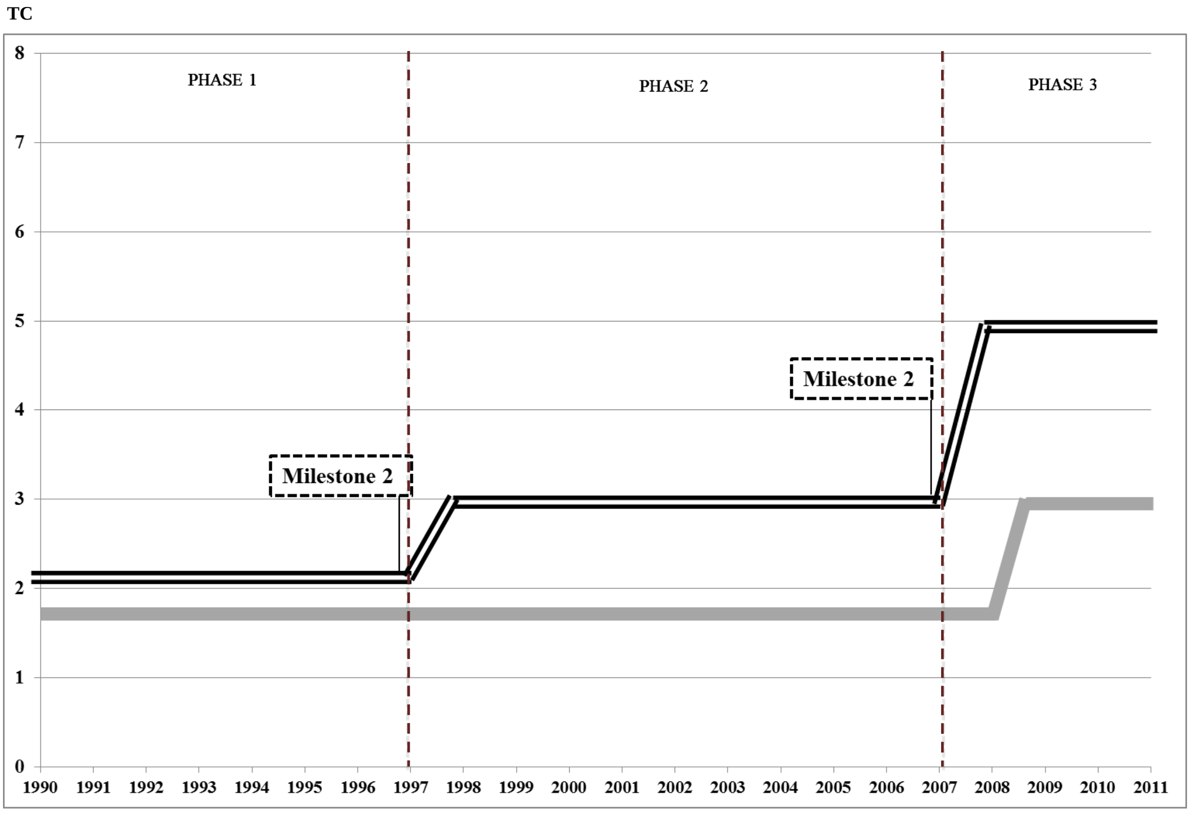


Figure 3-3 – Timeline model of technological trajectory of subsidiaries in MERCOSUR
Source: own elaboration

References: BR subsidiary AR subsidiary

The third step in the analysis of the case studies was the examination of the role played by the 'driving' agents of the process of technological learning of subsidiaries operating in the MERCOSUR region (RQ3). The analysis pointed to an understanding of the influence of agents' actions during each of the phases identified above and, in particular, in the occurrence of the 'milestones' marking the transitions between them (Figure 3-3). A matrix was elaborated for each of the phases of the technological trajectory of carmakers in the region (Figure 3-4). The matrix allowed for a clearer identification of relations between agents' actions, and between them and the technological performance of subsidiaries.

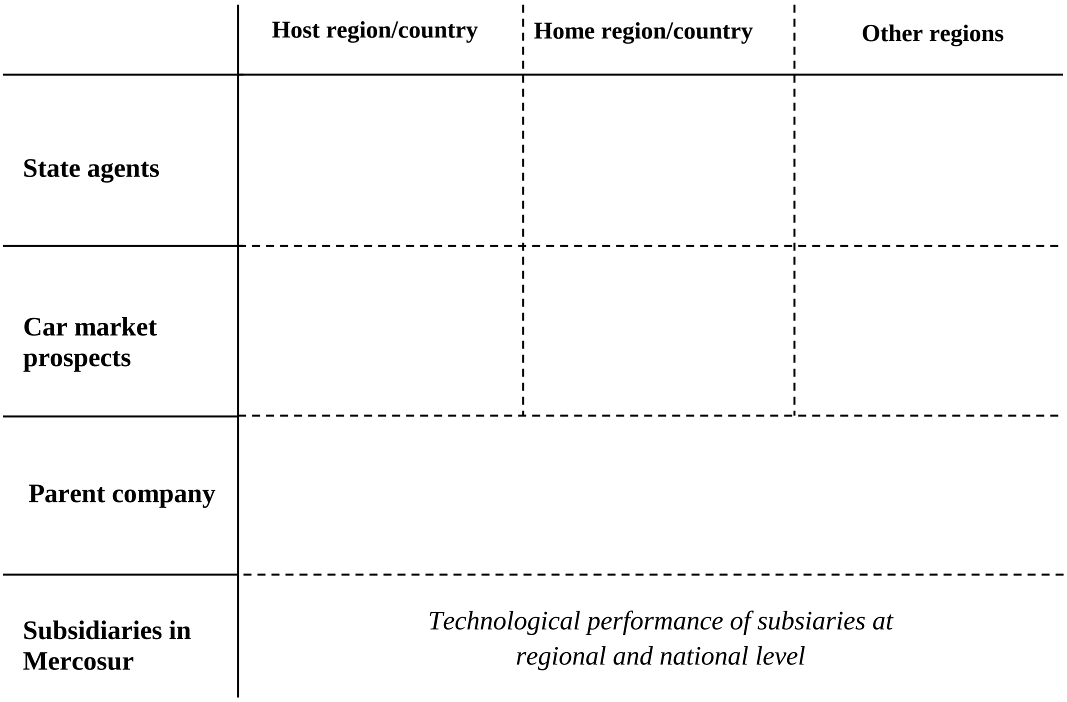


Figure 3-4 – Driving agents behind the technological trajectory of subsidiaries in MERCOSUR

In parallel with the fieldwork and data analysis processes, interim versions of the case studies were drafted (Miles and Huberman, 1994). This step was very important for outlining the structure of empirical chapters. It was also a good opportunity to carry out a mid-term evaluation of the progress of the fieldwork process and to become aware of the necessity of collecting additional information or of follow-up communication with the managers of subsidiaries. As the presentation style of the case studies is mainly narrative, the drafting of interim cases studies provided an opportunity to devise effective forms of data display. Timelines, matrices, network and organisational charts, and different types of figures were used to arrange and show data in a systematic way that contribute to elucidate the research questions –see, for instance, Figure 3-3 and Figure 3-4 above. The elaboration of a first draft of cases studies was a fruitful occasion for joint reflection and discussion with supervisors and colleagues. Their feedback provided insights that encouraged adjustments to be introduced in the organisation of the chapter as well as to identify some points that needed clarification. On the basis of new information and corrections a final version of the case studies was written.

3.5 Cross case comparison analysis

The validity of the conclusions of the case studies cannot be extended to other cases of the same kind. This is simply to say that research designs covering a limited sample do not allow for generalisation (Miles and Huberman, 1994; Yin, 2009). Cross case comparison, however, is important for an understanding of the conceptual applicability of the findings of the study and for improving the current understanding of the problems it deals with. Therefore, the main objective of cross case comparison is to reconcile “an individual case’s uniqueness with the need for more general understanding of generic processes that occur across cases” (Miles and Huberman, 1994: 173). It is also directed at searching for recurrent specific, concrete and history-grounded patterns identified in individual case studies, in order to build “abstractions across cases” (Merriam, 1988: 195). In the cross-case analysis phase, the researcher seeks for “a general explanation that fits each of the individual cases, even though the cases will vary in their details” (Yin, 1994: 112).

A first comparison was carried out between the technological trajectories of the three companies (RQ1). This allowed the study to highlight the heterogeneity of the firms’ strategies in terms of the degree of knowledge-intensity of product engineering activities performed in the region and the timing of the implementation of strategies. However, at the same time, a common pattern was identified in regards to the peripheral position of MERCOSUR subsidiaries within the corporate division of labour.

Subsequently, a comparison was made between the different forms organisation of product engineering activities at regional level and the capability accumulation processes of individual subsidiaries. Also in these cases a common pattern can be identified beyond differences. In particular, the fact that an increasingly hierarchical division of labour consolidated in all companies as the integration process advanced.

Part II
Empirical findings

Chapter 4 - The consolidation of the MERCOSUR automotive space

This chapter examines the process of consolidation of MERCOSUR as an automotive space and its main characteristics. The purpose of this analysis is to provide a framework for the analysis of case studies carried out in the next empirical chapters. The presentation is organised in two sections.

The first one is devoted to the analysis of the MERCOSUR regional regulatory framework. This analysis is carried out from a multi-level perspective, taking into consideration the normative provisions put in place by national and sub-national governments, as well as the agreements reached by Argentina and Brazil at a bilateral level –or, at the MERCOSUR level, when appropriate.

The second part examines the progressive configuration of the MERCOSUR automotive network between 1991 and 2011, in the light of the global processes discussed in Chapter 2 (in particular pp. 35-54). The analysis focuses on three specific phenomena that characterised the evolution of this process and are particularly relevant for our research problem: the *enlargement* of the production capacity, the *modernisation* of the industry, and the *regionalisation* of the network. This section provides some indications supporting the main contention of this study: i.e. as the MERCOSUR region gained importance as a world production and consumption centre, Brazilian subsidiaries emerged as privileged semi-peripheral agents in relation to their peripheral Argentinian counterparts.

4.1 The evolution of the MERCOSUR automotive regulatory framework

Under the umbrella of the Programme for Integration and Economic Cooperation (PIEC) launched in 1986, some first steps were taken aiming at achieving closer integration between the Brazilian and Argentinean automotive industries. An agreement regulating bilateral exchanges of vehicles and auto parts was signed in 1988 (*PICE Protocolo Nº21 - 1988*): the two countries established import quotas free of tariffs for vehicles produced on their respective territory. Quotas of 5,000 units were set in 1989; in 1990 they were raised to 10,000 units. In order for carmakers to have access to this benefit, a minimum of 85% of the parts used for the production of the vehicle had to be manufactured in either of the two countries. As for the bilateral exchange of auto parts a limit of US$ 150 million was agreed upon. In the event of a trade unbalance, this was not allowed to exceed 15% of total trade (*PICE Protocolo Nº21 - 1988*) (Vigevani and Cândia Veiga, 1997).

This initiative reflected the interests of some carmakers in expanding the geographical scope of their manufacturing and commercial activities beyond the boundaries of individual states. As already seen in Chapter 2, this interest was in line with the business strategies adopted by carmakers at a global level. Some companies located in Argentina and Brazil had, in fact, already advanced in this direction before the intra-regional liberalisation of trade. Ford and Volkswagen, for instance, created in 1987 the joint venture Autolatina, integrating under a single organisation their four subsidiaries located in the two countries. The objective of this enterprise was to achieve more efficient scales of production. It was also intended to reduce costs by developing common platforms then used by the individual brands to commercialise models within their own badges (Bastos Tigre *et al.*, 1999).

As already discussed in the Introduction and in Chapter 2, the 1990s decade witnessed a profound reconfiguration of the ‘rules of the game’ in the Latin American region –commonly known as the Washington Consensus reforms (Katz, 1996). The automotive sector was not exempted from these changes. However, differently from the liberal approach which permeated the reform strategy in the region, the governments of Argentina and Brazil actively intervened in the reconfiguration of the car industry. As will be shown below, in the early 1990s, both countries put in place specific policies that were intended to boost the depressed demand levels of vehicles. At the same time, they created incentives for firms operating in the region to modernise their production lines and expand their production capacity protecting them from foreign competition.

Interestingly, besides the efforts deployed at the national level by individual governments, from the very launch of MERCOSUR in 1991, Argentina and Brazil sought to further advance with their joint efforts to promote the integration of the local automotive industries. During the first half of the 1990s, the policy approach was essentially kept within the lines of the experience of the PIEC. The automotive sector was excluded from the free trade agreement signed between the two countries *(ACE Nº14 - 1990 (ALADI))* –extended in 1991 to the other two original member countries of MERCOSUR: Paraguay and Uruguay *(ACE Nº 18 – 1991 (ALADI))*. With extreme caution, avoiding intra-regional commercial imbalances, the two countries sought to encourage commercial exchanges setting export quotas.

Over the years, however, the two governments progressively eased the restrictions on bilateral trade. They even agreed on a commitment to create a common automotive market within the MERCOSUR region. Through the progressive liberalisation of intra-regional barriers on trade, they aimed to create favourable conditions for companies with subsidiaries operating in the two countries, encouraging them to adopt a single strategy for the region. That is, to organise production and commercial activities around the regional market.

However, as will be seen below, the objective of establishing a common market was never achieved. At different periods of time, the two governments proved to be adverse to a complete liberalisation of intra-regional trade flows. Reluctance was particularly more intense on the part of Argentina which, reflecting the opinion of most subsidiaries operating on its territory, saw the total removal of trade barriers as a threat to the domestic industry.

The sections below summarise the evolution of two parallel and interconnected processes which gave shape to the automotive regional regulatory framework, namely: the automotive policies adopted by Argentina and Brazil at a national level; and the protocols the two countries agreed upon to regulate trade flows, both within their region and with third countries.

4.1.1 The period 1991-1994: early attempts to recover the national automotive industries

In the early years of the 1990s, both Argentina and Brazil put in place different measures to reactivate the automotive industry. In the decade starting in 1980, the performance of the car sector in the region had been in line with that of the overall economy and needed to be restructured. The scale of production was low, sales were depressed, investment was scarce, and the technological gap with developed countries was wide. As can be seen in Figure 4-1 (p. 101)[45], in 1990, production output in Argentina was at levels comparable to those seen in the 1960s, when the national car industry was in its early stages. In the case of Brazil, the volume of production had seen its golden years in the period 1978-1981, when it exceeded 1 million units. From then on, output fell sharply and stagnated during the 1980s around levels of 800-900 thousand units per year.

Against this backdrop, the policy reaction of the Argentinean government came earlier in time and was more vigorous. In 1991, it put in place incentives to foster domestic demand, attract investment and promote exports, encouraging a closer integration with GPNs. The implementation of the plan was certainly facilitated by the stabilisation of the domestic economy achieved in those years.

By contrast, during this period, the Brazilian response to the stagnation of the car industry was rather erratic. The difficulties the government had in controlling inflation and stabilising the macroeconomic situation complicated any attempt to reactivate any specific industry. The government attempted to formulate a solution involving all the affected parties in its negotiations for the formulation of an automotive policy: companies –vehicle assemblers and suppliers–, workers, and government (at different levels). As a result of this tripartite negotiation, two 'sectoral chamber' agreements were signed (*acordos das câmaras setoriais,* as they are commonly referred to in Portuguese).

Between 1991 and 1994, policy efforts were fundamentally maintained at the national level. The priority for them was to *recover the national 'automotive space'*. *Efforts to articulate a regional space were timid* as it put at risk domestic industry. Accordingly, both countries agreed to continue with the same methodology of regulated trade exchanges implemented under the PIEC.

[45] As already indicated, in order to improve the readability of the following section, figures have been grouped in Appendix 4.1 at the end of this chapter.

- *The new Argentinean automotive policy*

The normative framework regulating the automotive industry in Argentina was established with the *Decreto 2677/91 (Argentina)* on the Automotive Industry, in force from 1st January 1992. The new policy lowered tariffs applied to imported auto parts and finished vehicles. This gave car manufacturers settled in the country more flexibility to incorporate a higher level of imported content into their products and to commercialise more imported cars in the domestic market.

However, in order to be able to have access to lower tariffs, companies had to meet some specific performance conditions. Firstly, locally manufactured vehicles had to incorporate a minimum domestic parts content of 60%. This percentage was calculated as a ratio between the total value of imported parts and the total value of the parts of the vehicle. Secondly, imports made at a reduced tariff had to be compensated for with: i) exports of finished vehicles or auto parts produced in the country by independent companies; or ii) up to 30% of total investment in fixed assets produced in the country. Exports of finished vehicles were granted a 'bonus' of 20%, i.e. each dollar exported was calculated as 1.2, for the purposes of compensating for imports. The objective of this second provision was to create incentives for companies to export their own production (or that of their associated partners).

For companies with no manufacturing facilities in the country an import tariff of 18% was established, provided that they compensated for the total import amount with exports of products elaborated by independent auto parts producers. The final destination of these exports could be their own headquarters, other subsidiaries of the corporation or independent dealers overseas. Non compensated imports of vehicles were charged with a tariff of 22% and could not exceed a fixed share of the total national production of vehicles set at 8% in 1992; at 9% in 1993; and at 10% in 1994.

As stated above, the main objectives of the policy were to attract investment in order to *expand* and *modernise* production facilities, and to encourage a *closer and balanced integration with global production networks*.

- *Sectoral chambers agreements to encourage the recovery of the Brazilian car industry*

During this period, the Brazilian federal government also attempted to create a normative framework aimed at fostering investment and the modernisation of the automotive industry (De Negri *et al.*, 2008). Along the lines of the trade liberalisation reforms which had been started to be gradually implemented in 1988[46], the government lowered the barriers applied to imported vehicles. A tariff reduction schedule was set for the import of vehicles: 85% in 1990, to 60% in February 1991, 40% in October 1992, 35% in July 1993, and 20% in September 1994 (Comin, 1998).

An original feature of the Brazilian approach for the formulation of the new automotive policy was the way it was negotiated. For the first time, the three relevant groups

[46] The average tariff on all tariff lines fell from 41%, in 1988, to 25.3% in 1991, 13.5% in 1994 (Comin, 1998).

participating in the sector gathered together to agree on the regulatory framework: the federal and state governments, the companies and the trade unions. During this period, two 'sectoral chamber' agreements resulted from the tripartite negotiations, the first one being signed in March 1992 and the second one in February 1993.

One of the first issues raised in the negotiations was the necessity of expanding the domestic market and of bringing down the price of vehicles. With this intention, the federal state made the access to consumption and production loans more flexible (Arbix, 1996; Belieiro Júnior, 2012). With this same purpose in mind the agreements reduced the tax burden on vehicles.[47] In 1992, the Tax on Manufactured Products (TMP; *Imposto sobre Produtos Industrializados*) charged by the federal government on certain types of vehicles was lowered. In the same vein, the Tax on the Circulation of Goods and Services (TCGS; *Imposto sobre Circulação de Mercaderias e Serviços*), collected by state governments, was also reduced (Comin, 1998). As a result of this first agreement, the average price of vehicles was reduced by 22%. The sectoral chamber agreements also established goals for wages, employment levels and company profits.

In 1993, President Itamar Franco promulgated a decree enacting the so-called 'popular car' policy. In essence, this measure set a symbolic TMP of 0.1% on vehicles using engines up to 1.0 cc. Other vehicles were charged with taxes ranging from 25% to 30%. The measure had an immediate effect on both domestic demand and production levels (Figure 4-2 and Figure 4-3, in p. 101 and p. 102, respectively).[48] The differentiated tax burden introduced by this measure had a significant impact on the structure of the domestic market: the share of 'popular car' vehicles produced in Brazil over the total units produced rose from 10.4% in 1990, to 40% in 1994, and peaked at 71.1% in 2001 (Figure 4-6, in p. 103).

It is interesting to note that the popular car policy resulted from direct negotiation between carmakers and the federal state. The other actors participating in the sectoral chamber agreements i.e. trade unions, suppliers, etc., were excluded from it. This measure put in evidence the fragility of the tripartite dialogue and showed the intention of both the federal government and carmakers to move away from the collective method of negotiation (Comin, 1998).

- *The bilateral agreement between Argentina and Brazil to regulate automotive trade flows*

The possibility of including the automotive industry in the free trade agreement signed between Argentina and Brazil in December of 1990 *–ACE Nº 14 - 1990 (ALADI)–*[49], was seen both as an opportunity and a challenge for the automotive industry in Argentina and

[47] In the case of cars with engines up to 1.0 cc litre, the tax burden on vehicles fell from 34.5% in 1990 to 17% in 1994. In that of vehicles with bigger engines, the tax fell from 42-44% to 35-33% in the same (Comin, 1998: 39).

[48] Sales of this type of vehicles grew from 700 thousands units in 1992 to more than 1 million in 1993. As for production levels, the growth was from 850 thousands units to 1.1 million in the same period.

[49] The Treaty of Buenos Aires *–ACE Nº14 - 1990 (ALADI)*— was signed between Argentina and Brazil in 1990. It is considered to be the predecessor of the *ACE Nº 18 – 1991 (ALADI)* –or Treaty of Asunción– which was extended to Uruguay and Paraguay giving birth to MERCOSUR in March 1991.

Brazil. On the one hand, it was conceived as an opportunity for achieving more efficient scales of production, thus contributing to the objective of improving the efficiency of the industry. On the other, however, a more intense competition resulting from free trade could put at risk the recovery of the industry, in particular in the case of Argentina, where the companies were less competitive and operated at lower scales.

As pointed out earlier, during this period national governments were fundamentally concerned with recovering national automotive spaces rather than advancing with the construction of a regional market. Hence, in this initial phase of the integration process, the two governments *opted for excluding the automotive sector from the bilateral liberalisation schedule agreed with the signing of the Treaty of Asunción* (*ACE Nº 18 – 1991 (ALADI) – Appendix 1)*. They decided to continue applying the same methodology as under the PIEC thus regulating bilateral trade flows through the establishment of import quotas. It was agreed that in 1991, each country could export 10,000 finished vehicles and that the bilateral exchange of auto parts could not exceed 15% of the FOB total value exported. The volume of the quotas was increased to 18,000, 20,000 and 35,000 units in 1992, 1993 and 1994, respectively.

4.1.2 The period 1995-2000: the convergence of national regulatory frameworks and the agreement of Ouro Preto

This period is characterised by the *convergence of the national automotive policies of Argentina and Brazil*. The latter country left behind the tripartite negotiation approach to put in force, in 1995, a comprehensive normative framework which, in essence, resembled that adopted some years ago by its neighbour.

In December 1994, the four member countries of MERCOSUR –and not only Argentina and Brazil– signed an agreement in Ouro Preto which expressed their commitment to create a common normative framework to regulate the car industry at a regional level (*Decisión 29/94 (Consejo Mercado Común)*). An *Ad hoc* Technical Committee was created whose main mission was to elaborate a proposal for the adoption of a common automotive policy to be adopted in 2000.

The convergence between the national regulatory frameworks and the intention of implementing a regional policy *contributed to creating the institutional conditions for companies to progressively organise their business activities on a regional basis*. As a first step, it was during this period that a significant number of carmakers decided to establish themselves on the two sides of the border.

- *Policy continuity in Argentina: minor adjustments to the existing automotive policy*

The guidelines of the Argentinian automotive policy were maintained during this period. The country had been successful in boosting domestic demand and attracting foreign investment to modernise and expand production capacity. Some adjustments were introduced in the current scheme in order to enhance the implementation mechanisms and enforcement of the policy. Changes were also directed at reducing the trade deficit accumulated by the automotive complex in the preceding years (Figure 4-7, in p. 104). Higher tariffs on imports for companies with no manufacturing operations in the country were applied.[50] Thirdly, in order to further encourage carmakers' exports and investment, companies were allowed to calculate a higher percentage of these two items to compensate for imports made at preferential tariffs.

The most important changes were introduced with regard to the calculation of the domestic content of vehicles. The parts and components imported from Brazil could now be considered as domestic content provided they were compensated for with investment or exports to any destination (*Decreto 2677/91 (Argentina))*. This was a significant step towards the construction of the MERCOSUR automotive space, as it contributed to regionalising the production network.

In 1996, the method for the calculation of domestic content was changed, allowing the incorporation of a higher share of imported parts. The previous form of calculation set the *minimum* domestic content for a vehicle to be considered as locally manufactured. This value was calculated as a proportion of the total value of the parts incorporated in the finished vehicle. Differently, the new norm set a *maximum* imported content, which was calculated as a share of the price of the vehicle charged to the dealer (*Decreto 33/96 (Argentina)*):

$$\frac{\sum FOB\ Value\ of\ imported\ parts\ incorporated\ in\ the\ vehicle}{Sales\ price\ to\ the\ dealer\ before\ taxes}$$

The maximum ratio was originally set at 40-42% in 1996 (in accordance to the type of vehicle). The norm included a schedule setting a progressive decrease of this ratio up to 32.5% in 1999. This method was also applied for systems or sub-system to be considered as of national origin: i.e. the ratio between the total value of the imported parts incorporated into the system or sub-system and the sales price before taxes of the part to the assembler –i.e. the carmaker–could not exceed 40%.

In practice, the change in the system of calculation gave carmakers (and multinational first tier suppliers) the possibility of incorporating in their products more imported parts. The denominator of the formula now depended on the added value carmakers themselves incorporated in the vehicle during the assembling process (estimated in around 30%). This gave them some flexibility to 'accommodate' this value in order to increase the share of imported inputs.

Additionally, the tariff applied to systems, sub-systems and parts was reduced to 2% in the case of imports from third countries, and totally removed in that of imports from MERCOSUR, provided they were compensated for with exports. All these changes, in

[50] Imports made by these companies were charged with a tariff of 50% (*Decree 683/94 (Argentina)*).

combination with the possibility of taking Brazilian auto parts as domestic content (provided they were compensated for with exports), allowed carmakers and, especially, first tier sub-systems suppliers to produce vehicles with a very low level of national content (Cantarella *et al.*, 2008). These measures certainly benefited the modernisation and regionalisation of the automotive value chain. However, it did so at the expense of suppliers located on the Argentinean territory –in particular, of second and third tier local suppliers with no direct connections to car assemblers (Cantarella *et al.*, 2008).

- *Brazil changes the policy approach: from the sectoral chamber agreements to an Argentinian-type of automotive policy*

In February 1995, a third tripartite sectoral chamber agreement was reached in Brazil. In practice, however, this understanding was rather ineffective since, by the end of the year, it was replaced by a new automotive policy outlined by the federal government with the 'blessing' of MNC carmakers operating in the country. Although the scheme incorporated some of the points of the tripartite agreement of February, it basically embraced a new approach to the automotive question. More power was given to carmakers at the expense of the other actors involved in the industry –i.e. workers, suppliers, and sub-national governments.

It is important to note that the new automotive scheme was put in place within the broader framework of a macroeconomic stabilisation plan (*Plano Real*) adopted in 1994 and of the structural economic reform programme intensified under the newly elected Cardoso administration. Accordingly, as had been the case of Argentina, the new automotive policy set measures aimed at attracting foreign investment, fostering the modernisation of the domestic car industry, its expansion and its closer integration into global production networks.

At the same time, however, the implementation of the new automotive scheme was highly conditioned by the so-called Tequila crisis which erupted at the end of 1994[51]. In consequence, in the short-term, the measures adopted for the sector were oriented towards the protection of the domestic economy from external imbalances (De Negri, 1999; Mori, 1998). Among the measures taken by the Cardoso administration to protect the domestic economy during the Tequila crisis, the decision was taken to raise the tariff applied to imported vehicles. At the time, the automotive sector accounted for the largest share of the overall trade deficit which was putting at risk the stability of the whole economy (Mori, 1998). Initially, the tariff was increased from 20% to 32%.[52] Later on that same year, it was raised

[51] The expression 'Tequila crisis' is usually used to make reference to the economic crisis brought about as a consequence of a shortage of foreign exchange reserves in the Mexican Central Bank and the sudden devaluation of the Mexican peso in December 1994. The crisis extended to a large number of Latin American countries. In the Southern Cone, Argentina was particularly affected by the crisis with a fall in GDP of 2.95% (Source: World Bank Data). These nations, whose growth was largely fuelled by foreign capital inflows, experienced a sharp reversal of capital flows. This event had a strong negative impact on their GDP in 1995. See, for instance, Ffrench Davis (1997).

[52] *Decreto 1391/95 (Brasil).*

again to reach 70%.[53] In its original version, the automotive policy also set import quotas for vehicles. In the second semester of 1995 they were set at a level equal to 50% of the total number of imported vehicles in the first semester of that same year. However, this generated conflicts with Argentina and other members of the WTO –Japan, Korea, the EU and the US– and had to be replaced by other norms (Econômico, 2003; O Estado de São Paulo - Economic News, 1998). Against the backdrop of the crisis, the federal government also decided to raise the TMP tax applied to 'popular cars' from 0.1% to 8% (Comin, 1998).

The new Brazilian automotive policy was initially adopted through two "Provisional Measures" (*Medidas Provisorias*) of the executive power of the government.[54] The norms underwent some changes in the negotiation process for its approval by the Brazilian Congress in 1997. Two laws were finally enacted: *Lei 9.440/97 (Brasil)* and *Lei 9.449/97 (Brasil).* In an attempt to avoid the concentration of investment in Argentina, which had taken the lead in this field, the Brazilian scheme incorporated the basic elements of the Argentinean policy. Carmakers and suppliers operating in Brazil were allowed to import finished vehicles, capital goods, components, parts and raw materials at a reduced tariff provided they complied with two basic rules[55]: i) vehicles had to incorporate a minimum parts domestic content of 60% (parts from Argentina were considered as domestic content on the condition they were compensated for)[56]; and ii) imports had to be compensated for with exports and investment.

With respect to this last issue, namely the link between the import and export performance of companies, the Brazilian regime established, in principle, that the total value of imported vehicles and parts could not exceed the total automotive exports (including direct and indirect export carried out through subsidiaries or associated export companies)[57]. However, as in the case of Argentina, the scheme included some 'bonuses' which allowed firms to increase import vehicles and parts for a value of up to 57% over its exports.[58]

[53] *Decreto 1427/95 (Brasil).*

[54] *Medida Provisoria 1024/95 (Brasil)*, then replaced by the *Medida Provisoria 1235/95 (Brasil).*

[55] The level of tariff reduction was 50% for finished vehicles (i.e. they were charged with a tariff of 35%); and 90% for capital goods (tariff could not be lower than 2%). In the case of components, parts and raw materials the *Decreto 2072/96 (Brasil)* set the following a reduction: 70% in 1996; 55% in 1997; 40% in 1998; 40% in 1999. The final average tariff in this case ranged from 4.8% in 1996 to 9.6% in 1999 (Mori, 1998).

[56] It is interesting to note that Brazil adopted the calculation method used in Argentina in the period 1991-1994, and not the one that the country implemented in 1996. This means that the index of 60% was calculated as a ratio between the value of parts produced in the country and the total value of parts incorporated in the vehicle (including both nationally produced and imported parts). As seen above, this method gave carmakers and suppliers less flexibility to import parts.

[57] A second, and more specific provision, established that the ratio between imported inputs at a reduced tariff and total exports could not be higher than 2/3.

[58] The norm allowed companies to consider a percentage of their investment in machinery and equipment produced in the country as well as imported tools for cold pressing as if they were exports. For machinery and equipment, the percentage decreased according to the following schedule: 140% in 1996, 120% in 1997, 95% in 1998, 70% in 1999. For tools for cold pressing, the schedule was as follows: 100% in 1996 and 1997, 95% in 1998, 70% in 1999.

The amount of credit obtained from these two bonuses could not be higher than 37% of effective exports carried out by the firm (i.e. direct plus indirect exports). Secondly, the export of vehicles and auto parts produced by carmakers gave these companies a bonus of 20% that could be applied for the reduction of the tariff applied to the import of parts and vehicles. The normative scheme also included some specific provisions regarding the

With the objective of encouraging foreign investment, the Brazilian automotive scheme provided special treatment to 'newcomers' –i.e. companies with no already existing manufacturing facilities installing a new plant in the country–, and for companies already settled in the country which decided to open new plants or to establish new lines of production. In brief, this special treatment consisted in granting them with longer terms to comply with the provisions set in the legislation. In the same vein, a lower index of domestic content, set at 50%, was established for a period of three years, in the case of assemblers, and of one year in that of auto parts manufacturers[59].

One particular feature of the Brazilian automotive policy was the fact that in 1997 it created a special regime for the least developed regions of the North, North-East, and Central-West (*Lei 9.449/97 (Brasil)*). The scheme was the outcome of a negotiation process with those regions which allowed the legislation on the automotive policy to be passed in the Congress (Zauli, 2000). The special regime provided companies establishing in those regions with more flexible conditions as well as more 'generous' bonuses for the imports of parts. For instance, it allowed imports of parts and component at a tariff reduced by 90% until 1999. Moreover, the acquisition of capital goods manufactured in Brazil gave a 'bonus' of 200% for importing at a preferential tariff, whereas the purchase of tools gave a bonus of 150%. Until 1999, the purchase of capital goods did not pay TMP and that of raw materials payed a rate reduced by 45%.

- *A commitment to creating a common automotive market in MERCOSUR by the end of the decade*

The prevailing economic conditions in the region at the time of the Summit of Ouro Preto (see p. 72), made it very difficult to reach an agreement for the creation of a common automotive market in the short-term. Moreover, the policy approach of the two countries was still very different. Argentina had taken the lead in promoting the reconversion of the car industry. Against the background of a more stable economic situation, the specific incentives set for the automotive sector had proved to be successful in boosting the demand for vehicles, attracting investment, and promoting exports. The Argentinean government was therefore reluctant to agree on rules at the regional level that might intensify competition and divert investment to Brazil.

On the other hand, Brazil had not yet defined its automotive policy and was lagging behind its neighbour. The sectoral chamber agreements were weak and the overall economic situation very fragile. The only car segment which seemed to have really benefitted from the measures taken by the government was that of the small 'popular' vehicles. Carmakers settled

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possibility of importing capital goods at a reduced tariff. The amount of imports authorised under this condition was linked to the value of capital goods acquired in the country. It was established that the ratio between the total value of capital goods produced in Brazil (including that produced by the company itself) and the import of capital goods at a reduced rate could not be lower than 1 until December 1997, and 1.5, post 1998.

[59] In the original decree 1.024/95 it was also established that a portion of the investment and re-investment made in foreign currency could be considered as exports for the purposes of importing at a reduced tariff. However, this rule was removed since it generated controversies with international organisations.

in Brazil, represented by ANFAVEA, lobbied the federal government to adopt a sectoral policy similar to that of Argentina. However, it was only after the MERCOSUR summit, once the Cardoso administration took office, that they were successful in their efforts (Diario Comercio, 2004; Mercantil, 2003a).

In Ouro Preto, member states of MERCOSUR came to an agreement to establish a common automotive market by 1st January 2000 (*Decisión 29/94 (Consejo Mercado Común))*. They created an *Ad hoc* Technical Committee (see p. 72) whose main task was to elaborate a proposal on the rules governing such a market. In principle, the common market had to meet three basic conditions:

- total liberalisation of intra-regional trade for the automotive sector;
- a common external tariff;
- the removal of national incentives 'distorting' competition in the region.

Bilateral agreements between Brazil, Argentina and Uruguay[60] regulating specific aspects of commercial relationship were incorporated into the framework of the *Decisión 29/94 (Consejo Mercado Común)*. With regards to the main points of the settlement agreed between the first two countries –then formalised with some changes in the *ACE Nº 14 - Protocolo 28 (ALADI)*–, it was established that:

- the commercial exchange of vehicles between Argentina and Brazil was free of tariffs provided imports were compensated for with exports to any destination, according to the rules established in the legislation of each country.
- both countries recognised the auto parts produced in the other country as nationally produced parts for the calculation of the minimum domestic content, provided imports were compensated for with exports to any part of the world.
- with the objective of compensating the trade deficit accumulated by Argentina in the bilateral trade, export quotas from Argentina to Brazil with no import compensation requirements were distributed among companies with subsidiaries in the two countries (85,000 units).
- export quotas with no compensation requirements were distributed among companies with manufacturing facilities in only one of the two countries in order to facilitate their free access to intra-regional trade (e.g. Toyota and Renault in the case of Argentina; and Honda and Volvo in the case of Brazil).

The effective application of this agreement was not without its difficulties. As pointed out above, the first version of the Brazilian automotive policy enacted in 1995, unilaterally established import quotas not originally envisaged in the agreement.[61] The Argentinean government claimed that the measure disrespected the Ouro Preto agreement and demanded that bilateral trade was excluded from quantitative restrictions. An agreement between the two countries on this issue was only reached in 1996 (Econômico, 2003).

[60] As pointed out in the Introduction, there is no production of vehicles in Paraguay.
[61] *Medida Provisoria 1024/95 (Brasil)*.

As will be seen below, beyond the ups and downs experienced by the car industry during this period, bilateral trade flows expanded significantly and the two countries became each other's main trade partner (see discussion in next section, pp. 88-100). The incipient convergence in the normative framework of the two countries and the expectation that a common market would be created by 2000 encouraged the *progressive deployment of regional business strategies around the MERCOSUR geographical space*. Carmakers already settled in only one of the two countries opened new manufacturing facilities in the other –or, at least, began the process of doing so. That was the case, for instance, for Renault and Peugeot in Brazil, and General Motors and Fiat in Argentina. Other companies, like Toyota, started to construct new plants in both countries.

4.1.3 Shaping a regional automotive space under the 'flex' rule

- *The 'flex' rule as an alternative to the creation of the common market*

In December 1999, when the agreement on the automotive sector in MERCOSUR was about to expire, Argentina and Brazil had not yet arrived at an understanding on the creation of the common market they had committed to in Ouro Preto. Finally, an agreement between the two countries was reached in June 2000 (*ACE Nº14 – Protocolo 31 (ALADI)*). In December, the agreement was extended to the MERCOSUR region as a whole, incorporating some additional rules concerning the other member states (*Decisión 70/00 (Consejo Mercado Común)*; *ACE Nº18 – Protocolo 31 (ALADI))*. The agreement established a set of specific conditions, valid until December 31st 2005, under which vehicles and auto parts could be freely exchanged between the member countries. Some of the provisions most relevant for the purposes of this study are summarised below:

- *Extra-regional trade*

A common external tariff of 35% was established for vehicles.[62] In the case of auto parts, a schedule covering the period 2001-2006 was set by each country, establishing the tariff scale to be applied to different types of products. At the end of the period, tariffs in Argentina and Brazil converged to 14-18%. The auto parts not produced within MERCOSUR and imported from non-member countries were charged with a tariff of 2%.

- *Intra-regional trade and regional content requirements*

Intra-regional trade of vehicles was duty free provided that:

- products complied with the rules of origin requirements;
- it was maintained within the margins established by the 'export deviation coefficient' (the so-called 'flex' index). The 'flex' index was a ratio between the value of exports and imports that could not be exceeded by any of the signing

[62] This norm made reference to different types of vehicles, including trucks, buses, trailers, etc. Here, unless explicitly stated, we will focus on cars and light commercial vehicles.

countries. The protocol set a flex index of 1.105 in 2001 escalating up to 1.222 in 2003. In practical terms, this meant that if, for instance, Argentina exported US$ 1.105 billion to Brazil it had to import at least US$ 1 billion from that country.

Different from the previous scheme, in which export requirements were enforced at the level of the firm, this agreement was monitored at a global level. It was only in the cases when global bilateral trade went beyond the limits set by the flex index that the foreign trade balance sheets of individual companies were examined. Those firms exceeding the limits of the flex rule were charged with a tariff equivalent to 70-75% of the current tariff.

As pointed out above, in order to be able to be freely traded, products had to comply with some country of origin requirements which applied to vehicles, systems and sub-systems. The regional content rule was defined by the following formula[63]:

$$1 - \frac{\sum value\ of\ the\ auto\ parts\ imported\ from\ non\ member\ countries\ (CIF)}{Ex\ works\ value\ of\ the\ good\ (before\ taxes)} \leq 60\%$$

- *Public incentive programmes*

In response to Argentinean demands, the new agreement included a norm establishing that products manufactured in plants benefitting from public incentive programmes were to be considered as extra-zone goods. This provision, however, did not apply retroactively, and was therefore not valid for companies settled in Brazil before December 1999.

The implementation of the agreement was affected by the progressive deterioration the Argentinean economy was suffering from 1999 –which triggered the eruption of a dramatic crisis in 2001. It forced the two countries to alter the flex index schedule as originally set in the agreement. As demand levels fell sharply (Figure 4-3, p. 102), the survival of carmakers and auto parts suppliers was put at risk. As a response, companies sought to increase their exports, mainly to Brazil, in order to mitigate the situation. However, the flex index set a limit to this strategy. Then, the Argentinean government faced a paradoxical situation: the low flex index the government had negotiated to protect its domestic market against Brazilian competition had become a straightjacket. In times of extremely low domestic demand it limited the country's capacity to export the overproduction to Brazil. According to the value of the coefficient defined for 2001, the country was forced to import one dollar for every 1.105 dollar exported.

[63] New models had an extended term of two years to reach the level of regional content required by the legislation: in the first year, it was set at 40%, whereas in the second one at 50%. The protocol also set that products manufactured in Argentina should contain a minimum level of domestic content, defined as a ratio between the total value of parts produced in Argentina and the total value of auto parts incorporated into the final product. However, the norm was ineffective since the methods of calculation were extremely complicated and difficult to control. Moreover, car assemblers both in Argentina and Brazil were opposed to this rule (Cantarella *et al.*, 2008).

The Argentinean government requested from Brazil a renegotiation of the terms of the protocol, in particular, the flex index. In July 2002, the *ACE Nº 14 - Protocolo 31 (ALADI)* between Argentina and Brazil was signed, establishing a more flexible scale for the export deviation coefficient: 1.6 in 2001, 2.0 in 2002, 2.2 in 2003, 2.4 in 2005, 2.6 in 2006.[64] From that year, trade between the two countries had to be free. In the short-term, the new flex index scale contributed to alleviating the situation of vehicle producers in Argentina as they now could export more vehicles in Brazil. However, the Protocol meant that conditions were set for a higher deficit with Brazil in the immediate future, once the domestic market had recovered.

- *The bilateral agreement regulating automotive trade since 2006: maintaining the status quo*

From 2006, two new protocols were signed between Argentina and Brazil. The Kirchner administration, in office in Argentina since 2003, rejected the complete liberalisation of intra-regional trade flows. Accordingly, in the renegotiation of the automotive agreement due to expire by the end of 2005, the Argentinean government sought to restore the previous flex index scheme.

After arduous negotiations, in June 2006, a new agreement was signed, valid until June 2008 (*ACE Nº14 – Protocolo 35 (ALADI)*). Most of the rules were maintained, but at the request of the Argentinean government, the flex index, was reduced from 2.6 to 1.95. As for the rules of origin for products manufactured in the region, the index was maintained at 60%. On this occasion, the agreement did not include any specific rule regarding the minimum domestic content for products manufactured in Argentina.

In 2008, a new agreement was signed valid until June 2014 (*ACE Nº14 – Protocolo 38 (ALADI))*. It was agreed, however, that provisions regarding intra-regional trade had validity until June 2013. In this case, the Argentinean government intended to correct a disadvantage implicit in the existence of a symmetric flex index for two markets with big differences in size. The two governments finally decided to establish differentiated flex indices depending on which country had a deficit in the bilateral trade balance. In case Argentina acquired a trade deficit with Brazil, the flex index would be of 1.95; under the opposite circumstances, the index would be 2.5. In essence, this new scheme entailed that intra-regional trade be constrained in the case where Argentina would have a deficit, whereas more flexibility was allowed in the opposite case.

[64] In exchange for the negotiation of a new flex index scale, Argentina had to make some concessions to Brazil in other fields. For instance, the method for calculating the minimum domestic content for vehicles manufactured in Argentina was replaced by another one which allowed for a higher proportion of imported parts.

The sections above discussed the progressive configuration of a regulatory framework in MERCOSUR which contributed to the organisation of a peripheral regional integration scheme. As can be seen in Table 4-1 (p. 86), summarising the main phases of the construction of such framework, Argentinian and Brazilian national sectoral policies converged. At the same time, at the supranational level, the two governments agreed on some basic rules for vehicles to be freely exchanged within the region. The *main objective of this institutional framework was to offer a large and relatively protected market* for carmakers settled in the region. In exchange for this benefit, *governments demanded from carmakers that they localise a portion of their production with the purpose of 'embedding' their activities in the region*.

This framework, however, *did not completely preclude the possibility for national governments and their sub-national units to put into force unilateral actions* for the embeddedness of automotive production networks to take place in their territories. In this regard, the Brazilian government, with a larger amount of resources, had a more proactive approach to industrial policy.

4.1.4 Brazilian unilateral actions to 'embed' carmakers' activities

There are two particular features of the Brazilian policy which have been a source of conflict between the two countries as they have contributed to accentuating the already existing structural imbalances between Argentina and Brazil. The first one refers to the role of sub-national political units and their attempts to attract automotive firms onto their territories. The activism of Brazilian states in this regard, in particular during the second half of the 1990s, was so intense that it gave rise to the so-called 'fiscal war' (Arbix, 2000; Dulci, 2002). Beyond its re-distributive effects within the country –an issue which is beyond the scope of this work–, the fiscal war highlighted the greater capacity of Brazilian sub-national units to deploy 'industrial policy' tools in contrast with their Argentinian counterparts. Although the two countries have federal systems of government, Brazilian states have more autonomy and resources due to their ability to collect their own taxes.

The second issue relates to the role of Brazilian public institutions, in particular the Brazilian Development Bank (BNDES), in providing financial support automotive companies. As will be seen below, in the early 1990s, this institution had an important role in promoting the expansion and modernisation of the sector. More recently, it extended its support to the localisation of innovation activities of MNC automotive subsidiaries. Also in this regard, the comparison with Argentina offered contrasting outcomes, as this country lacked similar mechanisms to provide financial support to the automotive sector.

- *The 'fiscal war' of Brazilian states*

The expression 'fiscal war' has been used to depict the individual and uncoordinated actions carried out by Brazilian states to attract foreign investment, in particular, during the period between the mid-1990s and early 2000s. Without any mediation by the federal government, states competed with one another offering fiscal benefits and other types of concessions to MNCs which had shown their intention to establish manufacturing facilities in the country. This process resulted in an extraordinary transference of resources from states and municipalities to private agents (Comin, 1998; Dulci, 2002; Rodríguez-Pose and Arbix, 2001).

According to Dulci (2002), in the mid-1990s there were some conditions favouring the eruption of the fiscal war. Firstly, the democratic constitution enacted in 1988 resulted in a profound decentralisation in favour of sub-national political units. States were given, for instance, the competence to autonomously manage the application of the TCGS, their main source of revenue. Secondly, since the early 1990s, in the context of the dismantling of national industrial policies by the Washington Consensus reforms, state governments assumed the responsibility of pursuing their own industrial policy.

These internal conditions concurred with a growing interest of MNCs to settle down or expand their presence in Brazil. This motivation resulted from the liberalisation and opening of the Brazilian market, as well as the stabilisation of the economy in the mid-1990s. As a matter of fact, according to Dulci (2002), the interest of MNCs in Brazil preceded the promotional actions of states. Accordingly, he claimed, the fiscal war affected the choice about the geographical location of companies *within* Brazil rather than their decisions on investment options between alternative countries.

The automotive industry was the sector in which the fiscal war between Brazilian states was most intense (Arbix, 2000). The aforementioned contextual conditions coincided with specific sectoral factors. First, the creation of MERCOSUR and the perspectives of a common automotive market in the region attracted the attention of carmakers looking for alternatives to expand their international activities. Second, the domestic market showed a considerable growth since 1993 as a result of the enactment of the popular car policy in 1993. A third important factor was, evidently, the implementation of the automotive regime in 1995 (Rodríguez-Pose and Arbix, 2001). In this context, firms with presence in the country, as well as newcomers, were attracted by the business opportunities offered by Brazil. As will be seen in the next section, during the period 1995-2000, the country experienced a large expansion of its vehicle production capacity, becoming one of the main world production poles. All the companies which decided to invest in the Brazilian territory were granted generous state benefits, thus having the cost of their investment substantially reduced.

The competition between states contributed to affecting profoundly the map of the automotive industry in Brazil. From the 1950s to the 1990s, the bulk of carmakers and suppliers –with the notable exception of Fiat in the mid-1970s– had opted to settle down in the suburbs of Sao Paulo (in particular, in the so called ABC region). By contrast, during the new wave of investment initiated in the mid-1990s, most companies selected states with no automotive tradition, such as Parana, Rio Grande do Sul, and Rio do Janeiro, as destinations to install new manufacturing facilities (Arbix, 2002; Rodríguez-Pose and Arbix, 2001).

Even though this competition was referred to as a 'fiscal' war, states did not only make use of 'fiscal' instruments. Together with the deferment of the TCGS and municipal taxes –in no case for less than ten years–, companies were also offered other benefits, such as loans at subsidised interest rates by state institutions or lower electric rates. Moreover, in general, states donated to MNCs the land to build plants and develop the logistic infrastructure (e.g. roads, ports, train connections, etc.). In some cases, states offered additional benefits such as the provision of public transportation to employees or childcare for their children (Rodríguez-Pose and Arbix, 2001).

The access to information on the volume of incentive packages included in the protocols signed by states, municipal governments and companies is restricted, making it difficult to estimate their net effect on welfare.[65] Drawing on available information on protocols signed with three companies[66], Arbix (2002) estimated that the ratio between the incentives offered by Brazilian states and the estimated employment created by companies was much higher than that corresponding to the agreements signed between US states and carmakers during the 1980s and early 1990s. Arbix (2000) argued that agreements in Brazil were greatly unbalanced in favour of MNCs, as the generous benefits provided by states were not counter balanced by obligations of a similar magnitude by the MNCs.

- *The role of the BNDES in supporting the development of the Brazilian car industry*

The BNDES, which had actively participated in the development of the sector since its creation in the 1950s, contributed to the reconversion of the sector during the 1990s. It provided loans with terms of payment very convenient for companies, denominated in local currency and charged interest rates below those prevailing in the market. The BNDES participated in 12 out of the 22 investment projects made by car assemblers between 1995 and 2001 (Santos and Burity, 2002).[67] The participation of the BNDES in the total investment made by car assemblers rose from 0.1% in 1991 to 37.8% in 2000[68] –in fact, the big leap forward was made in 1998 (Mendes, 2012).[69]

The growing support of the BNDES for the reconversion of the car industry reflected in the balance sheet of the institution: the participation of the sector in the loans granted by the bank grew from 1.5 in 1990 to 7.2 in 2000, peaking at 7.8% in 1999 (Santos and Burity, 2002). The main application of the loans was the acquisition of equipment and tools –mainly locally

[65] Some 'images of the war' –as the author made reference to them– consisting of a brief description of the agreements signed between local governments and car companies are provided by Arbix (2000).
[66] Information refers to General Motors, Ford and Mercedes.
[67] Among these projects, the most important were the truck and bus plant of Volkswagen in Resende (RJ), the plant of Toyota in Indaiatuba (SP), the Daimler Chrysler plant in Juiz de Fora (MG), the Volkswagen-Audi plant in São José dos Pinhais (PR), the plant of Ford in Camaçari (BA), the plant of Peugeot Citröen in Porto Real (RJ) and that of Iveco in Sete Lagoas (MG).
[68] The participation of the BNDES in the sector of auto parts was less impressive, rising from 6.2% in 1991 to 20.2% in 2001 (Santos and Burity, 2002).
[69] Still in 1997, the BNDES only accounted for 1.5% of investment carried out by car assemblers. In 1998, the share of the bank rose to 14.3%, in 1999 30.1%, and in 2000 37.8% Mendes (2012).

manufactured ones– and civil works. During this period, the BNDES did not provide funds for technological development projects (Santos and Ávila Pinhão, 2000).

When the domestic demand of vehicles resumed its growth in 2004, a new investment cycle began with the support of the BNDES. Since carmakers had idle capacity, the bulk of investment during the first half of the decade was directed to the modernisation of the production lines and the launch of new models. During this period, the car industry gained more importance within the institution: in total loans granted to the industry accounted for 10.11% of the portfolio of the BNDES in 2006 (Barros and Pedro, 2012). After that, the participation of the automotive sector in the BNDES decreased, averaging about 4% between 2007 and 2011 (Barros and Pedro, 2012).[70]

During the second half of the 2000s, the BNDES slightly changed the focus of its strategy, incorporating the promotion of innovation activities as one of its priorities. In the case of the automotive industry, this essentially meant that more credit was provided for loans requested to introduce changes in products or production processes. The growing interest of the BNDES in this type of innovation activities acknowledged the process of decentralisation of knowledge-creating activities carried out by headquarters in favour of subsidiaries in emerging countries discussed in Chapter 2 (in particular, pp. 45-48). In fact, some subsidiaries in Brazil had already benefited from this process (Carneiro Dias, 2003; Consoni and Quadros, 2006b).

In 2007, the BNDES created the Programme for Automotive Engineering specifically oriented to the promotion of technological knowledge in the car sector. Until its expiration in 2009, this programme lent R$ 374.5 million. In 2009, with the creation of the programme BNDES Pro-Engineering and the Production Innovation Facility, the bank expanded the coverage of the innovation programme to include other sectors such as that of capital goods, defence, aeronautical, aerospace, nuclear and the supply chain of oil, gas and naval industries. Also in 2009, the Production Innovation Facility was created to increase the absorption capacity of companies from R&D activities. With these programmes, the BNDES sought to improve the capacity of carmakers and suppliers to accumulate technological capabilities, in particular that of first tier suppliers.

Between 2007 and 2012, the automotive industry received R$1.3 billion from the Programme for Automotive Engineering and the BNDES Pro-Engineering.[71] Funded projects did not necessarily need to be related to investment on fixed assets or specific models, but could involve basic engineering activities and conceptual projects (Cassotti and Goldenstein, 2008).

[70] This fall is partly explained by the postponement of the new cycle of investment by carmakers as a result of the economic crisis of 2009, as well as the increase of other sectors in the total lending resources of the BNDES (Barros and Pedro, 2012).

[71] In the case of the Pro-Engineering Program, for instance, interest rates are calculated as the sum of the Long Term Interest Rate, plus 0.9% and plus a premium risk which varies according to the client (maximum 4.8%). The Long Term Interest Rate (Tasa de Juros do Longo Prazo) is calculated on a quarterly basis. It is calculated on the basis of two parameters: i) the inflation target determined by the National Monetary Council; and a ii) risk premium. Between 2008 and 2011, for instance, the long term interest rate averaged around 6%. The BNDES is enabled to fund up to 60% of imported equipment; 70-90% of national machines and equipment (depending on item and the client); 80-90% of other items. The terms of the loans depend on the client.

In fact, the bulk of the granted loans fundamentally funded activities oriented towards the conception and restyling of vehicles, and the creation, expansion or modernisation of engineering centres (Barros and Pedro, 2012).

Table 4-1
Summary of the evolution of the automotive policy in Argentina and Brazil since 1991

<table>
<tr><td></td><td>Argentinian framework</td><td>Brazilian framework</td></tr>
<tr><td rowspan="3">1991 - 1994</td><td>1991- New automotive policy

- Preferential tariffs (2%) to import vehicles provided that: i) imports were partially compensated for with exports or investment; ii) vehicles had a domestic parts content of at least 60%.

- Higher import tariffs (18%) for companies with no manufacturing facilities in the country</td><td>1992-1993 - Sectoral chamber agreements

- Reduction of import tariffs applied to vehicles and auto parts (from 85% to 20%).

- Reduction of taxes (TMP and TCGS).

1993- Popular car policy

- TMP set at 0.1% on vehicles using engines up to 1.0 cc.</td></tr>
<tr><td colspan="2">Bilateral/regional framework</td></tr>
<tr><td colspan="2">Import quotas: 10,000 units each country (1991); 18,000 (1992); 20,000 (1993); 35,000 (1994).</td></tr>
<tr><td rowspan="2">1995 - 2000</td><td>Argentinean framework</td><td>Brazilian framework</td></tr>
<tr><td>Continuity of the automotive policy with some adjustments:

- Enhancement of implementation and enforcement mechanisms.

- Changes in the method of calculation of the minimum domestic content: greater flexibility to incorporate imported parts.</td><td>1995 – Brazilian automotive policy

- Higher tariffs applied on the imports of vehicles.

- Preferential tariffs to import vehicles, auto parts, capital goods, tools, and raw materials provided that: i) imports were partially compensated for with exports or investment; ii) vehicles had a domestic parts content of at least 60%.

- Special automotive policy for North, North-East, and Central-West least developed regions. More flexible conditions provided for companies investing in these territories.

Period of intense ‘fiscal war’ among Brazilian states.</td></tr>
</table>

		Increasing participation of BNDES in financing the establishment of newcomers and the expansion of firms already operating in the country. Main application of the loans: acquisition of equipment and tools, and civil works.
	Bilateral framework	
	Ouro Preto Agreement: - Bilateral exchange of vehicles was free of tariffs provided imports were compensated with exports to any destination, according to the rules established in the legislation of each country. - Both countries recognised the auto parts produced in the other country as nationally produced parts for the calculation of the minimum domestic content, provided imports were compensated for by exports to any part of the world. - Export quotas from Argentina to Brazil with no import compensation requirements distributed among companies with subsidiaries in the two countries. - Export quotas with no compensation requirements distributed among companies with manufacturing facilities in only one of the two countries in order to facilitate their free access to intra-regional trade.	
2000 - onwards	**Bilateral framework**	
	- Common tariff on vehicles (35%) and auto parts (national tariff reduction schedules for the period 2000-2006). - Regional rules of origin. Minimum level of domestic parts content conceded to Argentina (decreasing percentage until 2005). - Free trade of vehicles providing countries provided countries do not exceed the export deviation coefficient ('flex' coefficient). The coefficient changed over the years as a result of successive renegotiations: 1.105 (2001; then changed to 1.6); 2.0 (2002); 2.2 (2003); 2.4 (2005); 2.5 (2006); 1.95 (2006). - Asymmetric flex coefficient established for the period 2008-2013: 1.95 if Argentina have trade deficit; 2.5 if Brazil has trade deficit. **Brazil**: increasing participation of the BNDES in supporting the new expansion cycle of the automotive industry. Since 2007, special interest in providing funds to support innovation activities.	

Source: Own elaboration

4.2 The evolution of the automotive industry in Argentina and Brazil since the creation of MERCOSUR

In the context of the profound global restructuring of automotive networks examined in Chapter 2 and the progressive configuration of a new normative framework in the region depicted above, the automotive industry underwent a sea change in Argentina and Brazil between 1991 and 2011. This transformation was characterised by:

i) firstly, a substantial enlargement of the car production capacity in the two countries (*expansion*);
ii) secondly, a narrowing of the technological gap with Triad countries in terms of the quality of the products manufactured locally as well as of the production processes carried out in local plants (*modernisation*);
iii) and, finally, a closer functional integration among the subsidiaries operating in Argentina and Brazil as well as between them and those located overseas (*integration*).

The analysis of this process can be divided into four phases which partially overlap with the evolution of the regulatory framework examined in the previous section.

4.2.1 1991-1994: Recovery of production output and incipient commercial integration between Argentina and Brazil

During this period, automotive business strategies were mainly directed to *expanding* the production capacity in order to meet the growing domestic demand and to *modernising* production lines to increase productivity (Bastos Tigre *et al.*, 1999). The decade of the 1980s had been extremely negative for the car industry in Argentina with production levels well below the figures reached in the previous decade (Figure 4-1, p. 101). Whereas in Brazil the situation had not been as unfavourable, the evolution of the sector had been very erratic and as a result, at the beginning of the 1990s, the car industry was at a critical point (Figure 4-1, p. 101).

As shown in Figure 4-2 (p. 101), Figure 4-3 (p. 102), and Figure 4-5 (p. 103), in those years, vehicle consumption and production levels recovered rapidly both in Argentina and Brazil. As a result of this *expansion*, the two countries increased their participation in the world production of vehicles from 2.14% (1986-1989) to 2.52% (1990-1994) (Figure 4-4, p. 102).

In Argentina, the recovery is mainly explained by the stabilisation of the macroeconomic situation and improvement of domestic purchasing power which boosted pent-up domestic demand for vehicles. On the supply side, the automotive regulatory framework enacted in 1991 created incentives for firms to expanding and modernising their nearly obsolete production lines (Bastos Tigre *et al.*, 1999). The recovery of the Brazilian car industry during this period was less steep and lagged behind the Argentinean one. It was the enactment of the so-called popular car policy in 1993 which boosted demand and production levels of the particular segment of small vehicles in Brazil. This measure, as pointed out in the previous section, profoundly affected the structure of the domestic car market: small vehicles with engines up to 1.0 cc, which accounted for a 15.6% of the local production in 1992, explained a 42.8% of the domestic output in 1995 (Figure 4-6, p. 103)[72].

The improvement experienced by the car industry in those years was mainly driven by the companies already located in Argentina and Brazil, as no new firms opened manufacturing facilities during this period (Table 4-6, p. 103). In the case of Argentina, only two carmakers –Ford and Volkswagen– had subsidiaries directly controlled by their headquarters. In fact, under the umbrella of the joint venture Autolatina, these subsidiaries operated in an integrated network with their Brazilian counterparts between 1987 and 1996 (Bastos Tigre *et al.*, 1999). In a way, this initiative was an early attempt by private agents to configure a peripheral regional integration scheme (Figure 2-6) which anticipated bilateral policy initiatives adopted in the 1990s.

The other two car assemblers with manufacturing activities in Argentina were controlled by local business groups: Sevel and Ciadea. Whereas the former had a license to manufacture Peugeot and Fiat vehicles from 1980; the latter produced Renault vehicles from 1991, when the French carmaker relinquished direct control over its operations in the country. In Brazil, the car industry was controlled by the so-called ‘Big 4’: Fiat, Ford, General Motors, and Volkswagen. These companies had a longstanding presence in the country which dated back to the 1970s in the case of Fiat, and to the 1950s in that of the other three. The production of these companies accounted for 99.7% of total production of vehicles in Brazil in 1991, and 98.3% of the domestic market share.[73]

During this period, companies still maintained the organisation of their business strategies within national territories (as the one depicted in Figure 2-7, p. 45). That means that the bulk of locally produced vehicles were commercialised in domestic markets. In total, there were 40 active platforms operating in the two countries, 17 in Argentina and 23 in Brazil[74]. As can be seen in Table 4-2 (p. 90), in 1994, only three companies had simultaneous manufacturing presence in the two countries: Fiat (which back then was operated through a local licensee in Argentina), Ford, and Volkswagen. At the time, these three companies had a total of 17 vehicle platforms in the region: 7 were exclusively located in Brazil and 2 in Argentina. The other 8 platforms operated in the two countries. There were two companies in each case with manufacturing facilities in only one of the two countries: Renault and Peugeot in Argentina, and General Motors and Toyota in Brazil.

With regards to the models produced in the region, a large number of vehicles produced in Argentina and Brazil corresponded to old platforms already discontinued in the headquarters and in subsidiaries located in Triad countries. That was the case, for instance, of the Fiat Spazio and Fiat 147, local versions of the Fiat 127 which had been discontinued in Italy in

[72] The popular car policy clearly benefited Fiat, which was the only company with a relatively modern product complying with the characteristics demanded by the norm: the Fiat Uno. This allowed the company to quickly meet the explosive demand for small vehicles, with no significant investment efforts. As a result, Fiat was able to lead the small car segment and progressively gain participation in the domestic car market.
[73] Source: ANFAVEA.
[74] Calculated on the basis of data from ADEFA and ANFAVEA.

1987; Ciadea produced the Renault 18 until 1993 and the Renault 12 until 1994, discontinued in France in 1986 and 1980, respectively; in Brazil, in order to meet the demand for small cars created by the popular car policy, Volkswagen resumed the production of the Beetle (locally known as *Fusca*), discontinued in Germany in the 1970s.

Table 4-2
Carmakers with manufacturing facilities in Argentina and Brazil.
Geographical distribution of platforms
(1994)

<table>
<tr><th colspan="2">Firms operating only in Argentina: 2</th><th colspan="6">Number of firms operating in Argentina and Brazil: 3</th><th colspan="2">Firms operating only in Brazil: 2</th></tr>
<tr><td colspan="2">Renault (CIADEA)
Peugeot (Sevel)</td><td colspan="6">Fiat (Sevel in Argentina)
Autolatina: Ford and Volkswagen</td><td colspan="2">General Motors
Toyota</td></tr>
<tr><th colspan="2">Number of platforms</th><th colspan="2">Number of platforms exclusively in Argentina</th><th colspan="2">Platforms operating in the two countries</th><th colspan="2">Number of platforms exclusively in Brazil</th><th colspan="2">Number of platforms</th></tr>
<tr><td colspan="2">7</td><td colspan="2">2</td><td colspan="2">8</td><td colspan="2">7</td><td colspan="2">8</td></tr>
<tr><th colspan="5">Total number of platforms operating in Argentina</th><th colspan="5">Total number of platforms operating in Brazil</th></tr>
<tr><th colspan="5">17</th><th colspan="5">23</th></tr>
</table>

Source: Own elaboration on the basis of information from ADEFA and ANFAVEA

During this period, carmakers in the region –especially in Argentina– were not able to meet the demand for vehicles as the expansion of production capacity lagged behind the extraordinary increase in new orders from customers. Under the terms of the new automotive normative framework, excess demand was then covered by intra-firm imports mainly from the headquarters and from subsidiaries located in the neighbouring country. As can be seen in the data on vehicle trade flows (see Figure 4-7, p. 104; Figure 4-8, p. 104; and Figure 4-9, p. 105), and export and import coefficients (see Figure 4-10, p. 105; and Figure 4-11, p. 106), this resulted in a progressive opening of the sector to international trade flows. In the case of Argentina, this process was initially more intense on the import side thus giving rise to a trade deficit in vehicles. In Brazil, where the automotive sector had traditionally been more export oriented, vehicle trade balance became negative only in 1994.

It is during this period that the bilateral trade relation in the car industry between Argentina and Brazil –almost non-existent in the past–, began to take shape.[75] The increase in bilateral trade flows highlighted the incipient deployment of *commercial integration strategies* by subsidiaries operating in the two countries, developed under the foreign trade provisions of the *ACE Nº 14 - 1990 (ALADI)*. The growing bilateral integration is clearly put in evidence

[75] Between 1986 and 1989, Brazil had only accounted for 1.59% of the Argentinean imports of vehicles, whereas Argentina only explained 0.25% as origin country of Brazilian imports (Source: ADEFA and ANFAVEA).

by data on the geographical distribution of trade flows (see Figure 4-13, p. 107; Figure 4-15, p. 108; Figure 4-17, p. 109; and Figure 4-19, p. 110). As can be seen in Figure 4-15, between 1990 and 1994, MERCOSUR member countries accounted for more than 40% of Argentinean imports[76] and almost 86% of its exports –more than 99% and 81% of these figures, respectively, are explained by Brazil itself.

In the case of Brazil –which as pointed out before had been traditionally more export-oriented than Argentina– the geographical distribution of trade flows were more balanced. However, the participation of Argentina as a trade partner of this country grew significantly in importance. Hence, between the period 1991-1994, Argentina accounted for 24.95% of Brazilian imports and for a 26.45% of its exports –the rest of the MERCOSUR member countries explained 0.06% and 9.49%, respectively (see Figure 4-17, p. 109; Figure 4-19, p. 110).[77]

It is important, however, to clearly point out the limitations of the intra-regional relationship. As seen in Chapter 4, between 1991 and 1994, the bilateral automotive agreement between Argentina and Brazil only allowed for a limited commerce of vehicles which was regulated through quotas (see, pp. 69-72). This did not create the conditions for the functional integration of subsidiaries around the MERCOSUR regional market.

4.2.2 1995-1998: Expansion, modernisation and further integration within the MERCOSUR

During the period 1995-1998, the two countries experienced severe macroeconomic problems. Consequently, the performance of the car industry in terms of sales and production was more erratic than in the previous period (1991-1994) (Figure 4-3, p. 102; and Figure 4-5, p. 103).[78] The instability of the macroeconomic situation, however, did not prevent carmakers from continuing with their investment plans in the region. During this period, they further *expanded* their production capacity, and, continued with the *modernisation* of both their production lines and the models locally manufactured. The distinctive fact of those years, however, was the incipient implementation of regional business strategies (i.e. *integration*) of companies with manufacturing facilities in the two countries. This was the case of both newcomers and companies with manufacturing facilities already operating in the region.

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[76] Mercosur countries were followed by Japan (14.95%), Chile (10.72%), France (7.34%), Italy (5.66%) and Germany (5.13%) in the case of imports and Chile (4.56%) and France (2.15%) as destination of Argentinean exports.

[77] On the import side, the other main trade partners were Italy (23.48%), Japan (21.03%), and Germany (11.30%). As for the geographical distribution of Brazilian exports, Argentina was followed by Italy (14.83%), Chile (11.02%), Uruguay (7.48%), Mexico (7.41%) and the US (5.21%).

[78] By the end of 1994, Argentina was strongly affected by the so-called Tequila crisis which originated in Mexico (see Section 4.1.2). This event resulted in a fall of 2.8% in GDP in 1995, and threatened the pillars of the currency board scheme which had, since 1991, contributed to stabilising the macroeconomic situation. Later on, during the final years of this period the two countries were affected by the contagion of the financial crisis that broke out in Asia in 1997. In the case of Argentina, this event combined with some domestic factors to lay the foundations for a long recession, initiated in 1999, which ended up in social, political and economic turmoil in 2001. As a result of a more adequate economic policy, Brazil managed to resume growth in 2000, after a period of stagnation which extended between 1998 and 1999.

As can be seen in Figure 4-2 (p. 101), in 1997 and 1998, the production of vehicles reached record levels in Brazil and Argentina –that were not surpassed until 2004 and 2007, respectively. The region continued improving its position as a manufacturing pole in the world, accounting for a 3.62% of the total global output between 1995 and 1998 (Figure 4-4, p. 102). The growth in domestic sales was less impressive (Figure 4-3, p. 102) but it was compensated for by a significant rise in exports (Figure 4-7, p. 104). This reflected the adoption by carmakers of a business model more integrated into global and regional production networks.

The implementation of the new automotive regime in Brazil, in 1995, and the signing of the Ouro Preto Agreement (see pp. 72-78) contributed to generating positive expectations in automotive MNCs about the future of MERCOSUR as a common automotive market. Nevertheless, the growing interest in the region was not only motivated by the 'pull forces' exerted by a promising emerging market. As examined in Chapter 2, 'push forces', notably the low growth perspectives of advanced mature markets, compelled these companies to increase their presence in Argentina and Brazil (see pp. 41-45).

Against this backdrop, some companies which had left Argentina in the past decided to return to the country (Table 4-6, p. 110). Renault and PSA Peugeot Citröen regained control of their licensee operations in 1997 and 1998, respectively, maintaining the already functioning manufacturing plants. Toyota, which had never produced vehicles in the country, opened a new plant in 1997 to produce a pick-up truck. Fiat regained direct control of its operations and built a new plant in 1995. General Motors also decided to advance with a greenfield investment inaugurating new manufacturing facilities in 1997. In these two latter cases, the Argentinian subsidiaries were to operate in close *integration* with their Brazilian counterparts, which were part of the Big 4 group.

In Brazil, the Big 4 companies expanded their operations and newcomers established in the country (Table 4-6, p. 110)[79]: Honda started its operations in 1997, Mercedes Benz built a new plant in Minas Gerais to produce its A-Class model that same year 1999. Toyota, which until then had a very small operation to produce little more than 3,000 units of the SUV Bandeirantes, built a new plant in São Paulo which started its operations in 1998. Renault established in the state of Parana and opened its first plant in 1999. The operations of the company in the region were *integrated* under the MERCOSUR Business Unit.

Business strategies adopted by newcomers were rather conservative in terms of the installed production capacity (in particular the Asian companies). By contrast, the expansion of the production capacity of the Big 4 Brazilian carmakers in the region was much more aggressive. They managed to extend their control over the Argentinean and Brazilian markets. Whereas in 1990 the production of GM, Fiat, Ford and Volkswagen accounted for

[79] The scale of production of the newcomers' plants, especially in the case of Brazil, was relatively low. This was particularly the case of Asian firms like Toyota and Honda, which initially produced no more than 20,000 units. According to Laplane and Sarti (2008), these conservative strategies seemed to be adequate for companies with no experience in the Brazilian market.

87.1% of the production of the two countries taken together; in 1997, their production share was of 94.1%.[80]

The regulatory framework adopted by the two countries during this period certainly encouraged carmakers to move a step forward in the organisation of their business strategies around the regional 'automotive space'. A 'snapshot' of the automotive industry in the region in 1998 shows that the number of firms with operative platforms in the two countries increased from seven (1991-1994) to nine: Chrysler, Fiat, Ford, General Motors, Toyota, and Volkswagen had now presence in the two countries and used a total of 28 vehicle platforms.

The three larger companies in the region –Fiat, General Motors and Volkswagen– concentrated a growing number of 'exclusive' platforms in Brazil. This means that they allocated their manufacturing centre in this country, from where they supplied the rest of the region. In Argentina, only Ford, Toyota and Chrysler (which, in fact only produced a small number of the SUV Cherokee) had exclusive platforms in the country for the regional market. In consequence, as can be seen in Table 4-3, out of the 28 platforms of the companies with presence in the two countries, 15 operated exclusively out of Brazil, and only 4 of them out of Argentina. The remaining 9 platforms were manufactured in the two countries.

Table 4-3
Carmakers with manufacturing facilities in Argentina and Brazil.
Geographical distribution of platforms
(1998)

<table>
<tr><th>Firms only operating in Argentina: 2</th><th colspan="4">Number of firms operating in Argentina and Brazil: 6</th><th>Firms only operating in Brazil: 1</th></tr>
<tr><td>Renault
PSA Peugeot
Citroën</td><td colspan="4">Chrysler
Fiat
Ford
General Motors
Toyota
Volkswagen</td><td>Honda</td></tr>
<tr><td>Number of platforms</td><td>Number of platforms exclusive in Argentina</td><td colspan="2">Platforms operating in the two countries</td><td>Number of platforms exclusive in Brazil</td><td>Number of platforms</td></tr>
<tr><td>7</td><td>4</td><td colspan="2">9</td><td>15</td><td>1</td></tr>
<tr><td colspan="3">Total number of platforms operating in Argentina</td><td colspan="3">Total number of platforms operating in Brazil</td></tr>
<tr><td colspan="3">20</td><td colspan="3">25</td></tr>
</table>

Source: Own elaboration on the basis of information from ADEFA and ANFAVEA

[80] This performance, as a matter of fact, was almost exclusively explained by Fiat, whose share rose from 20.4% to 30.8%, compensating for the relative fall of Ford.

This period also witnessed a significant *modernisation* in terms of the type of products manufactured in the region. In the previous years, as pointed out above, a large number of the models produced in the region had already been discontinued in developed markets. By contrast, during the second half of the 1990s, carmakers started to produce models with a delay of no more than twelve months with respect to the original launch on their home markets.

In general, beyond some minor changes introduced to meet the requirements of the local legislation or to respond to the availability of raw materials, vehicles produced in the region were the same as those manufactured in other parts of the world. Among the Big 4, for instance, Fiat started to produce in MERCOSUR its 'world car' models for emerging markets, the Palio and Siena. The arrival of newcomers accelerated the closing gap with headquarters in terms of products, as these firms generally based their product strategy on models produced in their own home countries: the Hilux and Corolla in the case of Toyota; the Megane and Scenic in the case of Renault; and the Civic in the case of Honda, just to provide some examples.

This indicates that during those years subsidiaries in Argentina and Brazil did not only advance with a more profound integration between them, but also established a *closer integration with their parent companies in Triad countries*. This reveals the progressive configuration of a 'peripheral integration' automotive space discussed in Chapter 2 (pp. 41-45; and Figure 2-6, p. 43).

The progressive regionalisation of carmakers' business strategies resulted in a sharp increase of export and import coefficients in the two countries and in a substantial growth of bilateral trade flows. The relative participation of Brazil in Argentinean exports of vehicles rose sharply from 69% to 92% (MERCOSUR as a whole 94.85%; Figure 4-13, p. 107). In the case of imports, the increase was more moderate from 40% to 45% (Figure 4-15, p. 108). The share of Argentina among Brazilian destination markets also grew significantly from 26% to 41% during that period (Figure 4-17, p. 109). As for imports, the share of that country doubled from 25% to 50% (Figure 4-19, p. 110).

As it is expected from the 'peripheral integration' schemes such as that of MERCOSUR, the major non-regional trade partners on the import side were the home countries of companies settled in the region: France, Japan, Italy and Germany (Figure 4-15, p. 108). This reflected the fact that regional production was complemented with the import of higher-end vehicles from the headquarters, under the special import provisions established in the automotive policy.[81]

[81] Interesting, however, was the case of Korea, a country which at the time did not have any subsidiary in the region. It became the third largest non-regional partner of Brazil, accounting for 7.22% of its import of vehicles between 1995 and 1999.

4.2.3 1999-2003. The collapse of the Argentinean car industry

The years 1999 to 2003 were critical for the automotive sector in the region as a consequence of an extremely negative macroeconomic performance. This was especially the case in Argentina: in 2002, after three years of recession, the economy of this country collapsed with the GDP remaining 18% lower than in 1998.[82] In Brazil, economic growth halted in 1998 and 1999, but it resumed in 2000.[83]

Car production output and sales were negatively affected by the economic situation in both countries. However, the magnitude of the decline was, as observed in Figure 4-2 (p. 101) and Figure 4-3 (p. 102), much stronger in Argentina. Sales in this country reached levels below the figures of 1990. In 2002, only 82,345 units were sold in the domestic market, which represented only an 18% of the domestic sales figures of 1998. In Brazil, sales fell around 12% between 2001 and 2003, which was a much milder decline. As for manufacturing output, in Brazil, the production of vehicles averaged 1.48 million units between 1999 and 2003. The record levels of 1.77 million units of 1997 were far from being recaptured. In Argentina, average output levels were just above 50% of those reached of the 458 thousand vehicles produced in 1998 and the installed capacity utilisation fell to 21%.

The contrasting performance of the two countries resulted in a significant change in the relative weight of each country in the total regional production of vehicles. Between 1990 and 1998, Argentina accounted for, on average, around 20% of the production of the two countries put together (reaching levels above 25%). Between 1999 and 2003, the participation of this country was below 15%, bottoming out in 2002 when it explained less than 10% of the joint production of vehicles.

The dissimilar evolution of the macroeconomic situation in the two countries and its impact on the car market affected the configuration of regional business strategies. During this period, a growing imbalance between carmakers' subsidiaries in the two countries started to take shape. Argentinean subsidiaries were given the responsibility of producing some new models in 1999 and 2000, for instance: Chevrolet Corsa II, Citroën Berlingo, Peugeot 206, Ford Focus, Renault Kangoo. After that, however, the decline in domestic demand became more pronounced and the allocation of new production responsibilities to the subsidiaries operating in the country was interrupted for a number of years.[84] In the case of Fiat, the

[82] In this brief space It is not possible to examine the evolution of the Argentinian economic situation in its full complexity. Suffice it to say that the causes of the crisis were manifold and combined both domestic and international elements. In addition to the GDP fall, it is important to point out here that the crisis put an end to the currency board system which had been in force for more than ten years, resulting in a sharp devaluation of the exchange rate from 1 to almost 4 pesos per dollar. The government defaulted on its debt and the bank system crashed. The crisis had devastating social effects: poverty was over 50% and unemployment reached levels of 25%. As far as the political situation is concerned, the government fell and a provisional president was elected by the Congress until elections were called in 2003. For more on the Argentinean crisis, see for instance Damill and Frenkel (2003).

[83] Economic growth rates, which had averaged around 4% between 1993 and 1997, halted in 1998 and only resumed in 2000 at a lower level of 2.3% in average until 2003.

[84] An exception to this was the case of the Corsa II, corresponding to the second version of the model produced by General Motors in the country since 1997.

company even decided to discontinue altogether the production of vehicles in Argentina and to adapt the existing plant for the production of gearboxes and other auto parts.

In Brazil, in spite of the stagnation of the local market, subsidiaries were able to keep themselves active assuming new manufacturing responsibilities. Newcomers, such as Renault and PSA Peugeot Citroën, opened new plants to produce up-to-date models such as the Renault Scenic (1999), the Citroën Picasso (2001), the Peugeot 206 (2002), and C3 (2003)[85]. The Big 4 also updated their product range, launching onto the market new derivative models exclusively developed for the Brazilian market such as the Chevrolet Meriva (2002), the Ford Ecosport (2003) and the Volkswagen Fox (2003).

A brief examination of the distribution of platforms among Argentinian and Brazilian subsidiaries in 2003 shows interesting changes from the previous period. Firstly, it can be observed in Table 4-4, that with the opening of the new plants of Renault and PSA Peugeot Citroën in Brazil, there remained no company with manufacturing facilities operating only in Argentina. At the same time, since Nissan and Land Rover opened new plants only in this country and Fiat decided to discontinue the production of vehicles in Argentina, the number of platforms active in the region turned strongly in favour of Brazil. In 1998, 25 platforms were used in Brazil and 20 in Argentina (Table 4-3, p. 93). In 2003, the number of platforms used in Brazil rose to 29, whilst only 12 remained operative in Argentina (see Table 4-4).

A second interesting feature revealed by data in Table 4-4 is the increasing specialisation of subsidiaries in exclusive platforms produced for the regional market (i.e. *integration* process). The division of manufacturing responsibilities between carmakers within the region allowed carmakers to enlarge the scale of production of the platforms. Only 5 out of the 37 platforms operative in the region were produced in the two countries. They corresponded to the most popular models: Chevrolet Corsa, Volkswagen Gol and Polo, Renault Clio and Peugeot 206.

This means that 7 out of the 12 platforms produced in Argentina, and 16 out of the 25 manufactured in Brazil were exclusive to each country. This reflected the increasing complementation between subsidiaries established in the two countries. The concentration of exclusive platforms in Argentina mainly took place in light commercial vehicles (Citroën Berlingo, Peugeot Partner, Renault Kangoo) and pick-ups (Toyota Hilux, Ford Ranger).

[85] Other models which started to be produced by Brazilian subsidiaries during this period were: Chevrolet Zafira and Celta (2000), Fiat Doblo (2001) and Stilo (2002), Peugeot Jumper (2002), Citroën Boxer (2002), Renault Master (2002), the New Toyota Corolla (2003), the Volkswagen Polo (2002), and the Honda Fit (2003).

Table 4-4
Carmakers with manufacturing facilities in Argentina and Brazil. Geographical distribution of platforms
(2003)

<table>
<tr><th>Firms only operating in Argentina</th><th colspan="3">Number of firms operating in Argentina and Brazil: 7</th><th>Firms only operating in Brazil: 4</th></tr>
<tr><td rowspan="2"></td><td colspan="3">Daimler Chrysler
Ford
General Motors
PSA Peugeot Citroën
Renault
Toyota
Volkswagen</td><td rowspan="2">Fiat
Honda
Nissan
Land Rover</td></tr>
<tr><th>Number of platforms exclusive in Argentina</th><th>Platforms operating in the two countries</th><th>Number of platforms exclusive in Brazil</th></tr>
<tr><td></td><td>7</td><td>5</td><td>16</td><td>8</td></tr>
<tr><th colspan="2">Total number of platforms operating in Argentina</th><th colspan="3">Total number of platforms operating in Brazil</th></tr>
<tr><td colspan="2">12</td><td colspan="3">25</td></tr>
</table>

Source: Own elaboration on the basis of information from ADEFA and ANFAVEA

In Argentina, exports played an important role compensating for the decline in domestic sales level. Although export volumes fell in absolute terms they did it in a magnitude significantly lower than production. Consequently, export coefficients jumped from 32% in 1999 to 77% in 2002 (Figure 4-10, p. 105).

In a context of sharp economic contraction and low demand levels in the two countries, companies were forced to look for new target markets for their products, thus reconfiguring the geographical distribution of their trade flows. The participation of Argentina and Brazil in each other's export basket declined, especially in the case of the latter (Figure 4-13 and Figure 4-17, p. 107 and p. 109, respectively): between 2000 and 2004, the participation of Brazil as a destination of Argentinean exports of vehicles fell from 92.4% (1995-1999) to 62.8%. In the case of Brazil, Argentina accounted for only 20.9% of sales overseas between 2000 and 2004.

In the sphere of foreign trade, the novelty was the emergence of Mexico as a significant trade partner. This reflected the intra-firm triangulation strategies of carmakers with subsidiaries in that country which sought to export their surplus production in the MERCOSUR region. During this period, the MERCOSUR market came to account for 24.7% of Argentinean exports, reaching in 2003, a participation of 32%, only 10 points below that of Brazil. South America (excluding MERCOSUR) also grew significantly as a target market of Argentinean exports, enlarging its share in the export basket from 2.5% to 10.4%. In the case of Brazil, exports to Mexico between 2000 and 2004 averaged almost 21% of the total volume of vehicles sold abroad, relegating Argentina to the second position as a destination market for this country. A remarkable growth rate was also evident in the US which also became a destination market, with a jump from 0.36% to 14.6% of the total volume of vehicles sold abroad.

For the purposes of this study, without a doubt the most interesting feature of this period is the increasing technological gap between the subsidiaries operating in Argentina and Brazil. As carmakers with more experience in the region –i.e. the Big 4– decided to develop models specifically tailored to the conditions prevailing in host markets, Brazil started to assume a central position within the regional automotive space (e.g. Chevrolet Meriva, Ford Ecosport, and Volkswagen Fox). For the first time, Brazilian product engineering teams assumed an active participation in the development of new models. Originally, these products were exclusively developed for the Brazilian market on the basis of existing platforms. However, as a result of their great success on the domestic market, these cars were firstly exported to the South American region and then to European markets (Carneiro Dias *et al.*, 2011; Carneiro Dias and Salerno, 2004; Consoni, 2004; Quadros and Consoni, 2009).

This development entailed a further step in the consolidation of MERCOSUR as a 'peripheral regional integration' automotive space. The creation of a functionally integrated regional network did now not only involve an intra-regional division of labour in commercial and manufacturing functions, but also in product development activities. The nature of this incipient scheme appears, as discussed in Chapter 2, as one of a semi-periphery/periphery type; according to which Brazilian units assumed intermediate product development responsibilities whereas Argentinian subsidiaries specialised in manufacturing activities (see Figure 2-9, p. 48).

4.2.4 2004-2011. Consolidating the MERCOSUR regional automotive space as a worldwide production and (peripheral) product development centre

From 2004, in response to the virtuous cycle of economic growth enjoyed by the Latin American region, the automotive industry recovered at a fast and steady pace from the difficulties experienced in the previous years (Figure 4-5, p. 103). Between 2004 and 2011, GDP in Argentina and Brazil grew at an average rate of 7.6% and 4.2%, respectively. Against this backdrop, the domestic demand for vehicles recovered rapidly boosting sales to record levels. In 2011, the total amount of vehicles sold in Argentina reached around 880 thousand units, a volume which doubled the highest sales point reached in 1998 before the crisis and was tenfold greater than the low figures of 2002. In Brazil, the growth of sales in the domestic market was no less impressive: the amount of units sold in 2011 was above 3.4 million, almost duplicating the record levels of 1997 (Figure 4-3, p. 102).

In line with the sales figures, production reached record levels which in 2011 were over 800 thousand vehicles in Argentina and 3.1 million in Brazil (Figure 4-2, p. 101). As can be seen in Figure 1-1, this performance resulted in a significant growth in the participation of the two countries in world production, up to 5.13% (average for the period 2009-2011), with both countries becoming the sixth largest vehicle producer. In this context, investment levels recovered strongly as compared to 2005. Initially, the new cycle of investment flows was mainly directed to setting new production lines and to improving manufacturing processes for the production of new models allocated to the subsidiaries in the region (*modernisation*). A second investment cycle was later on carried out to expand production capacity in the two countries (*expansion*).

With the exception of Honda and Hyundai, all carmakers had manufacturing facilities in the two countries[86] (Table 4-5[87]). Following the strategy adopted by newcomers at the beginning of the decade, bigger companies like General Motors and Volkswagen allocated 'exclusive platforms' to their Argentinean subsidiaries. Models like the pick-up truck Amarok (Volkswagen) and the Chevrolet Agile (General Motors) joined other exclusive models like the Toyota Hilux, the Ford Focus II and Ranger, the Renault Fluence, the Citroën C4, and Peugeot 307. Fiat resumed the production of vehicles in Argentina in 2008. However, differently from other companies, it decided to produce the Siena and the Palio in these countries, two models also produced in Brazil.

As a result, as can be seen in Table 4-5 below, the number of platforms exclusively operating in Argentina increased from 7 in 2003 to 13 in 2010 –out of a total of 18 platforms operating in the country. These platforms were used for the production of 3 pick-ups (Ford Ranger, Toyota Hilux and Volkswagen Amarok), 3 medium size vehicles (Citroën C4, Peugeot 307 and Ford Focus), 2 small vehicles (Chevrolet Agile and Peugeot 206), and 2 light commercial vehicles (Renault Kangoo, and the PSA Berlingo-Partner platform). Four platforms were manufactured simultaneously in the two countries, corresponding to popular models such as the Fiat Palio, Chevrolet Corsa and Volkswagen Fox.

The increasing number of exclusive platforms in relation to the total number of platforms operating in the two countries (around 75% in the two cases), reflects the consolidation of the MERCOSUR region as a peripheral integration regional space. Foreign trade figures confirm this fact. In the case of Argentina, exports became a central element in the business strategies of carmakers. The export coefficient of this country stabilised around a high level above 60% since 2008 (Figure 4-10, p. 105). The MERCOSUR and South American markets regained prominence after the fall suffered during the years of the crisis, explaining more than 87% of the exports of vehicles out of the country (Figure 4-13, p. 107). Brazil itself accounted for a 78.7% in average between 2010 and 2012. The second partner was Germany with 4.95% and the third one Mexico with 2.63%. On the side of imports, there were no significant changes, except for the expansion of Mexico as a trade partner –in particular, after the signing of a trade agreement in 2006 (Figure 4-15, p. 108).

[86] Honda inaugurated a manufacturing plant in Argentina in 2011.
[87] The table was elaborated with information on 2010, since this is the last year ANFAVEA provided detailed information about the models produced in Brazilian territory.

Table 4-5
Carmakers with manufacturing facilities in Argentina and Brazil.
Geographical distribution of platforms
(2010)

<table>
<tr><th>Firms only operating in Argentina</th><th colspan="3">Number of firms operating in Argentina and Brazil: 8</th><th>Firms only operating in Brazil: 8</th></tr>
<tr><td rowspan="2"></td><td colspan="3">Fiat
Ford
General Motors
Mercedes Benz
PSA Peugeot Citroën
Renault
Toyota
Volkswagen</td><td rowspan="2">Honda
Hyundai</td></tr>
<tr><th>Number of platforms exclusive in Argentina</th><th>Platforms operating in the two countries</th><th>Number of platforms exclusive in Brazil</th></tr>
<tr><td></td><td>13</td><td>4</td><td>24</td><td>4</td></tr>
<tr><th colspan="2">Total number of platforms operating in Argentina</th><th colspan="3">Total number of platforms operating in Brazil</th></tr>
<tr><td colspan="2">17</td><td colspan="3">32</td></tr>
</table>

Source: Own elaboration on the basis of information from ADEFA and ANFAVEA

In the case of Brazil, by contrast, business strategies were more concentrated on the domestic and the regional markets. The export coefficient decreased steadily from 2005 (after recovering and reaching a peak of 33%, that year this indicator fell to 17% in 2011) (Figure 4-11, p. 106). Argentina gained importance as a trade partner (Figure 4-17, p. 109). The participation of this country, as a destination for Brazilian exports, grew from 28% to 65% of Brazilian sales overseas.

This period witnessed the consolidation of Brazilian subsidiaries as the centre of the peripheral integration scheme deployed in the MERCOSUR region. Particularly in the case of the group of the Big 4 companies, units in Brazil assumed more complex product engineering responsibilities delegated from their headquarters (Amatucci and Mariotto, 2012; Amatucci and Mariotto, 2010; Balcet and Consoni, 2007; Carneiro Dias *et al.*, 2011; Ibusuki *et al.*, 2012b; Quadros and Consoni, 2009). With increasing support from public institutions such as the BNDES, a growing amount of resources were directed to supporting product development activities and to developing the infrastructure necessary to do that (see discussion on this issue in Chapter 4, pp. 81-85). As a result, as will be seen in more detail with the case studies analysed in the empirical chapters to follow, the technological gap between Argentinean and Brazilian subsidiaries widened considerably during those years.

Appendix 4.1

Statistical data on the automotive sector in Argentina and Brazil

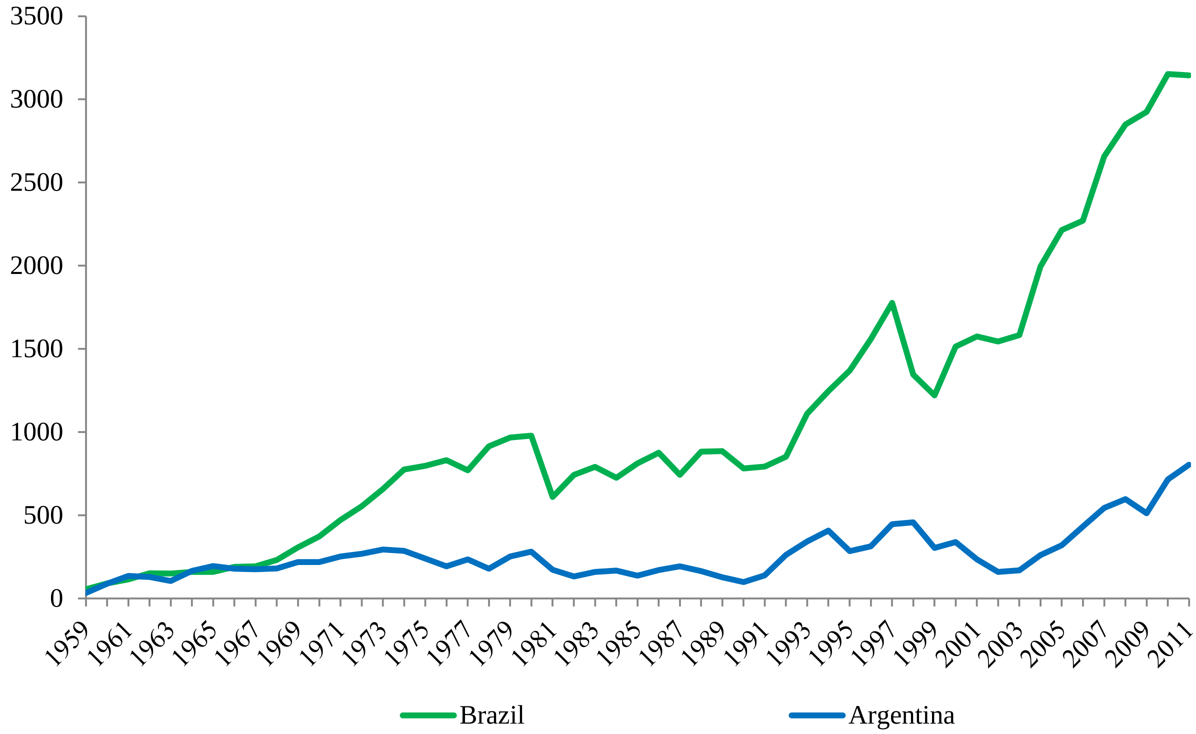

Figure 4-1 - Production of vehicles in Argentina and Brazil (1959-2011; thousand units)
Source: ADEFA and ANFAVEA

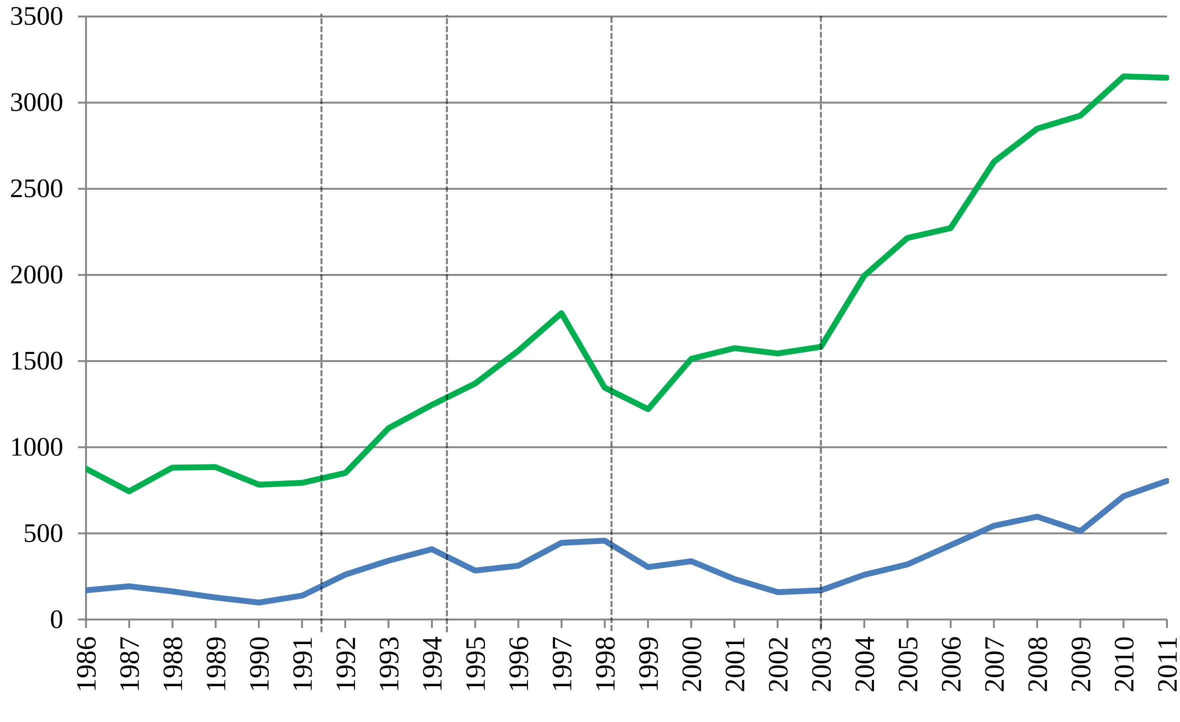

Figure 4-2 - Production of vehicles Argentina and Brazil (1986-2011; thousand units)
Source: ADEFA and ANFAVEA

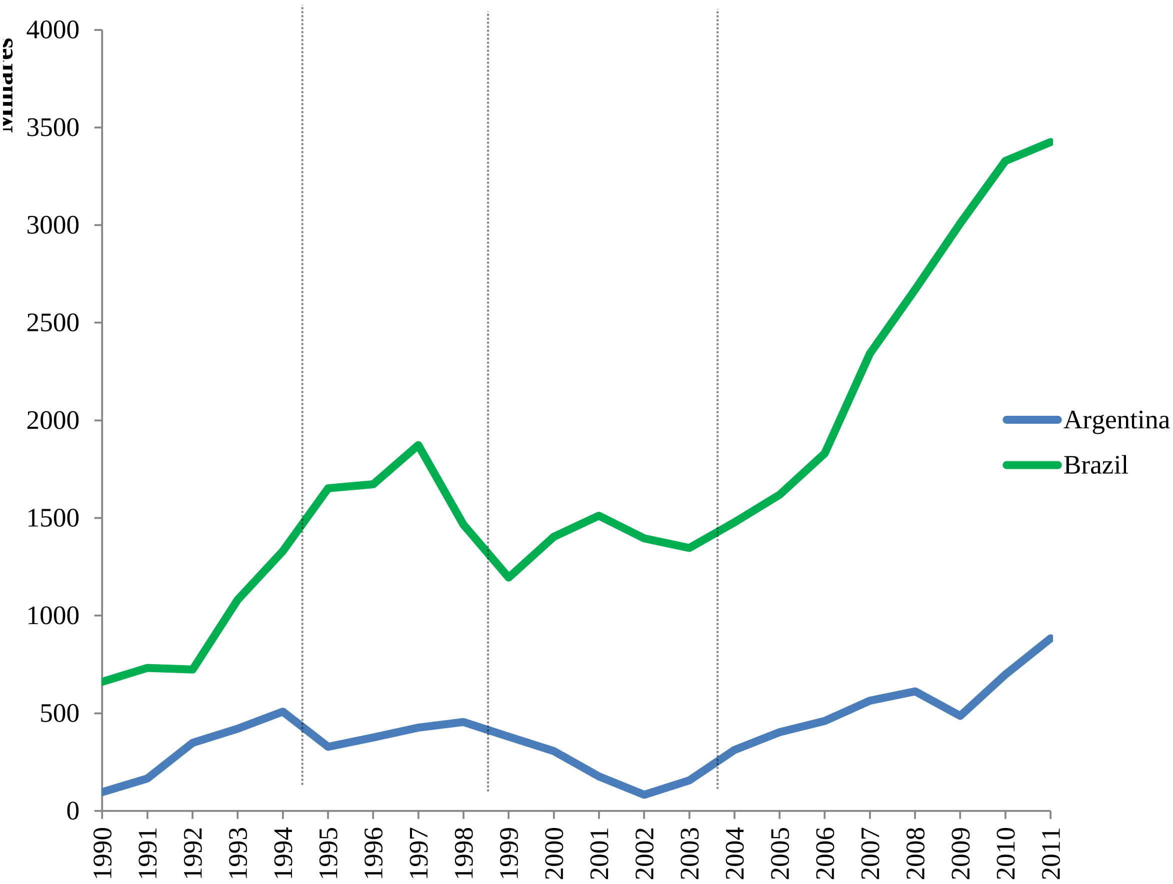

Figure 4-3 - Sales of vehicles Argentina and Brazil (1990-2011; thousand units)
Source: ADEFA and ANFAVEA

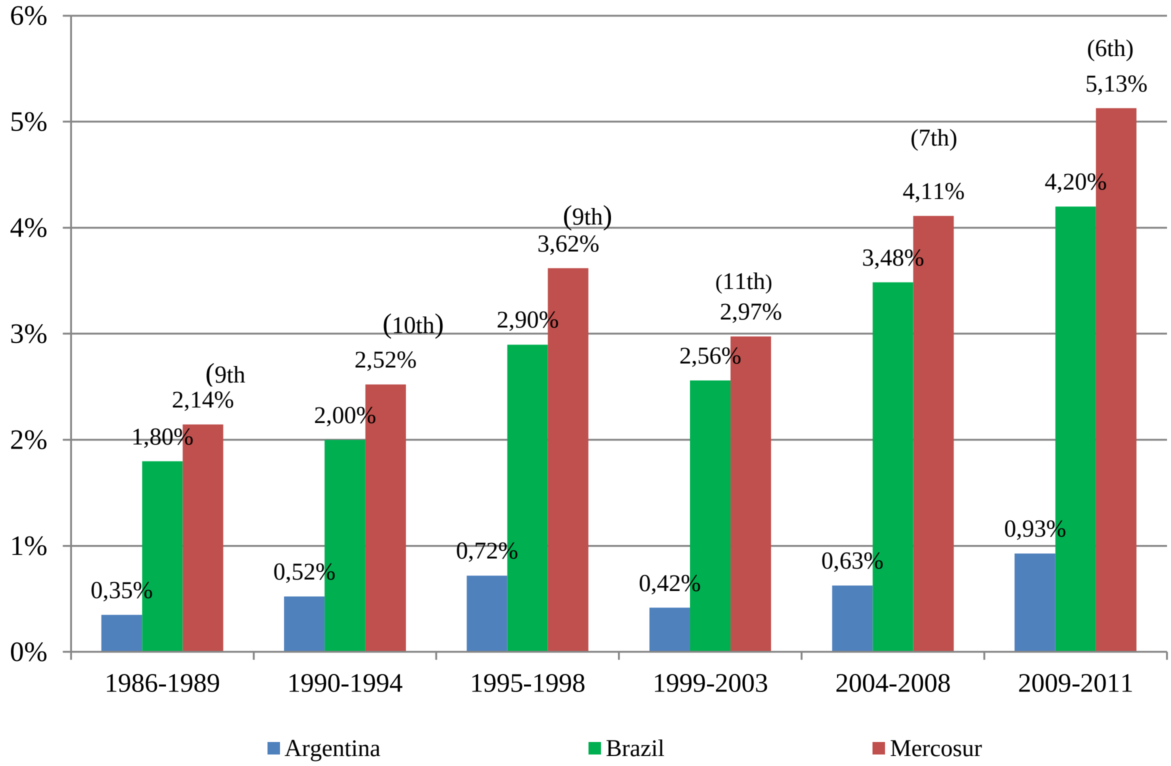

Figure 4-4 - Share of Argentina and Brazil in world production of vehicles (%)
Source: ADEFA, ANFAVEA and OICA

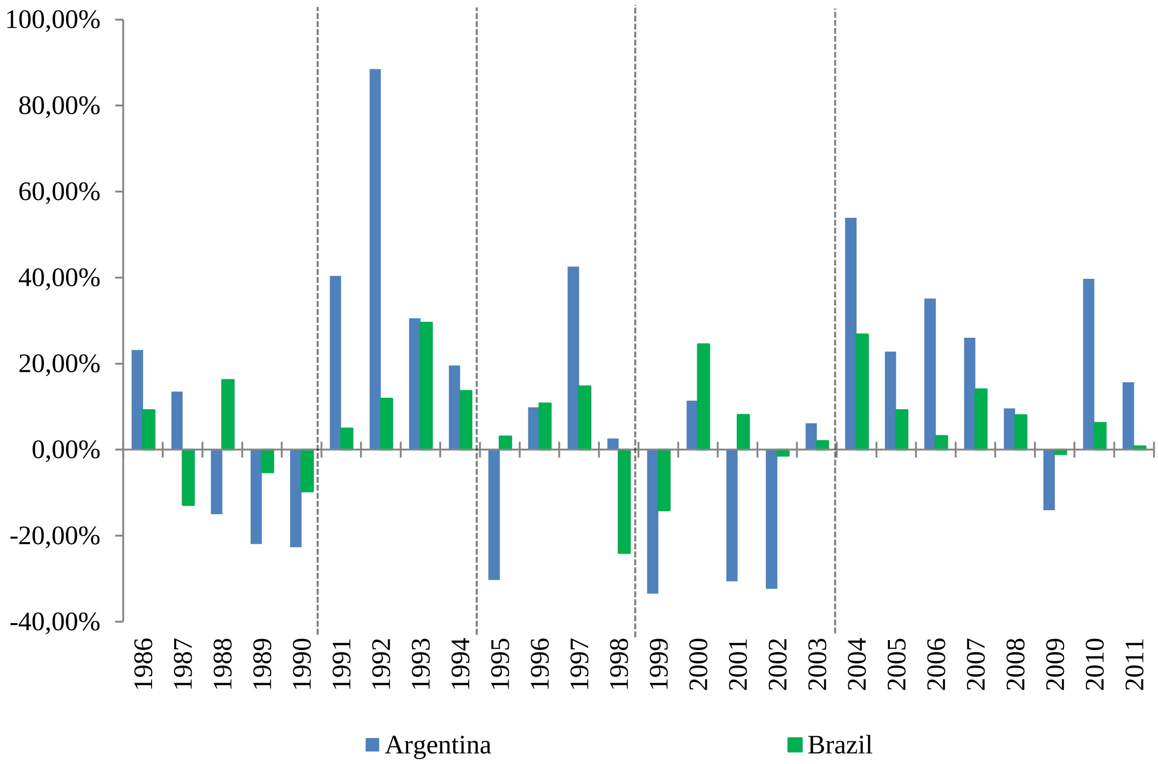

Figure 4-5 - Growth rates of vehicle production (change in the units produced over the previous year)
Source: ADEFA and ANFAVEA

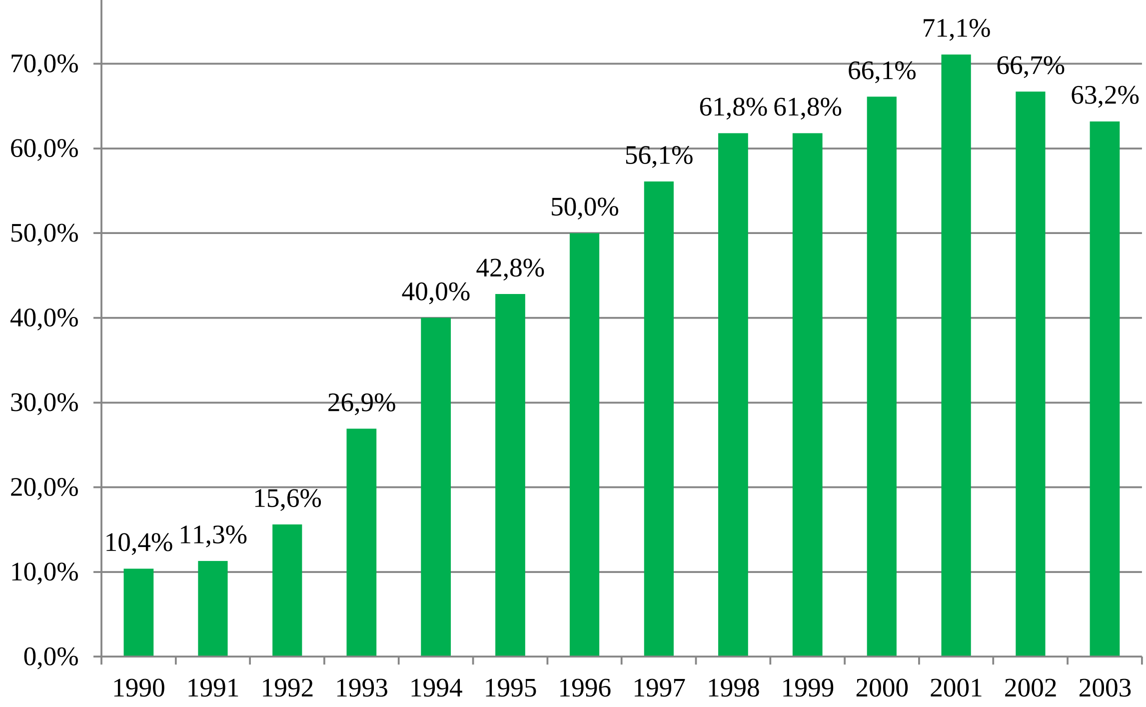

Figure 4-6 - Market share of 'popular cars' in Brazilian domestic market (vehicles with engines up to 1.0cc)
Source: ANFAVEA

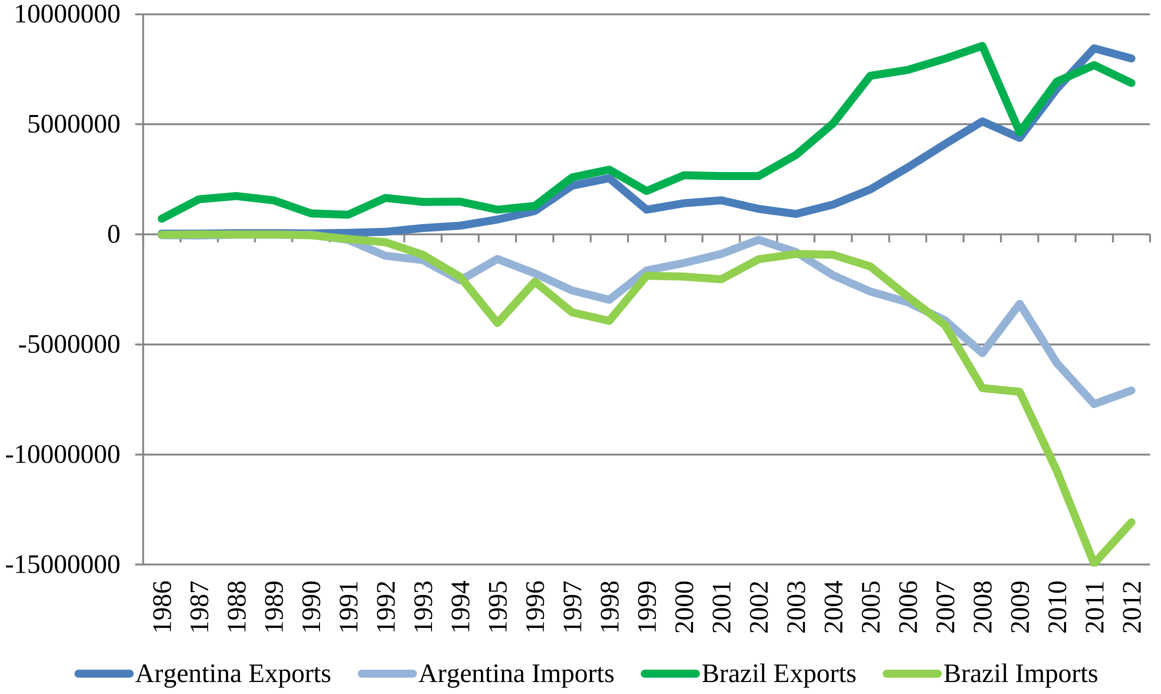

Figure 4-7 - Evolution of exports and imports in Argentina and Brazil (current U$S, in thousand)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

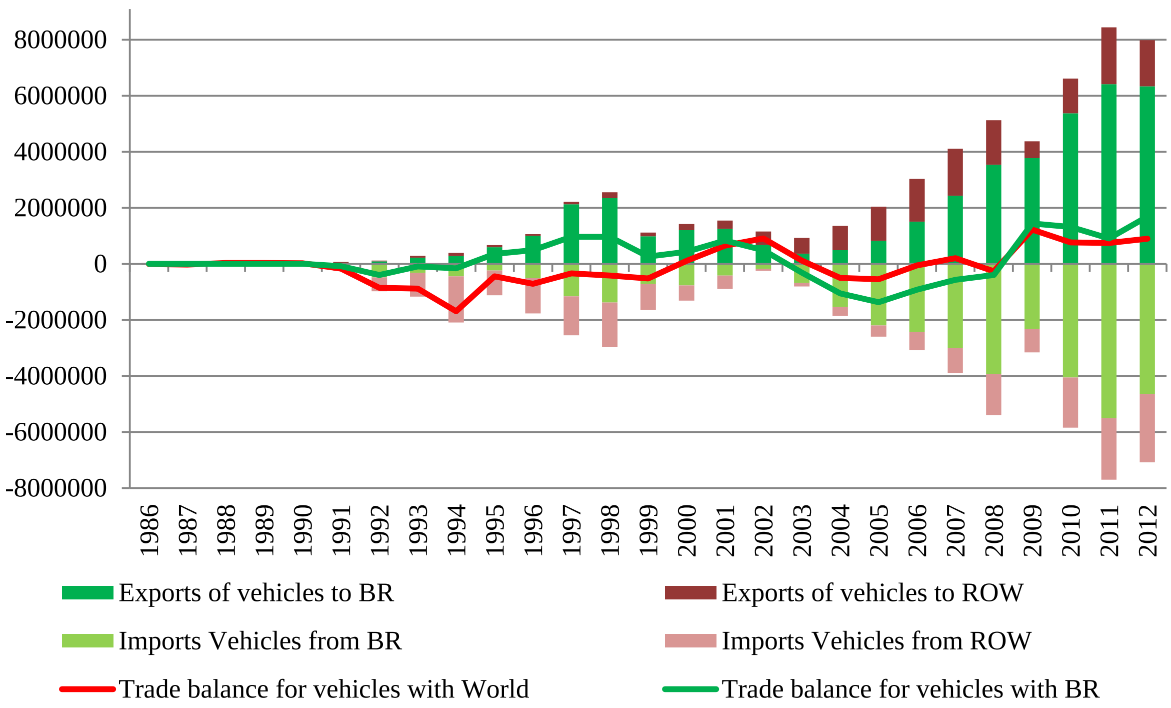

Figure 4-8 - Trade flows of Argentina: exports, imports and trade balance of vehicles (current U$S, in thousand)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

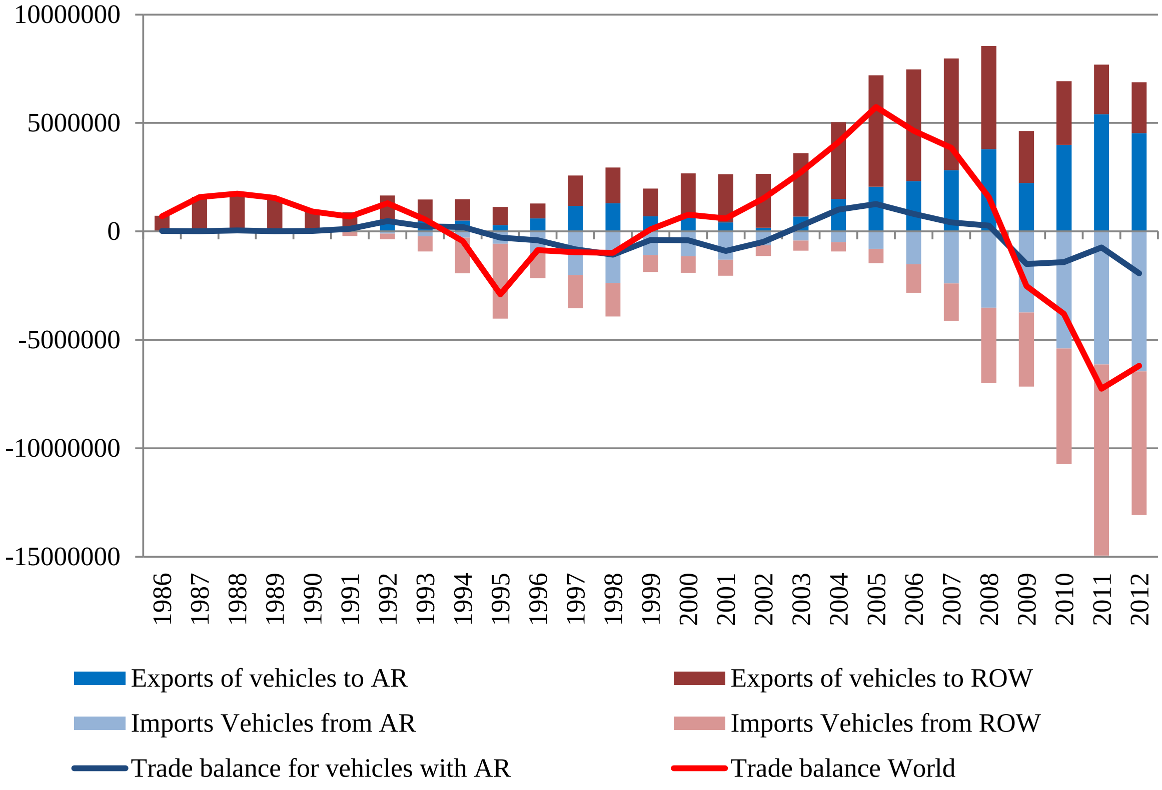

Figure 4-9 - Trade flows of Argentina: exports, imports and trade balance of vehicles (current U$S, in thousand)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

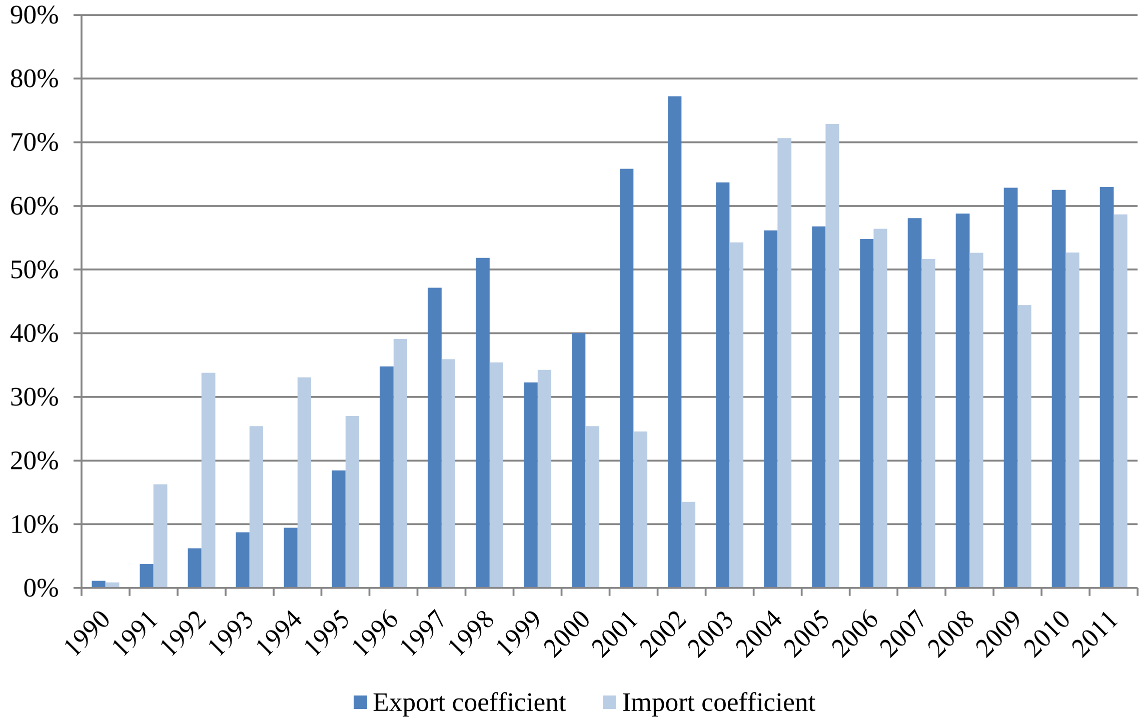

Figure 4-10 - Export and import coefficient of Argentina (exported vehicles/produced units; %)
Source: ADEFA and ANFAVEA

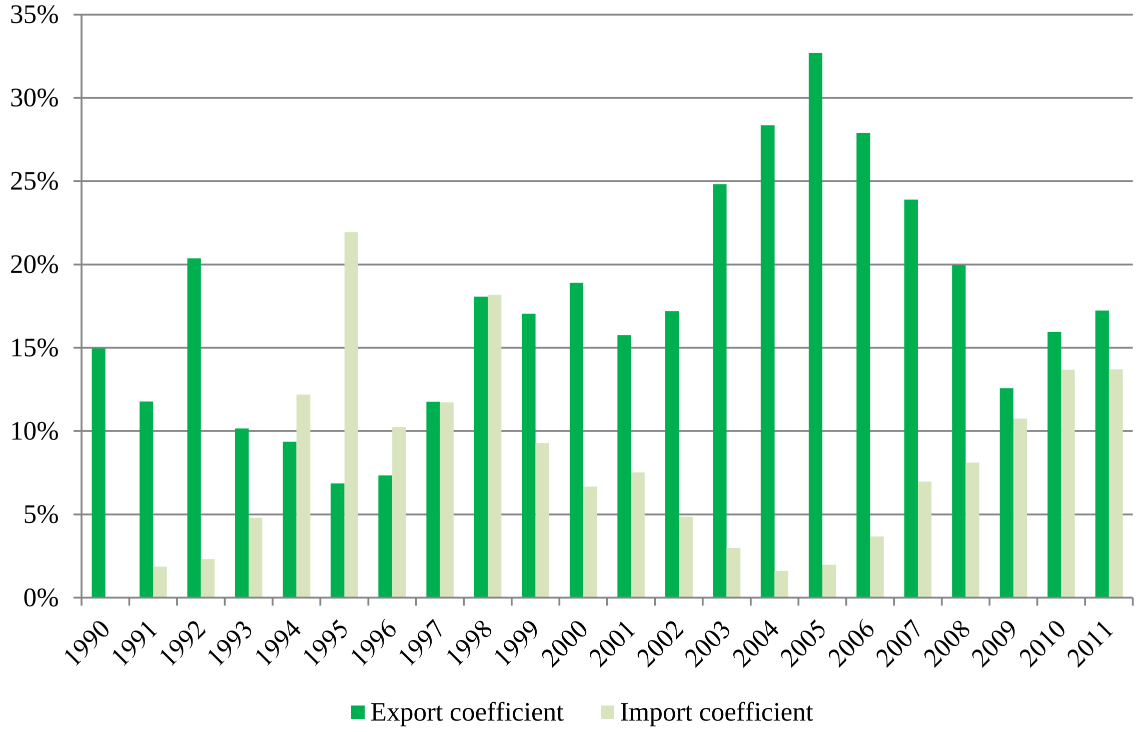

Figure 4-11 - Export and import coefficient of Brazil (exported vehicles/produced units; %)
Source: ADEFA and ANFAVEA

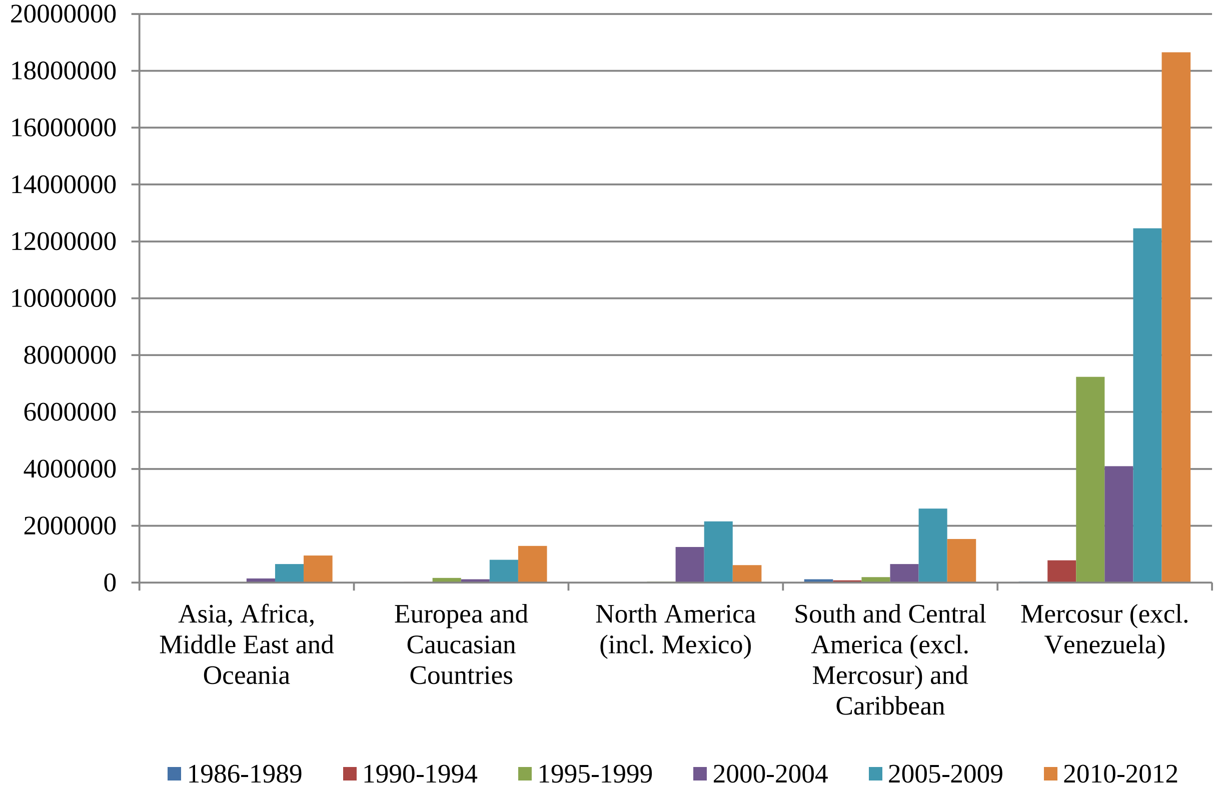

Figure 4-12 - Vehicles: Export trade partners of Argentina (current U$S; in thousand)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

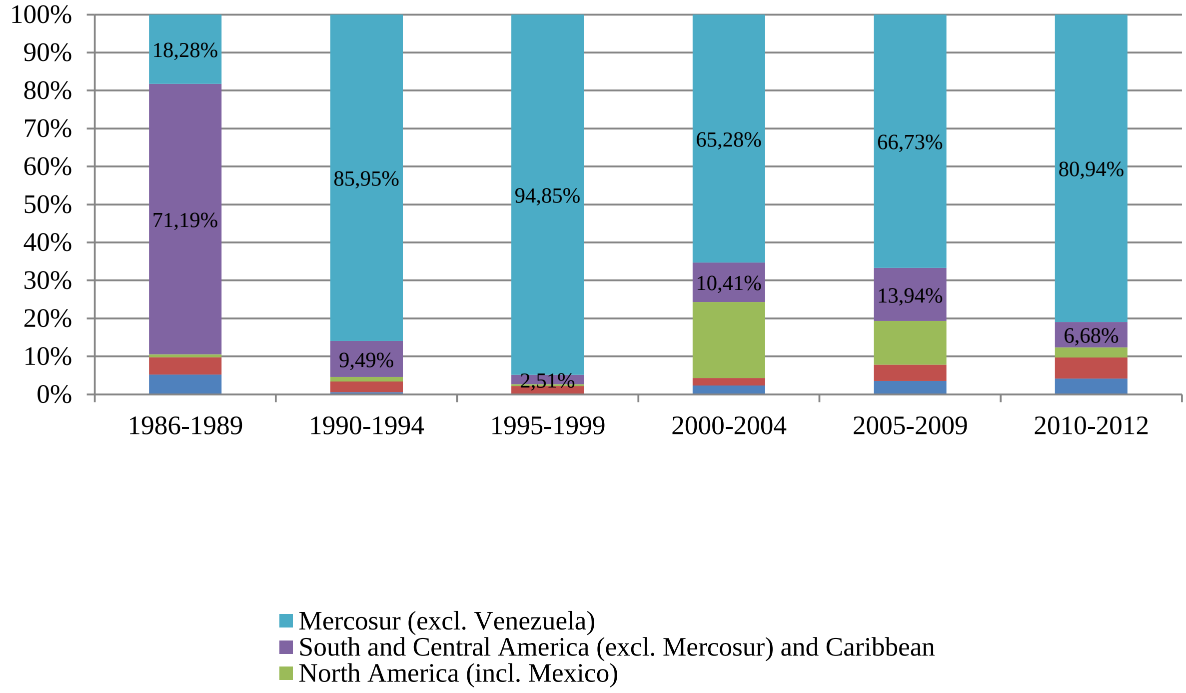

Figure 4-13 - Vehicles: Export trade partners of Argentina (%)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

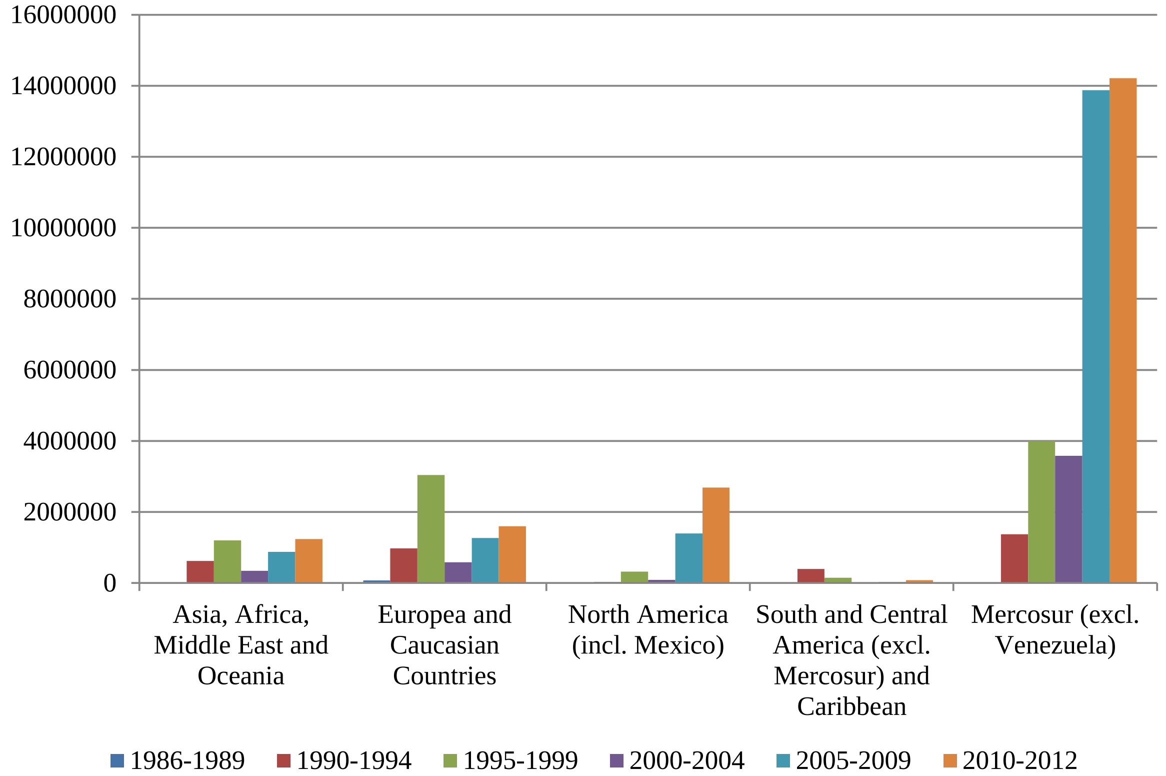

Figure 4-14 - Vehicles: Import trade partners of Argentina (current U$S; in thousand)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

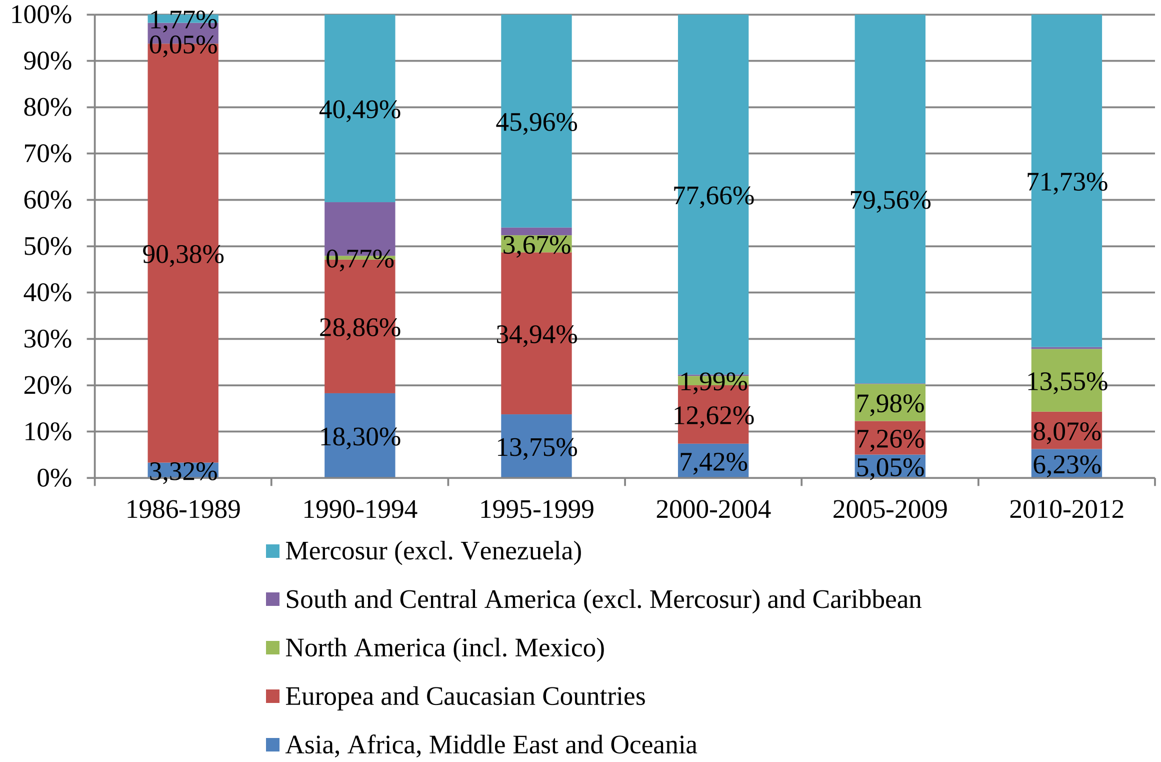

Figure 4-15 - Vehicles: Import trade partners of Argentina (%)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

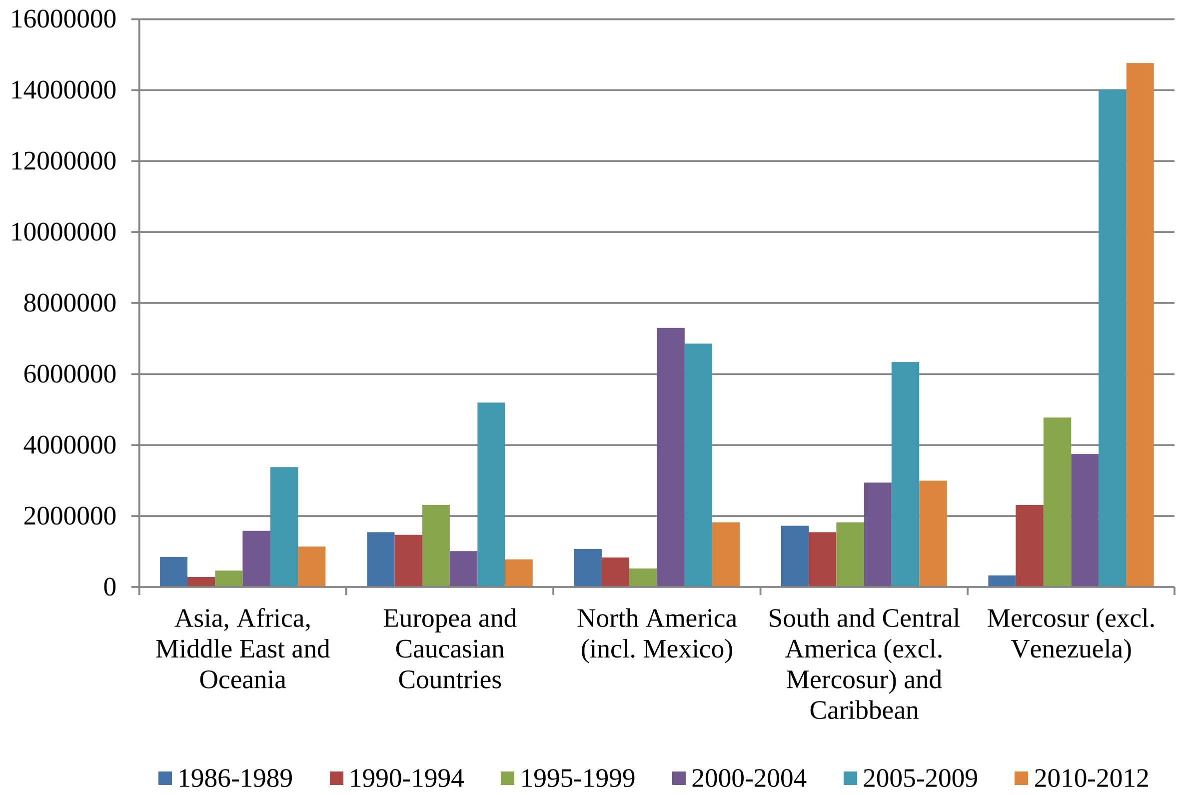

Figure 4-16 - Vehicles: Export trade partners of Brazil (current U$S; in thousand)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

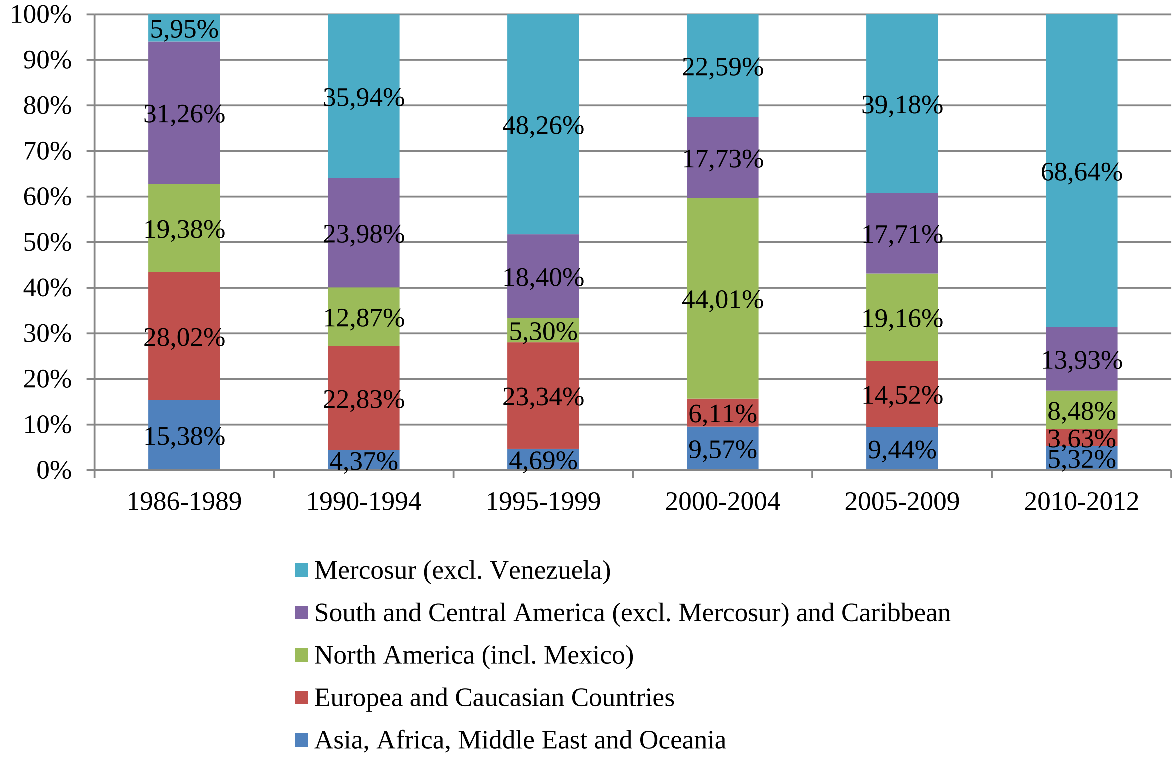

Figure 4-17 -Vehicles: Export trade partners of Brazil (%)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

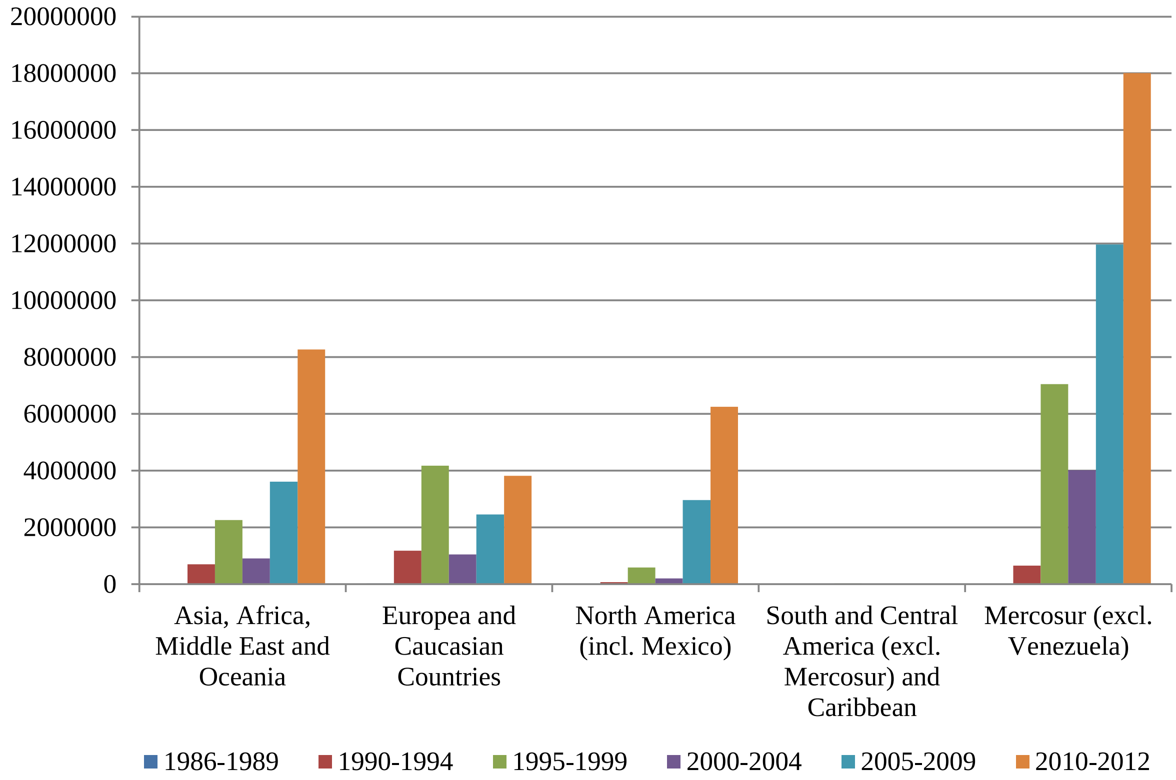

Figure 4-18 - Vehicles: Import trade partners of Brazil (current U$S; in thousand)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

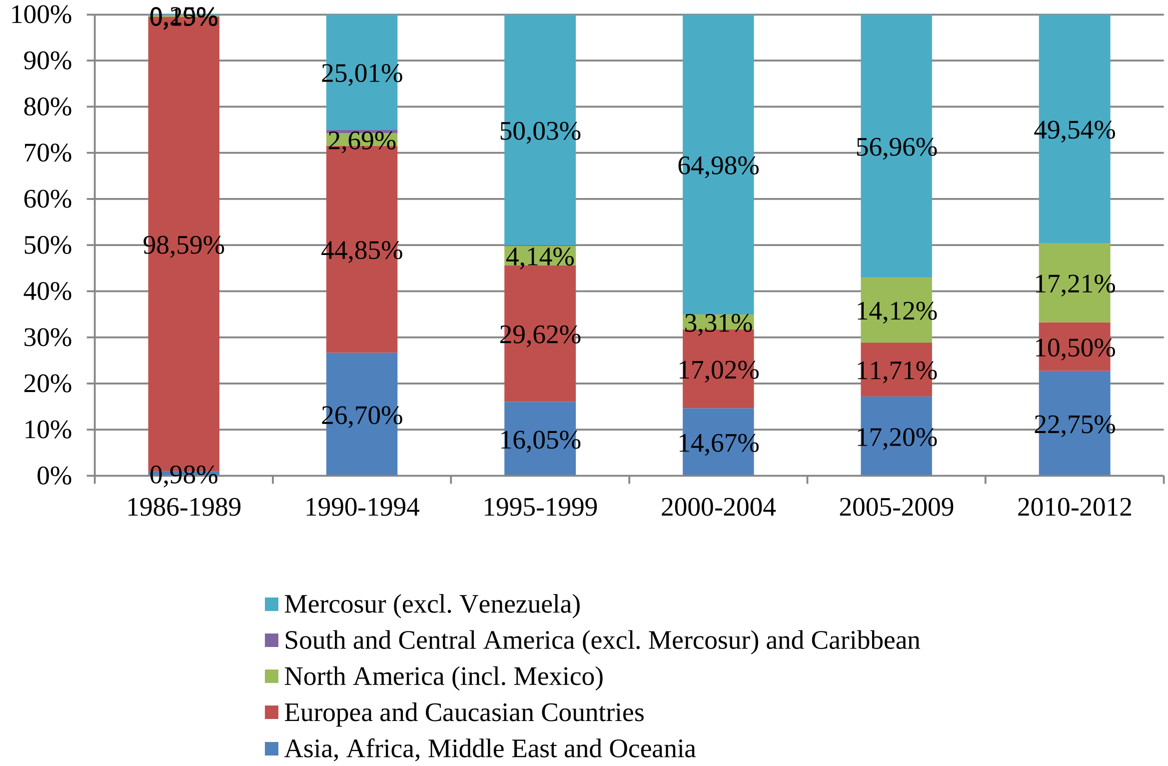

Figure 4-19 - Vehicles: Import trade partners of Brazil (%)
Source: UN Comtrade (SITC Rev. 2; codes 781, 782 and 783)

Table 4-6
Carmakers in Argentina and Brazil producing cars, light commercial vehicles, SUV and pickups (bus and trucks manufacturers are excluded)

	Argentina	**Brazil**
Fiat	1960-1980[a]	1976
	1995	
Ford	1961	1957
General Motors	1960-1978[b]	1958
	1997	
Honda	2011	1997
Toyota	1997	1959
Hyundai		2012
Iveco[c]		2000
Renault Argentina	1960-1991[d]	1999
	1997	
Mercedes Benz	1953 (buses, trucks)	1957 (buses, trucks)
	1995 (LCV)	1999-2010
Mitsubishi		1998
Nissan		2002
PSA Peugeot Citroën	1964-1980[e]	2001
	1998	
Volkswagen	1980	1957

Source: ADEFA, ANFAVEA and company information

[a] Between 1980 and 1985 the operations in Argentina were managed by Sevel.
[b] The company closed in Argentina in 1978.
[c] Iveco only produces trucks in Argentina.
[d] Renault products were manufactured by CIADEA between 1992 and 1997.
[e] Between 1960-1964, models of Peugeot were manufactured by the Argentinean firm IAFA. Between 1980 and 1998, Peugeot and Citroën models were produced by Sevel.

Chapter 5 - Italocars

Italocars has a longstanding presence both in Argentina and Brazil, which can be traced back to the early years of the 20th Century.[88] The manufacturing activities of the company in the region began in the 1960s and 1970s, respectively. In the early 1980s, however, Italocars decided to delegate the management of its operations in Argentina to a local business group (Sevel) and focused its business activities in Brazil. In the mid-1990s, the company put in place a new global internationalisation strategy, seeking to expand its operations in emerging countries. With this purpose, it decided to regain control of its activities in Argentina and progressively integrated the activities of this subsidiary with those of the Brazilian unit around the MERCOSUR market.

Since then, the *MERCOSUR region has become a strategic pole within Italocars' global operations*. This position is not only reflected in the participation of the regional subsidiaries in corporate sales, production or profits, but also in the role of MERCOSUR as a location with product development responsibilities. However, the technological evolution of the individual subsidiaries in Brazil and Argentina has been divergent as Italocars decided to concentrate the bulk of its product engineering activities on Brazilian territory. As a result, *the intra-firm division of labour within the MERCOSUR automotive space constructed by Italocars has assumed an extremely hierarchical format*.

Figure 5-1 graphically depicts the technological trajectory of subsidiaries of Italocars operating in MERCOSUR, according to the scale proposed in Table 2-2 (p. 52). It clearly shows that, *within the framework of a very 'aggressive' technological strategy in the region during the second half of the 2000s, the learning path of the two subsidiaries followed a deeply divergent trajectory*. Whereas the starting point was nearly the same, by 2011, the technological gap between the two units was very large. The Argentinian unit remained stagnant, conducting 'localisation' activities (level 2 of TC; Figure 5-1). By contrast, the Brazilian unit accumulated capabilities at a steady pace, experiencing a substantial improvement –in particular from 2004 onwards – that allowed it to develop new platforms for regional/emerging markets (level 6 of TC; Figure 5-1).

Three different phases can be identified during the period 1991-2011. The first one corresponds to the period 1991-1996, when Italocars organised and put in place a global network –with a regional node in MERCOSUR– to create a vehicle platform for developing countries (internally referred to as Project 178 –P178). The Brazilian subsidiary had an active role in this project, collaborating with the parent company in different stages of the development process. The second phase starts with the effective implementation of the P178. From a global perspective the project happened to be a failure and, in the region, the Argentinian unit project was 'deactivated'. By contrast, the Brazilian subsidiary continued upgrading its own capabilities. It even managed to gain some independence to advance with

[88] For a more detailed account of the history of Italocars in Argentina and Brazil, see Appendix C (p. 260).

some autonomous project internally developed. This period finishes with an important milestone which set the foundations for the big leap forward in terms of technological learning for the Brazilian subsidiary: the creation of a full-fledge Product Development Centre in Brazil. From then on, the Brazilian subsidiary assumed more knowledge-intensive product engineering responsibilities and its hierarchical precedence over the Argentinian unit was formalised.

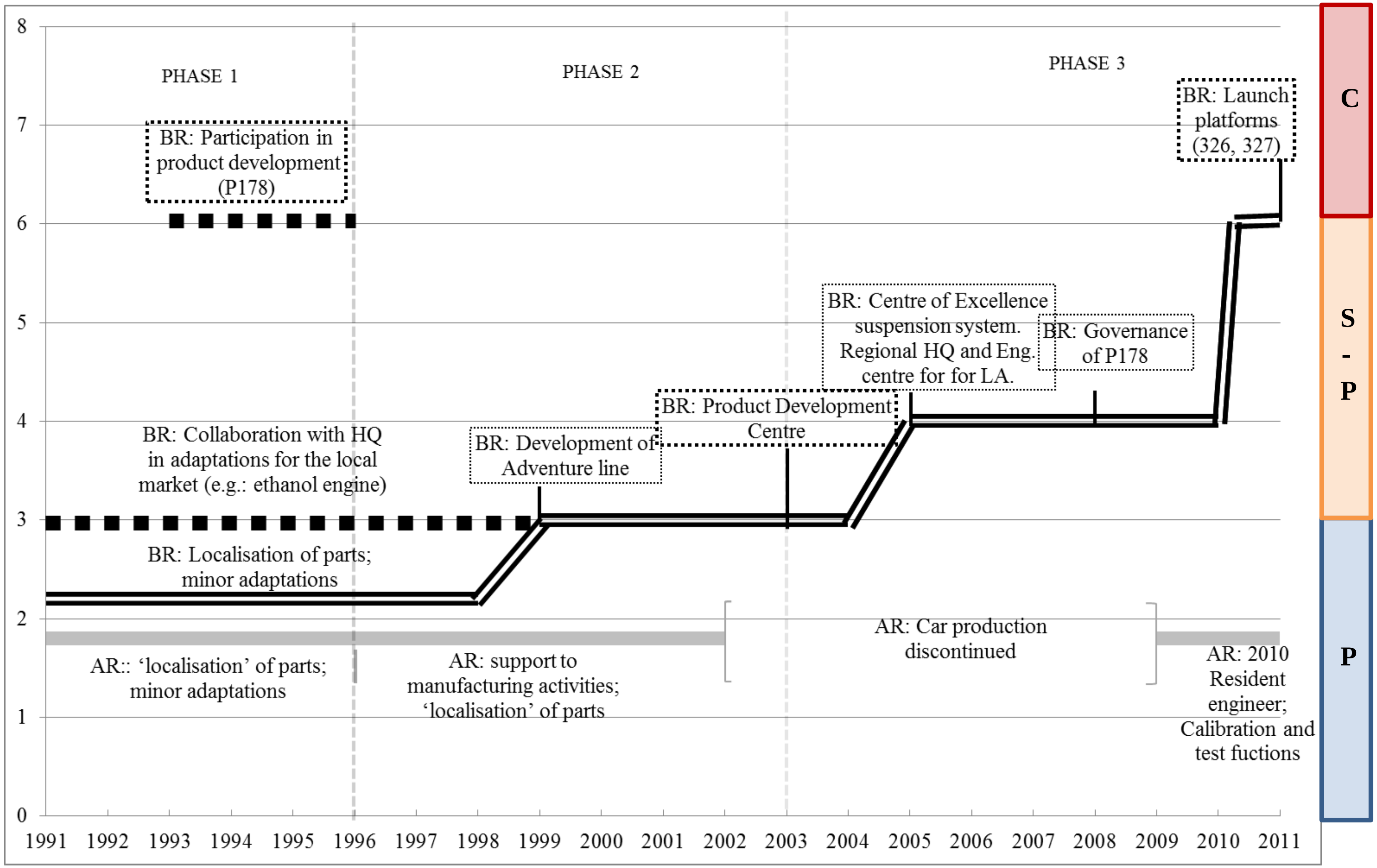

Figure 5-1 – Technological trajectory of Italocars in MERCOSUR
Source: own elaboration on the basis of fieldwork

References: TC BR subsidiary TC AR subsidiary Collaboration in PD with HQ

P Periphery **S-P** Semi-periphery **C** Centre

5.1 Phase 1 – Learning through collaboration: the co-leading role of the Brazilian subsidiary in the P178 global car project (1991-1995)

5.1.1 The Project 178: the Trojan horse of Italocars' renewed internationalisation strategy

In the early 1990s, Italocars decided to *give a new boost to its internationalisation strategy*. The interest of Italocars in expanding its operations overseas was closely related to changes in the Italian competitive scenario in the early 1990s. Then, Italocars' quasi-monopoly position in its home market –which at the time accounted for more than 50% of Italocars' total car sales– was challenged. Italian consumers showed an increasing preference for car segments which were not served by Italocars' products. At the same time, the growth of Korean carmakers –such as Hyundai, Kia and Daewoo– represented a threat for Italocars. These companies, specialising in the same type of lower range vehicles, were striving to gain a presence in the Triad countries (Volpato, 2009).

But the reasons leading to the strengthening of the internationalisation strategy of Italocars did not only lie in 'push' forces stemming from the company's home country. As discussed in Chapter 2, a group of 'emergent' countries in Asia, Latin America, and Central and Eastern Europe were accelerating their rates of motorisation as a result of the implementation of stabilisation and structural reform programmes. The perspectives of an increasing demand for vehicles emanating from these countries constituted a 'pull' force which motivated a re-shaping of Italocars' international strategy. The spirit of the new internationalisation plan was clearly expressed in the words of the then President of the Italocars Group between 1996 and 1998:

> It is with great conviction that Italocars has adopted a new strategy to penetrate into markets where demand will be higher in the next 20 or 30 years: East Asia, Latin America and Eastern Europe. For this we need to keep growing, because it is the only way of guaranteeing a long-term future for the company (Fiat Auto Argentina, 2009: 234).

The launch of the MERCOSUR integration process in 1991 and the perspective for the creation of a common market for automobiles in the region –expected to reach 2.5 million units by the following decade– represented an additional incentive for the company (Fiat Auto Argentina, 2009). As will be seen below, the organisation of its operations in the region was based 'on the anticipation' of the effective completion of the common market.

Spearheading the internationalisation initiative was the *development of a global platform* for emerging markets internally referred to as P178. The project was originally conceived in 1992 as a restyling of the Uno model, which had been produced in Brazil since 1984. However, the project's scope changed dramatically when Italocars decided to proceed with the development of a 'world car'. The project's objective was to develop a family of low niche vehicles using the same modular platform to serve emerging countries with high growth rates of motorisation, including Argentina, Brazil, China, India, Russia, South Africa, and Turkey (a complete list of countries can be found in Table 5-1, p. 117). The family of vehicles of the P178 shared around 69% of parts; mainly non-visible structural and powertrain related components and systems, such as engine, transmission, wheels, axles, under-body pressings, fuel tanks, brakes, and suspensions. Vehicles were to be produced in a fully standardised manner across different subsidiaries (Ciravegna, 2003). This family of cars of the P178 included four models: a hatchback (Palio); a three-volume sedan (Siena); a stage wagon (Palio Weekend); and a pick up (Strada). The development of the vehicles sought to meet the preferences of consumers within the target markets and to be adapted to the prevailing driving conditions.

Table 5-1
Production of Palio and Siena models between 1996 and 2001

	1996	**1997**	**1998**	**1999**	**2000**	**2001**	**Forecast for 2001 according to original plan**
Brazil	157,570	390,501	282,956	261,566	259,569	271,686	**400,000**
Argentina		48,939	61,777	29,413	25,581	31,553	**100,000**
Poland		9,006	28,521	21,957	10,945	6,168	**50,000**
Venezuela		9,766	8,858	1,867			**23,000**
Morocco		98	5,393	8,361	6,190	6,407	**20,000**
Turkey			20,095	23,964	43,892	13,835	**110,000**
India				3,766	2,701	8,990	**100,000**
South Africa				137	6,822	8,161	**25,000**
Egypt					3,201	3,375	**15,000**
Russia							**70,000**
China							**100,000**
Total	**157,570**	**458,310**	**407,600**	**351,031**	**358,901**	**350,175**	**1,013,000**

Source: Enrietti and Lanzetti (2002); data on Argentina and Brazil from ADEFA and ANFAVEA, respectively.

It is worthwhile noting that the *South American region represented the main strategic market of the P178*. As can be seen in the Table 5-1, according to the forecast of the company for the year 2001, more than 50% of the sales of the family of vehicles developed on the basis of the new platform were expected to be concentrated in Argentina, Venezuela and, especially, Brazil. The Brazilian subsidiary had had an *auspicious performance in the early 1990s, before the implementation of the P178*. This was as a direct consequence of the sales success of the Uno Mille launched on the Brazilian market in 1990. The market share of Italocars in Brazil soared from 15.7%, in 1990 (104,025 vehicles sold), to 20.7% in 1992 (243,739 units).[89] The positive performance of Italocars in Brazil was further reinforced from 1993 with the enactment of the popular car policy which boosted the sale of cars up to 1.0 cc engines (see Chapter 4, pp. 69-72; and Figure 4-6, p. 103). The company led this particular vehicle segment which in 1996 accounted for 50% of the domestic market (Figure 5-2, p. 118).[90]

[89] Source of information: ANFAVEA.
[90] At the time, Italocars was the company which was better prepared to offer vehicles complying with the normative provisions of the popular car policy –in particular the Uno Mille. Volkswagen's popular car, for

As argued by the interviewed managers, the success of Italocars in Brazil under the popular car regime *contributed to improving the status of the subsidiary within the corporation*, which became the main destination market out of Europe, and *changed its relationship with the parent company* (Interview IC-CA2). The growth in sales and production levels increased its importance as a production pole within the whole corporation. The participation of the Brazilian subsidiary of Italocars in the total production of the corporation grew from around 10% in 1990, to almost 22% in 1993.[91]

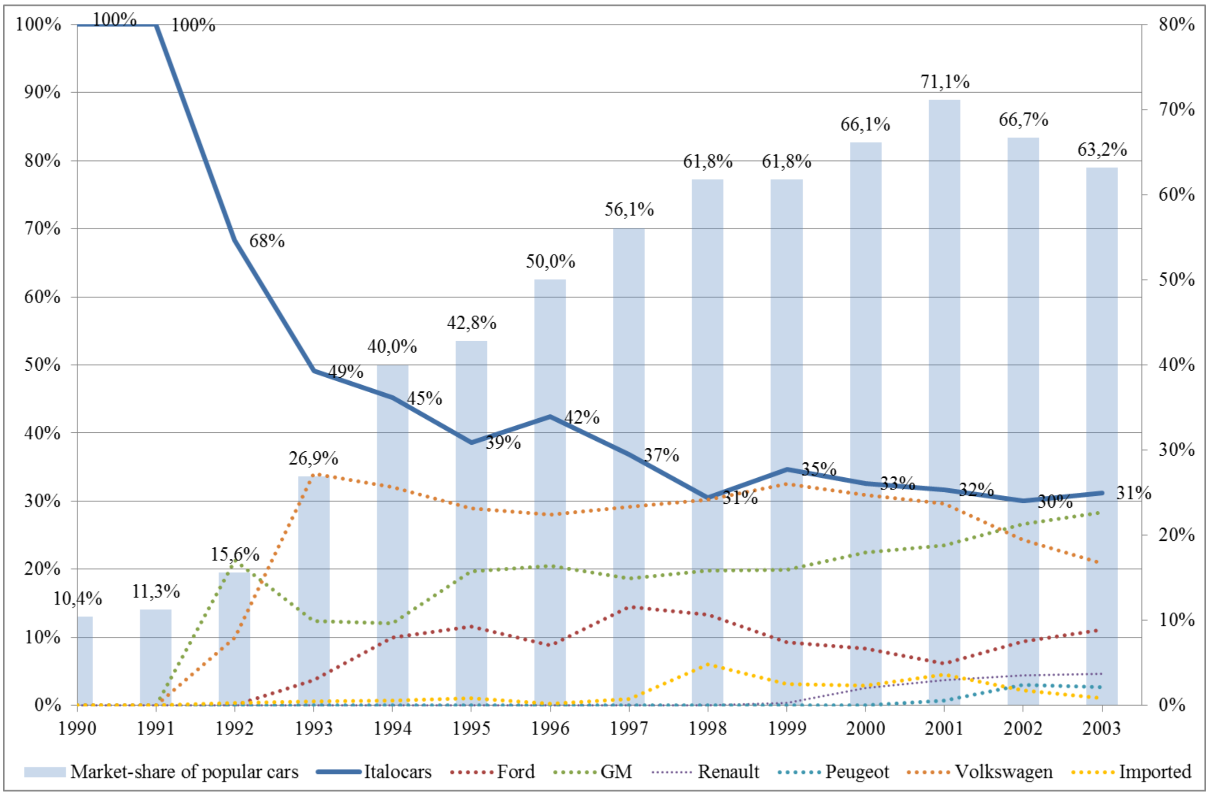

Figure 5-2 - Evolution of the market share of the Brazilian subsidiary of Italocars in the segment of popular cars
(Primary axis: market share of the brand in the Brazilian market; secondary axis: Market share of 'popular' vehicles in the Brazilian market)
Source: ANFAVEA

5.1.2 Reorganisation of the corporate network

Until the implementation of the P178, the global network of Italocars had operated on the basis of a 'hub and spokes' model, with the parent company in Italy dominating a dyadic headquarter-subsidiary pattern of intra-corporate relations (see Figure 5-3). In a kind of Hymerian division of labour (see discussion in Chapter 1, pp. 23-25), these were one-way exchanges in which the parent company provided subsidiaries with product and processes

instance, was the VW Fusca, an outdated model designed in the 1940s whose production in Brazil had been discontinued in the mid-1980s.

[91] Source of information: ANFAVEA and Italocars.

specifications. Linkages among fellow subsidiaries were nearly non-existent. The supply chain of each unit was largely integrated at the national level –configuring a national automotive space as the one depicted in Figure 2-7 (p. 45). The parent company supplied subsidiaries with some parts and vehicles to complement the domestic supply.

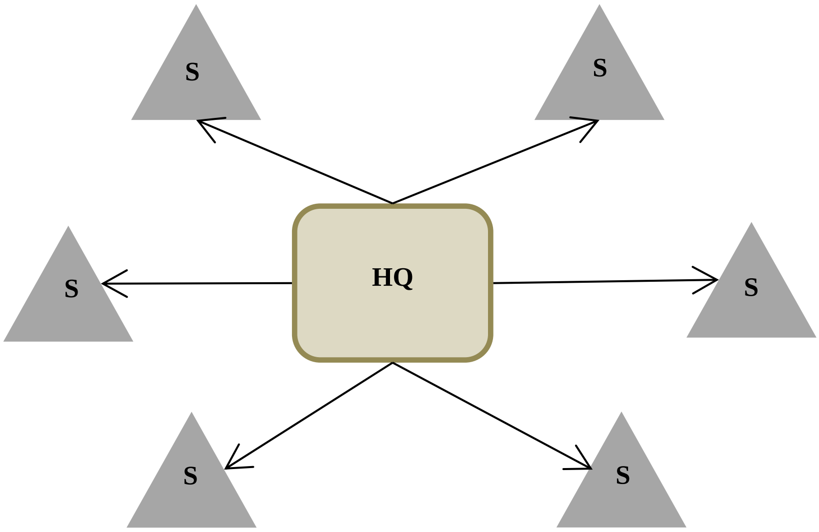

Figure 5-3 - Organisation of Italocars' global network before the implementation of the P178
Source: Own elaboration

References: HQ: Headquarters; S: subsidiaries.

Fundamentally, the *'global' nature of the P178 required a profound reorganisation of Italocars' corporate network.* It aimed at achieving a closer integration among subsidiaries to avoid inefficient duplication of functions and tasks (Figure 5-4). A common 'corporate language' had to be created in order to facilitate the standardisation of processes among the subsidiaries overseas. Subsidiaries had to be able to share product specifications, quality standards, and production processes in order to comply with the criteria of cross-plant and cross-market component uniformity (Ciravegna, 2003). Corporate communication was decentralised and a global sourcing strategy was developed (Volpato and Camuffo, 2002).

As shown in Figure 5-4, the responsibility for the overall coordination of the network was that of the parent company. Overseas subsidiaries can be classified into two tiers according to their role within the network and the nature of their linkages with the rest of the subsidiaries: 'first tier' subsidiaries (S1) maintained privileged and intense information and knowledge flows with the parent company; at the same time, they were responsible for providing parts and components to second-tier subsidiaries (S2), which mainly had assembly responsibilities. The relationship between first-tier and second-tier subsidiaries, however, was not limited to material exchanges. In some cases, the former assumed management functions over the latter. Although linkages between the parent company and the second-tier subsidiaries existed they were largely mediated by first-tier subsidiaries. In this scheme, for reasons that will be further explained below, the Brazilian subsidiary played a strategic role which entailed some coordination responsibilities over S1 and S2 subsidiaries (see pp. 120-122).

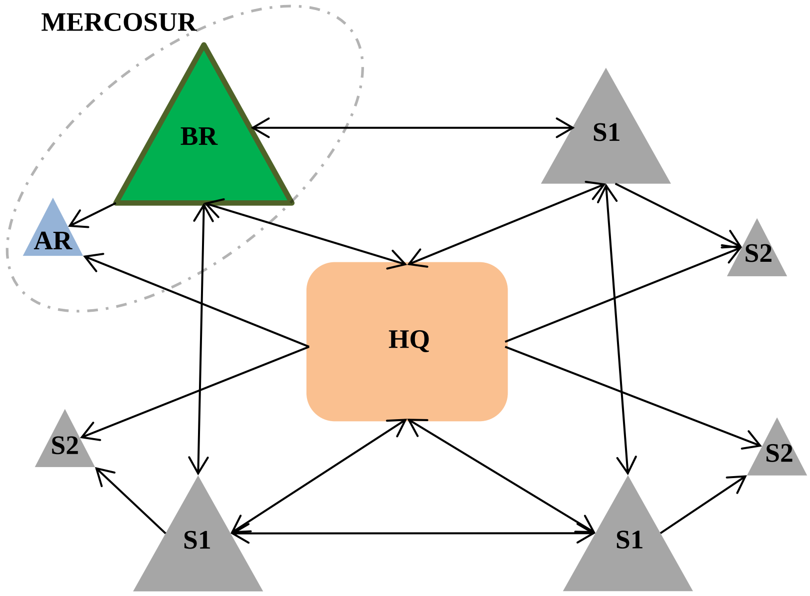

Figure 5-4 - Organisation of Italocars' corporate network under the P178
Source: Own elaboration

References: HQ: Headquarters; S1: First-tier subsidiaries; S2: Second-tier subsidiary; BR: Brazilian subsidiary; AR: Argentinian subsidiary.

5.1.3 *Capabilities accumulated by subsidiaries in MERCOSUR*

In the period immediately before the launch of the P178, the *product engineering capabilities and infrastructure of Sevel and the Brazilian subsidiary of Italocars were rather limited*. From 1981, Sevel produced vehicles under Italocars' license and its responsibilities were circumscribed to following the product specifications defined by the parent company. As most local carmakers at that time, Sevel operated with a high level of domestic integration of parts and components, and maintained scarce linkages with the rest of the corporation (Figure 5-3, p. 119). Its condition as licensee reinforced this isolation, compared to its Brazilian counterpart.

The product engineering efforts of Sevel were mainly focused on the 'localisation' of parts (level 2 of TC; Figure 5-1, p. 115). This responsibility implied engineering collaboration with suppliers to develop local parts. Sevel had autonomy from the parent company in this field provided that the product was not substantially changed, and that some quality and safety standards were maintained. However, the fact that Italocars had only a minority stake in

Sevel resulted in weak control and enforcement mechanisms, which made it difficult to guarantee effective compliance with those requirements (Interview IC-PROC1).

The relationship between the Brazilian unit of Italocars and its parent company was different, as the latter exercised direct control over the subsidiary. Therefore, although the subsidiary only had localisation responsibilities (level 2 of TC; Figure 5-1, p. 115), it closely collaborated with the corporate product engineering department in the development of specific adaptations for the Brazilian domestic market (level 3 of TC; Figure 5-1, p. 115). During this period, about 200 people –about half of which were engineers (Interview IC-PROD1)– worked at the product engineering department of the Brazilian subsidiary. In close collaboration with the parent company, this team participated actively in the development of some adaptations applied to vehicles commercialised in Brazil. At the time, however, product engineering responsibilities were centralised in the parent company and, accordingly, changes were designed and implemented in Italy.

The role of engineers in Brazil was fundamentally focused on the collection of information and the elaboration of reports which provided inputs for engineers in the parent company to be able to develop the adaptations (Interview IC-PROD2). Since the 1980s, the Brazilian unit assumed some testing responsibilities and was endowed with the infrastructure required for that purpose.

There are *two particular areas in which the Brazilian subsidiary was able to accumulate capabilities during this period*. The first one concerns the pioneering position of Italocars in Brazil with regards to the production of engines operating with ethanol as fuel as an alternative to petrol.[92] In 1979, three years after the launch of the first car produced by the Brazilian subsidiary of Italocars, a version of the model 147[93] with a 1.3 litre ethanol engine was introduced into the market. The development of the engine was chiefly carried out by engineers in the headquarters. However, members of the Brazilian subsidiary had active participation in the process (Interview IC-PROD2).[94]

The second area in which the Brazilian subsidiary developed specific capabilities early on was in the field of vehicle suspension systems. Cars commercialised in the Brazilian market have always required having their suspension systems reinforced as poor quality and more ‘aggressive’ roads put at risk the durability of vehicles (Interview IC-PROD2). Members of the product engineering department of the Brazilian subsidiary participated, for example, in the adaptation of the suspension system of the model Uno, along the lines of that of the model 147, considered to be more resistant (Carneiro Dias, 2003). Some years later, in the early

[92] The production of this type of engines was framed within the National Alcohol Programme –*Pro-Álcool*, in Portuguese–, put in force by the Brazilian government in 1975 (*Decreto 76.593 1990 (Brasil)*). As a response to the first oil crisis of 1973, the programme had the objective of replacing fossil fuels with ethanol produced from sugar cane. For more information on the origin and evolution of the Pro-Álcool programme (NovaCana).
[93] This model was a derivative of the compact model 127, especially designed for the Brazilian market.
[94] After having peaked in 1986, when vehicles with ethanol engines accounted for 76.1% of the passenger and light commercial vehicles market in Brazil, the production dropped significantly. One of the main reasons behind this fall was the dramatic decrease in crude oil prices from an average of US$ 30 per barrel, between 1979 and 1985, to around, US$ 18 between 1986 and 1992. Source: InflationData (2013).

1990s, a similar experiment was carried out with the model Tempra, which incorporated the suspension systems of large European sedans –such as the Croma or the Alfa Romeo 164 (CavRamp, 2013). Additionally, from the mid-1980s, some tests started to be carried out in Brazil, especially those directed to adapting vehicles to driving conditions prevailing in the country (e.g. driving tests, reliability and durability tests).[95]

5.1.4 Implications of the P178 in the technological learning process of subsidiaries in MERCOSUR

The implementation of the P178 –and the organisational changes it brought about– had significant, albeit different, implications for the technological trajectory of the Argentinian and Brazilian subsidiaries. For the latter, the project was a stepping-stone towards a sustained path of technological learning and the acquisition of the infrastructure necessary to sustain it. It was also the beginning of a process of delegation of increasingly complex product engineering responsibilities by the parent company which culminated with the local development of two vehicle platforms for developing countries (see Figure 5-1, p. 115).

As pointed out above, the parent company selected its Brazilian subsidiary to play a role as a co-leader in the development process of the P178. Two main factors explain this decision. Firstly, the *market performance of the subsidiary* in the first years of the decade as well as *the promising perspectives of the South American market as a whole*; secondly, as has just been discussed above, the *technical competence and tradition of collaboration between the subsidiary and the parent company* in some of the adaptation efforts carried out in the country (Interview IC-PROD2; Interview IC-CA2). These two factors positioned the Brazilian subsidiary as a *strategic market* player as well as a *potential collaborator* which could provide good inputs to respond more effectively to the preferences of domestic consumers.

The development process of the P178 was carried out in Italy. The parent company exercised 'governance' over the whole process, ranging from the conception of the family of products to the design of production process. However, the Brazilian subsidiary was directly involved in the development process and, albeit from a subordinate position, shared responsibilities with staff from the parent company. In 1993, about 50 members from different areas –purchasing, product and process engineering, sales, etc.– moved from Brazil to Italy. This learning-by-doing and learning-through-collaboration experience on the premises of the parent company lasted nearly 18 months, until the time the project was relocated to Brazil to initiate the manufacturing stage. The experience was completely new for Italocars which had

[95] Consoni (2004) indicates that the Brazilian subsidiary of Italocars also developed a special capability for the development of a compact disc reproduction system with a buffer anti-shock mechanism. The necessity for this development stemmed from the difficulty of getting standard audio systems to perform satisfactorily on Brazilian irregular roads. She points out that the development of the system, which was carried out jointly with a supplier, took 18 months and became a reference for the whole corporation.

never before given a subsidiary such a role in the development of a new vehicle (Interview IC-PROD2).

The Brazilian subsidiary had active participation in the conception of the models of the P178. As Brazil was its main target market (see Table 5-1, p. 117), product specifications were defined on the basis of information gathered by Brazilian staff members regarding consumer preferences, driving conditions in the country, etc. Drawing on that information, the parent company advanced design and technical solutions. Economic approval for the project was co-decided between the parent company and the Brazilian subsidiary as both had a significant stake in it: while the former had to guarantee adequate return to shareholders, the latter had to ensure the profitability of the project (Carneiro Dias, 2003).

During the product development process, at least one staff member of the Brazilian subsidiary of Italocars worked with an Italian counterpart as *affiancato* –i.e. in a supporting role– in the definition and design of the product specifications of the various parts of the vehicle: design, chassis, electric components, engines, etc. (Interview IC-PROD2). The prototypes as well as the tools and machinery for series production were designed and produced in Italy. Verification tests were carried out in a pilot plant in that country. By the end of 1994, the project was relocated to Brazil, the first country where the P178 family was to be manufactured. Brazilian staff members who had stayed in Italy went back to Brazil, accompanied by Italian engineers, who supervised the setting up of the manufacturing facilities and the initial phases of the production process (Interview IC-PROD2). The manufacturing of the model Palio started in January of 1996.

As the P178 was conceived as a global project, the participation of foreign subsidiaries was not restricted to Brazilian staff members. A group of engineers from the Argentinian subsidiary[96] as well as from other participating countries, such as Turkey and Poland, also moved to Italy to participate in the development process. These groups, however, were substantially less numerous than the Brazilian contingent. Their activities were fundamentally focused on manufacturing, purchasing and logistic issues, that is, on areas in which these subsidiaries would have direct responsibilities in the future (Interview IC-PROD1; Interview IC-PA1; Interview IC-PROC1).

As discussed above, a hierarchical organisational scheme was set up within the global network of Italocars in order to develop, and then, to implement the P178 (see Figure 5-4, p. 120). In such scheme, the Brazilian subsidiary had a subordinate position to the parent company in the development of the project, but, at the same time, played a leading role with respect to other subsidiaries. In some aspects, it acted as a liaison agency between the project's leading team and the subsidiaries involved in it. For instance, if any subsidiary had a suggestion for some change to product specifications, it had to be communicated to the Brazilian team, who were responsible for analysing the proposal and making the final decision about its final implementation (Carneiro Dias, 2003).

[96] In reality, the Argentinian subsidiary as such did not formally exist until April 1995, when the company effectively regained direct control of its operations in the country.

5.1.5 Creating a MERCOSUR automotive space: a hierarchical structure under the leadership of Brazil

The reorganisation of corporate network of Italocars to implement the P178 had significant implications in Argentina and Brazil. As seen above, until then, the operations of Italocars in these two countries had essentially worked as watertight compartments around national automotive spaces (see Figure 5-3, p. 119). The production of parts was poorly standardised in the region and product specifications in the two countries differed. The fact, that the operations in Argentina were not directly managed by Italocars, made it very difficult to control and enforce product specifications and quality standards.[97] Connections between the two units were constrained and limited to commercial exchanges of vehicles and parts between the Brazilian subsidiary and Sevel under the umbrella bilateral automotive protocols signed from 1988 (see Chapter 4, in pp. 69-72).[98]

The implementation of the P178 in MERCOSUR entailed the creation of a functionally integrated network involving commercial and manufacturing activities. The dynamism of the Argentinian domestic market and the prospects surrounding the creation of a common automotive market in MERCOSUR motivated the return of Italocars to the country in the mid-1990s. The objective was to consolidate the country as a manufacturing location in the region and as an export platform for some models of the P178 vehicles to other MERCOSUR member countries –and the South American region. A new plant with a production capacity of 120,000 cars per year was built on the premises of an industrial complex in the province of Córdoba (Fiat Auto Argentina, 2009).[99] The Argentinian subsidiary of Italocars was virtually born as a brand new subsidiary, completely independent from Sevel.[100]

The reorganisation of Italocars' activities around the MERCOSUR area entailed the progressive development of a particular intra-firm division of labour between the two subsidiaries whose evolution will be analysed below. This integration encompassed not only manufacturing activities, but other functions as well, such as marketing, sales, accounting and finance, etc. The organisation of Italocars' corporate network in MERCOSUR represents a

[97] As pointed out by a manager interview, this entailed that models produced in the two countries –e.g. Uno– differed in many aspects (Interview IC-PROC1).
[98] Under this scheme, for instance, the Italocars Tempra was exported from Brazil to Argentina, whereas the Italocars Uno and Italocars Duna followed the opposite way.
[99] Additionally, the plant had the capacity to manufacture 800 engines, 500 suspensions, and 1000 gearboxes per day.
[100] In 1994, Italocars initiated the negotiations with the Macri family to acquire its share in Sevel. At that time, 85% of Sevel Argentina was held by Macri (72%) – through the holding Grumafra– and Italocars (13%); the remaining 15% was listed on the stock exchange of Buenos Aires (see Appendix C - A brief historical review of the activities of Italocars in Argentina and Brazil). When the negotiations with the Macri family failed, Italocars decided to advance with a greenfield investment in Córdoba. The plant was built along the lines of Italocars' most modern plant, located in Melfi, Italy. Its construction took 18 months, being finalised in December 1996. During its first years of activity, the production mix of Italocars in Argentina combined models manufactured by Sevel in the past, which still enjoyed high acceptance among domestic consumers –the Uno and the Duna, produced by Italocars Argentina until the end of 2000–, and two models of the 178 family: the Siena and the Palio.

first step towards the articulation of a *peripheral regional integration scheme* as the one depicted in Figure 2-6 (p. 43): i.e. subsidiaries in the MERCOSUR region became increasingly functionally integrated, whereas the leadership of the network remained located out of the regional automotive space in the parent company.

From the very beginning, the *intra-firm division of labour between the Argentinian and Brazilian subsidiaries was hierarchical in nature*. Most managers in Argentina reported to a regional manager responsible for the corresponding area who was located in Brazil. During this period most regional managers were Italians –with the exception of some specific areas such as sales or human resources. The Argentinian subsidiary did not have the autonomy to make strategic decisions without the authorisation of the regional manager in Brazil (Interview IC-CA1; Interview IC-PROC1).

The subordinate status of the Argentinian subsidiary was also reflected in the type of product policy adopted by the company in the MERCOSUR region. Different from other companies, which opted for a partial or total complementation of the range of models produced in Argentina and Brazil (see discussion in Chapter 4, pp. 88-100), Italocars opted for a strategy that can be referred to as 'bi-location'. The bulk of the production of Italocars in Argentina corresponded to models which were also produced in Brazil: with the exception of the Duna[101], the models produced by the Argentinian unit –the Uno, the Palio, and the Siena– were also produced by the Brazilian subsidiary. Between 1997 and 2000, these three models accounted for about 80 to 90% of Italocars total production in Argentina (see Figure 5-5 and Figure 5-6, in p. 126 and p. 126, respectively).

[101] In Brazil, the production of this model was discontinued in 1995.

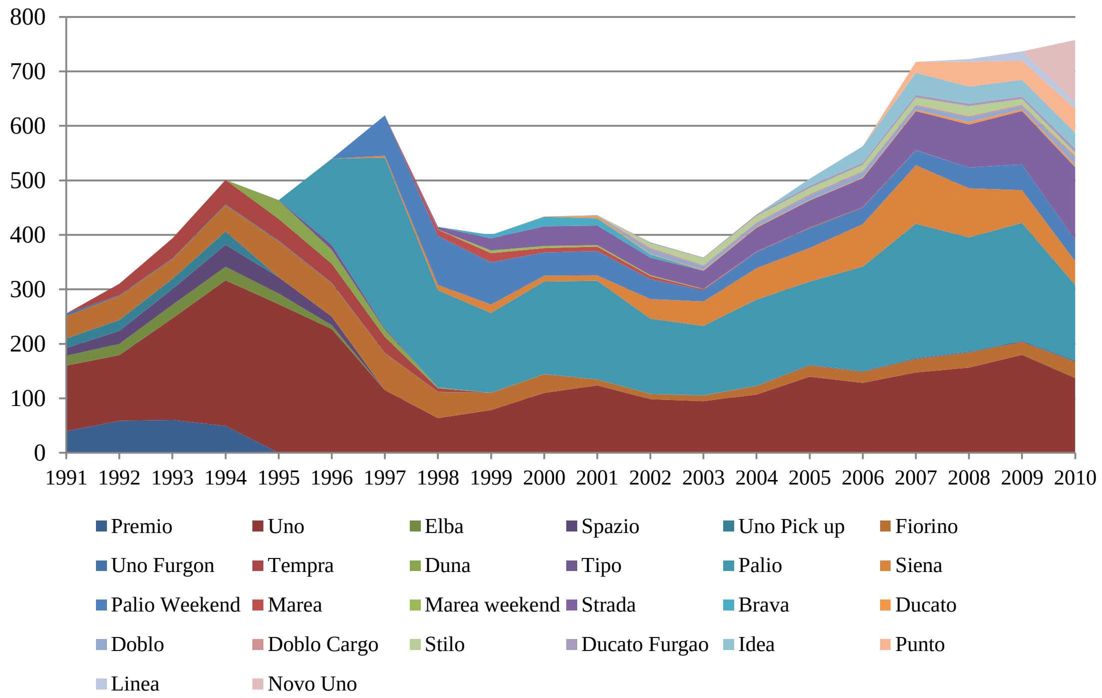

Figure 5-5 - Production output of Brazilian Subsidiary of Italocars (thousand units and models; 1991-2011)
Source: ANFAVEA

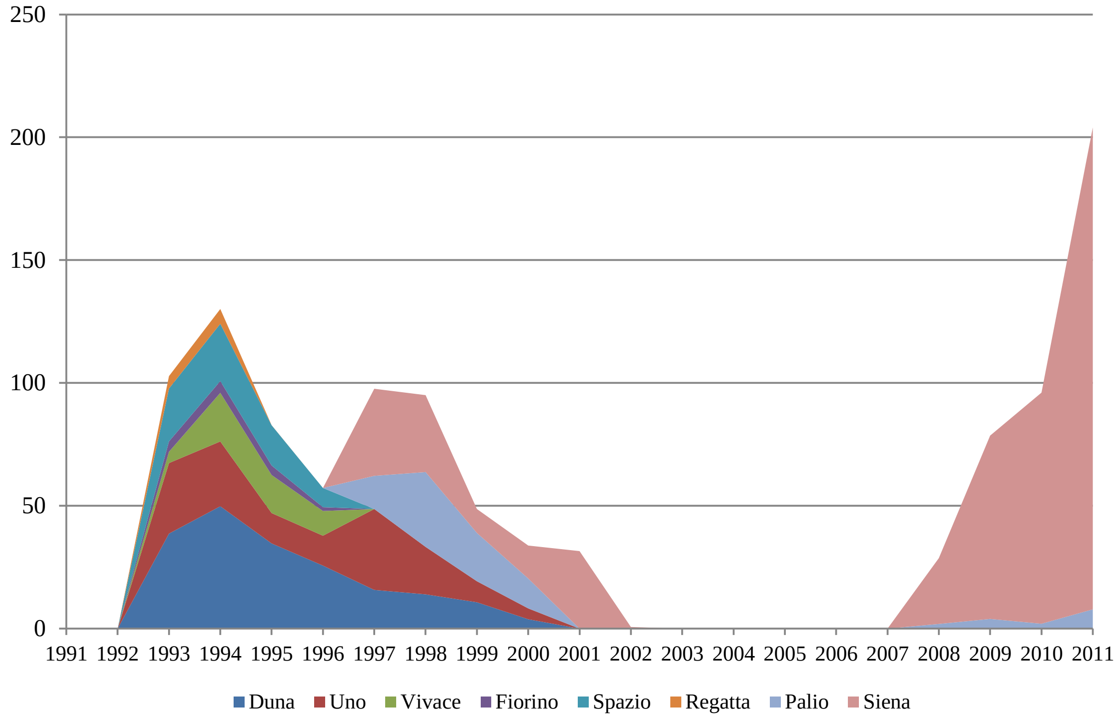

Figure 5-6 - Production output of Sevel and Argentinian subsidiaries of Italocars (thousand units and models; 1991-2011)
Source: ANFAVEA

The goal of this strategy was to establish a regional scheme allowing for a flexible allocation of production among the two subsidiaries. In case of fluctuations in the domestic economic conditions (e.g. exchange rates) or problems with local suppliers affecting the profitability of the company, Italocars had the capacity to change the production mix in Argentina and Brazil (Interview IC-CA1; Interview IC-PROC1).

5.1.6 Summary of phase 1 (1991-1995)

Drawing on the matrix proposed in Figure 3-4 (p. 63), Figure 5-7 below summarises the discussion above, seeking to identify the role of corporate and state agents in the technological performance of Italocars in MERCOSUR. As discussed above and shown graphically in Figure 5-1 (p. 115), the *technological strategy followed by Italocars in the MERCOSUR region during this period fundamentally remained at the level of localisation activities*. However, the *launch of the P178 set the foundations for a more relevant role for the region in the product development activities of the corporation* (RQ1).

The *implementation of the P178 also created the conditions for the articulation of a MERCOSUR automotive space*, which was fully operative from the inauguration of the Argentinian manufacturing plant in 1996. From the beginning, the *division of labour between subsidiaries within the region was highly hierarchical in nature* (RQ2). Nevertheless, at that time, this hierarchy could not be correctly grasped by the technological capability scale, since, as can be seen in Figure 5-1 (p. 115), the two subsidiaries fundamentally performed localisation activities. However, from the organisational scheme adopted by the regional network, it was clear that the Brazilian subsidiary played a leading role in the region.

With regards to the identification and role of corporate and public agents in the technological strategy of Italocars in MERCOSUR during this period, the analysis reveals that it fundamentally depended on *decisions made at the level of the parent company* (RQ3). It was the *redefinition of the internationalisation strategy* of the company and the conception of a *new product policy for emerging countries* –the P178 project– which opened the possibility for a learning-through-collaboration experience for the Brazilian subsidiary. It was neither in response to a requirement from Brazil, nor the result of negotiation between the two parties or the outcome of an internal competition process (Interview IC-PROD2).

It is worth noting that the *greenfield nature of Italocars' investment in Argentina in the mid-1990s, and the complete independence from Sevel contributed to avoiding potential resistance from local managers and staff to the subordination to the Brazilian counterpart* (Interview IC-PROC1). The *early subordinate position of the Argentinean unit also conditioned its future evolution*. This idea emerges clearly in the words of a manager of the Argentinian subsidiary who participated in the process:

> When we [Italocars - Argentina] were born, we already had a clear idea about the scope of the subsidiary in terms of engineering activities. […] We were aware that we would never be responsible for the development of a vehicle. […] We were born with a clear external point of

> reference for the provision of know-how […]. We already knew that knowledge-creating activities would never be localised in Argentina (Interview IC-PROC1).

The managerial and technological subordination was magnified by the 'bi-location' product policy implemented by the company in MERCOSUR. The production of the same models of the P178 on both sides of the frontier left the Argentinian unit with less room to develop any kind of distinctive capabilities or skills to do with the management of vehicle platforms.

With respect to the role of state agents, as seen in Chapter 4, the main interest of governments at the time was to create an environment favourable for the *expansion* and *modernisation* of manufacturing facilities. Then, the localisation of knowledge-intensive responsibilities fell outside the scope of sectoral public policy. In this respect, the policy measures adopted in Argentina and Brazil matched the strategic goal of Italocars of gaining presence in emerging markets.

At the national level, in particular, the automotive policy implemented in Argentina from 1991, and the enactment of the popular car policy in Brazil in 1993 created positive expectations about the evolution of domestic demand. The supply of products manufactured by Italocars perfectly matched the most dynamic sectors of the Brazilian demand. The *fast-growing dynamics of the Brazilian market undoubtedly strengthened the position of the Brazilian subsidiary as an attracting market and potential privileged 'partner' for its parent company's internationalisation strategy*. As pointed out by a manager interviewed during the fieldwork process, the popular car initiative completely changed the relationship of the Brazilian subsidiary with the parent company:

> Our success coincided with the crisis of the parent company, which was suffering a weakening process at the time. Both the European and the Italian markets were lost. In fact, this has been the situation until now. […] The strengthening of Italocars in Brazil began with the crisis of the headquarters. […] These were two interrelated events (Interview IC-CA2).

In turn, the bilateral agreements between Argentina and Brazil, in particular the protocols signed in Ouro Preto in 1994 (see Chapter 4, pp. 72-78), were important to define the nature of the entry strategy –or, more correctly, re-entry– of the company in the former market. The *perspectives of the creation of a common market led Italocars to set up in Argentina a plant highly integrated with its Brazilian fellow subsidiary* –although still formally dependent on the parent company.

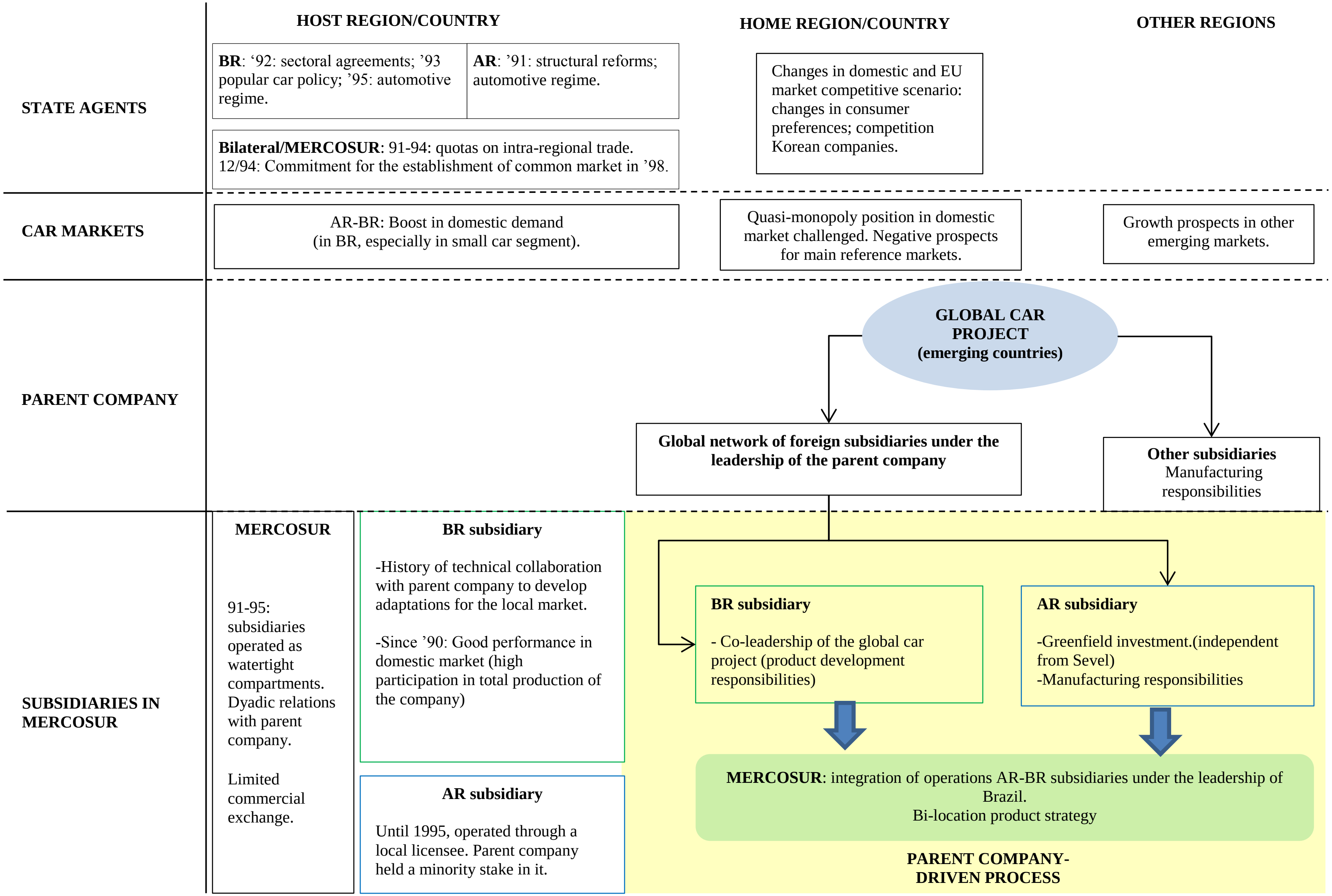

Figure 5-7 – Process of technological development of Italocars in MERCOSUR (1991-1995)

Source: Own elaboration on the basis of fieldwork

5.2 Phase 2 – From the P178 to the creation of a product development centre in Brazil (1996-2003)

5.2.1 *The global failure of the P178*

As can be seen in Table 5-1, the global performance of the P178 fell well short of the ambitious goals originally set by the headquarters. Whereas the company expected to be producing more than one million units of the P178 family of vehicles by 2001, the effective production outcome barely exceeded 450 thousand units per year. The main reason for the poor performance of the P178 was to be found in the severe economic crisis which affected its main destination markets; starting with the eruption of the Asian financial crisis in 1997, then expanding to Russia (1998), Brazil (1999), Turkey (2001) and Argentina (2002).

Despite this dismal global backdrop, the performance of the Brazilian subsidiary was much better than that of the other participating countries. In some countries, such as Russia and China, the initiative was not even launched within the expected timeframe. In fact, *the global car project ended up becoming only a Brazilian project*. Whereas by 2001 the production of the Brazilian unit was expected to account for around 40% of the total production of the P178, in practice it explained about 77%.[102]

The performance of the Brazilian subsidiary of Italocars did not only stand out in the context of the corporate failure of the P178, but also in its own domestic market. As seen in Chapter 4, in 2003, vehicle sales volumes in the Brazilian market were around the same levels as in 1994, and 40% below the peak volume reached in 1997 (Figure 4-3, p. 102). In the context of a stagnating domestic market, Italocars managed to increase its market share. In 2002, it took over leadership of the domestic market, in the hands of Volkswagen for the previous 42 years.[103] Italocars' performance largely stemmed from the ability of the Brazilian subsidiary to lead the mass-market segment of popular cars (Figure 5-2, p. 118). This reflected its *profound knowledge of domestic consumption trends* and *its ability to translate it into innovative products* –as shown, for instance, by the development of the Adventure line (more on this below, pp. 132-134) (Interview IC-PROD1).

By contrast, during this period, the performance of the Argentinian unit of Italocars was in line with the evolution of the domestic car market. As seen in Chapter 4, the number of units sold in the domestic market in 2002 (just above 82,000) represented only 18% of the domestic sales figures of 1998 (Figure 4-3, p. 102). In 1998, the subsidiary managed to produce 61% of the 100 thousand units of the P178 models forecasted for 2001 by the parent company. However, from 1999 the Argentinian unit was seriously affected by the domestic

[102] The production of this subsidiary during the first six years of existence of the P178 accounted for 78% of the total production outcome project.

[103] The specialisation of Italocars in the small car segment, which benefitted from lower taxes by the federal government, was very important in order to achieve this performance. This explains the position adopted by the company within ANFAVEA with respect to the decision of the federal government to remove the tax benefits on small cars in 2002. In disagreement with the other carmakers, Italocars then defended a further reduction of the IPI for small engine vehicles and rejected the convergence with the IPI applied on medium size cars then envisaged by the government (Vilardaga, 2001)

macroeconomic situation. The fall in domestic consumption was one of the sources of Italocars' crisis in Argentina. In addition to this, *production costs* in the country experienced an increase in relation to its Brazilian counterpart, mainly as a result of a divergent evolution of real exchange rates in the two countries.[104] This added to the high logistic costs which had always affected the Argentinian subsidiary as the bulk of its suppliers were still located in Brazil (Interview IC-CA1).

As can be seen in Figure 5-6 (p. 126), the production volumes of the Argentinean subsidiary of Italocars began to fall sharply from 1999. By the end of 2000, the production of the model Palio, which had been progressively shifted to Brazil, was discontinued. Later on, in June 2001, it was announced that 80% of the production of the Siena by the Argentinian units would be reallocated to Brazil.[105] Finally, by the end 2001, only five years after its installation in the country, the *parent company made a drastic change when it decided to discontinue car manufacturing activities*. *The bi-location strategy followed by Italocars in the MERCOSUR facilitated the progressive 'deactivation' of the Argentinian unit* as it allowed for a relatively smooth intra-regional reallocation of the production mix between subsidiaries.

According to the interviewed managers, the threat of the Brazilian government to fine Italocars' subsidiary in Brazil was the *coup de grâce* for the Argentinian subsidiary (Interview IC-CA1; Interview IC-CA2). The rules imposed by the *Decreto 660/00 (Argentina)* changed the terms of the *ACE N°14 – Protocolo 31 (ALADI)* and set stricter limits to bilateral exchanges of vehicles (see discussion in Chapter 4, pp. 78-81). As a result, the Argentinian subsidiary of Italocars could not expand their exports to Brazil without increasing imports.

From 2002, the main objective of Italocars in Argentina was to reverse the negative situation and to become profitable.[106] Actions were adopted to keep the distribution network active and to support the image of the brand (Interview IC-CA1). Finished vehicles were mostly imported from Brazil. A large number of staff members of the technical teams were reallocated to other units of the Italocars Group, either in the country or overseas. However, despite the success of the subsidiary in returning to profit in 2004, the discontinuation of the production of vehicles in Argentina had severe consequences for the subsidiary in terms of market share, brand reputation and a local suppliers' 'drain' (Interview IC-CA1; Interview S-1; Interview S-3). Within the context of the firm, the *crisis of the Argentinian subsidiary of Italocars contributed to widening the gap with its fellow subsidiary, reinforcing its subordinate position*.

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[104] Whereas Brazil abandoned the fixed exchange rate regime with the devaluation of the real in 1999, Argentina maintained the parity between the peso and the US dollar until 2002.

[105] From a production output above the 95,000 units in 1997 (around 80% of total manufacturing capacity), the volume of production of the Argentinian subsidiary decreased to less than a third in 2001, totalising a production of 31,554 vehicles (26%) (Figure 5-6, p. 115). This fall of about 65% largely exceeded the reduction in total manufacturing of vehicles of the country during the same period, which declined around 48%, from a volume of 446,306 in 1997 to 235,577 in 2001 (Figure 4-3, p. 114). Source of information: ADEFA.

[106] Between 1997 and 2003, the Argentinian subsidiary of Italocars suffered significant losses. The subsidiary managed to become profitable again in 2004 (Del Rio and Ortega, 2005).

The beginning of the new millennium was a period particularly delicate for Italocars. The failure of the P178 added to the financial problems the whole corporation was experiencing at the time (Volpato, 2009). In 2002, the company announced its intention to *reduce the geographical scope of its international operations,* seeking to focus on the best performing and most promising markets. The Brazilian subsidiary, the second largest production pole of the company, was among the beneficiaries of this 'selective' internationalisation plan. China, India and Turkey were also pointed out as priority markets. Operations in Argentina, by contrast, were to be maintained at a minimum level (Diario do Grande ABC, 2002). In October 2002, the CEO of Italocars-Latin America, expressed this priority clearly: "We want to stop having losses in Argentina because we need to invest in Brazil" (SABI - Business News, 2002).

5.2.2 Technological activities in MERCOSUR: increasing product engineering responsibilities and autonomous initiatives in Brazil

In addition to consolidating its position as the main production pole of Italocars overseas, during these years the *Brazilian subsidiary was progressively given engineering responsibilities of higher complexity by its parent company*. Since its launch onto the Brazilian market in 1996, the family of P178 models underwent four product facelifts –the last of which came out on the market in June 2012. Product engineering responsibilities of the Brazilian subsidiary increased with each of these product updates.

The first facelift, introduced on the market in 2001, was carried out in Italy. However, the Brazilian engineering team actively participated in it, assuming new responsibilities.[107] For instance, while in the original process of development of the vehicle, the first verification tests had been carried out in a pilot plant in Italy, on the occasion of the launch of the first product facelift, they were entirely carried out in Brazil. A group of engineers from the parent company moved to that country to provide support to the local team. Another field in which the Brazilian unit assumed more responsibilities was that of purchasing and supplier development: control, technical assistance, tests and final approval of parts remained under the responsibility of Brazil (Interview IC-PROD2).

Between the first and second facelift of the P178 models, the Brazilian subsidiary launched the line Adventure on the domestic market. This was a derivative model of the P178 which incorporated changes aimed to give an off-road style to some models of the family. The development of this derivative vehicle was not foreseen by the company's original plan. *The design of the Adventure line was, as a matter of fact, an interesting case of proactivity of the subsidiary*, at a time when the governance of the project was still located in Italy (Araújo and Gava, 2012).

[107] According to Carneiro Dias (2003), the Brazilian subsidiary of Italocars was responsible for more than 50% of the engineering hours spent in the re-styling of the Palio family. Around 15 staff members of the parent company maintained responsibilities for the supervision of some specific areas of the project.

The design of Adventure line was conceived by a small team of the Brazilian subsidiary of Italocars designers. In reality, the project was developed almost 'clandestinely' since leaders of the P178, in Italy, were against it because they considered the vehicle to be 'too Brazilian' and 'quasi-folkloric' (Interview IC-PROD2). Drawing on data collected from surveys and the observation of trends in consumer behaviour, strategists from local marketing and product development departments identified a growing preference among Brazilian consumers for off-road four-wheel drive automobiles. Until then, that niche had been satisfied by imported vehicles. They considered that there was some room for offering a more affordable product which would incorporate some functional and aspirational attributes of these models –style, height, and robustness. As a result of this process, they forged a 'light-off-road' model, the Palio Weekend Adventure, brought to the market in September 1999 (Araújo and Gava, 2012).

The development of the Adventure line required some structural modifications to the original model almost completely developed by the Brazilian subsidiary. These alterations did not only include the design of the new external plastic components which gave the model an off-road 'flavour', but also changes to the suspension system. For example, the front suspension of the pick-up Strada was incorporated and especially adapted for this model; and back springs and dumper supports had to be reinforced (Araújo and Gava, 2012).

Building upon the success of the Palio Weekend Adventure, Italocars launched the pick-up Strada Adventure, in 2001; and, in 2003, the light commercial vehicle Dobló Adventure. All these models were very well received by the market. The Adventure concept was very effective in bringing differential value to the station wagon segment, in which competition was fierce in the Brazilian market. The launch by Italocars of the Adventure line virtually created a new niche which led other carmakers in the region to follow the path opened by Italocars, such as Volkswagen (which launched the Parati CrossOver, and the CrossFox), Peugeot (206 Escapade), Citröen (C3 XTR), among others.[108]

With the Adventure project, strategists of the Brazilian subsidiary demonstrated very good knowledge of the market environment and a great capacity to grasp the potentiality of the product. From a technical perspective, the local engineering team showed capabilities to assume responsibilities in the design of parts and components (level 3 of TC; Figure 5-1, p. 115).[109] The development of the line Adventure was also a *demonstration for the parent company of the fact that the proximity to the market was important and that it was difficult to develop from distant headquarters in Europe the sensitivity required to identifying and grasping this kind of opportunity* (Interview IC-PROD2).

[108] As reported by Fiat Automóveis (2009), in 2010, 17 light off-road models were produced and commercialised by 6 carmakers in the Brazilian market, reaching a volume of 87,081 vehicles. Italocars accounted for a 56% share of the market.

[109] Although the line Adventure could be considered as a derivative model of the P178 (level 4 of TC), the characteristics of the design and technical alterations (mainly in suspension systems) introduced in the Palio family rather corresponded the level 3 of TC –i.e. restyling activities (Figure 5-1, p. 104).

Also during this period, the Brazilian unit assumed *some engineering responsibilities at corporate level in two particular technical areas on which it had accumulated capabilities since its establishment in the country: suspension systems and ethanol engines* (see discussion in this chapter, pp. 120-122). With regards to suspension systems, the subsidiary started to be considered as a point of reference for the whole corporation. As discussed above, capabilities in these areas had been developed over the years as a result of the efforts of the engineering team to adapt vehicles commercialised in the domestic market to the poor road conditions of the country. In 2001, Betim was endowed with a laboratory for suspension system simulation which, at the time, was more modern than the one existing in Italy. Some suspensions tests of vehicles designed in Italy started to be carried out in Brazil by local engineers (Carneiro Dias, 2003). With respect to the ethanol engine, the Brazilian unit was responsible, along with its supplier Magneti Marelli[110], for the development of the flex-fuel engine introduced into the market in 2003 (Interview IC-PROD2).

The *role of the Argentinian subsidiary during this period continued to being completely subordinated to its Brazilian counterpart*. During the period 1996-2001, when the subsidiary manufactured vehicles, engineering efforts were fundamentally concentrated on stabilising the production process and improving the productivity performance in an increasingly complicated macroeconomic context (Interview IC-CA1; Interview IC-PROC1). Then, as the subsidiary discontinued the production of vehicles, engineering teams were largely dismantled and some staff member reallocated to other units of the corporation.

5.2.3 The creation of a Product Development Centre in Brazil

The technical progress achieved by the Brazilian subsidiary during this period was crowned with the establishment in 2003 of a fully-fledged product development centre in Brazil. The ultimate objective of the centre was to be able to develop a 100% Brazilian vehicle (Cossolino, 2003). One of the factors which contributed to the parent company's decision to advance in this direction was the intention of *reducing development time and costs*. It was expected that the former would be cut down by around 10-20%. Direct control over the development process would avoid delays resulting from bottlenecks occurring in the headquarters' engineering department. As for development costs, it was estimated that the creation of a development centre in Brazil would contribute to savings of around 20% compared to the current situation (Interview IC-PROD1).

The centre was organised according to a matrix structure along three axes: product engineering; product management; and support services (Figure 5-8, p. 136). The product engineering areas are the technical core of the centre (vertical axis), being responsible for the different parts of the vehicle: chassis, interior body, external body, and electronic and

[110] Magnetti Marelli is a subsidiary of the Italocars group specialised in the development and production of systems and components for the automotive sector in the areas of: lighting, powertrain, electronic systems, suspension, exhaust systems, plastic components and modules, motorsport. Source: Magnetti Marelli (2013).

electrical parts. This area also encompasses the *Centro Stile* (Design Centre), in charge of the design of both internal and external parts of the vehicles.[111]

One of the horizontal axis of the matrix structure in Figure 5-8 corresponds to the management of the various platforms manufactured in Brazil. The management of these areas is divided into four areas corresponding to the type of platforms commercialised in the region: small (e.g. Uno); compact (e.g. Palio); commercial (e.g. Ducato), and special vehicles.[112] Each of these sections is headed by a Vehicle Line Executive (VLE). VLEs are responsible for ensuring compliance with the objectives defined during the product conception of new models (costs, product specification, quality, etc.). They are also in charge of the management of the products already being produced by the subsidiary, with the objective of attaining continuous improvement in the performance of the vehicle in terms of costs, quality, etc. Accordingly, they work in close collaboration with functional areas described in the previous paragraph.

The third axis corresponds to the area of services, which provides support to the product engineering and platforms areas. The most important section corresponds to the field of experimental engineering, which covers three areas: experimentation, prototypes and material engineering. From the creation of the product development centre, this area was endowed with infrastructure to conduct tests and development activities –for example, an electromagnetic compatibility laboratory; an electro acoustic laboratory; a noise, vibration and harshness laboratory; a photometric laboratory; a road simulator, etc. The experimental engineering area also develops the prototypes to conduct verification tests. Besides, it is in charge of the development and testing of materials used for the production of vehicles. In order to comply with this function, it has laboratories for the production of metals, plastics, and chemicals.[113]

[111] The area of engines and transmissions is under the responsibility of Italocars Powertrain Technologies, a company of the Italocars Group created in 2005 to develop and produce powertrain systems in joint-venture with General Motors. Italocars Powertrain has a subsidiary in Brazil, within the premises of the Brazilian subsidiary. In 2012, the area of powertrain was re-incorporated into Italocars. However, from an organisational perspective, it is not part of the product development centre of the subsidiary.

[112] The area of 'special vehicles' is responsible for models requiring adaptations for specific purposes. For instance, ambulances, or pick-ups used in sugar cane fields. In these cases, the subsidiary works in collaboration with suppliers to develop special accessories and to carry out the required tailor-made adaptations.

[113] More detailed information can be found in Fiat Automóveis (2009).

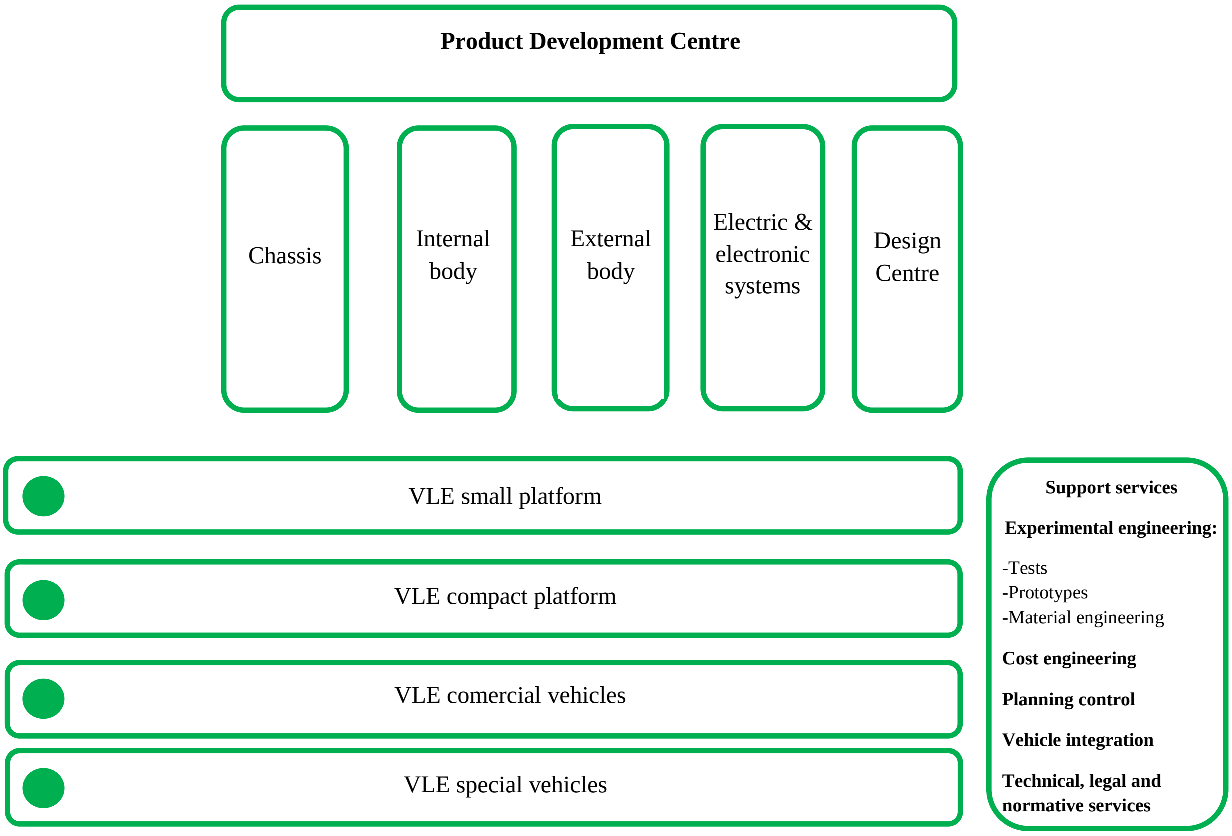

Figure 5-8 - Simplified organisational chart of the Product Development Centre in the Brazilian subsidiary of Italocars
Source: own elaboration on the basis of fieldwork

As pointed out above, the creation of the Product Development Centre was a fundamental milestone in the process of technological learning undergone by the subsidiary. The Brazilian unit was endowed with state-of-the-art laboratories, tools, and software which in the future would allow the subsidiary to fully develop a vehicle locally. It also created a structure better prepared to provide fast and better tailored solutions to emerging markets preferences and needs identified by local strategists. The creation of the centre also resulted in a marked and steady expansion of the product engineering team. The number of product development staff members –which had already increased from around 200 (100 engineers), in 1996, to 350 (150 engineers) in 1999[114]– reached 490 people (250 of which were engineers) in 2005 (Balcet and Consoni, 2007).

5.2.4 Summary of phase 2 (1996-2003)

As can be seen in Figure 5-1 (p. 115), this phase of Italocars' technological trajectory in MERCOSUR is fundamentally marked by two facts: firstly, the *decision made by the parent*

[114] Source of information for 1999: Quadros and Queiroz (2001).

company to adopt a more advanced technological strategy in the region (RQ1); and, secondly, the *widening technological gap between the Argentinian and Brazilian subsidiaries* (RQ2). Figure 5-9 below summarises the main forces driving the above referred to dynamics (RQ3).

To a large extent, the second phenomenon was a consequence of the *macroeconomic situation in the region*. The negative performance of the domestic car market suffered by Argentina during those years was accentuated by the devaluation of the Brazilian real in 1999. This created a growing disparity in the relative costs of production in the two countries and a progressive drain of suppliers to Brazil. However, there are two other factors which contributed to aggravating the situation of the Argentinian subsidiary and led the parent company to make the drastic decision of discontinuing the production of vehicles. One originated in the corporation and the other in a government decision. As for the corporate factor, it is clear that the *'bi-location' product strategy*, as discussed above, *put the Argentinian unit in a position of relative weakness*. It provided the corporation with a flexible instrument which facilitated relatively rapid changes in the allocation of the volume of production between subsidiaries in the region. In the extreme case of closing the vehicle plant, the company did not even to have to set up a new line of production in Brazil to manufacture the model previously produced in Argentina –as would had been the case if the subsidiary had had exclusive regional platforms.

The second factor which had a decisive influence on Italocars' final decision to discontinue the production of cars in Argentina originated in a regulatory change. In particular, the *narrow 'flex' coefficient* put in force in 2000 (*Decreto 660/00 (Argentina)*). As seen in Chapter 4 (pp. 78-81), with the purpose of protecting its domestic market, Argentina negotiated a flex of 1.105 which set stricter limits to bilateral trade imbalances. This *measure closed the export channel as an 'escape mechanism' to allocate the local production that could not be absorbed by the Argentinian domestic demand*. As discussed above, the threat of the Brazilian government to fine Italocars for its import from Argentina –in accordance to the flex rule– was the determining factor behind the decision to discontinue the production of vehicles in Argentina.

From the perspective of the global corporate strategy, the decline of the Argentinian subsidiary coincided with the *redefinition of the internationalisation strategy of the parent company after the global failure of the P178* (RQ3). This change re-focused its investment efforts on the most promising markets overseas –among which was also Brazil (see pp. 130-132). One of the elements of this policy was the *creation of the Product Development Centre in this country which provided the subsidiary with the resources necessary to undertake an accelerated learning process*.

The creation of the Product Development Centre was a *decision made by the parent company, which still maintained the control of the operations in the region*. However, it is worth stressing the importance of the Adventure project. The Brazilian subsidiary showed *signs of autonomy and a great capacity to grasp the preferences of domestic consumers*. The success of the Adventure line certainly contributed to the gaining of more credit by the Brazilian unit.

The second issue which is also worthwhile pointing out is the fact that during those years the *Brazilian federal government provided strong support to the consolidation of Italocars in Brazil* –mainly channelled through the BNDES. From 1998, this institution allocated a growing amount of resources to the automotive sector. As can be seen in Table 5-2, including detailed information about the loans granted by the bank to the company, the bulk of resources granted to the Brazilian unit were fundamentally directed to *expansion* projects (around 73% of the funds). However, in 2002, the company borrowed money to carry out the re-styling of two projects, one of which was part the P178. This indicates the *support provided by the public institution to the progressive delegation of product development responsibilities from the parent company to the Brazilian unit.*

Table 5-2
Loans granted by BNDES to Italocars between 1996 and 2003

Year	**Application of the funds**	**Amount of the loan (in R$)**
1999	Setting up of a unit to manufacture commercial vehicles and light trucks in Sete Lagoas. Setting up of a production line of light commercial vehicles and an engine plant in Betim.	388,148,832
2002	Expansion of production capacity of production and assembly line in Betim (model Doblò)	40,124,525
2002	Re-styling projects of Palio models and of the new P192 in Betim (expected production volumes 345 thousands and 40 thousands, respectively)	160,689,491
Total		**588,962,849**

Source: BNDES

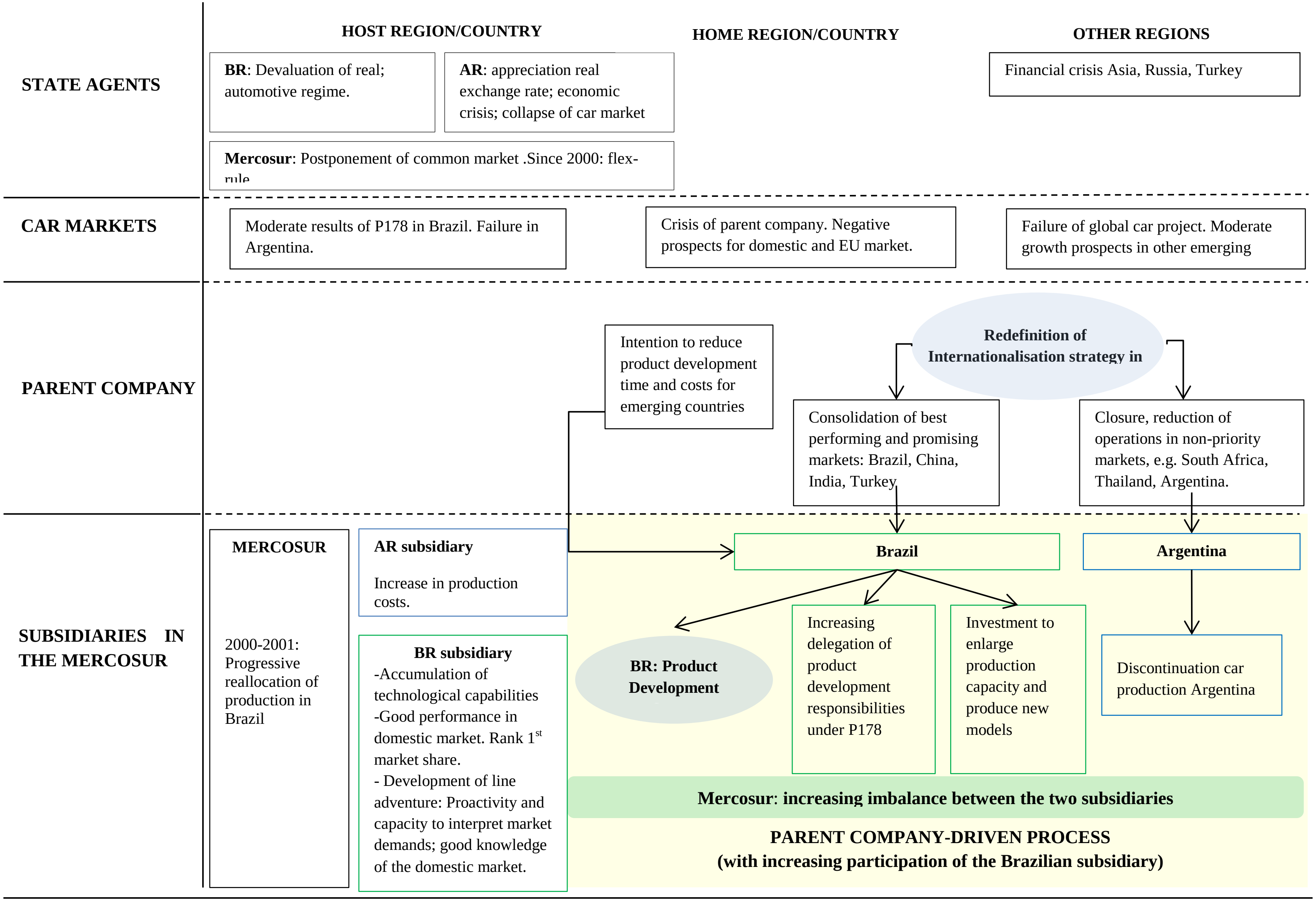

Figure 5-9 - Process of technological development of Italocars in MERCOSUR (1996-2003)
Source: Own elaboration on the basis of fieldwork

5.3 Phase 3 – The 'tropicalisation' of Italocars (2004-2011)

5.3.1 Increasing management autonomy and power in the corporate structure

In parallel with the process of accumulation of technological capabilities (see Figure 5-1, p. 115) and infrastructure, during this period the Brazilian subsidiary progressively gained autonomy in the management of its own affairs and those of the region as a whole. An expression of this increasing power was the presence of a greater number of Brazilian executives in managerial positions either in Brazil or in the parent company. In the mid-1990s, when the P178 was implemented, the Brazilian subsidiary of Italocars was still a 'very Italian' firm (Fortes, 2012). This state of affairs started to change in the 2000s.[115] In an interview published in 2012, the President of the Italocars Group in Brazil asserted that –at the moment of the interview– only three directors of the Brazilian subsidiary were Italians. They worked in the areas of product, manufacturing and mechanical engineering.[116]

The so-called process of 'tropicalisation' of Italocars gained momentum especially when a new CEO of the group took office in 2004. That same year, in what represented a turning point for the subsidiary, for the first time in the history of the company, a Brazilian executive was appointed CEO of the Brazilian subsidiary. Later on, in 2005, at the request of the CEO of the corporation, the Brazilian CEO accumulated even more power as he became President of the whole Italocars Group in Brazil.[117]

The march forward under the Brazilian President's administration was not restricted to the domestic territory. The Brazilian subsidiary assumed an increasing number of management responsibilities within the corporation. In 2004, the Brazilian subsidiary became responsible for the operations of the company in South Africa. A year later, *Italocars-Latin America was created under the responsibility of the Brazilian subsidiary, which then became a sort of 'regional headquarters'*. In September 2011, the President of Italocars in Brazil became Chief Operating Officer for Latin America and member of the Board of Directors of Italocars, the most important decision-making body of the corporation.[118]

The managers interviewed argued that the greater presence of Brazilian managers (as well as of former managers of the Brazilian unit) within the decision-making positions of the corporation was undoubtedly related to the *importance of Brazil for the survival and resurgence of the Italocars corporation during the second half of the 2000s* (Interview IC-

[115] In 2002, the then President of the Brazilian subsidiary stated: "Brazilians are occupying increasingly important positions within the corporation" (Valor Econômico, 2002). These words were pronounced on the occasion of the appointment of the Brazilian José Silva Tavares, an executive of the Brazilian subsidiary of Italocars, as Financial Director of Italocars in Italy.

[116] To illustrate the Italian character of the firm in the past, he recalled that "executive meetings began in Portuguese, then changed into Italian and finished in Piedmontese [the dialect from the region of Piedmont, in Italy, home region of Italocars]" (Fortes, 2012).

[117] Also this move had an 'inaugural' nature as for the first time that the same manager was in charge of the two positions in Brazil.

[118] For more information, see Fiat (2013).

CA2).[119] Under the guidance of its Brazilian CEO, from 2004 the subsidiary shifted its strategic priorities from market-share objectives to profitability goals. When he became CEO, the subsidiary had reached the top position in the domestic sales ranking of vehicles. However, as he himself put it, this had been largely achieved at the expense of profitability (Fortes, 2012). This profit-oriented strategic change allowed the Brazilian subsidiary of Italocars to become a lucrative subsidiary in turbulent times of losses at the world level for the car division of the company

The strong financial performance of Italocars in Brazil resulted in more autonomy for the subsidiary to make decisions on the technological strategy and product policy for the Latin American region. As pointed out by the managers interviewed, the fact that the subsidiary could fund its own projects clearly facilitated the process of approval of the projects by the parent company (Interview IC-PROD2; Interview IC-CA2).

5.3.2 Technical activities and capability accumulation at the Brazilian Product Development Centre

The growing autonomy of the Brazilian subsidiary was not only a consequence of the concentration of management responsibilities and of a positive financial performance, but also of the accumulation of technological capabilities –in particular, from the opening of the Product Development Centre in 2003 (Fiat Automóveis, 2009). From its inauguration in 2004, the local team of the Product Development Centre continued expanding steadily: from the 490 staff members of 2005, the number of employed personnel in the Centre grew to 650 in 2007 (450 out of which were engineers)[120], to 800 in 2009 (600 engineers)[121], and to 1000 in 2012 (700 engineers).[122]

The launch in 2008 of the third facelift of the P178 family was an important event in the history of the subsidiary, as the governance of the project was definitely transferred from Italy to Brazil. After that point, the whole responsibility for the project remained in the hands of the Brazilian subsidiary and the parent company assumed a supervisory role.

During this period, the Brazilian subsidiary embarked on its most ambitious project. The one, in fact, which had motivated the very establishment of the Development Centre: the development of two new platforms completely developed in Brazil. One of the platforms – internally referred to as P327– was intended to give birth to a new generation of the Uno model; the second one (P326) corresponded to the new generation of the P178 family. The new models were introduced to the Brazilian market in 2010 and 2011 respectively. The Brazilian subsidiary was in charge of all the stages of the product development and testing

[119] To illustrate this point, an interviewed manager pointed out that for some years, bonuses were not paid in Brazil in order to provide financial support to the parent company (Interview IC-CA2).
[120] Source: Quadros and Consoni (2009).
[121] Source: Fiat Automóveis (2009).
[122] Source: Interview IC-PROD2.

processes – with the exception of some specific tests, for instance, aerodynamic, electromagnetic and safety tests (Interview IC-PROD1).[123]

The growing technical autonomy resulted, at the same time, in a *deeper involvement of the subsidiary in global corporate technical affairs*. In 2005, the parent company conducted a mapping of the capabilities of its subsidiaries overseas. Then, the Brazilian subsidiary became a sort of 'centre of excellence' within the corporation in the area of suspension systems, providing technical support and conducting tests even in models neither produced nor commercialised in the country –level 4 in Figure 5-1 (p. 115)– (Interview IC-PROD2).

In 2009, Italocars started a process of merger with Chrysler. Interestingly, from the outset in this process, the Brazilian subsidiary assumed some product engineering responsibilities related to Chrysler products. For example, Chrysler's Dodge Journey, a mid-size crossover SUV manufactured in a Mexican plant, was re-styled to be sold in the European, Brazilian and other markets under the denomination of Italocars Freemont. The Development Centre in Brazil also participated in this restyling process, specifically in the adaptation of the suspension system (Rios, 2011). The initiative to work on this particular aspect came from the Brazilian subsidiary. The adaptation consisted basically of changes in the suspension geometry; in the roll centre of the car in order to provide it with more stability; and in the balance of the springs in order to reduce car vibration. The adaptations were initially developed for the Brazilian market since, as pointed out before, road conditions are more adverse and negatively affect the durability of vehicles. However, as the final result satisfied Chrysler's headquarters in the United States, it was decided to adopt Brazilian calibration for the other markets as well (Interview IC-PROD2; Rios (2011)).

5.3.3 Consolidation of a hierarchical structure in PD activities within the MERCOSUR

As seen above, in December 2005, after the creation of Italocars-Latin America, an internal communication confirmed that the Brazilian subsidiary was to assume responsibility for the engineering activities of the whole region. The new role of the Brazilian subsidiary encompassed, for instance, the development of products, materials or other types of adaptations which may be required to commercialise Italocars' vehicles in any of the countries of the region. It also entailed the organisation of supplier development activities in countries with manufacturing responsibilities (Interview IC-PROD2). In the particular case of MERCOSUR, this implied that the managers of the engineering department of the Argentinian subsidiary –which at the time was not producing vehicles– now reported to Italocars-Latin America. The *hierarchy between the Brazilian and Argentinian unit had thus become formalised*.

[123] Safety tests were carried out either at the premises of the parent companies in Italy, or in other test centres in Europe or the United States. The reason for carrying out these tests outside of Brazil resided in the high investment costs the construction of the labs would have required. As these tests are conducted over short periods of time and only during the development phase, the duplication of the infrastructure would have been economically inefficient.

The subsidiary of Italocars in Argentina started to emerge from its stagnancy in 2008, when it resumed the production of vehicles after a six year interruption. The decision to reactivate the plant was made when the production capacity of the Brazilian plant, which was already working in three shifts, was not able to cope with the boost in demand of vehicles in the region (Figure 4-3, p. 102). As in the past, bi-location was the product strategy followed by the company in the region. As a matter of fact, bi-location was reinforced, as the totality of the models produced in Argentina –Palio and Siena– were now also manufactured in Brazil (Figure 5-6, p. 126).

In 2010, the figure of 'resident engineer' in Argentina was created, responding to the necessity of strengthening the local engineering department. This person was a 'representative' of the regional product engineering department (in Brazil) on the Argentinian territory. The limited scope of the responsibilities of the Argentinian product engineering department and its subordination to the Brazilian unit can be observed in Figure 5-10, showing the position of the subsidiary within the organisational chart of the regional product engineering department in 2012.

The Argentinian units only covered the following two areas (in blue in Figure 5-10): i) the local management of the two platforms produced in Argentina (the old P178, and the new P326); and, ii) the provision of some support services covering technical, legal and normative services, and the experimentation area. The size of the department remained very small. According to data provided by the subsidiary in 2012, *18 people work in the Argentinian product engineering department* (8 engineers, 4 engineering students and 6 technicians). For comparative purposes, it is worth remembering that at the time the *product engineering department of the Brazilian unit had around 1000 employees*.

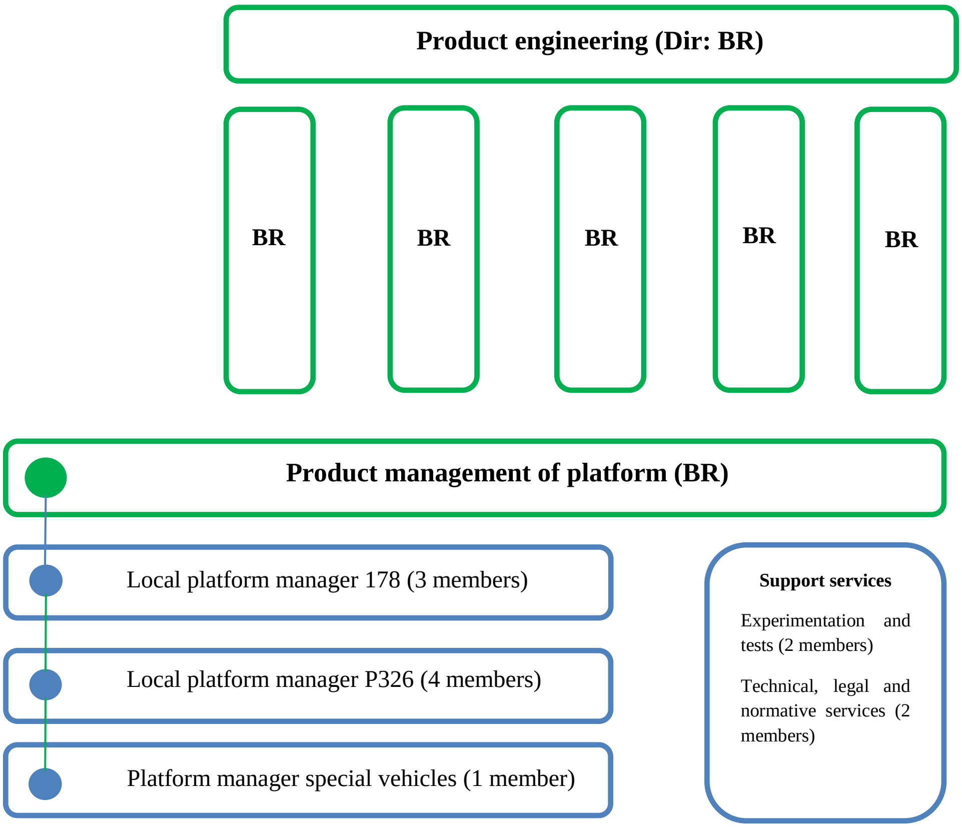

Figure 5-10 – Simplified organisational chart the regional of Product Engineering department in MERCOSUR (2012)
Source: Own elaboration on the basis of Interview IC-PROC1

References

Area under the responsibility of the Brazilian subsidiary

Area under the responsibility of the Argentinian subsidiary

Four main engineering responsibilities were delegated to the Argentinian subsidiary of Italocars from its 'reactivation' in 2008, some of which were new in relation to the previous phase:

i) to provide engineering support to manufacturing activities;
ii) to provide support to suppliers established in the country in order to guarantee the correct 'localisation' of parts. This function was reinforced over the last few years as the objective of the company was to increase the degree of local integration of

components and parts. The discontinuation of car production between 2001 and 2008 had deleterious effects on the network of local suppliers;[124]

iii) to carry out calibrations in the electronic control unit and engines of vehicles. These adjustments are required to adapt vehicles to the characteristics of the petrol used in Argentina and to allow for the accreditation of vehicles by national authorities;

iv) to conduct some tests such as performance, tyres and coast down tests.[125]

5.3.4 Summary of Phase 3 (2004-2011)

After the creation of the Product Development Centre in Brazil, the *technological strategy of Italocars in the region became much more intensive in innovation activities* (RQ1). In turn, *the Brazilian subsidiary was able to take control of its own technological trajectory and that of the whole Latin American region*. It assumed responsibility for the management and technical activities in the region, and undertook responsibility for the products sold in the region, to the point of developing two new vehicle platforms for emerging markets on the premises of its Centre (level 6 of Figure 5-1, p. 115). In sum, this period witnessed a *shift from a parent company- to a subsidiary-driven technological learning process (RQ3).*

But this transition was not only underpinned by the technical autonomy provided by the creation of the Centre, but also by a *change in the relative power between the parent company and the Brazilian subsidiary*. As discussed above, the relative weight of the South American region as a sales destination and source of profit for the company grew significantly in this period. The growth of Italocars in Latin America resulted in an increasing presence of Brazilian executives in the management of the subsidiary as well as in decision-making positions within the corporation. In this regard, an interviewed manager stated:

> This has been part of a natural process. We grew so much that we could not be left out […]. The stake of Italocars in Brazil is now bigger than in Italy […]. Evidently, this creates problems with the Italian government. [The CEO of the company] is 'crucified' every day in Italy. He shut down plants, fired employees. Italocars is investing in the world (Interview IC-CA2).

The increasing importance of the Latin American market for Italocars was not only a consequence of the good performance of the local subsidiaries, but more broadly, of the virtuous growth process of these economies from 2003. The high GDP growth rates favoured a strong recovery of demand levels in the region, after some years of stagnation (see Figure 4-3, p. 102). The *positive economic cycle created conditions favourable for the relaxation of restrictions on intra-regional trade* and the adoption of a higher flex index. This *normative*

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[124] As early as 2002, 25 out of the 40 Italian suppliers that had accompanied the establishment of the Argentinian subsidiary had already left the country (Boragni, 2002).

[125] The delegation of calibration and testing responsibilities are new to the subsidiary. The decision was made by the Brazilian unit, which wanted to be dispensed from the workload. Since the octane rating of the petrol used in the two countries differed, around 70% of Italocars' vehicles commercialised in Argentina (imported from Brazil) needed to be recalibrated in order to be accredited by national authorities. In order to perform these new functions the subsidiary was endowed with tools and software, for instance, LabvView Full Developer Suite, VBox for Coast Down tests, a portable fuel analyser (Interview IC-PROC1; Interview IC-PROD1).

and macroeconomic framework led the Brazilian unit, in charge of the Latin American affairs, to make the decision of resuming the production of vehicles in Argentina.

The performance of Italocars in Brazil during this period was strongly supported by the BNDES (RQ3). It is worth noting that in this case, as can be seen in Table 5-3, *loans were not only directed to funding investment in production capacity but also in engineering capabilities –under the Pro-Engineering facility* (see Chapter 4, pp. 81-85).

Table 5-3
Loans granted by BNDES to Italocars between 2003 and 2011

Year	Application of the funds	Amount of the loan (in R$)
2005	To adapt production lines for the production of the new version of the Palio model	90,000,000
2005	Working capital	19,000,000
2006	Development of minivan Idea. Improvement and modernisation of manufacturing plant in Betim. Support to the social project "Arvore da vida"	177,403,255
2007	Re-styling of the Palio family. Development of two new vehicles. Adaptation of production lines of the manufacturing plant of Betim. Support to the social project "Arvore da vida".	600,500,000
2008	Enlargement of production capacity of vehicles, engines and transmission. Restructuring of industrial, administrative and engineering area in Betim. Support to the social projects for local communities.	549,999,999
2011	Development and adaptation of assembly lines for the launch of new models and engines, as well as the development of a flex-fuel vehicle. Support to the social project "Arvore da vida".	1,299,536,999
2011	Funds granted under the Pro-Engineering facility	399,826,000
Total		**2,737,340,255**

Source: BNDES

In 2007, US$ 60 million were invested to expand the production capacity from 120,000 to 240,000 units in Argentina, and the subsidiary resumed the production of the Siena and Palio models.

In 2011, Italocars announced an investment of $ 800 million[126] (around U$S 200 million) to produce the new Palio (P326). Around 70% of this investment ($ 565 million) was funded by a loan granted by the Argentinian federal government under the so-called Bi-centennial Loans. This was a public facility created by the federal government in 2010, which provided

[126] The symbol "$" stands for Argentinian pesos.

5-year soft loans at convenient terms and conditions covering up to 80% of investment projects.[127] This was the first time the Argentinian subsidiary was granted a soft loan by the federal government of the country (RQ3). This was an occasional contribution from an *ad hoc* facility which cannot be compared with the size of the BNDES. With respect to the difference in government support received by the two subsidiaries, a manager from the Argentinian unit claimed:

> They have the BNDES. In the case of the new plant of Pernambuco [in Brazil, which should be inaugurated in 2014], they were given a generous tax deferment which basically pays for the investment in the country. Here [in Argentina] we do not have such mechanisms. The new line for the production of the P326 was funded with the Bi-centennial loan. However, this is not the BNDES. It is an *ad hoc* 'invention' of the government. From the provincial government we have some support. But it is peanuts. In the past, during the crisis of 2009, we had a subsidy of $400 for each employee. Italocars' investment is not conditioned on public support. However, in practice, it is undeniable that these imbalances weigh on decisions about the geographical allocation of investment […] (Interview IC-CA1).

It is evident that the upward path taken by the Brazilian subsidiary during the second half of the 2000s contrasted with the overall performance of Argentinian unit during the decade. The divergent tendencies of the two units affected the nature of the bilateral relationship: the *technological gap between them widened and hierarchical links were formalised* (RQ2). As Brazil gained power within the corporation, it also asserted its leadership within Latin America. As can be seen in Figure 5-10 (p. 144), the management of both technical and managerial areas at the regional level remained under the control of the Brazilian unit. A manager of the Argentinian subsidiary put it this way:

> At the beginning, during the '1996 administration', so to say, we were more Italy-dependent. Now, we are 100% Brazil-dependent. Everything… The engineering, the platforms, the technical direction, everything…all the reference people are in Brazil. Everything is centralised in Brazil. […] They developed themselves, they developed their engineering area, their technical division, their platforms, and now they even have a design centre. Here, we just produce vehicles. We now have resident engineers, which is a group of people who liaise between the plant and Brazil. What is this for? For instance, they authorise some deviations, changes in parts, small modifications in the product and the quality. The have the capacity to do that. But if we want to make a big change, then we have to go to Brazil (Interview IC-PROC1).

The increasing subordination of the plant and the change in the leadership from Italy to Brazil was not experienced as a traumatic transformation by the Argentinian subsidiary. As already pointed out above, from the very beginning, the role and scope of the subsidiary were clear. In the words of a manager of Italocars Argentina:

[127] For instance, the real interest rate of the loan was negative. The nominal rate was 9.9%. In 2011, the inflation rate (consumer price index) of the country as reported by the National Statistics office was 9.5%. However, private analysts estimate that the inflation rate is considerably higher (around 20%). More information available at Ministerio de Industria (2013).

We did not experience it as a strong change. It was the result of an increasing delegation of responsibilities to Brazil. For us, it was exactly the same to have either Italy or Brazil as leader. It was not traumatic (Interview IC-PROC1).

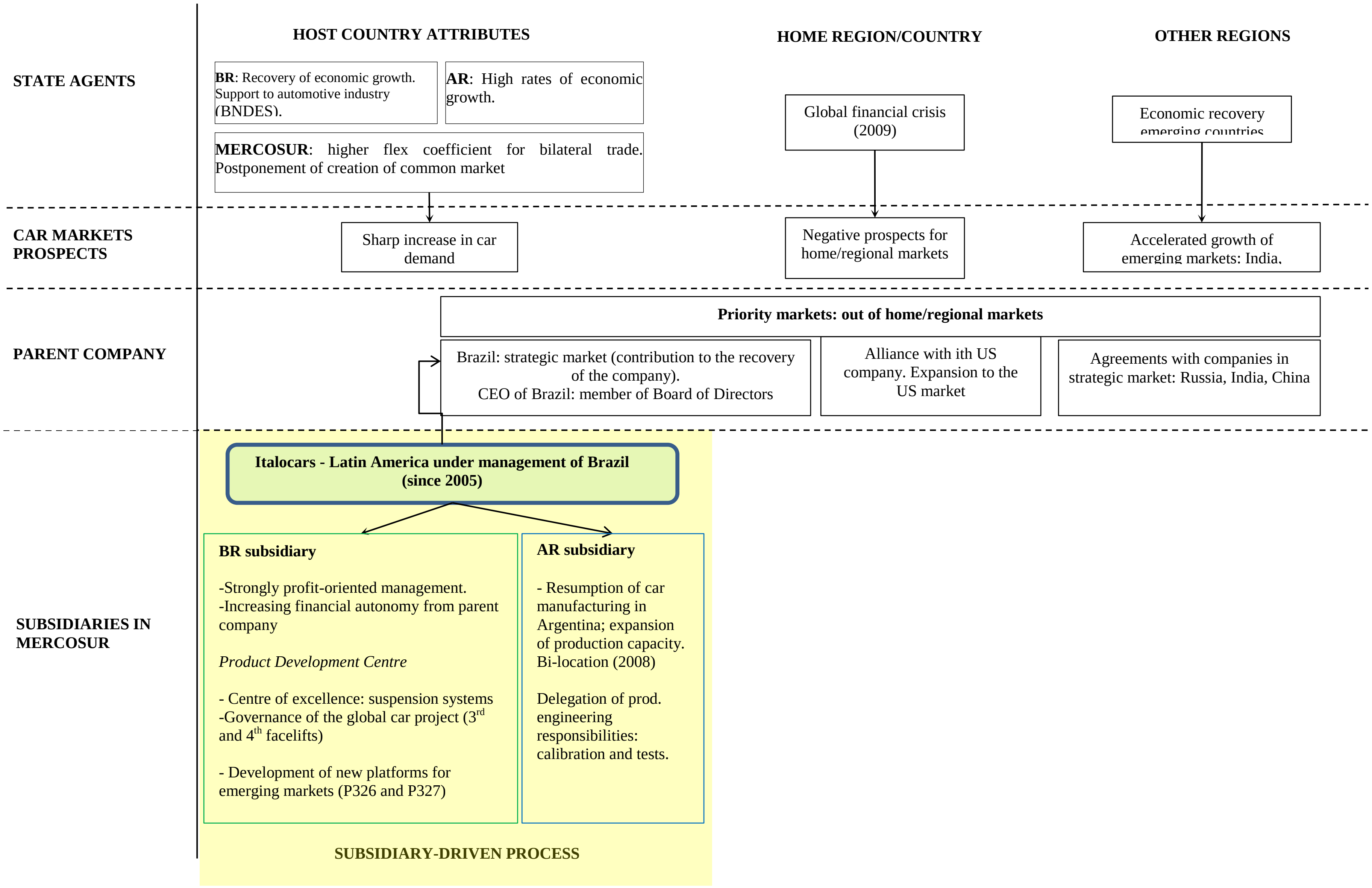

Figure 5-11 - Process of technological development of Italocars in MERCOSUR (2004-2011)
Source: Own elaboration on the basis of fieldwork

Chapter 6 - Francocars

The technological trajectory of Francocars in the MERCOSUR region can be divided in three clear phases (Figure 6-1). The first one, running from 1992 to 1997, corresponds to a period when the company only had a manufacturing presence in Argentina. At that time, the management of the local subsidiary was left in the hands of a local licensee –Ciadea.[128] The technological activities of Ciadea primarily focused on localisation and adaptation activities (level 2 of Figure 6-1) with a high level of autonomy from the parent company. During this phase, models commercialised in Brazil were imported from France and Argentina.

The second phase started in 1998, when Francocars regained the control of its operations in Argentina and started the construction of a new plant in Brazil. In those years, the company started to gradually give shape to the MERCOSUR 'automotive space'. The project was part of a renewed internationalisation strategy on the part of the company, aimed at expanding the presence of the company out of Europe. At the time, the company pursued home-country based product policy and the bulk of product innovation activities were concentrated in the corporate engineering department in France. The role of local units was fundamentally restricted to the implementation and improvement of manufacturing processes. Accordingly, during that second period, product engineering responsibilities of subsidiaries in the region were very restrained, basically limited to some minor adaptations.

The third phase began in 2007. Important changes were made at the level of the global corporate strategy which had a significant impact on subsidiaries in MERCOSUR. The degree of centralisation of the corporate engineering structure was relaxed and a new product policy specifically targeting developing countries was put in place. Against this backdrop, an engineering centre –Francocars Technology Americas (FTA) was created in the region. From then on, subsidiaries in Argentina and Brazil were involved in more complex product engineering responsibilities.

Figure 6-1 illustrates the technological trajectory of the Brazilian and Argentinian subsidiaries of Francocars. As can be seen in the figure, for many years, the two units in MERCOSUR maintained low levels of capabilities, confined to localisation activities and minor adaptations in the vehicles manufactured locally. It was only with the creation of the engineering centre in 2007 that the strategy in the region became more knowledge-intensive. In the framework of a development programme agreed to with the parent company, the two subsidiaries were progressively given the responsibility to carry out localisation and adaptation activities with some degree of autonomy.

[128] For a historical account of the history of Francocars since its establishment in Argentina until 1992, see Appendix D - A brief historical review of the activities of Francocars in Argentina and Brazil (p. 267).

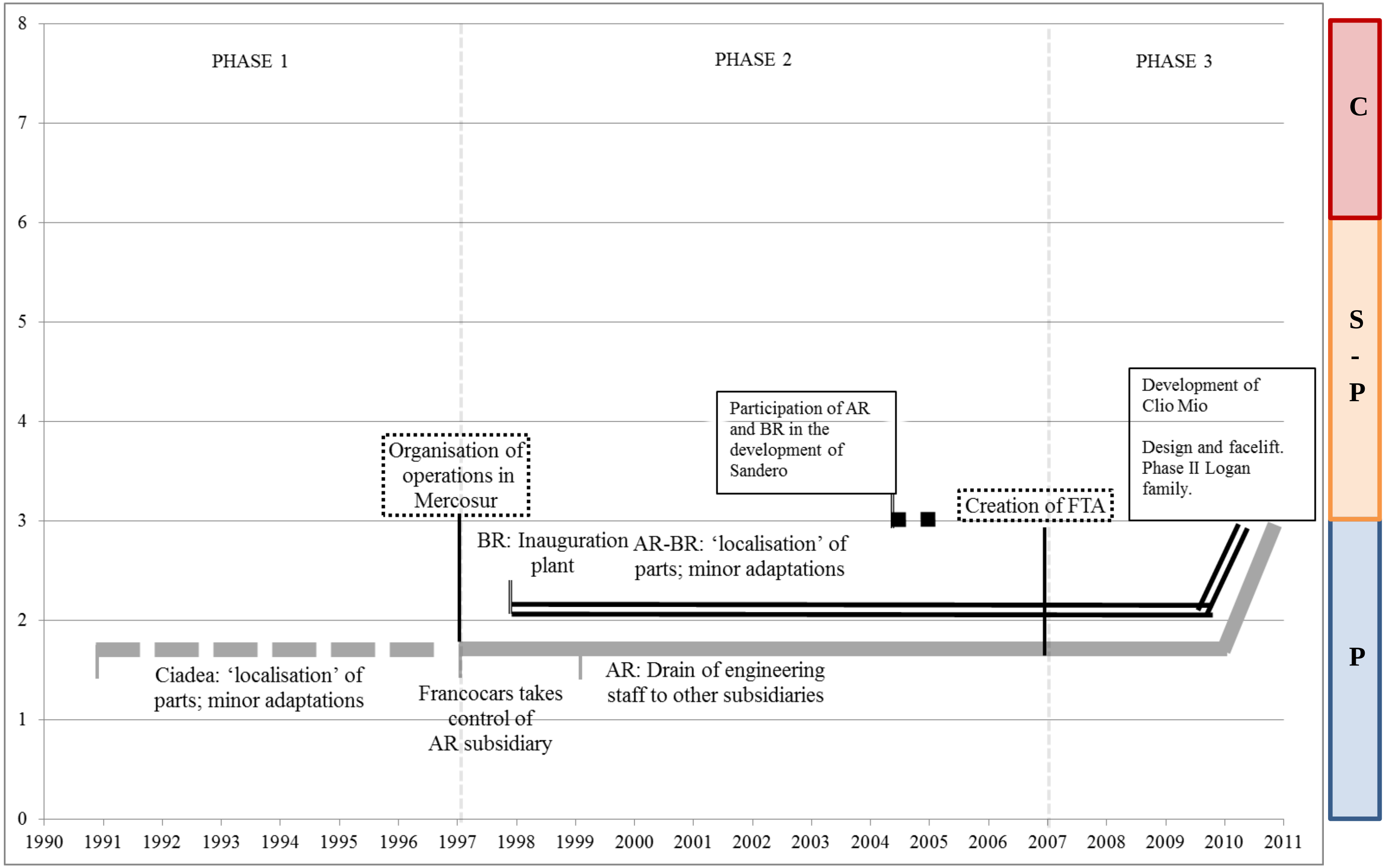

Figure 6-1 – Technological trajectory of subsidiaries of Francocars in MERCOSUR
Source: own elaboration on the basis of fieldwork

References: TC BR subsidiary; TC AR subsidiary; Collaboration in PD with HQ

P Periphery; S-P Semi-periphery; C Centre

6.1 Phase 1 – Modernisation *in absentia*: the reconversion of Francocars in Argentina under the management of a local licensee

6.1.1 Expansion and modernisation initiatives in Argentina

The first years of the MERCOSUR integration process initiated in 1991 coincided with the 'retreat' of Francocars from the South American region. In the first half of the 1980s, Francocars experienced a severe crisis which motivated a profound *redefinition of its profit base and internationalisation strategies* with the objective of lowering the break-even point.[129] In the international sphere, Francocars reduced the geographical scope of its operations. It focused on the European market, reorganising and taking control of the operation of the plants located in Belgium, France, Portugal and the then Yugoslavia (in the Slovenian territory).[130] The objective was to integrate subsidiaries into a single regional system serving the European market, thus giving shape to a sort of 'peri-central integration' scheme as the one depicted in Figure 2-5 (p. 42). According to this strategy, each model would be assembled in at least two locations, with the exception of high range or niche vehicles. The objective was to commercialise products with higher quality and higher profit margins, in particular in the Northern regions of the European continent which had greater purchasing power (Freyssenet, 2003; Loubet, 2008).

In 1987, Francocars sold the American Motor Corporation –a US company it had acquired in 1979– to Chrysler, thus withdrawing from the North American market. Later on, in 1992, a similar path was followed in Argentina, where Francocars had experienced negative results since 1988 (Les Echos, 1997). In this case, however, the company opted for a formula that allowed it to maintain its manufacturing presence in the country reducing its exposure to risk. In 1992, a holding named Ciadea (acronym for *Compañía Interamericana de Automóviles*) assumed control of the local subsidiary.[131]

The immediate goal of Ciadea was to reverse the negative performance experienced in previous years. The recovery of demand levels within the frame of a stabilised economic situation (Figure 4-3, p. 102) and the implementation of the automotive regime in 1991 (see Chapter 4, pp. 69-72) contributed to the achievement of that objective. Domestic car sales levels rose significantly and Ciadea positioned itself as the company with the highest market share in the Argentinian market. Production output soared during the first two years, reaching

[129] Between 1981 and 1986, the company had negative results which totalised nearly 33 million of francs (Freyssenet, 2003).

[130] In 1991, Francocars took control of its subsidiary in Slovenia, Revoz (54%); and, in 1992, of Oyak Francocars (56%), in Turkey. In 1990, it initiated a process of purchase of the 29% of the shares of its Spanish subsidiary that were in the hands of the public. Francocars gained total control of its Spanish operations in 2000 (Freyssenet, 2003).

[131] The majority stake of the holding (72.3%) was held by the *Compagnie Financière pour L'Amérique Latine* (COFAL), jointly integrated by Surauto –a local company managed by a local businessman, Manuel Antelo, who held the presidency of the group– and Francocars. Hence, Francocars passed on the control of the company to a local partner, maintaining a share of 33% of COFAL. This percentage was reduced later.

a peak of 106,000 units in 1994 (more than 50% above the production volume of 1992 –see Figure 6-2). As a result of this performance, as early as 1993, just a year after Francocars had left the country, Ciadea managed to return to profit, obtaining a net benefit of US$ 100 million (El Cronista, 1994a).

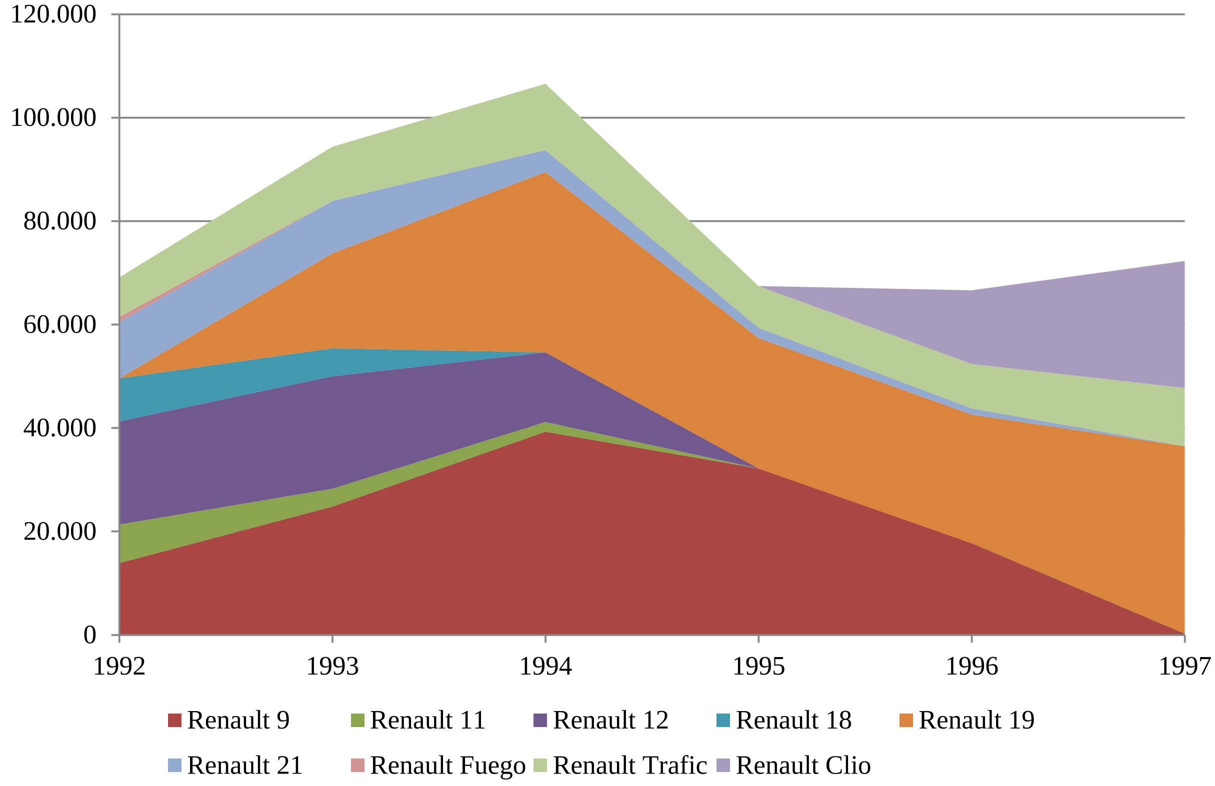

Figure 6-2 – Production output of Ciadea (units and models)
Source: ADEFA

This performance was accompanied by an investment plan targeted towards *expanding the production capacity, augmenting the localisation of parts, and carrying out a significant modernisation of the equipment and production processes* (e.g., the robotisation of the welding process) (Interview FC-PROC1). As a result, the daily production of vehicles grew from 100 units in 1992 to 650 in 1994. The investment programme also included a reduction in the imported content and the plant's modernisation (El Cronista, 1994a).

As for the *product policy*, *Ciadea updated the range of models manufactured in the country* replacing some models whose production had already been discontinued in France with vehicles which were more up-to-date within the parent company –this was the case, for instance, of the Clio and Mégane (see Table 6-1). The range of models offered in the domestic market was complemented with imported models from France such as the Twingo or the Safrane.

Table 6-1
Francocars models produced by Ciadea in Argentina

Models	**Production**	
	France	**Argentina**
R9	1981-1989	1987-1997
R11	1981-1989	1984-1993
R12	1969-1980	1971-1994
R18	1978-1986	1980-1993
R19	1988-1997	1993-2000
R21	1986-1995	1989-1996
Fuego	1980-1992	1982-1992
Trafic	1981-	1981-2002
Clio 1	1990-1998	1996-
Mégane	1995-	1997-

Source: Francocars and ADEFA

During this period, the *connection between the parent company and its manufacturing premises in Argentina was restricted to the provision of technical assistance and licensees for the production of its models*. As indicated by the managers interviewed during the fieldwork process, the fact that investment was funded by the local partner put it in a position of higher autonomy in comparison to the period when Francocars had control of the operations (Interview FC-PROC1; Interview FC-PROC2). As argued by a manager:

> […] at the time, discussions between local engineers and managers in France were fierce. […] But we had autonomy because local investment was funded by our own capital […]. This implied much higher engineering responsibilities for the subsidiary –both in process and product. In this respect, we discussed *tête à tête* with the parent company (Interview FC-PROC1).

On the one hand, this encouraged more intense local engineering activities, both in product and production processes. On the other, autonomy also entailed some degree of isolation from the corporation. This situation made it *difficult to bridge the technological gap with the parent company*, for instance, in terms of product quality. The words of the current Director of Communications of Francocars America, who was personally involved in the transition process when Francocars decided to regain the control of its operations in Argentina, in 1997 (see discussion below, in pp. 161-176) illustrate the point:

> When Francocars bought Ciadea and regained the control of operations in Argentina, the Mégane was launched onto the market. It was essential to optimising and improving the quality of the 'finishing' of products; in particular, with respect to the painting process, the colours, the textures and the upholstery. I moved back to the country [at the time he was working at the parent company] to establish a design and quality cell. When I arrived, I found severe problems with quality control procedures (from the time of Ciadea). For example, in the dashboard of the Clio, there was a lack of harmony among the keys, the cover of the glove compartment and the rest of the dashboard; the plastic of the bumpers whitened as a result of sunlight exposure […]

> it was a disaster. I started to give directions, I had to struggle with suppliers –some of them still hate me […]–, but, finally, the quality levels of the product were improved and ended up being substantially higher than those of the R19 and other models. I also had to work hard on the painting sector, because it was very difficult to comply with the quality standards required by Francocars. The painting process is one of the most complicated processes in the automotive industry. It is very difficult to harmonise colours among plastic and metallic parts. Whereas the bumper was painted by the supplier, the body was painted in our plant; we had many difficulties which were largely the responsibility of suppliers. […] After two years, when we launched the Mégane I, we had finally achieved the international quality standards demanded by Francocars (own translation, Auto Historia, 2013).

The Vice-President of the Brazilian subsidiary of Francocars at the moment of writing this study[132] confirmed this view by asserting:

> [In the early 1990s] we began to import cars [to Brazil] from Argentina; their quality was terrible. This problem with quality was responsible for the problems Francocars would have in the future. In those years, the quality of vehicles in Brazil was not good, but still much better than those from Argentina. […] Whilst we offered a poor quality R21, Honda, which had its sales store just opposite ours, was selling a 5 stars quality Civic imported from the US (own translation, Tavares, 2010: 115).

6.1.2 Commercial presence of Ciadea in Brazil

During this period Ciadea *sought to capitalise on the commercial opportunities provided by the export quotas set in the automotive protocols in force between Argentina and Brazil* (see Chapter 4, pp. 69-72). As Francocars did not have a manufacturing plant in Brazil, the presence in that market was exclusively channelled through the import of vehicles from Argentina and France[133] (Figure 6-3). During the first years, the best-selling model of Francocars in Brazil was the R19, which was mainly imported from Argentina. This model accounted for about 50-60% of total sales of Francocars in Brazil between 1993 and 1996. As can be seen in Figure 6-3, sales in Brazil experienced an accelerated growth until 1995: while in 1993 the company sold 1559 units, in 1995, it reached 10,541 vehicles. As a result of this growth, from 1994, Francocars ranked 1st among carmakers with no manufacturing operations in Brazil. However, in a market where the 'Big-4 companies' accounted for more than 98% of the more of 1.3 units sold in the domestic market, the share of Francocars' share remained at very low levels oscillating around 0.5% (ANFAVEA).

[132] March 2013.
[133] The import and distribution of Francocars vehicles in Brazil was in the hands of the local firm CAOA, which had operated as an authorised dealer of Ford in the country since 1979.

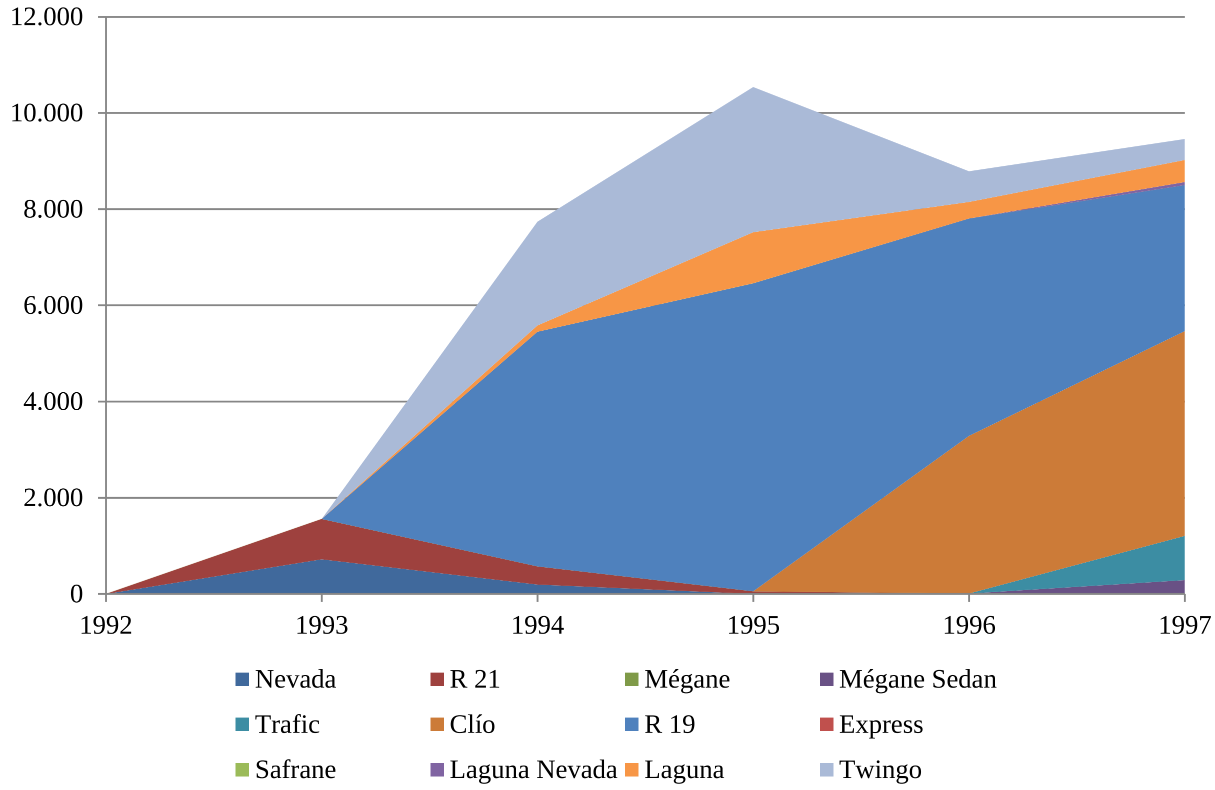

Figure 6-3 - Imports of Francocars vehicles in Brazil (units; 1992-1997)
Source: ANFAVEA

As early as mid-1993, conversations started with a view to opening a manufacturing plant in Brazil. Initially, negotiations involved managers of Ciadea, the parent company in France and CAOA –the authorised dealer in Brazil. As a matter of fact, the CEO of Ciadea was very interested in reaching an agreement to expand the operations of Francocars around the region. With no manufacturing presence in Brazil the expansion of his business was very limited (El Cronista, 1994b). The bilateral automotive scheme, especially the one agreed in Ouro Preto (see Chapter 4, pp. 72-78), required presence both in Argentina and Brazil in order to have access to the neighbour country with no tariff restrictions. The fact that Ciadea only had manufacturing facilities in Argentina made it dependent on regular negotiations between the two governments which fixed special export quotas for subsidiaries with presence in only one of the two countries.

In December 1994, at the request of the CEO of Ciadea, a delegation of executives of Francocars visited Argentina and Brazil to carry out a feasibility study to install manufacturing facilities in Brazil. The original intention of the CEO, however, was to maintain control of operations in Argentina to hold a share of the Brazilian unit, expanding his business within the region. In Brazil, according to his plans, Francocars could produce the Twingo which would locally benefit from the popular car policy and, at the same time be exported to Argentina. In this way, as indicated before, Ciadea would be able to expand the size of its business around the MERCOSUR market (El Cronista, 1994b).

The *perspectives for the creation of a common automotive market* in a region in which the demand of vehicles was experiencing an accelerated growth represented a powerful ‘pulling’ force for the firm (see discussion in Chapter 4, pp. 67-72; and Figure 4-3, p. 102). In February 1995, the spokesman of Ciadea declared:

> Francocars wants to have a market share of 10-15% of the [MERCOSUR] common market, which is expected to reach 3 million units in 2000. For the company, that would imply, at least, around 300.000 vehicles (El Cronista, 1995a).

In order to achieve these figures, it was essential to establish manufacturing facilities in Brazil, which accounted for over 70% of the South American car market. The prospective growth of the Brazilian market, in particular in the segment up to 1.0 cc as a consequence of the popular car policy, offered attractive conditions to set up a plant in the country. As will be seen below, negotiations among the different parties extended for months until the decision to build up a plant in Brazil was finally made in 1995.[134]

6.1.3 Summary of Phase 1 (1992-1997)

Figure 6-4 summarises the evolution of the technological behaviour of Francocars in MERCOSUR during this period. The technological strategy (RQ1) adopted by the Francocars brand in this country was marked by the *decision of the parent company to abandon the South American region and focus its business activities in its home region (RQ3)*.[135] As seen above, the company maintained a minority stake in the controlling group, Ciadea, which was under the management of a local businessman.

As seen above, the business strategy of the firm was focused on the Argentinian domestic market –configuring a sort of ‘protected national market’ strategy (Figure 2-7, p. 45). The fact that the company had no manufacturing facilities in Brazil precluded the possibility of implementing a regional strategy (RQ2). Linkages among neighbouring countries were limited to export quotas specifically set in the protocols of the *ACE 14 – 1990 (ALADI)*.

Ciadea enjoyed a *high degree of autonomy with respect to the parent company* (RQ3). It made decisions on the manufacturing processes and localisation of the production of Francocars’ models in the country. As for the product engineering activities, it only maintained nationalisation activities, following product specifications defined by the parent company, and introducing only some minor adaptations (level 2 in Figure 6-1).

There were two agents that *played a crucial role in the future establishment of the company in Brazil and the configuration of a regional automotive space around the MERCOSUR area* (RQ3). One of them was the *CEO of Ciadea himself*.

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[134] A press report on the evolution of the negotiations can be found in El Cronista (1993); 1994b); d); 1995b); c).

[135] The timing of the decision, however, was not very good: soon after the company left the region, both the Argentinian and Brazilian car markets initiated a strong recovery especially fuelled by the new automotive normative framework. As early as 1993, Francocars was evaluating the possibility of (re)entry in the region through a greenfield investment in Brazil.

The *second relevant agent in the configuration of the regional automotive space is the state government of Parana, in Brazil*[136]. The experience of this sub-national unit was a leading case in the fiscal war between Brazilian states (Arbix, 2002) (see Chapter 4, pp. 81-85). As will be seen below, the benefits provided to Francocars for the establishment of manufacturing plants in the region of Curitiba significantly reduced the cost and the risks that Francocars assumed in the country.

[136] Deichmann Santos Lima (2007) indicates that a dossier about the city of Curitiba was delivered in March 1993 to the offices of Francocars in Paris by the then Brazilian representative at ONUDI, Sérgio Azinelli. The objective was to position the city with a headstart over its potential competitors with respect to hosting Francocars' plant.

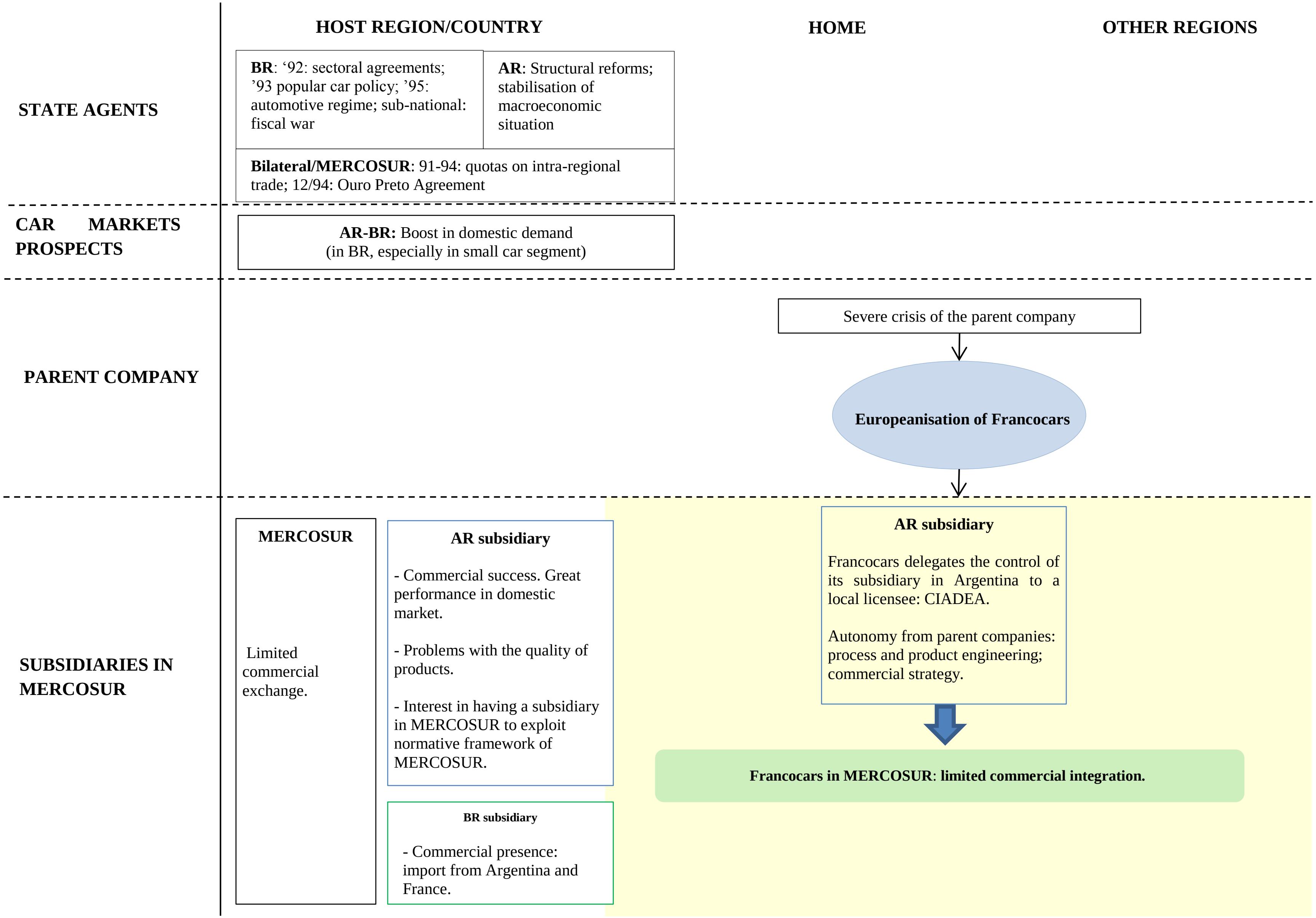

Figure 6-4 - Process of technological development of Francocars in the MERCOSUR (1992-1997)
Source: Own elaboration on the basis of fieldwork

6.2 Phase 2 – The origins of Francocars MERCOSUR: ambitious plans and meagre results (1998-2007)

6.2.1 From Europeanisation to internationalisation: shaping the automotive space of Francocars in MERCOSUR

In 1995, the Executive Committee of *Francocars decided to change the geographical focus of its activities from "Europeanisation to internationalisation"* (Loubet, 2008: 133). The fast growth rates of emergent markets together with the substantial removal of barriers on international trade and capital flows offered reasons to be optimistic about the benefits of such a strategy. Three regions were privileged in the expansion plan devised by the parent company: Central and Eastern Europe, Asia and Latin America.

The expansion towards the East was possible thanks to the 'opportunities' provided by the financial crisis that erupted in Asia in 1997. In 1998, Francocars invested US$ 5.4 million to acquire a share of 36.8% in Nissan –a company which at the time was close to bankruptcy– and to establish an alliance between the two firms. In 1999, it acquired 99% of the Romanian Dacia[137]; and, in September of 2000, Francocars expended US$ 560 million for 70% of the Korean Samsung. As a result, the alliance Francocars-Nissan became the fifth largest producer in the world, accounting for 9.2% of the world car market in 2000 (Freyssenet, 2009a).

As seen from the discussion above, the return to South America by Francocars started to be planned earlier in time. Although in the recent past it had delegated the control of its activities to local companies, the region was familiar to the company (Appendix D - A brief historical review of the activities of Francocars in Argentina and Brazil, p. 317).[138] Its products were known and were well received among the consumers of the countries where Francocars had a manufacturing presence. The strategy, however, was not without risks. Although the company had a long history in Argentina and Brazil, Brazil was still an unexplored territory for the company. Francocars would be a pioneer among 'newcomers' establishing itself in a territory controlled by the so-called Big 4 companies which accounted for more than 98% of the domestic market –Fiat, Ford, General Motors and Volkswagen.

After a period of analysis and negotiation, an agreement was signed on the 12th of March of 1996[139] between Francocars, the state of Paraná and the municipality of São José do Pinhais setting the conditions for the establishment of the company in Brazil. In times of intense 'fiscal war' between Brazilian states, both the state and municipal governments offered 'generous' conditions for Francocars to locate on their territory (see discussion in Chapter 4, pp. 81-85).[140] The terms of the agreement included a capital contribution of Parana of US$

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[137] An account of the process of acquisition of Dacia is provided by Jullien *et al.* (2012).
[138] The company had a long standing presence in Argentina and Colombia (see Appendix).
[139] The negotiations extended for twenty weeks and involved twenty two missions of French executives to the state of Paraná, in Brazil (Tavares, 2010).
[140] The signing of the protocol was very controversial in Brazil as its content was kept under wraps until 1998. Opposition parties to the government of Jaime Lerner, and, in particular, Senator Roberto Requião requested

300 million in return for a participation of 40% in non-voting shares; tax benefits, among which a deferred payment of the TCGS for a period of 48 months; deferred payment of TCGS generated in purchasing of material, parts and components; funding up to US$ 1.5 billion to establish commercial and industrial facilities; priority for the use of state transport infrastructure (i.e. ports, airports, etc.); a donation of a 2.5 million square metre piece of land with a reserve of 500 square metres; access to additional funding in case of changes in the economic situation of the country.[141]

In accordance with the terms of the agreement, Francocars assumed commitment for installing a manufacturing plant in São José dos Pinhais. It also pledged to gradually increase its stake in the company (originally set at 60%); to transfer technology from the parent company to local suppliers; and to train the local workforce. The company announced a multi-year investment plan of US$ 1 billion.[142] Francocars built up a plant in Brazil with a production capacity of 120,000 passenger vehicles, which started to operate in 1999. At the end of that year, US$ 120 million were invested to set up an engine plant to supply not only the plants of the company but also the Brazilian subsidiary of PSA Peugeot-Citröen. In December 2001, a third plant was inaugurated in Brazil for the production of light commercial vehicles.

The *creation of the Brazilian subsidiary of Francocars was not an isolated action in the region, but represented a stepping stone towards the regional organisation of a corporate business strategy within MERCOSUR* –along the lines of the scheme depicted in Figure 2-6 (p. 103). In 1997, it had been announced that Francocars recovered control over its operations in Argentina[143] and created *MERCOSUR Business Unit*.[144]

that the document be made public. However, the Court of Justice of Paraná rejected the request. It was only in January of 1998 that the member of state parliament, Luiz Cláudio Romanelli, revealed the content of the agreement (Deichmann Santos Lima, 2007).

[141] The agreement between Renault and the state of Parana, in Brazil, is a revealing case of the differences between the resources of sub-national governments in the two countries. At the time Francocars was negotiating the benefits package with the state government of Parana, Ciadea, in Argentina, was threatening the government of Cordoba to move to another province if the firm was not exempted from the gross income tax collected by the province. The subsidiary argued that as plants operating in the province of Buenos Aires were advantaged by such an exemption it was in a position of inferiority to compete with them (El Cronista, 1994c). The relative magnitude of the provincial tax generating the demands of Ciadea was below 5% of gross income, a negligible magnitude compared to the benefits Francocars received in Brazil.

[142] The first tranche would extend until the year 2000, totalising US$ 700 million (El Cronista, 1996).

[143] In order to regain control over its operations in Argentina, Francocars incorporated its participation of 60% in the subsidiary Brazilian of Francocars into COFAL, the controlling company of the Ciadea holding –then in charge of Francocars operation in Argentina.

[144] At the time, there were two other business units of this kind: one for Korea, and one for the Asia-Pacific. The rest of the commercial operations overseas, for instance, in Turkey, Romania, Asia (except Korea) and other Latin American countries (e.g. Colombia) remained under the Direction of International Operations (Carneiro Dias, 2003).

6.2.2 Audacious product policy in MERCOSUR

In the early 1990s, Francocars opted for a product policy strongly oriented towards the development of innovative models. Under the motto of 'car for living', the models conceived during this period privileged quality and a sense of 'liveability' and 'usability' over that of aggression and speed (Freyssenet, 2003). As pointed out in the previous section, vehicles conceived by Francocars during this period were at the top level of their respective ranges. Some of the innovative models launched into the European market during these years were: an entry level small passenger car, the Twingo (1993); the Laguna (1993), a large family car; the Scenic (1996), a compact multi-purpose vehicle (MVP); a half-passenger, half commercial vehicle, the Kangoo (1997); and a large MVP, the Grand Espace (1998). All these models had an innovative design, they were well equipped, and, accordingly, their prices were higher than those of their competitors. Overall, these models proved to be a success in Europe and contributed to increasing the net income levels of the company (Freyssenet, 2009a).

The *models offered by Francocars in MERCOSUR were the same as in its home region*. At the time, the *company did not have a differentiated product policy for emerging countries*. Therefore, the strategy followed by Francocars during its first years in MERCOSUR was directed to attracting the most 'sophisticated' segment of the market rather than competing for the blossoming Brazilian popular car market segment. Francocars thus aimed at differentiating itself from the Big 4 companies in Brazil, pointing to a consumer profile with higher aspirations and purchasing power. The strategy was in line with that of Asian newcomers such as Honda and Toyota. The strategy emerges clearly in the following statement of a former marketing manager of Francocars in Brazil:

> Let's imagine there are 16 types of Brazilian consumers. At the first 'cell', we find people who live in a *favela*[145]; in the second one, workers who do not have purchasing power to buy a vehicle; in the third one, consumers who have a 'popular car'. Francocars cannot offer vehicles for the first two groups of consumers. However, with an effective financing system, some consumers [from the third cell] will have the possibility to upgrade their position and buy a car corresponding to a fourth –and higher– category of consumers. This is when Francocars will offer her/him a vehicle […] (own translation Jacopin, 2003: 9).

Taking advantage of the regulatory framework agreed by Argentina and Brazil in those years, the company organised a regional manufacturing and commercialisation strategy. Each plant specialised in the production of different models then commercialised in the region through intra-firm trade flows. The Brazilian subsidiary manufactured the Scénic and the Clio 2 (Figure 6-5, p. 164). The former was an innovative compact multi-purpose vehicle (MPV), based on the platform of the Mégane, which had virtually created a new vehicle segment in Europe (Freyssenet, 2009a). It was also the first of this type to be manufactured and commercialised in the Brazilian market. The Clio 2 corresponded to the second phase of a sub-compact car –the Clio 1, manufactured in Argentina from 1996–, which had been launched in Europe in 1998. This model was sold in Brazil with a 1.0 cc engine, in order to

[145] Brazilian term for 'shanty town'.

comply with the provision to benefit from the popular car policy. Later on, when the new plant for light commercial vehicles was inaugurated in 2002, the Master model started to be manufactured. As for the Argentinian subsidiary, during the first years the company mixed old models –such as the R19 (until 2000)– and new vehicles such as the Mégane, the Clio 1, the Kangoo, and the Trafic (until 2002) (Figure 6-6, p. 165). The product offer in the region was complemented with imported models from France –Laguna and Express–; and Uruguay, where a local holding (Nordex) had a small CKD operation to assemble the Twingo.[146]

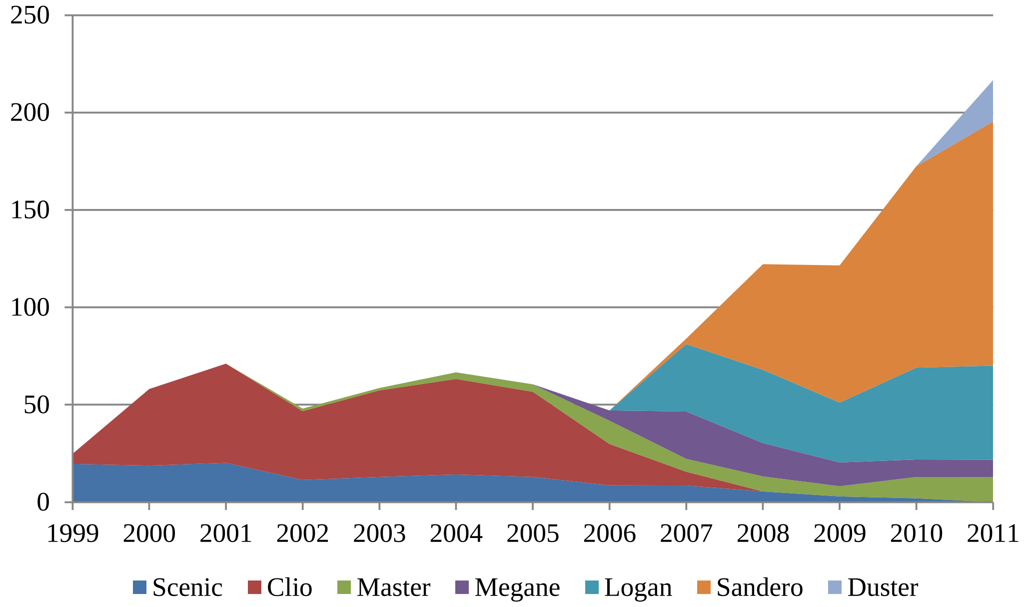
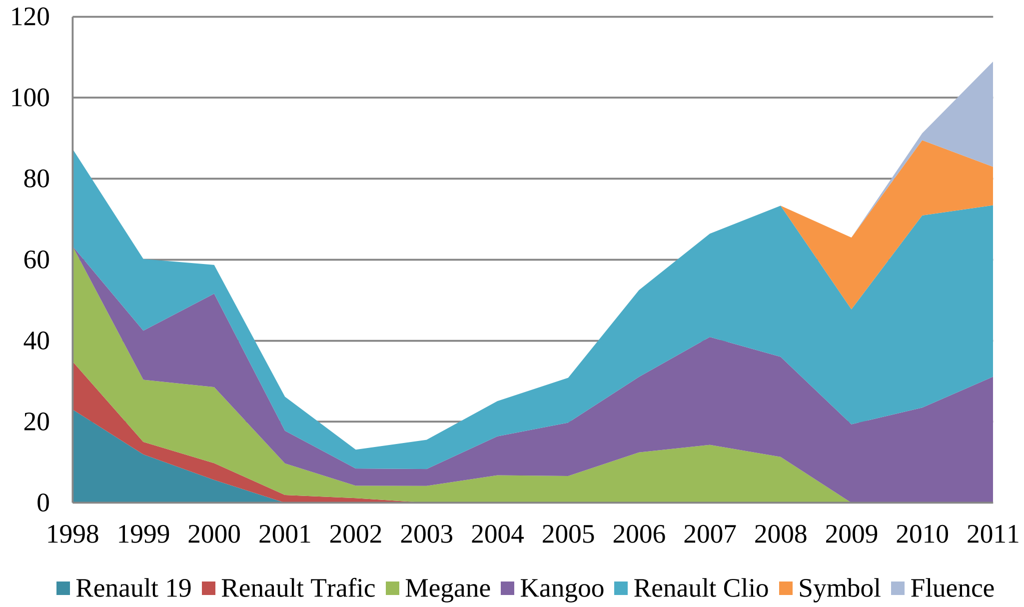


Figure 6-5 - Production of Francocars in Brazil (in thousand units and models)
Source: ANFAVEA



[146] See footnote 9, in p.6.

Figure 6-6 – Production of Francocars in Argentina (in thousands units and models)
Source: ADEFA

In a market largely dominated by the increasing market segment of 'popular cars' the strategy adopted by Francocars was audacious. The Francocars' Clio was the only model equipped with a 1.0 cc engine receiving the tax benefits established by the popular car promotion policy. The share of the company in the dynamic market segment of popular cars was very low (see Figure 5-2, p. 118).

The performance of Francocars in Argentina and Brazil between 1998 and 2006 was 'frustrating', in the words of the President and CEO of the company in 2005 (Berlinck, 2006; Olivera, 2006). As seen in Figure 6-7, Francocars never managed to reach a market share of 5% and, by the end of this period, it was around 2.6% –well below the expectations of attaining a share of 10-15% (Tavares, 2010). In Argentina, the company managed to maintain a high rate of participation in the domestic market. However, after the crisis of the early 2000s, the range of models offered by the company proved to be highly inadequate for the depressed domestic market. After reaching a peak of 20% in 2002, by 2006 the market share of Francocars in Argentina was around 12.8% (Figure 6-6 and Figure 6-5, p. 165).

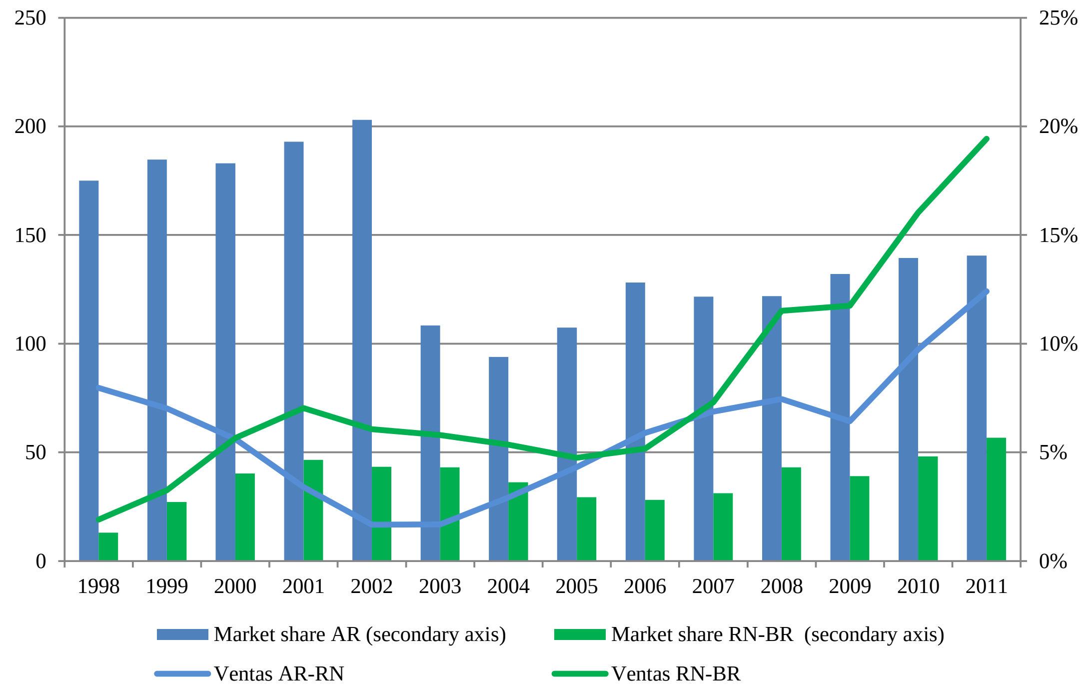


Figure 6-7 - Sales volumes and market share of Francocars in Argentina and Brazil (in thousand units and %; 1998-2011)
Source: ADEFA and ANFAVEA

Managers argued that the disappointing performance in MERCOSUR was largely due to the inadequacy of the product policy adopted in the region –see discussion in pp. 163-166– (Interview FC-PROD1; Interview FC-PROD2). Vehicles offered by Francocars were always at the most expensive end of each segment. It was claimed by the then Vice-President of the Brazilian subsidiary that *the product policy followed by the company during this period failed to grasp some distinctive features of the regional market (Tavares, 2010)*. For instance, since the rate of replacement of vehicles in the regional market is much higher than in Europe, automotive subsidiaries in the country have to be able to launch new models or restyled versions with higher frequency. At the same time, managers argued that local consumers –in particular in Brazil– are very 'emotional' and sensitive to novelty when buying a car. So, designers have to be able to grasp that sensibility and incorporate the vehicles features that satisfy it (Tavares, 2010).

6.2.3 The product development strategy of Francocars under the reign of the Technocentre

During the period 1998 to 2007, the *technological strategy of Francocars in MERCOSUR was completely subordinated to an extremely centralised corporate technological policy which concentrated most product development responsibilities in the parent company*.[147] This scheme was perfectly in line with the innovative and home-based product policy discussed above.

In 1989, Francocars made the strategic decision of concentrating into one single location all the different product development functions. The plans of the company were crystallised in the creation of the Technocentre, in 1998. This organisation brought together the various actors involved in the process of development of vehicles, thus facilitating an easier and more frequent exchange of knowledge. Furthermore, two other specific objectives were set for the Technocentre: "to reduce the time taken to develop a new model to 3 years by the year 2000, and then to 2 years at a later date, while achieving savings of at least FRF 1 billion[148] in the development cost for each new vehicle" (Renault, 1998: 1).

When asked about the justification for the centralised engineering scheme adopted by Francocars during this period, a former Vice-President of the Brazilian subsidiary argued: "[…] Francocars is a French company. France was marked by a Napoleonic model, which is a centralised model; but, in my opinion, there is an excessive centralisation here" (own translation, Tavares, 2010: 130). A similar position was put forward by a manager interviewed in the fieldwork process who claimed:

> I think [centralisation] was part of their culture. [Francocars] is a French brand. I think French culture had some influence on it. Now, as we can see, this has changed. At that time, it was part of the French culture. [They] give directions, but they do not sell their know-how. […] The creation of the Technocentre, the fact of bringing all the people together in that place […]. That's a cultural thing (Interview FC-PROD2).

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[147] A description of the organisation of product development activities during the period of time under analysis in this section can be found in Appendix E - Organisation of product development activities of Francocars during the period 1998-2007 (p. 269).

[148] FRF stands for French francs.

But this centralisation cannot only be explained on the basis of cultural factors. The very *geographical scope of Francocars' operations in the mid-1990s, when the Technocentre was created, was largely concentrated in Europe*. As for the sales figures, for instance, during the period 1995-1999, the domestic market accounted for 42% of Francocars' operations, and the European market as a whole explained 85%. During the period 2000-2004, figures were lower in the home market (37%) but maintained around the same levels at the European region (84%) (Jetin, 2009).

To some extent the concentration of product development activities conflicted with the global expansion plan put in place by Francocars in 1995. The multiplication of production sites in different geographical locations posed multiple challenges for the company. The workload of the different engineering areas of the company grew not only in volume but also in complexity. The products conceived at the Technocentre had to meet the preferences of a wide spectrum of clients all over the globe. At the same time, developers had to try to take into consideration driving conditions and characteristics of the diversity of local environments where the products were to be manufactured and commercialised. Additionally, products conceived in France, had to be able to be manufactured in overseas sites, which implied that the capabilities of subsidiaries and local suppliers had to be suitable for this objective.

To this purpose, local engineering work cells were created. They operated as an extension of engineering teams in the Technocentre.[149] Managers (*pilotes*) in the Technocentre had their corresponding local managers (*copilotes*) overseas, and were the people ultimately responsible for ensuring that the manufacturing process complied with the product specifications conceived in France. In order to lessen the burden of work on the parent company, delegation contracts were signed between the parent company and the subsidiaries defining the responsibilities that the latter could assume (Boboc, 2002).

The creation of local groups did not imply, however, a significant delegation of product engineering responsibilities to subsidiaries. The adaptations of parts required in different locations continued to be substantially carried out by the engineers in the parent company (members of the so-called Groups for Series Functions –GSF–)[150]. Even the interaction with suppliers operating in overseas locations for the development of parts was essentially in the hands of the parent company. The role of local GSFs was limited to the collection of information to identify particular features of foreign markets that may require the introduction of alterations in the products –for example, characteristics of the roads, geography, driving habits, etc. (Boboc, 2002). As indicated by a manager interviewed, sometimes changes in products were suggested by the subsidiaries. However, the corporate engineering team analysed, developed and made final decisions on the changes effectively implemented (Interview FC-PROD2).

[149] These groups were the Groups for Basic Functions (*Groupes Fonctions Élementaires*; GFE) and the Groups for Series Functions (*Groupes Fonction Série*; GFS). See Appendix E for a more detailed description of the organisation of product development structure of Francocars.
[150] See footnote 149, and Appendix E - Organisation of product development activities of Francocars during the period 1998-2007 (p. 269).

Therefore, during this period, the delegation of responsibilities to subsidiaries was mostly concentrated in the area of process manufacturing, mainly in the stage of assembly (Interview FC-PROC1; Interview FC-PROC2). As subsidiaries were heterogeneous in terms of age, equipment, levels of robotization, etc., specific local solutions had to be sought for each case. However, this did not diminish the fact that the GFS managers had to always be informed about the decisions made by the subsidiary (Carneiro Dias, 2003).

In order to facilitate the coordination of its activities and share intra-corporate knowledge, the Technocentre gathered local engineering teams into groups organised in accordance to different criteria, for instance: the similarity of the assembling processes, the type of vehicles manufactured, suppliers, etc. This contributed to developing different forms of cooperation among subsidiaries thus facilitating a more efficient implementation of production processes and of problem resolution. In order to facilitate the exchange of experiences among the subsidiaries, Francocars established a Single List of Problems (*Liste Unique des Problèmes* – LUP), which was consolidated by the parent company (Interview FC-PROD2).

6.2.4 Scope and organisation of product engineering activities in MERCOSUR

The nature and scope of product engineering activities in Argentina and Brazil were limited by the centralised scheme depicted above. When Francocars established the MERCOSUR Business Unit, product engineering responsibilities in the two countries were primarily confined to the 'localisation' of products (level 2 in Figure 6-1, p. 152). The number of staff members of product engineering departments remained low in the two countries: around 50 in Brazil and 30 in Argentina.[151]

The managers interviewed reported that, in the case of MERCOSUR member countries, product changes generally concerned 'invisible' features oriented to improving the quality, durability and safety of vehicles –for instance, due to poor quality roads, in suspension systems and the under chassis. Alterations never involved more 'perceivable' features tailoring products to satisfy the specific preferences and 'aspirations' of local consumers (Interview FC-PROD2).

However, as discussed above, modifications to the vehicles were not developed by subsidiaries on their own, but centrally conceived at the Technocentre in France and then validated together with local engineers. The responsibility of local engineering teams was limited to collecting information on the specificities of the destination markets and submitting it to the corresponding engineering sector in the parent company. Interviewed managers stated that, sometimes, local teams suggested solutions, although this was not their direct responsibility (Interview FC-PROD2).

The main responsibilities of the engineering departments of the subsidiaries located in MERCOSUR were in the area of production, with a mandate to manufacture goods for the

[151] Source of data for Argentina and Brazil in 1999 and 2000, respectively, from Quadros and Queiroz (2001).

domestic market at competitive costs. As indicated above, in this field, subsidiaries had some margin of autonomy to conceive their own solutions as local plants were endowed with different equipment and robotization levels which, in general, were below the European standards (Interview FC-PROC12012; Interview FC-PROC2).

In July 2001, an organisational modification was implemented in the Brazilian subsidiary of Francocars: a Department for Planning and MERCOSUR Product was created. The main responsibilities of this area were to monitor the long-term evolution of products commercialised in the regional market –but, especially, in Brazil–; and to contribute to planning the future product policy for the region (Interview FC-PROD2); and Carneiro Dias (2003)). At the time, the Brazilian subsidiary of Francocars was the only subsidiary within the whole corporation having a Department with these characteristics (Carneiro Dias, 2003). This can be read as a sign of the importance Francocars attached to the Brazilian market in the frame of a much centralised corporate policy. In the words of an interviewed manager:

> The goal was to be in a better position to choose the best product for the Brazilian market –which was the largest in the Americas region– thus reducing risks. The objective of this Department [Department for Planning and MERCOSUR Product] was to have a better knowledge of the local market. It was to conduct statistical analysis, comparative reports, studies on the situation on the world car market, etc. It was important to examine the profile of clients in the region. In this way, the company would be more assertive with decisions about the models to be produced in the country and those to be imported from overseas. We wanted to be able to better define the product policy in the region (Interview FC-PROD2, 2012).

Interestingly, the creation of the Department for Planning and MERCOSUR Product can be seen as a first formal step in explicitly acknowledging that client profiles in local markets were completely different from those in Europe: i.e. of the preferences, aspirations, and habits of consumers. And that, in order to gain a larger market-share, especially in the Brazilian market, it was necessary to have a more profound knowledge of local consumers.

However, at the time, *Francocars was not prepared to implement an effective differentiated product policy for the region and to delegate product development responsibilities to MERCOSUR subsidiaries*. Therefore, the creation of the Department for Planning and MERCOSUR Product did not imply a reduction of the level of dependence on the parent company with respect to the product engineering activities for the Brazilian market. Adaptations continued to be developed in the Technocentre, under the responsibility of the parent company.

As indicated by interviewed managers, the lack of autonomy of the product engineering area had negative consequences on the performance of the company in the region and, in particular, in Brazil. Fundamentally, this was interpreted as a result of the delay in providing responses to changes in local market preferences and demands (Interview FC-PROD2).

An evident example of this time lag was the case of the development of the flex fuel engine: Francocars incorporated this technology into vehicles commercialised in Brazil around a year and a half after the launch of the first flex fuel vehicle by Volkswagen in March 2003 (see

Box 6-1). When the flex fuel engine was launched by Francocars in Brazil[152], in 2005, this technology already accounted for about 32% of the Brazilian market; a few months later it explained almost 70%.[153] In the opinion of managers of the company, the delay had a negative impact on the market share of Francocars, which bottomed out in 2005 (see Figure 6-7, p. 165).

The development of the flex-fuel technology in Francocars[154]

In 2002, when evidence about firms conducting research on flex fuel engine technology in Brazil was brought to light, the Brazilian subsidiary requested authorisation from the parent company to initiate a project to develop a flex fuel engine. At the time, French managers, both in Brazil and in the headquarters, thought that this technology would not 'survive' for a long time and that flex fuel engines, had no future. The negotiation between the subsidiary and the parent company extended for 18 months. It was in mid-1993, after the launch of the first flex fuel vehicles in Brazil, that the parent company finally decided to advance in the development of such technology. The geographical distance between the destination market and decision-making organs in the parent company was, according to interviewed managers, a determining factor explaining the delay. According to a manager of the FTA, "they [the parent company] had no knowledge of our market, what the actual trends were, so they believed the technology would not work" (own translation, Tavares, 2010: 164).

The development process was carried out in France by the Department of Mechanical Engineering.[155] From a technical perspective, the project entailed a hard challenge for Francocars, as the company had no experience with ethanol fuels. Different from other companies located in Brazil, which had jointly co-developed the technology with external suppliers –such as Bosch, Delphi or Magneti Marelli–, Francocars decided to carry out this process internally. This entailed a very high cost for the company and further delayed the development process as capabilities had to be developed, basically through a learning-by-doing process.

The fact the development process was conducted in France created some additional 'practical' challenges to be overcome. Just to provide a brief example the ethanol fuel had to be 'simulated' in the Technocentre, as it could not be transported from Brazil to France. However, it was not possible to obtain exactly the same product in the two countries, where petrol and ethanol are different. In consequence, the results of tests and calibrations carried out in the two countries differed and had to be permanently adjusted.

Box 6-1 – The development of flex-fuel engine technology in Francocars
Source: Summary prepared on the basis of interviews with an Executive Director of product engineering area of the Brazilian subsidiary, published in Tavares (2010: 154-164); and Interview FC-PROD2.

[152] It was a flex-fuel engine 1.6cc litre, used in the Clio and the Scenic.
[153] This figure corresponds to the average share of flex fuel vehicles sold in the Brazilian market between January and April of 2005. Between September and December of that year, the percentage reached 67% (Source: ANFAVEA).
[154] Summarised from an interview with an Executive Director of product engineering area of the Brazilian subsidiary of Francocars included in Tavares (2010).
[155] The Materials Engineering Division of Francocars (DIMAT, by its French acronym) also actively participated in the developing process, investigating the effects of ethanol on the hoses, tubes, fuel pump, pistons, etc.; and conducting laboratory tests (Tavares, 2010).

Although a formal hierarchy did not exist, with creation of a MERCOSUR automotive space Francocars moved its *centre of gravity from Argentina –the historical location of the company in the region– to Brazil*. This did entail both *production capacity* (Figure 6-8, p. 171) *as well as engineering functions being migrated from the former to the latter country*. The negative situation of the domestic market and that of the subsidiary, in particular, reinforced the position of weakness of the Argentinian subsidiary (Interview FC-PROD1). From 2000, the production out of Francocars Argentina declined sharply, and in 2002, production (13,000 units) and sales levels (16,700 units) of Francocars Argentina hit bottom (Figure 6-6 and Figure 6-7, p. 165 and p. 165, respectively).

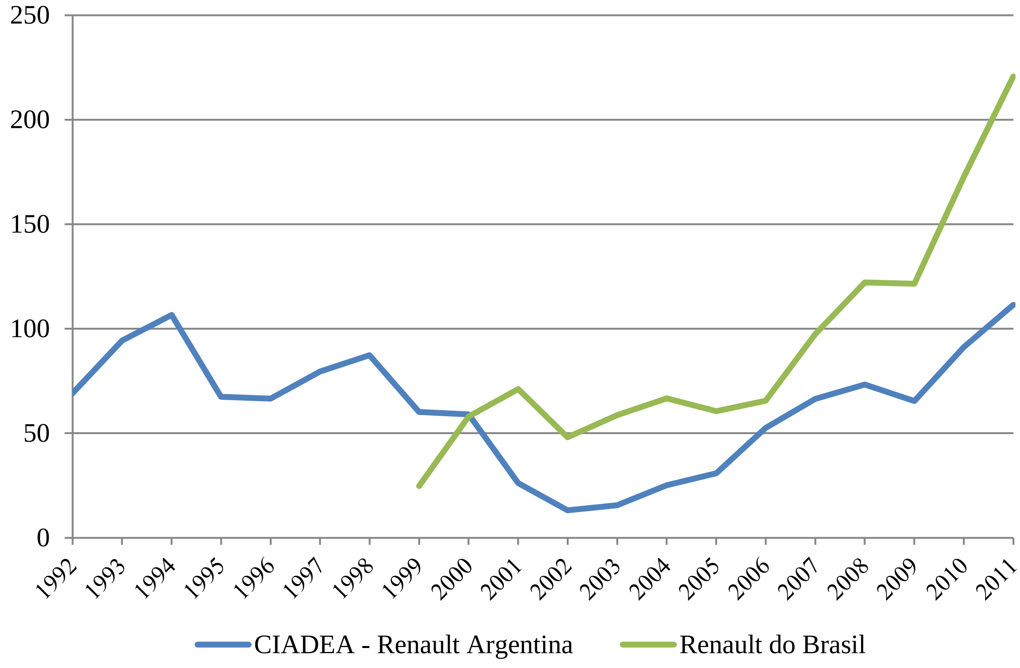

Figure 6-8 – Production of Francocars in Argentina and Brazil (thousand units; 1992-2011; units)
Source: ADEFA and ANFAVEA

The Technical Department for Vehicles of MERCOSUR was based in Brazil (Carneiro Dias, 2003).[156] The interaction among the engineering teams of the subsidiaries was mediated by the parent company, which was responsible for gathering information about common problems experienced overseas. Contacts and exchange of information between subsidiaries had an informal nature and were not mediated by formal organisational linkages (Interview FC-PROD2).

[156] The Department was divided into the following areas: Plant Engineering (with one department operating in Argentina and the other one in Brazil); Assembly Engineering; Body and Painting Engineering; Performance and Processes; Validation and Environment in MERCOSUR (regulations); and local Project Management departments with coordinating functions over the platforms produced in Argentina and Brazil (Carneiro Dias, 2003). A Technical management team was also established in the two subsidiaries with specific responsibilities in the field of engines.

Managers interviewed claimed that the Argentinian engineering team was downsized and a ‘drain’ of professionals took place, generating a deep discontent in the subsidiary (Interview FC-PROC1). The company had a longstanding presence in Argentina and staff members of the subsidiary had accumulated valuable know-how for the corporation. Therefore, in order to maintain that ‘stock of knowledge’ within the corporation, a large number of professionals were reallocated to other subsidiaries: nearly 60 engineers went to Europe (Rumania, Russia, France), and around 20-30 engineers moved to Brazil.[157] To some extent, this allowed these expatriates to improve on their pre-existing knowledge by acquiring professional experience overseas.[158] Most of the expatriate engineers came back to the country and were reincorporated into the Argentinian subsidiary of Francocars once the crisis was overcome.

Despite the crisis, during those years, the Argentinian subsidiary managed to maintain some competences in a particular field in which it had developed specific capabilities in the preceding years: the area of suspension systems. Engineers and testers of Francocars Argentina were recognised within the corporation for their skills in the field. Moreover, the characteristics of the country, with a wide variation of climate and road surfaces, made it attractive for testing purposes. Accordingly, some models, which were never manufactured or commercialised in the country, were tested and tuned up by engineers of the Argentinian unit in collaboration with staff members of the Technocentre. This was the case, for example, of the Modus, the Logan, the Laguna, and the Scénic (Interview FC-PROD1). As will be seen below, these capabilities were maintained over the years and allowed the subsidiary to assume some responsibilities within the engineering organisational scheme that was set up at a regional level after 2007.

6.2.5 Summary of Phase 2 (1998-2007)

As depicted in Figure 6-1, the technological strategy of Francocars in the MERCOSUR (RQ1) region during this period was confined to nationalisation activities (level 2 in Figure 6-1, p. 152). As shown in Figure 6-10 (p. 176), the *parent company was the central agent explaining the technological trajectory of Francocars in the MERCOSUR region (RQ3). This was essentially due to its tight control over two elements of the corporate strategy defined by the parent company,* namely: a *centralised corporate engineering structure* and a *home-country based product policy*. The ability of the Argentinian and Brazilian subsidiaries to gain some autonomy to carry out in-house technological changes or to be given more complex product engineering responsibilities was limited by these two factors.

Both the technological and product policy in the region trapped the Argentinian and Brazilian subsidiaries in a vicious circle depicted in Figure 6-9. Subsidiaries had neither the engineering capabilities nor the mandate from the parent company to tailor products to local

[157] In the case of Romania, for example, between 2001 and 2005, around 15 staff members of Francocars Argentina participated in the process of development of the Logan (more on this issue in pp. 192-194) and the reconversion of the plant of Dacia. They worked with a multinational group mainly constituted by French, but also by Slovenians, Turks, and Moroccans (En Avant, 2010).
[158] Some personal expatriation experiences are reported in Dávila (2010).

market preferences. In addition to this, models commercialised in the MERCOSUR market proved to be inadequate for the profile of the massive consumer segment. *The poor performance of the subsidiaries put them in a position of weakness against the parent company to negotiate for resources to improve local capabilities*. As stated by the Vice-President of the Brazilian subsidiary: "When you lose money, you shut up and do not ask for more resources. If you say: 'I want to build up an engineering centre', they ask, 'How much does it cost? What benefits will it bring about?'" (own translation, Tavares, 2010: 134).

Therefore, the poor economic performance did not only prevent the expansion of Francocars in the regional market, but also that of the subsidiaries within the corporate structure. For example, the participation of Argentinian and Brazilian plants in the total production of Francocars averaged 3.7% between 1999 and 2006 –even when the participation of overseas production during that period rose from 39% to 55%.

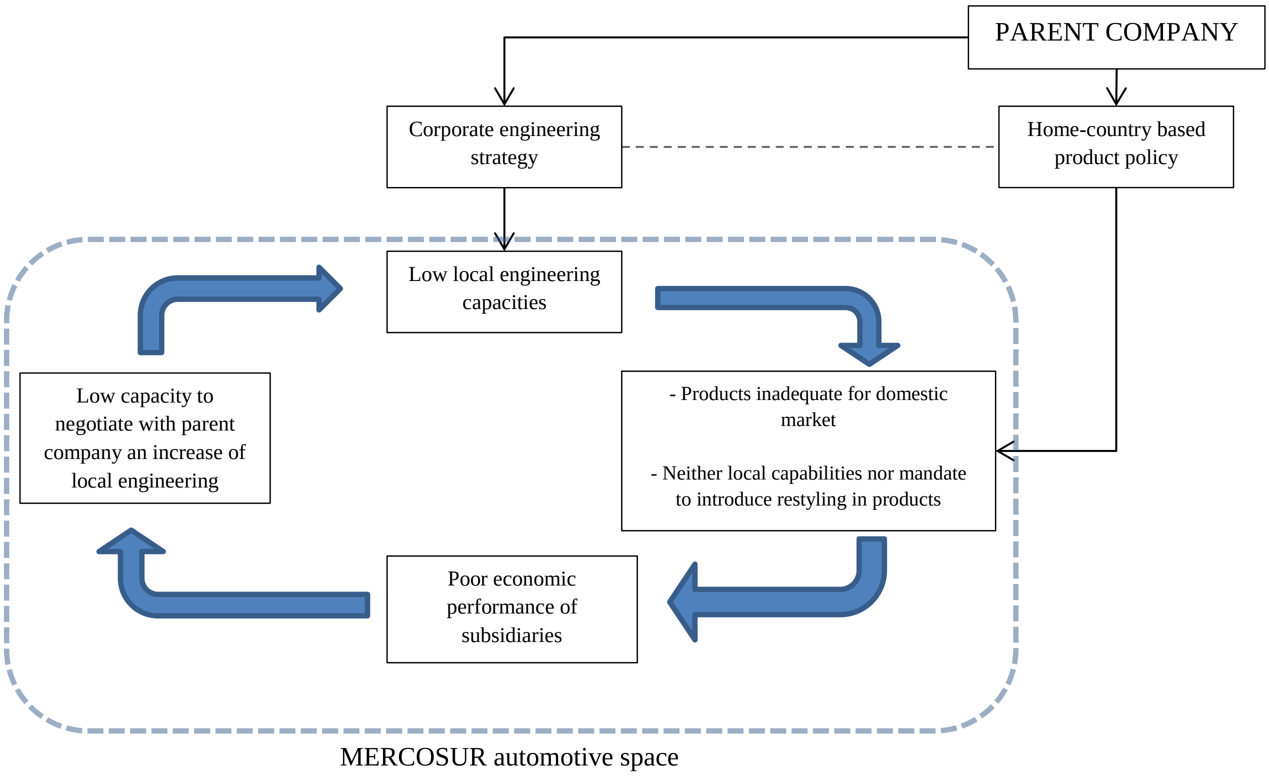

Figure 6-9 – The 'vicious' circle of Francocars' strategy in MERCOSUR
Source: Own elaboration

To understand the limitations of the technological strategy of Francocars in the region it is also important to bear in mind two facts: firstly, the company had poor knowledge of the Brazilian market; secondly, it established its plant in a region with no automotive tradition (the state of Parana). Therefore, beyond the limitations inflicted by a centralised corporate strategy, the company had to carry out a very slow process of accumulation of basic capabilities –both at the level of the subsidiary and of the local suppliers– and knowledge of client profiles.

The second issue which deserves to be discussed here is the division of labour *within* the MERCOSUR region, i.e. the relative technological performance of individual subsidiaries. In principle, it should be noted that the technological capability scale in Table 2-2 (p. 52) does not grasp significant differences in the level of capabilities in the two subsidiaries. Both fundamentally conducted localisation activities (level 2 in Figure 6-1, p. 152).

However, as seen above, with the *establishment of a subsidiary in Brazil and the organisation of a MERCOSUR automotive space, the centre of gravity shifted from Argentina to Brazil*. This shift was not only motivated by the *strategic importance of the Brazilian market,* but also by the progressive *decline of the domestic Argentinian market* from 1999 (Figure 4-3, p. 102). Additionally, the *uncertainty about the future of the integration scheme* apparent by the early 2000s (see discussion in Chapter 4, pp. 78-81) motivated a further reorientation of business priorities from Argentina to the largest market of the region, i.e. Brazil. In September of 2000, the Director of Francocars-MERCOSUR, claimed: "MERCOSUR is dead" (own translation, El Cronista, 2000a).

The preference for Brazil was confirmed that same year, when Francocars announced the construction of a light utility vehicle plant in Curitiba to produce the model Master. This represented a change in the original decision of producing the model in the Argentinian plant. Then, executives of Francocars explained the decision stating:

> […] this is a change in the strategy of the company due to the current uncertainties about the future of the car regime with Brazil. We are reconsidering our product strategy in the region to adapt it to the new scenario (El Cronista, 2000b).

As a matter of fact, managers claimed that the Brazilian unit never had to compete with other units for the allocation of vehicles (Interview FC-PROD1; Interview FC-PROC2). Firstly, the country was a strategic market where Francocars wanted to gain presence. Secondly, as a result of the poor performance of the company in the Brazilian market, the plants of Francocars experienced an idle capacity problem which had to be solved.[159] This was too costly for the company and led managers to put their efforts into reversing the situation. Therefore, somehow paradoxically, the poor performance of Francocars during its first years of operations in Brazil contributed to tipping the scale in its favour within the MERCOSUR region. By contrast, the Argentinian plant, with more than forty five years of experience in the country was already amortized (Interview FC-PROD1; Interview FC-PROD2).

Accordingly, in 2006, when the company announced the renewal of its product policy (more on this, in below in pp. 177-179), all the new models allocated to the region were given to the Brazilian subsidiary, which generated great frustration in Argentina (Olivera, 2006; Sabóia, 2006). This reaction did not only affect the local subsidiary but also the federal and provincial governments (La Voz del Interior, 2006). The minister of Finance of Argentina at the time, Roberto Lavagna, and the governor of the hosting province of Córdoba had maintained meetings with managers of the parent company in France in order to attract the allocation of a new model to Argentina. For instance, the local government offered tax benefits to the

[159] The Brazilian plants operated with high idle capacity which reached levels of 70% in 2006 (Olmos, 2006).

company if they were to produce a new platform in the plant (El Economista, 2005; SABI - Business News, 2005).

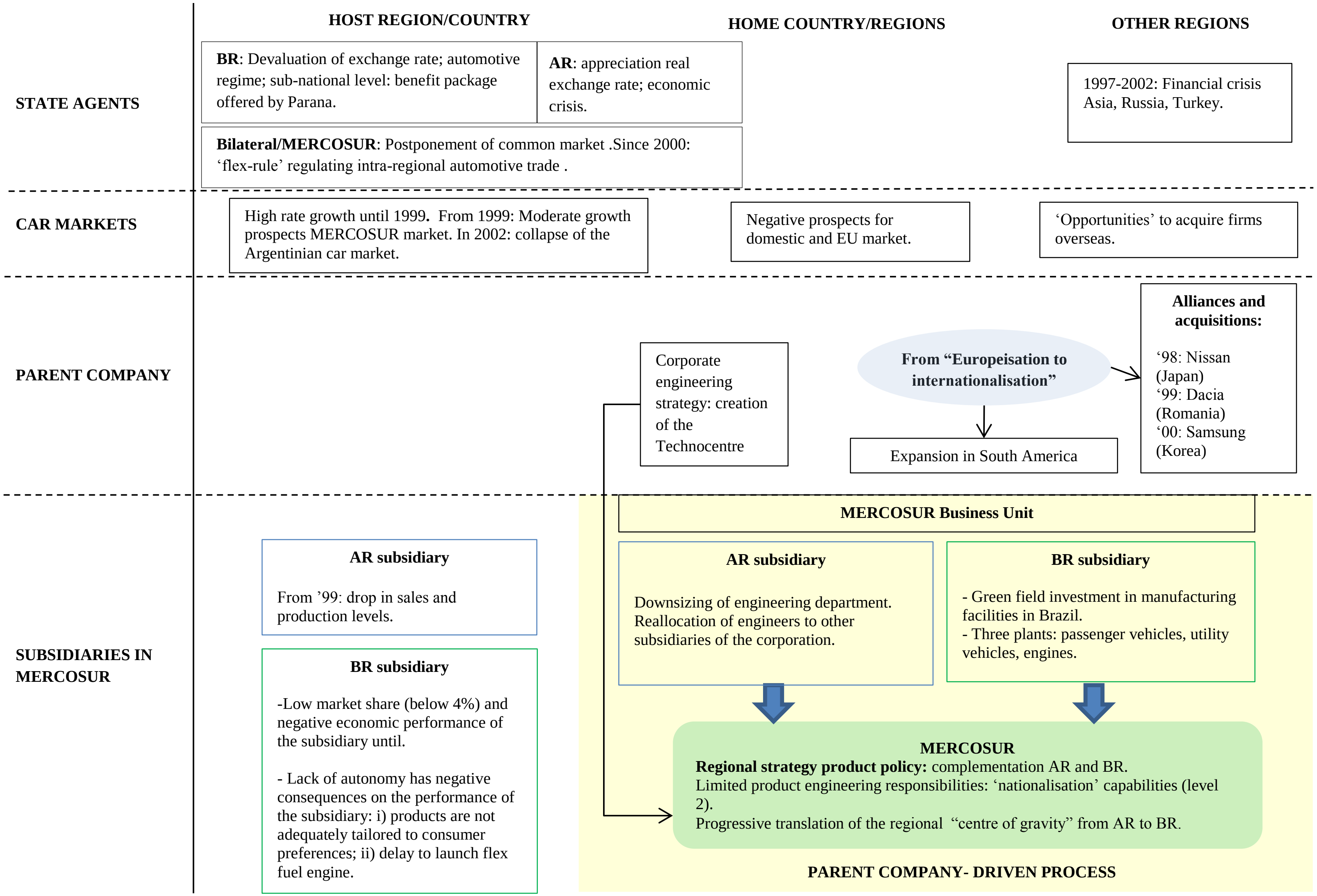

Figure 6-10 - Process of technological development of Francocars in the MERCOSUR (1997-2006)
Source: Own elaboration on the basis of fieldwork

6.3 Phase 3 – The reconversion of Francocars: 'closer to the customers', 'closer to the ground' (2007-2011)

6.3.1 Re-definition of Francocars' product policy: the 'entry range' concept

In his public presentation of the so-called Commitment 2009[160], in February 2006, the CEO of Francocars announced –among other relevant measures– a *change in the product policy*. He was very critical of the strategy hitherto pursued by the company: "We will produce cars for our customers […]. Every time we make cars to our own tastes, it's been a failure –there is a long list" (English, 2006). In a few words, this expression revealed a change in Francocars' strategy with the purpose of reaching a broader public with more 'conventional' vehicles. The new CEO showed his preference for developing 'cars to sell' rather than 'cars for living', as had been the case under the previous administration of Francocars between 1992 and 2005 (see discussion above in pp. 163-166) (Jullien *et al.*, 2012).

The growth goals set in the Commitment 2009 demanded *strengthening the company's efforts to attain a deeper penetration in non-Western European countries*: out of the 800,000 additional units expected to be sold by 2009, 550,000 were expected to target these economies (English, 2006). In order to be successful, it was necessary that the new product policy of Francocars pay greater attention to the specific conditions prevailing in countries with lower levels of income, different consumer profiles and driving habits and conditions. As the experience of the company in MERCOSUR clearly illustrated, the previous policy lacked a solid 'entry level' range of models, and therefore proved to be highly inadequate for expanding the market share of Francocars in the region.

The *Trojan horse of the new product policy to gain presence in emerging markets was a family of models developed on the basis of the model Logan* (project L90[161]). As accounted in detail in the book by Jullien *et al.* (2012), the Logan was an enterprise primarily pushed by whoever was CEO of Francocars between 1992 and 2005 and a small team of designers and developers. To carry out this project they had to struggle against the great scepticism of the managers of the corporation.[162] Around seven years elapsed from the original conception of the idea of developing an entry-level vehicle, to the launch of the Logan onto the Romanian market in 2004 (Jullien *et al.*, 2012).[163]

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[160] See Renault (2006).

[161] The original L90 project corresponded exclusively to the notchback version of the Logan. When the project developed into a fully-fledged programme including a whole range of derivatives, it was internally referred to as X90 (Jullien *et al.*, 2012). The second phase of the project is internally referred to as M0.

[162] Personal impressions of this CEO can be found in the interview published in Jullien *et al.* (2012: 52-60).

[163] In an interview published in Jullien *et al.* (2012), the then CEO of Francocars explained that the project was developed at a slow pace in various stages. Although the necessity of having vehicles better adapted for developing countries emerged as early as 1995, when the company launched its new internationalisation strategy, it was not until 1997, that he effectively conceived the possibility of developing a "modern, robust and affordable car"; the three basic specifications established for the Logan (Jullien *et al.*, 2012: 52-60).

In essence, the objective of the Logan project was to develop a €5000 'modern, robust and affordable' vehicle. Originally, the car, produced in the former plant of Dacia in Romania, was mainly targeted towards Eastern European countries. In the end, however, the vehicle was also sold in Western European countries –not without generating great controversies within the corporation. A growing part of the population of these nations, whose purchasing power had been negatively affected during those years (2007-2011) emerged as potential target consumers (Freyssenet, 2009a; Jullien *et al.*, 2012). The Logan family was extended to include a station wagon, the Logan MCV (then succeeded by the Lodgy); the hatchback Sandero, the Logan Van; the Logan Pick-up; a five-door sedan; a SUV, the Duster; and a mini multi-purpose vehicle, the Dokker. Spearheading the Logan project's internationalisation was, in fact, the development of one of its derivative models: the Sandero. *This vehicle was to a large extent developed with the Brazilian market in mind*. Francocars stated that this model was primarily designed to "meet the expectations of active, urban, family customers" in MERCOSUR.[164]

After several years when no new models were allocated to the MERCOSUR plants, a renovation of the range of products manufactured in the region began to be implemented in 2006. In February, the company announced that all the new models to be produced in the region would be manufactured in Brazil. As pointed out above, this had a strong impact in Argentina, which had not 'received' new models since the Kangoo, in 1999. All the new models produced in Curitiba between 2006 and 2011 were based on the Logan platform: the Logan and Sandero (2007) –including a derivative of the latter, the Sandero Stepway, from 2008–, and the Duster (2011). As a result, in 2011, 90% of Francocars' production plant in Curitiba produced vehicles based on the Logan family (Figure 6-5, p. 164). The Argentinian subsidiary had to wait until 2009 to be given the responsibility of producing a new model, the Symbol –based on the Clio platform. In 2010, the Argentinian subsidiary started to produce the Fluence (Figure 6-6, p. 165).

The deployment of the entry range strategy in Brazil resulted in an immediate improvement of the performance of Francocars in the region. As can be seen in Figure 6-7 (p. 165), sales volumes soared rapidly and the company finally succeeded in gaining a market share to dispute the fourth position occupied by Ford. A similar trajectory was followed in terms of production output levels (Figure 6-5, p. 165).

Against the backdrop of a boosting MERCOSUR market –and, by contrast, a declining demand in European countries–, the r*egion managed to rapidly become an important production pole and market destination for Francocars*. In regard to the entry range products, the Americas turned into the second largest producer of Logan family products after Romania and the largest market out of Europe (Renault, 2012).

This recovery resulted in further investment flows into Brazil. In 2011 it was announced that the production capacity of the manufacturing facilities in Curitiba was to be increased by

[164] The then Vice-President of Francocars in Brazil indicated that the launch of the Sandero was the first time in the history of the company that a model was launched outside of France (Tavares, 2010). See also (Renault, 2007b).

100,000 units to reach a total of 380,000 with an investment of US$ 285 million. An investment of US$ 1,400 million to construct a new plant of Nissan –member of the Alliance with Francocars– in Resende (Rio de Janeiro) was also made publicly known that year (Valor Economico, 2011).

In Argentina, the company also started to implement an investment programme mainly directed at preparing production lines (i.e. tools, equipment) for the new models allocated to the subsidiary: Symbol and Fluence. The production of the former model demanded an investment of $ 200 million (around US$ 65 million). Later on, the subsidiary put in place an investment programme for the period 2009-2011 of $ 500 (around US$ 130 million). Funds were directed to increasing the daily production capacity of the company from 76 to 100 thousands vehicles (La Voz del Interior, 2010). In 2010, the plant in Argentina inaugurated the monoflux assembly system, which accounted for around one third of that investment programme. This was the biggest modernisation initiative since the return of Francocars to the country in the mid-1990s. In essence, the monoflux system allows the assembly of different models in the same line. The Argentina subsidiary was the first plant of the corporation in Latin America to implement this system.[165]

6.3.2 Management and engineering decentralisation

The Commitment 2009 did not only entail changes in the product policy of the company but also in the organisation of its *management structure*, which *was meant to be progressively decentralised in order to "be closer to customer needs and for budget management to be closer to the ground"* (Renault, 2013c). In 2006, five Regional Management Committees were set up: Europe, Euromed-Africa, Americas, Asia-Pacific, and Eurasia. The committees were made up of "representatives from all business functions (research, engineering, purchases, production, sales and marketing, parts and accessories), national directors and vehicle program directors" (Renault, 2013c). They meet once a month for two days in order to discuss both operational and strategic questions. The company claimed that: "[a]s a result, decisions are made quickly and at grass-roots level, in line with customer requirements" (Renault, 2013c). This structure was considered to provide a more adequate management organisation to advance the international expansion of the company and to generate a growing percentage of sales outside Europe. As the CEO of Francocars put it:

> Implementing [Francocars] Commitment 2009 also meant re-examining our organization, methods and processes to ensure that, everywhere in the world, our overriding concern is customer satisfaction. The creation of the Regional Management Committees, for example, put international operations at the centre of the company. All functions can now respond to the

[165] Managers interviewed claimed that the immediate effect of the new monoflux system was negative for the productivity performance of the subsidiary. The problem, they argued, was that the plant had a very broad production mix, including, for instance, a light utility vehicle such as the Kangoo, and two different passenger vehicles, i.e. the Symbol and the Fluence. This makes it very difficult to 'balance' the line. In other plants, with a more homogeneous production mix, the monoflux system yielded more positive results (Interview FC-PROC1; Interview FC-PROC2).

specific needs of each region and manage operations directly and quickly at the local level (Renault, 2007a: 5).

In the field of engineering activities, Francocars also carried out a reform oriented to partially reversing the extreme centralisation of development activities in the parent company, 'empowering' local engineering teams. This goal was encapsulated in the motto "international engineering, close to markets" (Renault, 2013a), which was clearly along the lines of the new product policy intended to "produce cars for our customers" (English, 2006).

> This new structure enables [Francocars] Engineering *to take advantage of local opportunities in terms of competencies, costs and procurement* to develop quality vehicles attuned to the demands of local markets in highly competitive conditions (emphasis added Renault, 2008: 48).

The decentralisation of engineering activities started to be implemented in 2007 with the establishment of the so-called Francocars Technology centres (FTX) (Table 6-2).[166] Under the coordination of the Technocentre in France, local centres were created with the purpose of developing adaptations, derivatives and even complete new platforms better tailored to conditions prevailing in local markets –it is worthwhile to note that differently from the rest of the engineering centres, the FTA is the only one made up of various subsidiaries.. Accordingly, they were to be progressively endowed with resources and infrastructure to fulfil more complex responsibilities. The establishment of the global network of FTX was accompanied by the creation of a network integrated by 'satellite' design centres operating close to engineering teams (Table 6-2). Through the participation in intra-corporate 'call for tenders', the design centres take part in the design process of new models for the company. In collaboration with the FTX, the centres also have responsibility for the adaptation of models manufactured in different regions. The objective is to tailor vehicles to the preferences and aspirations of consumers in the various destination markets.

Within the framework of the decentralisation reforms, Francocars Technologies Americas (FTA) and Francocars Design Latin America (FDLA) were created in 2007 and 2008, respectively. As will be seen below, three subsidiaries in South America, namely those in Argentina, Brazil and Colombia, played different roles and assumed different levels of responsibility in the FTA. *The creation of the FTA and Francocars Design Latin America (FDLA) was a milestone for the subsidiaries located in the region.* As will be seen in Section 6.3, *after that, the company adopted a more knowledge-intensive technological strategy in the region* (level 3 in Figure 6-1, p. 152). Engineering staff in the parent company and subsidiaries collaborated to improving local product engineering capabilities for the subsidiaries to be able to assume more complex development responsibilities in the future.

[166] The roots of the process of decentralisation of the engineering activities can be traced back to the origin of the Logan project. Back then, the Romanian subsidiary was involved as co-developer of the Logan project in collaboration with the Technocentre. Already in the early 2000s, it was envisaged by the parent company that the subsidiary could assume higher responsibilities in product development activities; in particular, derivatives of the Logan platform. To this end, about 150 members of the engineering staff of the Francocars moved to Romania to provide on-the-job training in different fields (production, purchasing, quality, product development). Simultaneously, staff members of the Romanian subsidiary moved to France to be trained and 'socialised' into the corporate culture (Loubet, 2008).

Table 6-2
Francocars Technology and Design Centres

Francocars Technology centres	**Francocars Design Centres**
Francocars Technologies Romania (FTR; entities in Romania, Turkey, Russia, Slovenia and Morocco)	Francocars Design Central Europe (Bucharest, Romania)
Francocars Technologies Americas (FTA; entities in Brazil, Argentina, Mexico, Chile and Colombia)	Francocars Design Latin America (Sao Paulo, Brazil)
The Francocars Samsung Technical Centre in South Korea (FTK)	Francocars Samsung Design (South Korea)
Francocars Technologies Spain (FTS; entities in Spain and Portugal)	Francocars Design India (Mumbai, India)

Source: Renault (2013d).

The Technocentre remained at the core of the system. As shown in Figure 6-12, it concentrates the bulk of engineering human resources with 63% of the current engineering staff of the corporation (Renault, 2013d). With the exception of the Romanian centre, which concentrated a larger number of staff members (19%), the participation of the other centres was nearly equally distributed, with each accounting for about 5-7% of the total engineering workforce of the company.

However, important differences can be found when these figures are analysed in relation to other indicators (see Figure 6-11 and Table 6-3). For example, when the number of staff members of the FTX is examined in relation to the total workforce of the subsidiaries where they are located, it can be seen that the Korean engineering team accounted for a large portion of the total staff (48.1%). Instead, Argentina, Brazil and Colombia –i.e. the FTA as a whole– are well behind the rest of the FTX with only 9.5% of the staff working in development areas.

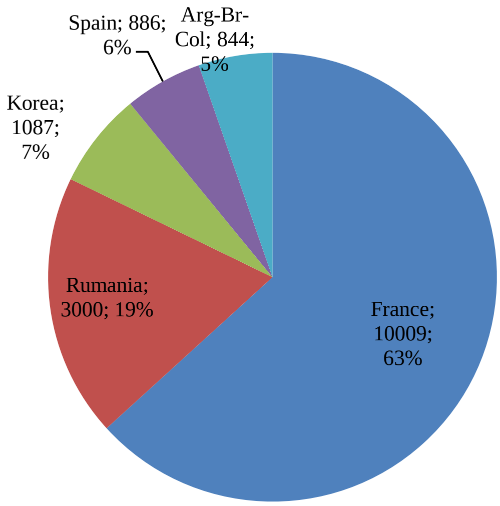

Figure 6-12 - Distribution of staff in the engineering centres of Francocars (number of employees and %)
Source: Renault (2013d)

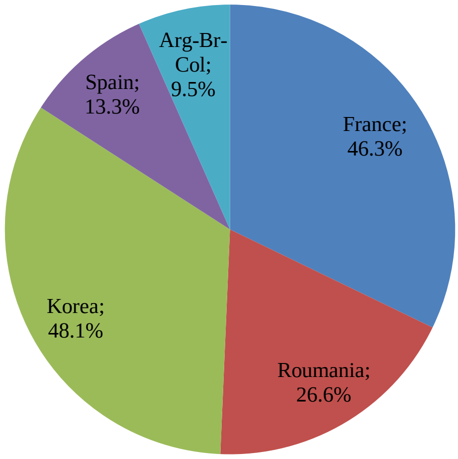

Figure 6-11 - Percentage of staff members of engineering centres of Francocars over the total workforce of the subsidiaries
Source: Renault (2013d)

Table 6-3
Production levels and employment in FTX

Francocars Technology Centre	Aggregate production levels (2012)[167]	Total workforce (TW)	Workforce FTX
Corporate engineering (CE)	Vehicles: 532,036 Engines: 875,083	Total Workforce (TW) in France: 21,631	CE: 10,009 CE/TW: 46,3%
FTA (Brazil, Argentina, Mexico, Chile and Colombia)	Vehicles: 434,590 Engines: 357,260	TW FTA countries: 8,857 TW in the FTA region: 9,417	FTA: 844 FTA/TW FTA: 9,5% FTA/TW FTA region: 9%
FTR (Rumania, Turkey, Russia, Slovenia and Morocco)	Vehicles: 1,022,290 Engines: 514,221	TW Rumania: 11,278 TW in the FTR region: 28,073	FTR: 3,000 FTR/TW FTR: 26,6% FTR/TW FTR region: 10,7%
RTS (Spain and Portugal)	Vehicles: 337,948 Engines: 1,485,009	TW Spain: 6,659 TW RTS region: 7,610	RTS: 886 RTS/TW RTS: 13,3% RTS/TW RTS region: 11,6%
RTK	Vehicles: 155,872 Engines: 86,259	Workforce in Korea: 2,261	RTK: 1087 RTK/TW RTK: 48,1%

Source: Renault (2013d)

[167] Auto systems and parts such as gear boxes, cylinders, axles, etc. have not been included in this table.

The *FTX constitutes a world network* where the roles and levels of responsibilities of each centre on different technical areas (*métiers*, in the jargon of the company) and vehicle product ranges out of Europe (*gammes*) differ. The main objective of the network structure is that of exploiting the resources offered by the hosting territories avoiding, at the same time, inefficient duplication of functions.

Francocars Technologies Romania (FTR), for instance, is responsible for the entry-range programme (M0), corresponding to the so-called Logan platform (e.g. Logan, Sandero, Duster, etc.) (Interview FC-PROD2). As indicated in Jullien *et al.* (2012), as the FTR evolved it became "a global reference for defining standard manual procedures for the production of vehicles in this range. […] These procedures were then disseminated to other industrial sites assembling different versions within the range […]" (Jullien *et al.*, 2012: 176)[168]. The RTK in Korea is responsible for medium and top of the range vehicles, such as the Koleos and Fluence (Interview FC-PROD2). And the FTA (in particular the Argentinean subsidiary) is responsible for the small and medium segments of the *Gamme* I (Clio II and Symbol) as the country is the only location where the two models are currently produced.[169]

6.3.3 Organisation of the FTA and the FDLA

As pointed out above, differently from other centres which are located in one single country with some peripheral antennas in the same region (see Table 6-2, p. 181), the FTA is organised on a regional basis. Brazil, Argentina and Colombia, in decreasing order, are the main 'poles' of the FTA. Chile and Mexico are local antennas focused on process engineering and minor adaptations necessary to comply with local regulations.[170]

Figure 6-13 reproduces a simplified version of the organisational scheme of the FTA. In essence, it replicates the matrix scheme applied at a global level along two axes (reproduced in Figure E-1, p. 320). The vertical axis of the matrix corresponds to the technical functions: equipment and chassis systems; internal body and equipment; external body and equipment; electric and electronic systems; and mechanic engineering. The horizontal axis corresponds to the platforms manufactured and commercialised in the region.

[168] Jullien *et al.* (2012) describe the evolution of the Logan project: whereas in its origin the project was developed at the Technocentre,in 2008, it was moved to Romania. Then, all the changes affecting the Logan were done in that country: quality solutions, cost-cutting, production evolution and incorporation of regulatory constraints. The next project of the X90 programme involved 50% of the work at the Technocentre and 50% in Romania. Finally, the Duster was 30% Technocentre and 70% Romania.

[169] The Clio II is only produced in Slovenia, and the Symbol in Turkey.

[170] In Chile, Francocars produces gearboxes; whereas in Aguascalientes (Mexico), Francocars used the manufacturing facilities of its partner Nissan to produce the Clio.

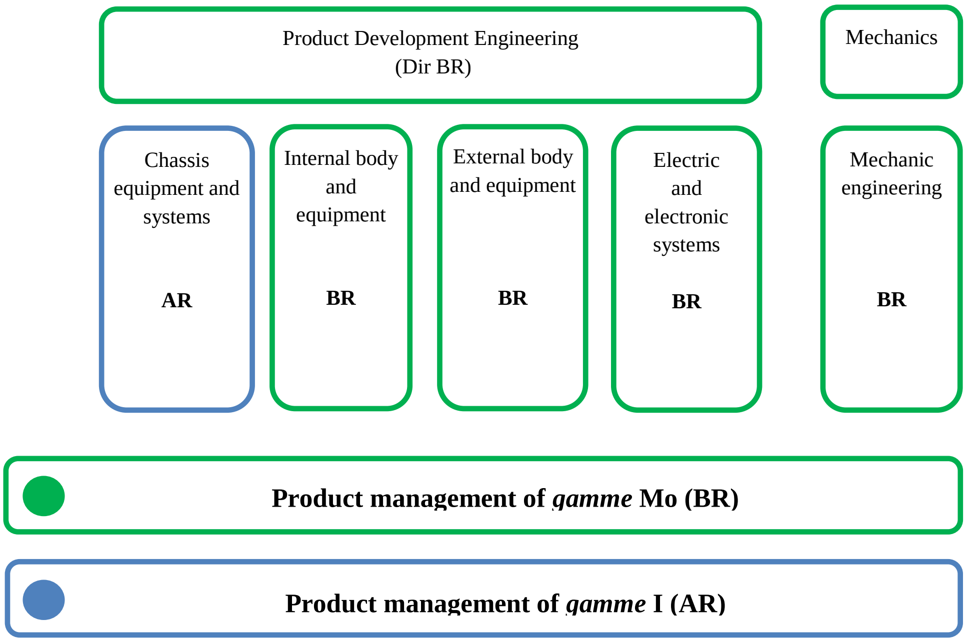

Figure 6-13 – Simplified organisational chart of FTA
Source: own elaboration on the basis of fieldwork

References

BR Area under the responsibility of the Brazilian subsidiary

AR Area under the responsibility of the Argentinian subsidiary

The *regional organisation of the FTA entails a division of responsibilities between the participating subsidiaries*. The structure depicted in Figure 6-13 is replicated in the largest subsidiaries of the FTA –i.e. Argentina and Brazil. However, each functional area of the FTA –vertical axis– is under the responsibility of a single subsidiary (in Figure 6-13, the location of the regional directors is indicated as AR, for Argentina, and BR, for Brazil). Hence, according to the regional organisation, there is *one director, who is responsible for the whole area at regional level*, regardless of which subsidiary he or she works for.

Figure 6-13 clearly reveals that the *distribution of management responsibilities of product engineering areas is largely unbalanced in favour of the Brazilian subsidiary*. This subsidiary is responsible for the management of the whole product engineering department, and for the following specific technical areas: body, accessories, electronic and electronic systems, and the mechanical area. The Brazilian subsidiary is responsible for the area of equipment and chassis systems. Argentina is also responsible for some support services within the FTA which have not been included in Figure 6-13. One of these services corresponds to that in the field of tests and validations, an area in which, as seen above, the subsidiary had developed some particular capabilities. In 2012, the total staff of the regional engineering centre was

844 people (Renault, 2013d). The Brazilian subsidiary accounted for around 60% of the centre and the Argentinian one around 30% (Interview FC-CA1).

6.3.4 Technological learning and engineering responsibilities of the FTA

Since its creation in 2007, the FTA has assumed growing levels of autonomy and responsibility to carry out more knowledge-intensive product engineering activities. As will be seen below, by 2011, the FTA was able to perform restyling and adaptation activities on models produced in the region (level 3 in Figure 6-1, p. 152). This was the result of *an evolutionary process which was negotiated between the subsidiaries and the parent company in the frame of the new FTX network structure put in place at a global level*.

In order for higher responsibilities to be delegated to it, the FTA –as the other centres integrating the FTX network– had to acquire the capabilities required to perform the corresponding activities. For each technical area there is a list of specific skills the technical staff has to possess. The learning process for the accumulation of capabilities is carried out through the so-called 70/20/10 rule. This implies that 70% of the learning process is on the job (i.e. experiential learning(; 20% is through mentoring; and 10% is through different forms of formal training (e.g. in-person class, e-learning, etc.) (Tavares, 2010).

The experience of learning-by-doing is therefore essential for the acquisition of new capabilities. To this end, staff members of the FTA are temporarily sent to other development centre overseas to have direct participation in the development of different projects. This ‘on the job’ training is complemented by the temporary reallocation of technical staff from other subsidiaries who move to the FTA to ‘train’ their colleagues (Tavares, 2010).

- *Activities of the FTA*

As discussed above, until the creation of the FTA, the involvement in product development activities of subsidiaries located in MERCOSUR had been practically non-existent (see, in particular, pp. 166-168). The first indication of change in this regard took place with the diversification of the L90 project into the X90 programme. The initial step in this direction was the development of the Sandero model which, as a matter of fact, took place before the creation of the FTA (Jullien *et al.*, 2012).

The model was developed by engineers from the Technocentre with the collaboration of the Romanian and Spanish subsidiaries. As pointed out before, the *Sandero was especially conceived with the Brazilian market in mind* – though not exclusively, as the model was to be commercialised in Western Europe as well (Renault, 2007b). Local managers of Francocars in MERCOSUR considered that the Logan did not meet the taste of Brazilian consumers and that something different was necessary.[171] As the intention of the company was to gain participation in the Brazilian market, the reference models for the development of the Sandero were those with which the model would compete, i.e. the VW Fox, the Ford Fiesta (Jullien *et al.*, 2012).

Staff members of MERCOSUR participated in the development of the project. In 2005, i.e. before the creation of the FTA, a group of around 50 engineers from Argentina and Brazil moved to the Technocentre, in France, to participate in the development of the Sandero (–for a more detail account on the participation of Argentinian and Brazilian engineers in the project, see Box 6-2).

> The role of local engineers in the development process of the Sandero primarily focused on three issues. Firstly, they collaborated in the definition of product specifications in order to meet the tastes and preferences of domestic consumers. Secondly, they provided information to make certain that the vehicle would respect the conditions of safety, resistance and durability prevailing in the destination markets. For instance, the car has a higher ground clearance –i.e. space between the base of an automobile tyre and the underside of the chassis–; the suspension system was reinforced; and an anti-corrosion wax was developed to protect the vehicle from tropical weather. Thirdly, local engineers had to ensure that the production of the model could be carried out in the region with adhering to adequate content levels of domestic parts. In the final stages of the vehicle development, MERCOSUR subsidiaries participated in the testing process. Road trials of the first two vehicles manufactured in Brazil were conducted in Argentina; six more vehicles were then tested on different types of road in South American countries. The local engineers also participated in the adaptations of engines for vehicles to incorporate flex-fuel technology.

Box 6-2 – Participation of the Argentinian and Brazilian subsidiaries in the development process of the model Sandero
Source: own elaboration on the basis of Interview FC-PROD1; Interview FC-PROD2; Renault (2007b)

Despite the fact that engineers from Argentina and Brazil participated in some of the development phases of the project, it would be excessive to claim that the Sandero "[…] is a Brazilian car for Brazilian people", as the President of the Brazilian subsidiary and Director of Francocars MERCOSUR did, in 2007, on the occasion of the public announcement of the production of the model in Brazil (Barbieri, 2007). The responsibility for the development of the vehicle, as already pointed out, was primarily located in France and, for some aspects, in Romania. At the time, the subsidiaries of Francocars in MERCOSUR countries did not have the capabilities to have a leading role in the development of a derivative such as the Sandero.

[171] In practice, however, the performance of the Logan in Brazil was much better than what local managers expected. The Entry Programme Director of Francocars between 2003 and 2012, explained:

> The Entry programme invented new markets that didn't have any references to rely on at the time the decisions were made. A good example was the Logan in Brazil. At first, the market didn't have any sedans and local managers told us that they didn't want the Logan. So we brought out the Sandero and the Logan together and noticed that Brazilians were also buying Logans. We resuscitated a market for sedans that didn't exist but which does now (quoted in Jullien *et al.*, 2012: 193-194).

However, as stated above, the participation in this project certainly ended up being for the region a significant, though collaborative, learning experience.

Since its creation in 2007, the responsibilities and autonomy of the FTA grew gradually (Figure 6-1, p. 152). The pace of advance in the various areas differed. The interviewed managers pointed out that the *delegation of mandates to the region was part of a long term plan 'negotiated' between the parent company and the subsidiaries*. Various factors are taken into consideration at the moment of delegating more responsibilities to the FTA (and any other centre of the RTX): local capabilities, strategic importance of the market, and manufacturing output volume.

In this regard, the current Director of the Francocars brand who, between 2005 and 2011, was Commercial Vice-President of the Brazilian subsidiary of Francocars, claimed:

> In principle, we empowered the local engineering teams to develop adaptations, giving them a greater voice in the future. One day we should be able to develop our own body frames here, ones that could then be sold in other markets, like what happened with the Stepway. Rivals like Fiat or VW all have local engineering teams that are totally autonomous. They are Brazilian and have a good feeling for the market and how it changes. They are creative (quoted in Jullien *et al.* (2012: 120).

The first stage of the development process of the FTA was fundamentally focused on the implementation of the production processes of the new models assigned to the region – initially the Logan, the Sandero, in Brazil; and then, the Symbol in Argentina (Interview FC-PROC1; Interview FC-PROD2). During its early years, the FTA also put effort into attaining a higher level of domestic or regional parts content, and establishing forms of closer collaboration with local suppliers. Accordingly, the FTA acquired more responsibilities in the development and direct relation with suppliers, until then largely under the responsibility of the parent company. This implied, among other things, that technical staff remained in charge of carrying out tests and validating parts produced locally. During this period, local development of the supply chain was set as an important priority for the company, the objective being to reduce the exposure to major turbulences introduced by exchange rates variations, logistic costs or changes in tariff and non-tariff policies. The *very nature of the new regional product policy made necessary the strengthening of localisation activities*. As entry range models were more sensitive to price variations than the 'French' models of home-country based product policy, the localisation of the local supply chain was crucial in order to keep costs under control (Interview FC-PA1).[172]

During the second phase of its development, the FTA assumed responsibilities for the introduction of minor changes in some specific parts of the vehicle with the purpose of improving their quality or safety levels, or lowering the local costs of production. These activities were carried out jointly with suppliers with which more intense forms of collaboration were established (Interview FC-PROD2).

[172] The local integration of the M0 platform in Brazil was around 80%. This high level of integration was facilitated by the fact that Francocars had an engine plant in the country (Interview FC-PA1).

The FTA is currently at its third stage of development. The ultimate goal of this phase envisages the possibility that the FTA might develop new models or have a leading role in the development of platforms. However, some intermediate steps were set before achieving this goal. In the first instance, the FTA was put in charge of designing some specific parts of the vehicle, in particular external pieces that affect the external appearance of the vehicle –i.e. accessories, plastic parts, etc. This is one of the areas in which the FTA has been delegated with a higher degree of responsibility and autonomy from the corporate engineering (Interview FC-PROD2). This delegation is closely related to the strategic mission of the RDAL. The functional connection between the two units was facilitated by their geographical proximity of the two units.

This function is, in fact, at the core of the new product policy and corporate engineering strategy discussed in the previous sections. The new entry range vehicles, differently from the 'French' models of the previous strategy, were much more suitable to being adapted to different markets. As pointed out by the new Director of the entry range program:

> The entry-program architecture is technically very flexible, so we have achieved maximum customization of the vehicles when we felt it was needed. […] Being able to fine-tune the characteristics is an important part of the edge we have over our competitors (Gay, 2012).

After the poor performance in its first years in the region, the company acknowledged that in order *to attain the goal of increasing its market share in the regional market –and, in particular, in the Brazilian one–, it was necessary to attend to the specific preferences of local consumers*. The vicinity and knowledge of the tastes of the Brazilian client in terms of geometry, upholstery, colours, materials, etc., allows the centre to introduce changes in the vehicles for the regional market. As put by a former Vice-President of the Brazilian subsidiary of Francocars, the objective was to "become a Brazilian company in the eyes of the Brazilian consumers" (Tavares, 2010: 114).[173] As defined by designers of the FDLA, one of their main goals is to:

> […] inject some Latin American DNA into Francocars projects. [The models of the Dacia family arrived in Latin America] with some 'entry level' genes, as well as some technical, economical and design features that did not suit the fiercely competitive local market where cost, although very important, is not the only criterion for purchase (Renault, 2013b).

The first project in which these skills were more actively deployed was the local design of the M0 family of vehicles, corresponding to the phase II of the Logan family –i.e. Logan II, Sandero II and Sandero Stepway II. The alterations did not affect the geometry of the body (which would have implied the modification of stamping dies), but principally concerned the front of the car –grille, bumpers, lighting system–, the dashboard, upholstery, etc. The models designed in Brazil were then manufactured and commercialised in other regions, such as

[173] It is worth noting that he speaks about "Brazilian consumers", which reveals the strategic importance Francocars attaches to that particular market. This impression was confirmed by a manager of the Argentinian subsidiary who claimed that Francocars "vehicles have to be attractive to the Brazilian market" (Interview FC-PROD1).

Romania, Morocco and Turkey.[174] The Duster, launched onto the MERCOSUR market in 2011, was also adapted by local staff. Changes introduced by local engineering teams did not only involve higher trims and a different dashboard with a double DIN-sized radio, but also major adaptations to meet local regulations, in particular with regards to safety norms, road conditions and the various types of fuels used in the region (Interview FC-PROD2).

Another project in which important responsibilities were delegated to the FTA was the development of the Clio Mio –internally referred to as LAC Project. The development of this model, which uses the platform of the Clio II, was proposed to the parent company in 2009 by the Argentinian subsidiary –which is responsible for the vehicle platform internally referred to as *Gamme* I (see Figure 6-13, p. 184). This project involved a transformation from a model usually presented as a top B market segment model into an entry-level car (Interview FC-PROD1).

The Clio Mio targeted the segment below the Sandero, which is a highly competitive sector not currently served by Francocars in the region (Interview FC-PROD1). The objective of this project, launched on the market in 2012[175], was to lower the final price of the vehicle and to make it a more fuel efficient vehicle, maintaining the platform of the Clio II. From a design perspective, the model allowed for multiple customization options with the purpose of making it more attractive for Latin American consumers –especially young clients in Brazil. Changes in the exterior design were conceived by the RDAL in order to adapt the model to current stylistic lines of the company at global level –in particular the Clio IV, launched in Europe in 2012. Changes affected the front bumper, lighting system, radiator grille, hood, wheels, and tailgate door. As for the interior, changes were applied on the door panels, the central console and instruments.

The next steps envisaged in the FTA's evolution strategy contemplated the possibility of going beyond the conception of parts in order to develop entire systems (e.g. the electric system, air conditioning system). A member of the FTA has indicated that the centre has already made some progress in this direction. However, at the moment when the fieldwork was conducted, it had not fully developed the capabilities to be given more complex responsibilities in this field (Interview FC-PROD2).

In addition to the autonomy assumed by the FTA in the area of body and accessories, the centre was invested with a higher degree of autonomy in the field of engineering mechanics, in particular in regards to the flex-fuel engine (Interview FC-PROD2). As pointed out by a member of the FTA, the parent company finally acknowledged that "people who know about this type of engines are located in Brazil" (Interview FC-PROD2). The approach of the company to the question of flex fuel technology has changed since its first incursion in the field in the mid-2000s. Once the technology was known by Francocars, the company opted to work jointly with well-known external suppliers sited in the country who master the

[174] In these locations, some features were altered (e.g. the engines) in order to comply with local regulations, but the external aspects developed by the FTA were maintained.

[175] The launch of the model on the market falls outside the timeframe of this research project (2011), suffice to say that the bulk of the developing process was carried out in the years preceding.

technology and are able to provide quicker responses in the occurrence of market changes (Tavares, 2010). The FTA is becoming a centre of excellence for the rest of the FTX network, transferring knowledge to other FTX, especially those located in other emerging countries who envisage the possibility of adopting the flex fuel technology (Interview FC-PROD2).

6.3.5 Summary of phase 3 (2007-2011)

Figure 6-14 summarises the analysis above putting in evidence the *central role of the parent company in driving the technological trajectory of Francocars in the MERCOSUR region during this period* (RQ3). In 2010, a manager of the FTA put it as follows:

> The picture, today, shows a lack of autonomy. But, if you watch the whole movie we'll see we improved […]. The very fact of creating the [Francocars] Technologies of Americas is a positive signal. Now, we are growing […] 5 or 6 years ago nobody would have created the FTA. In addition to the lack of autonomy, it was a centralised structure. [...] I was in charge of the first phase in the long way towards autonomy. First, you receive an organisation with no autonomy, then you have some autonomy, and so on…(quoted in, Tavares, 2010: 132-133).

As seen in Figure 6-1 (p. 152), the creation of the FTA entailed a clear change in the technological strategy of Francocars in the region. As seen above, decisions made at the level of the parent company were directly connected with the intention of the company to further expanding its internationalisation strategy. The main channel to advance in this direction was the implementation of a differentiated product policy for emerging countries based on the Logan platform. These changes brought about a deep transformation in the company and opened up learning opportunities for the subsidiaries.

The *distribution of responsibilities among the various centres integrating the FTX is also centrally coordinated by the parent company* (RQ2). It is clear that, within such network organisation integrated by centres with complementary responsibilities, the *possibilities for each FTX to become a fully-fledged centre are certainly very low*. As the Entry Programme Director between 2003 and 2012 put it: "Saying that you are adapting to local markets does not mean completely delegating all 'product' choices to national subsidiaries" (quoted in Jullien *et al.*, 2012: 193).

The case of Francocars is particularly interesting with respect to the organisation of product engineering activities in the MERCOSUR region. Differently from other carmakers in the region, which concentrated their development activities exclusively in Brazil, Francocars organised the FTA around the regional automotive space.[176] As seen above, this *division of labour was balanced in favour of the Brazilian unit*, which assumed higher management and technical responsibilities within the FTA (Figure 6-13, p. 184) (RQ2). *However, at the same time, it allowed for the 'reconstruction' of the Argentinian engineering team, which had been almost dismantled during the crisis*. The *parent company acknowledged the importance of*

[176] As indicated by a manager of the FTA, the centre "could have been named [Francocars] Technologies MERCOSUR" (own translation, Tavares, 2010: 133). However, the Colombian subsidiary was against its exclusion from the organisation and claimed to be included in it.

the capabilities accumulated in the subsidiary as well as the potential of the host location of Córdoba where the Argentinian unit operated. The words of a manager of the subsidiary express it clearly:

> With the restructuring of the company, the parent company noticed that Argentina had a long history in the development of vehicles –something that was not very well known by new generations in Francocars. […] Various factors influenced the decision of 'reconstructing' the local engineering team: the re-emergence of the Argentinian market after the crisis; a more competitive exchange rate which lowered local costs; and the location. In Córdoba there is an 'overpopulation' of professionals, there are five universities, more than 300,000 students over a total population of 1 million. This region also has a long automotive tradition. […] So we have a significant know-how which is not present in Curitiba [the host city of Francocars in Brazil]. The new leaders in the subsidiary considered that this was an opportunity to re-balance the relationship with Brazil. Until then, everything was extremely concentrated in Brazil. To a large extent, this was because they had the market. The other carmakers have their engineering centres in Brazil: Fiat, General Motors, Volkswagen… They develop their own models there. They have a long history in Brazil. Francocars opted for a more balanced scheme within the region (Interview FC-PROD1).

The new *engineering organisational scheme contributed to reducing the tensions between the two subsidiaries* (RQ3):

> In the area of manufacturing the two subsidiaries compete, because their subsistence depends on the allocation of models. The areas of product engineering, however, do not. We, for instance, are working in the development of a chassis of a model which is going to be produced in Brazil. The fact that we have a regional manager responsible for each area somehow limits the competition between the two subsidiaries (Interview FC-PROD1).

Finally, it is interesting to point out that during this period Francocars in Brazil established a closer relationship with the federal financial institution, in particular with the BNDES, which strongly supported its expansion in those years (RQ3). In the past, the interaction between the two actors had not been very smooth. In 2002 and 2003, the company had borrowed indirect loans to finance the export of vehicles, engines and auto parts (in total R$ 287 millions). In 2005, it obtained its first direct loan to fund the expansion of the plant for the launch of the Mégane (R$ 124 million). According to data provided by the BNDES, the funding volumes were well below those of well established companies, like Fiat, Ford, General Motors or Volkswagen. In this respect, in 2010, the then Vice-President of the Brazilian subsidiary claimed:

> With respect the BNDES, Francocars did nothing because France was scared. Fortunately, a Brazilian manager of that institution went to live in Europe, he stayed there for two years and he explained [to managers in Paris how the BNDES worked]. […] The financial support of the government is crucial to the profitability of projects. If the government provides you with funds, you have to use them! We are improving in this respect (Tavares, 2010: 135).

As can be seen in Table 6-4, the amount of resources granted by the BNDES to Francocars increased significantly from 2008. Loans borrowed from this institution did not only involve funds for the expansion and modernisation of production capacity, but also support for the "automotive engineering programme of the company 2008-2009". Although it falls outside the timeframe of this study, it is worth pointing out that the last two loans granted by the BNDES in 2012 were mainly applied to product engineering activities –representing almost 50% of the direct loans granted by the institution to the company since its establishment in Brazil. Additionally, the amount of indirect loans to export vehicles, engines and auto parts also increased substantially, reaching around R$ 1.2 billion between 2007 and 2011.[177] By contrast, investment in Argentina was completely funded by the corporation. The company did not obtain any funding from the national government.[178]

Table 6-4
Loans granted by BNDES to Francocars between 2008 and 2011

Year	Application of the funds	Amount of the loan (in R$)
2008	Improvement and modernisation for the production of models Logan sedan and Sandero hatch. Expansion and adequacy of engine plant. Socio-environmental investment in Sao Jose dos Pinhais. Enlargement of design and training centres in Sao Paulo and Jundiai, respectively.	309,271,314
2009	Implementation of automotive engineering programme of the company (2008-2009), including the adaptation of imported vehicles, performance improvement of national vehicles, improvement of ergonomics, design and reduction of costs in the process of production and assembly.	71,102,000
2010	Expansion and adaptation in assembly lines for the new model of SUV (project H79) and restyling of the models Sandero and Logan. Environmental investment in São Jose dos Pinhais.	70,313,000
2012	Implementation of engineering programme of the company (2011-2013), including the adaptation of imported vehicles, performance improvement of national vehicles, improvement of ergonomics. Social investment in São Jose dos Pinhais and Curitiba.	373,562,000
2012	Funds granted under the Pro-Engineering facility	34,604,000
Total		**717,578,729**

Source: BNDES

[177] Source: BNDES.
[178] It is interesting to note that, although the Argentinian local government of the host territory where Francocars operates did not provide any support for the expansion or technological development of the subsidiary, it provided funds during the delicate macroeconomic situation of 2008 in order to avoid mass layoffs. The provincial state provided tax exemptions and a direct subsidy of $ 400 for each new hired employee (González, 2008).

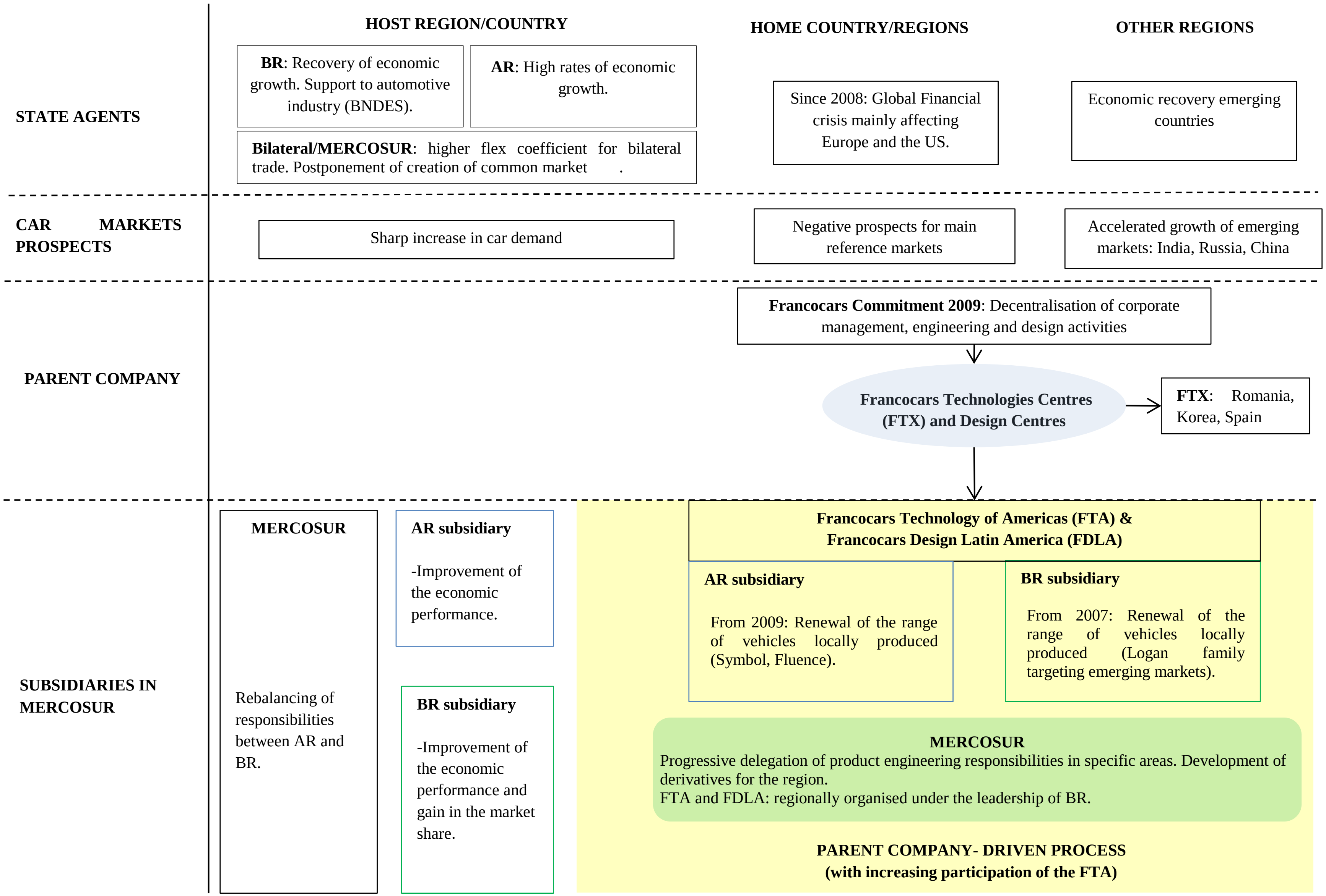

Figure 6-14 - Process of technological development of Francocars in MERCOSUR (2007-2011)
Source: Own elaboration on the basis of fieldwork

Chapter 7 – Nipponcars

The path followed by Nipponcars in MERCOSUR was depicted by an expert on the automotive industry as a “non-explosive, steady and non-volatile growth” (Interview S-3). A similar view was offered by a manager of the company who claimed that “[Nipponcars] does not take a step forward without consolidating the previous one” (Franco, 2000). On the one hand, this strategy allowed Nipponcars to be less exposed to the strong fluctuations that affected other carmakers in the region, in particular during the crisis of the early 2000s. However, on the other, ‘conservatism’ resulted in a very low share in the regional market, in particular in Brazil (Figure 7-5, p. 201) and with a limited accumulation of technological capabilities in the region.

As can be seen in Figure 7-1, in essence, subsidiaries of Nipponcars in MERCOSUR were only given responsibility for what has been referred to here as ‘nationalisation’ activities (level 2 in Figure 7-1). However, it is worth pointing out that this does not mean that subsidiaries did not ‘learn’ during these years. Improvements can be observed in terms of the type of ‘nationalisation’ activities local subsidiaries carried out. That is, although maintaining the same level of technological capabilities, units in MERCOSUR were able, over the years, to assume responsibilities of increasing complexity. For instance, increasing pressure was put on local subsidiaries to augment the domestic/regional integration of parts. Whereas at the beginning, the minimum level of 60% required by the bilateral regulatory framework was hardly achieved, subsidiaries managed to reach a higher index of localisation as production increased. The future establishment of an engine plant in Brazil will allow the company to have a domestic parts content of more than 80%. This progress entailed, even within a level 2 of the capability scale in Table 2-2, a growing responsibility of subsidiaries to ‘develop’ local suppliers and be responsible for the quality control and certification of parts locally manufactured.

At the same time, as pointed out by managers interviewed during the fieldwork process, over the years subsidiaries were asked by the parent company to assume more responsibility in the identification and reporting of problems in products locally manufactured. Local staff began to elaborate proposals to solve them, although final decisions and the actual development of solutions remained the responsibility of the corporate engineering department at the parent company.

In regards to the intra-regional division of labour among subsidiaries in MERCOSUR, it is worth noting that the two units maintained a rather balanced development over the years. However, as reported by managers in the region, this equilibrium became fragile once the decision was made to install a third plant in Brazil in 2008. Since then, the Brazilian unit started to assume a growing level of responsibility in the field of product engineering activities. Accordingly, even though the level of product development capabilities achieved by the Brazilian subsidiary is still rather modest, one can expect an increasing imbalance between the two subsidiaries to be observable in the future.

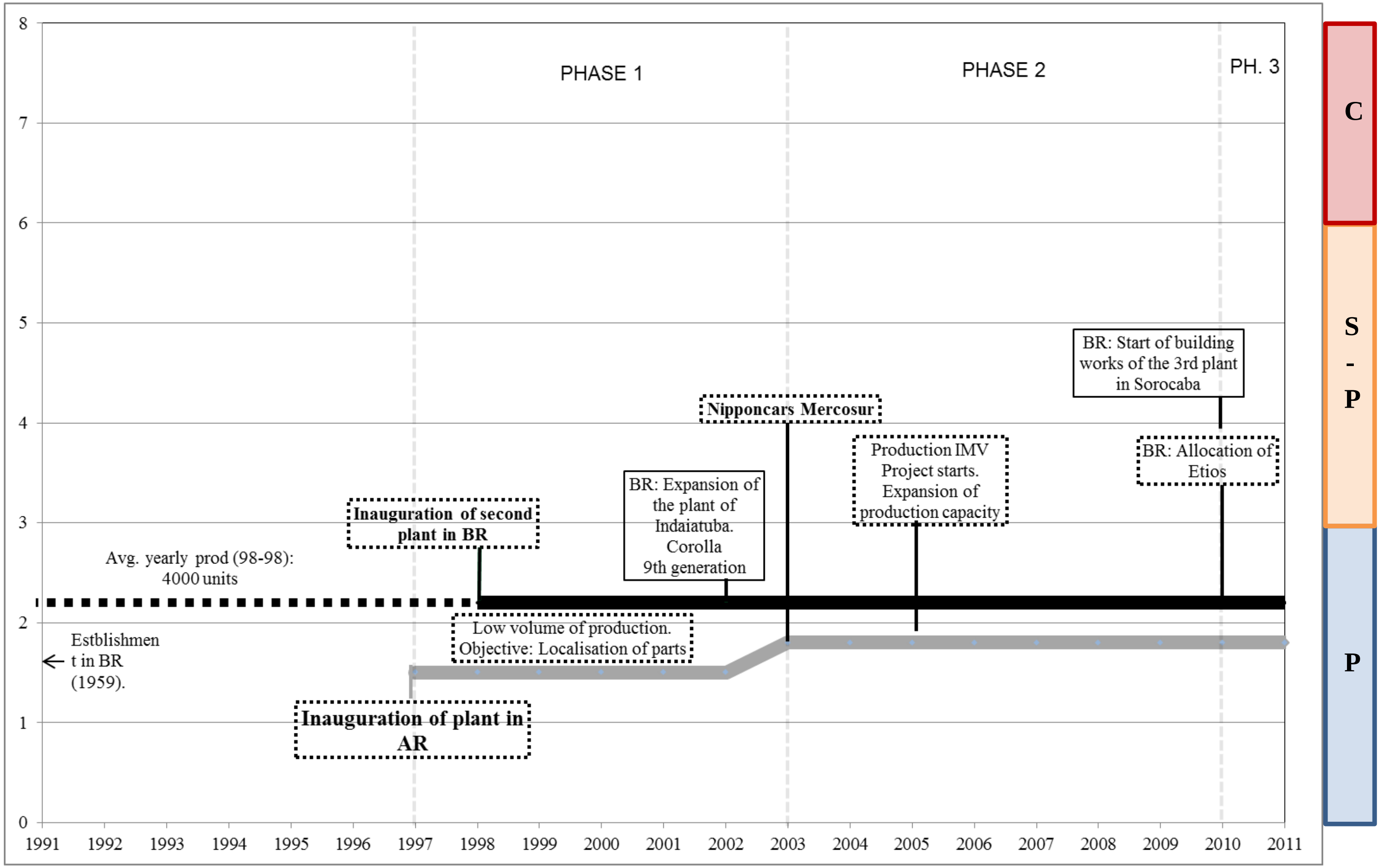

Figure 7-1 – Technological trajectory of Nipponcars' subsidiaries in MERCOSUR
Source: own elaboration on the basis of fieldwork

References: TC BR subsidiary — TC AR subsidiary — Collaboration in PD with HQ

P Periphery — **S-P** Semi-periphery — **C** Centre

7.1 Phase 1 – The soft landing of Nipponcars in MERCOSUR (1997-2002)

7.1.1 MERCOSUR: a minor target for Nipponcars' international expansion

The presence of Nipponcars in Brazil can be traced back to 1958.[179] That year the company established a sales office in São Paulo. Manufacturing operations began a year later, when Nipponcars initiated the production of a sport utility vehicle: the Bandeirantes (a local version of the Land Cruiser). The Bandeirantes was the only model Nipponcars produced in the country for almost four decades. The manufacturing output of Nipponcars in Brazil remained at extremely low levels between 1959 and 1997, averaging 2,500 vehicles per year, and never exceeding 6,700 units.[180] The output was exclusively destined for the Brazilian market.

Within the frame of an ambitious plan to expand its operations overseas, in the first half of the 1990s, Nipponcars decided to set up new manufacturing facilities in the Southern Cone of South America. Against the backdrop of a stagnated Japanese economy and after many years of intense trade conflicts with the US[181], in 1994, Nipponcars publicly announced its 'medium-term international business initiative' for the period 1995-1998: the so-called "New Global Business Plan". Until the late 1980s, Nipponcars had concentrated more than 90% of its production in Japan, being the least 'internationalised' carmaker among the world's leading car manufacturers (Wada, 2012).[182] With the exception of a few small CKD operations in some developing economies[183] –as had been the case of Brazil in the past– international activities of Nipponcars had almost exclusively concentrated its overseas operations in the North American market.

The New Global Business Plan fundamentally envisaged an ambitious expansion of the production capacity overseas through the establishment of new manufacturing plants in each region of the world. In this way, Nipponcars sought to consolidate its North American operations and progressively expand towards Europe, Asia and Latin America. As a result of the internationalisation strategy, the participation of overseas subsidiaries in the total production of Nipponcars increased from 28% to 38% between 1995 and 2002 (Figure 7-2).

[179] Brazil was the first destination chosen by Nipponcars to carry out manufacturing activities overseas (Toyota, 2013c).

[180] Source: ANFAVEA.

[181] In 1984, the company established a joint venture with General Motors – New United Motor Manufacturing, Inc. (NUMMI)– to manufacture vehicles in Fremont, California. The decision to establish in the US was made in 1981, with the purpose of avoiding the trade conflicts that had arisen with that country as a consequence of the aggressive export strategy Nipponcars had followed until since the mid-1970s. Along with the local production of vehicles, between 1981 and 1993, Nipponcars decided to voluntarily restrain the export of Japanese vehicle cars to the US market (Shimizu, 2000; 2009).

[182] Whereas in 1989, General Motors and Ford produced 49.7% and 58.7 of their automobiles outside their home country, Nipponcars' production overseas reached only 8.3% (Wada, 2012).

[183] The first wave took place in the 1960s, when the company set up small manufacturing operations in a small group of developing countries: Brazil, South Africa (1962), Australia (1963), Thailand (1964), Portugal (1968), Malaysia (1968), and Indonesia (1970). The second one started by the end of the 1980s, and mainly targeted the North American market (Shimizu, 2000).

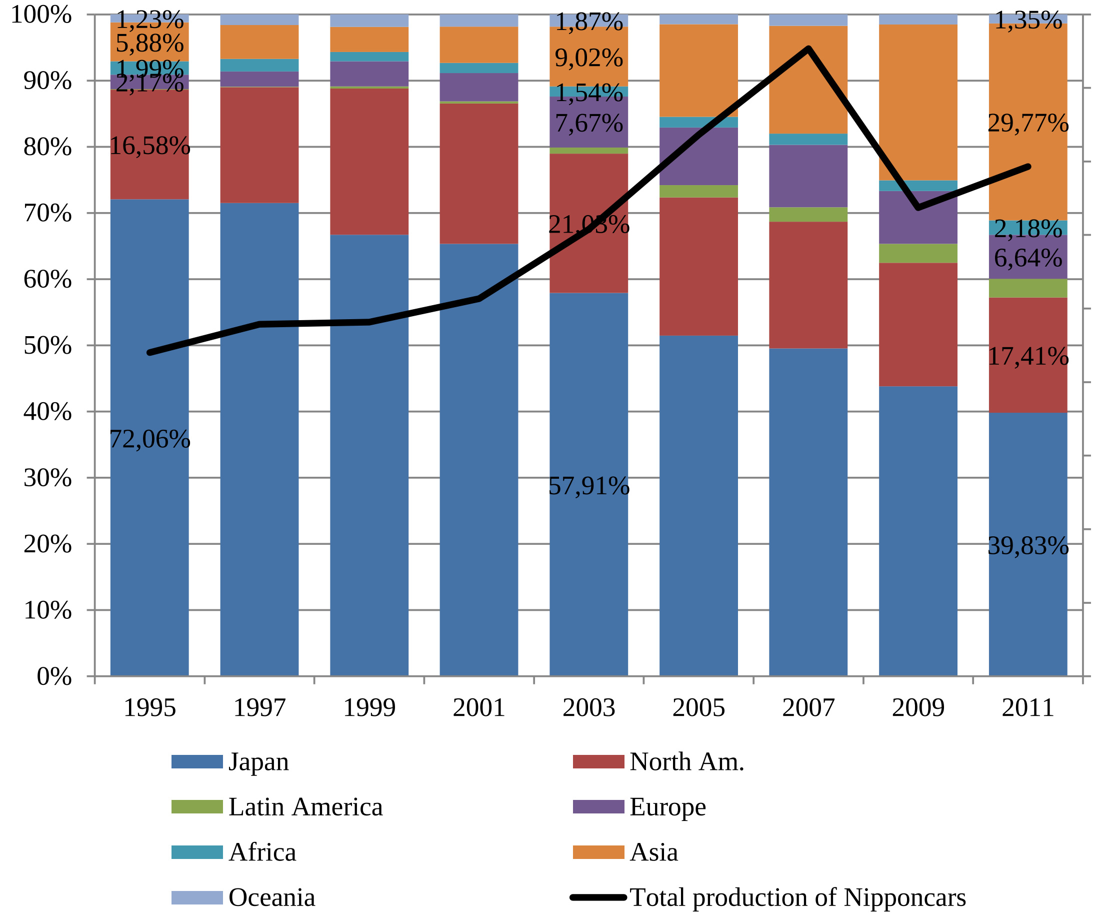

Figure 7-2 – Total production output and geographical distribution of Nipponcars' production (selected years; % and million units)
Source: Toyota (2005); 2013c)

In 1993, Nipponcars created the Brazil and Argentina Business Preparation Department and, in 1994, announced its decision to set up modern manufacturing plants in Argentina and Brazil.[184] Three years later, Nipponcars Argentina inaugurated its plant in Zárate (province of Buenos Aires)[185], and in 1998, opened up its second plant in Brazil, in the city of Indaiatuba (state of São Paulo).[186]

As pointed out by the managers interviewed, the *stabilisation of the Argentinean and Brazilian economies in the early 1990s*, and, especially, the *prospects of creation of a common market for vehicles in the MERCOSUR were important 'pulling' forces for Nipponcars' decision to set up manufacturing facilities in the region* (Interview NC-CA1). From the beginning, *Nipponcars' operations in the region were conceived with the idea of*

[184] Toyota (2013b).
[185] The establishment in Argentina was carried out through a joint-venture with a local firm, Decaroli S.A., dedicated to the production of buses.
[186] Nipponcars had other plant located in the Brazilian automotive pole of São Bernardo do Campo, also in the state of São Paulo, where the Bandeirantes had been historically produced.

consolidating a commercial and production regional automotive space.[187] This explains, for example, the decision to set up the Argentinean plant in the city of Zárate, with privileged access to the export port and to the so-called MERCOSUR route –the main road for commercial exchange between Argentina and Brazil.

7.1.2 The conservative entry market strategy in the MERCOSUR market

The *entry-market strategy adopted by Nipponcars in MERCOSUR was very conservative*. With regard to the product policy, during its first years in the region, Nipponcars manufactured only one model in each country: the pickup truck Hilux in Argentina (Figure 7-7), and the sedan Corolla, in Brazil (Figure 7-4). The volume of production of the two vehicles remained very low during this period, never exceeding the 20,000 units in each country.

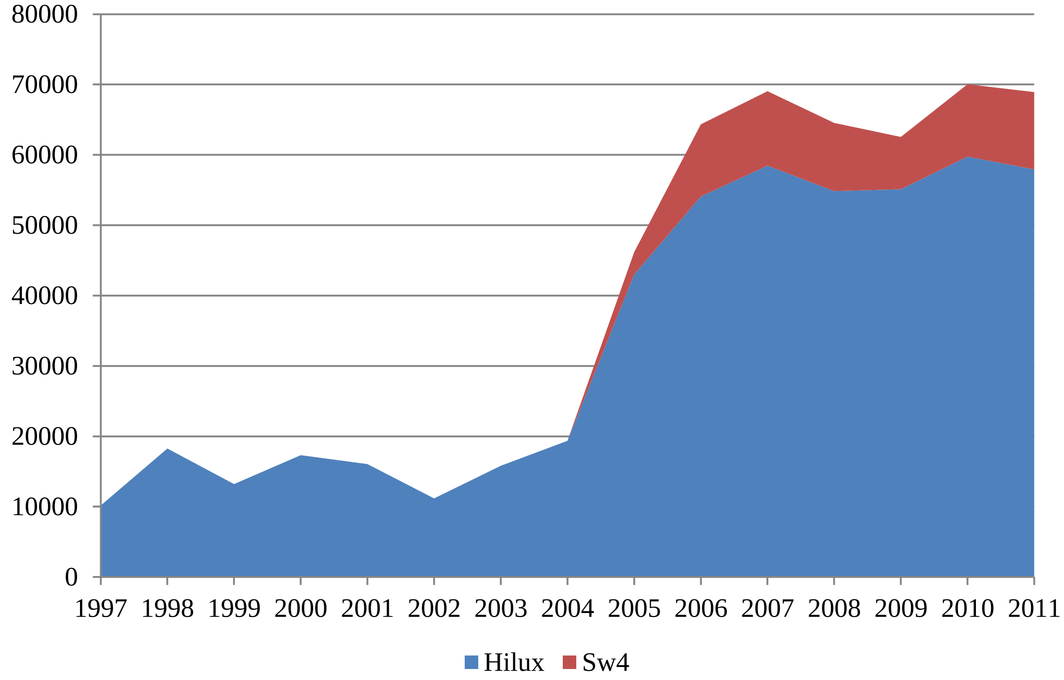

Figure 7-3 - Production of Nipponcars in Argentina (units and models)
Source: ADEFA

[187] From 1997 and 2001, between 30% and 45% of Nipponcars' production in Argentina was exported to Brazil. The exports of the Brazilian subsidiary were much lower, ranging from 7 to 15% during such period of time. Source of data ADEFA and ANFAVEA.

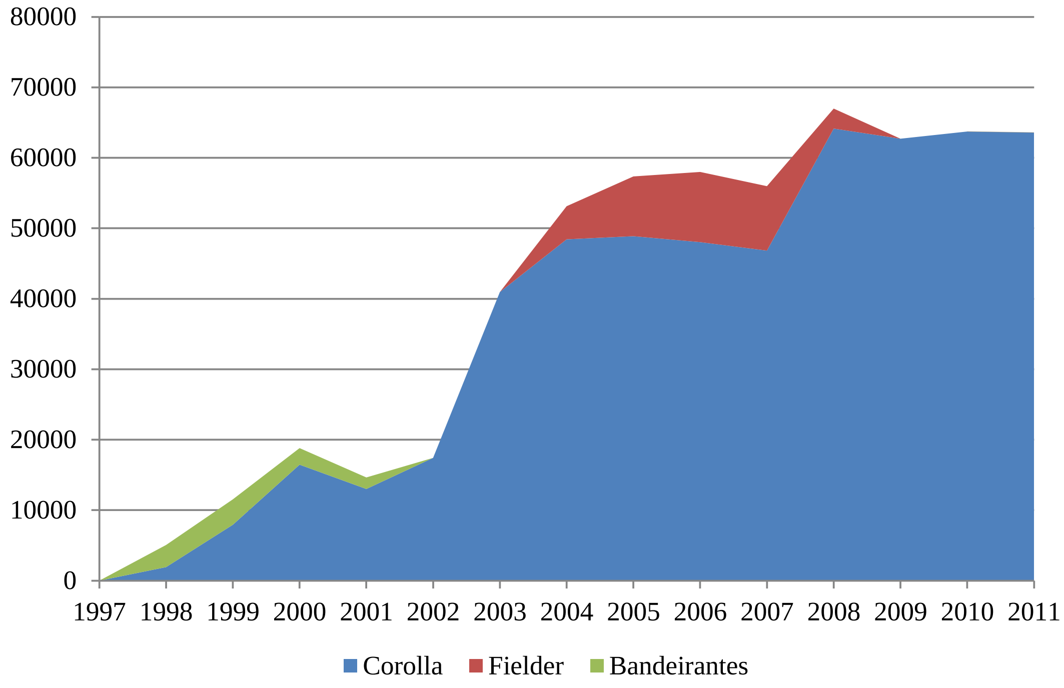

Figure 7-4 - Production of Nipponcars in Brazil (units and models)
Source: ANFAVEA

Since its early years in MERCOSUR, Nipponcars speculated on the possibility of producing a compact car in the region. Local managers acknowledged that this was the only way to attain their goal of accounting for 10% of the market.[188] This was particularly the case in Brazil, where the compact car segment accounted for a large share of the domestic market –in particular, the range of vehicles benefited by the popular car policy (see Chapter 4, in particular pp. 69-72). Moreover, the increase in domestic manufacturing output would allow for a larger scale thus offering Nipponcars the possibility of nationalising more parts and components.

However, the decision regarding the allocation of a model with these characteristics to the region was deferred several times, being only made at the end of the 2000s (more on this in the next sections). The reasons argued by the company to justify the postponement of the project were mainly related to the economic crisis which broke out in Asia in 1997, and which contributed to the economic turmoil suffered by Argentina and Brazil at the end of the decade (see Chapter 4, pp. 72-78). In particular, the devaluation of the Brazilian real was pointed out by an interviewed manager as an important destabilising factor which negatively affected the performance of the company in the region. As put by the then Managing Director of Nipponcars in Brazil, the subsidiary was not able "to reach the stability needed to plan the production of a second model [in the country] because we were caught by the exchange rate devaluation" (Olmos, 2000).

[188] In 1998, the then CEO of Nipponcars do Brasil stated: "With the production of a compact car we could attain that market share [10%] by the year 2005" (O Estado de São Paulo - Economic News, 1998, own translation).

Consequently, as observed in Figure 7-5 (p. 201), during this phase the market share of Nipponcars in Brazil was well below 10%: between 1997 and 2002, it averaged 1.44% (peaking 1.84% in 2002). In Argentina, the performance was much better. The market share increased steadily over the years: in 1997, Nipponcars accounted for 2% of the domestic market and, by 2002, it peaked to 6.2%.

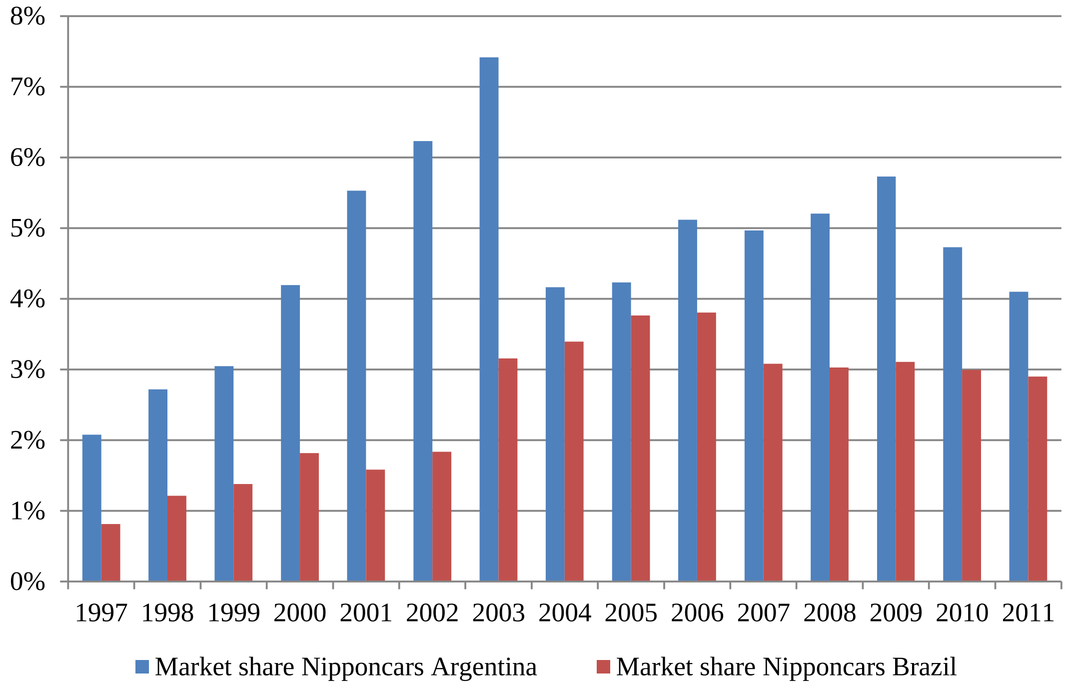

Figure 7-5 – Market share of Nipponcars in Argentina and Brazil
Source: ADEFA and ANFAVEA

With regards to the organisation of Nipponcars' operations in the MERCOSUR region, it is interesting to note that *in spite of the regional scope of its goals, the Argentinean and Brazilian subsidiaries operated as independent units until 2003* (Figure 7-6, p. 202). No management structure was set up in the region to coordinate their operations. This task was the responsibility of the parent company in Japan. There was, however, some collaboration between the two units in some specific fields, in particular for the development of the regional supply chain (Interview NC-PA1; Interview NC-PA2).

A second field of collaboration concerned the intra-firm commercial exchange of vehicles within MERCOSUR in the frame of the bilateral automotive protocols. In the first years of its operations in Argentina, Nipponcars was benefited with a special quota to export vehicles to Brazil, corresponding to the group of companies with subsidiaries in only one of the protocol signatory countries. It was authorised to export up to 4,500 vehicles in 1997, 9,000 in 1998, and 9,500 in 1999 *ACE Nº 14 - Protocolo 28 (ALADI)*. As reported by interviewed managers, the distribution of domestic production shares between the Argentinean and Brazilian markets was a very controversial issue that raised disputes between the two subsidiaries (Interview NC-CA1; Interview NC-PROD2).

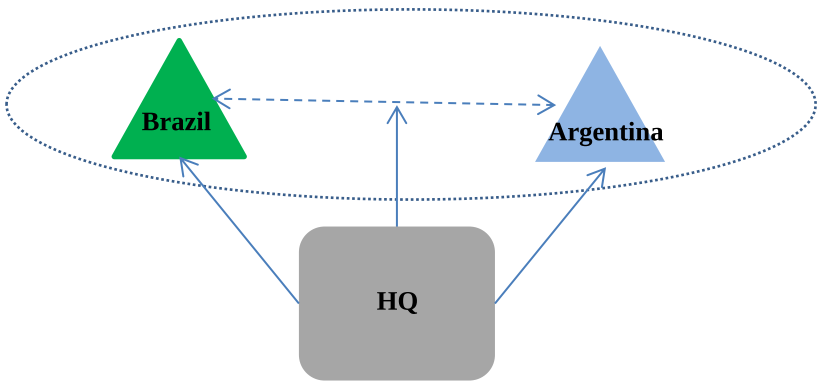

Figure 7-6 - Organisation of Nipponcars' operations in MERCOSUR
Source: Own elaboration

References

Collaboration in specific fields (e.g. supply chain, commercial activities)

Hierarchical control

7.1.3 Limited product engineering activities in the region

The conservative nature of Nipponcars' strategy in MERCOSUR also involved technological activities. The engineering activities of the two subsidiaries operating in the region fundamentally focused on production processes. The main challenge faced by subsidiaries was to attain a continuous improvement of the so-called Nipponcars Production System (Shimizu, 1999) and to localise parts and components with such low levels of production. In the area of product engineering activities, the *role of local subsidiaries was very limited, confined to some minor adaptations in the parts produced locally* (Figure 7-1, p. 196). *These limitations were a consequence of both the corporate engineering strategy and, especially, the specific nature of the operations of Nipponcars in MERCOSUR.*

It should be noted that during this period of incipient internationalisation of the company, *R&D activities of Nipponcars were extremely concentrated in Japan.* The only partial exemption to this approach concerned the US subsidiaries, which had assumed some minor product development responsibilities with the purpose of tailoring Nipponcars' products to the strategic North American market.

With respect to the second issue –i.e. the specific local factors explaining the low intensity of local engineering activities– it is worth noting that the two models manufactured in MERCOSUR were *'mature' products which did not require any further development*. The Hilux pickup truck produced in Argentina corresponded to the fifth generation of the model, firstly launched onto the market in 1988. The Corolla produced in Brazil corresponded to the eight generations of the best-selling vehicle of the company, originally introduced into the market in 1995. Accordingly, only some minor changes were introduced locally in order to comply with local legislation or, when necessary, to adapt pieces according to the local availability of materials (Interview NC-PROD1; Interview NC-PROD2). In each case, the *necessity of introducing modifications was evaluated by resident engineers of the parent company in the subsidiaries in conjunction with local engineering staff. The actual development and final approval of the modifications were the prerogative of the parent company* (Interview NC-PROD1).

An additional factor explaining the low intensity of product engineering activities regarded the *modest scale of Nipponcars' assembling activities in MERCOSUR*. In the case of Argentina, where there was not even a stamping plant, the operation was described by some of the engineers interviewed as a quasi semi-knocked down (SKD) operation[189] (Figure 7-1, p. 196) [190] (Interview NC-PROD1; Interview NC-PROC1). Stamped body parts were imported from Brazil, specifically from the old plant Nipponcars had in São Bernardo do Campo. Both the Argentinian and Brazilian subsidiaries imported the more complex sub-systems and components, such as the engines and transmissions, from Japan (Interview NC-PA2).

The main objective of the local subsidiaries was to achieve the minimum regional content required by the automotive protocol, set at a level of 60%. Subsidiaries faced difficulties to attain such a level in the context of extremely low volume operations in the region. This is illustrated by the fact that, during the first years of its operations in Brazil, Nipponcars opted to remain excluded from the automotive regime as the domestic parts content of the Corolla only reached 47%.[191]

Against this backdrop, the two subsidiaries created a 'localisation department'. This department fundamentally operated as a liaison between the corporate engineering unit, in Japan, and the suppliers sited in MERCOSUR. They sought to 'develop' suppliers transferring knowledge and providing them with technical support. The criterion to define the division of labour between the two subsidiaries in this field was the geographical localisation of suppliers: each unit was responsible for the relationship with suppliers located in its own territory, regardless of the final destination of the part (Interview NC-PROD1; Interview NC-PA2).

Over the years, local engineering staff members of Nipponcars became more involved in the development process of the successive facelifts applied to the models produced in the MERCOSUR. For instance, they were asked to collect and provide information on manufacturing problems or the customer experience in the destination markets. This information was taken as an input by the parent company for the definition of the new product specifications. Local staff members, always with the participation of resident

[189] As CKD operations (see footnote 9, in p. 6), SKD operations concerns the final assembling stage of the production process. However, differently from the former, in SKD activities, assembling kits are incomplete and require some further localisation efforts. For instance, some parts, such as tires, wheels, seats, headlights, windscreens and glass, batteries, interior plastics are produced locally.
[190] As quasi-SKD operations were not considered in the capability scale (Table 2-2, p. 43), a 1.5 level was assigned to the Argentinian subsidiary during this period to differentiate it from nationalisation activities (level 2).
[191] In September 1998, the then President of the Brazilian subsidiary of Nipponcars claimed that the domestic content was 47%, but the subsidiary was "making an effort to reach this goal [60%] so that we can export" (Marinelli, 1998).

engineers from the parent company, were also invited to provide proposals and solutions for the development of the parts to be developed in the region. For instance, in the case of the facelift of the Hilux pickup introduced into the market in 2001 –which included modifications in the engine, design and safety features–, a group of local engineers from Nipponcars Argentina moved to Japan with local parts already tested in prototypes (Interview NC-PROD1). Although this closer involvement in development activities did not imply a significant delegation of new responsibilities to the subsidiaries operating in the region, it was considered by local managers as an important learning experience inducing the development of problem identification and solving capabilities in Argentina (Interview NC-PROD1).

7.1.4 Summary of Phase 1 (1997-2002)

Figure 7-7 summarises the main corporate factors behind the extremely conservative technological strategy adopted by Nipponcars in the MERCOSUR region (RQ1); and the relative balanced division of labour among the two units (RQ2). As discussed above, to a large extent, this was a consequence of an *extremely centralised corporate engineering strategy* (RQ3). The high centralisation of R&D activities of Nipponcars in Japan is in line with the findings reported by authors such as Hobday and Rush (2007) and Whitley *et al.* (2003). These studies highlighted the reluctance of Japanese firms to give overseas subsidiaries some room to explore technological alternatives with some degree of autonomy.

The limited technological development of the subsidiaries in MERCOSUR was *'magnified' by the conservative business strategy adopted by the company in the region*. This is reflected fundamentally in its product policy, consisting in producing one single vehicle in one country, and in the low production capacity of the new plants settled in Argentina and Brazil.

The cautious behaviour of Nipponcars in the region is largely explained by the *marginal importance the region had for the corporation's internationalisation aspirations*. As seen above, the target of the new internationalisation strategy of Nipponcars pointed mainly to the US market, Asia –a 'natural' area of influence– and Europe. As seen in Figure 7-2 (p. 198), in 1995 the whole Latin American region accounted for 0.08% in Nipponcars' total production. By 2002, five years after its establishment in Argentina, the figure only reached a 0.49%. This represented around 1.28% of Nipponcars' production overseas (the US accounted for 56%, and Europa and Asia for 18% each). Against this backdrop, subsidiaries in the region had neither the aspirations nor the room for independent actions that may result in the achievement of higher capabilities.

It is also true that the *macroeconomic turmoil* experienced by MERCOSUR member countries soon after the arrival of Nipponcars to the region certainly did not help in creating the conditions for the adoption of a more aggressive strategy. As seen above, as a consequence of this situation, the production of a compact vehicle in the region was deferred several times. The *lack of presence of Nipponcars in a segment which in 2001 represented more than 70% of the Brazilian market prevented the subsidiaries in the region from gaining presence and importance within the corporation*.

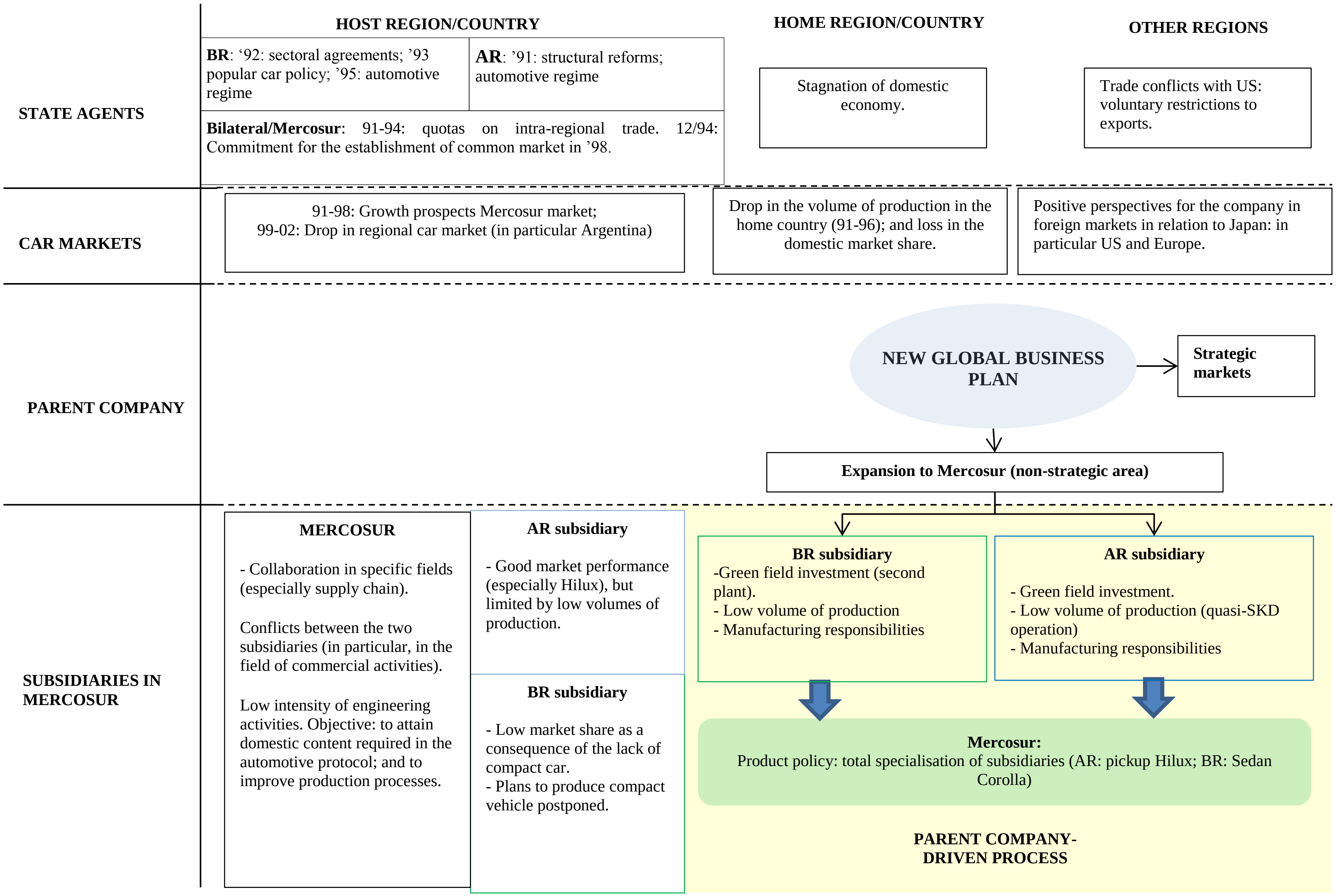

Figure 7-7 - Process of technological development of Nipponcars in MERCOSUR (1997-2002)

Source: Own elaboration on the basis of fieldwork

7.2 Phase 2 – The creation of Nipponcars-MERCOSUR (2003-2009)

7.2.1 Nipponcars strengthens its internationalisation strategy

In 2002, Nipponcars announced a new business strategy: the so-called *Global Vision 2010*. Among other goals, the company intended to further *acelerate its international expansion with the ambitious purpose of accounting for 15% of the global market*. In the context of this strategy, new manufacturing facilities were established in France, China, the Czech Republic and the US. The results of this strategy were reflected in an increasing percentage of Nipponcars' production overseas as shown in Figure 7-2 (p. 198).

Nipponcars accompanied this quantitative expansion with the *progressive reorganisation of its corporate structure. The objective was that of "managing the increasing complexity that resulted from its rapid expansion"* (Shimizu, 2009: 83). The company acelerated the *decentralisation of the management of the overseas operations* with the creation of 'regional headquarters': initially in the US for the North American region[192]; then in Belgium for Europe[193]; and in Singapore, China and Thailand for Asia.[194]

The decentralisation did not only involve management activities, but also some engineering responsibilities. This represented a change in Nipponcars' tradition which, as seen above, was characterised by a high degree of centralisation in this field. However, as can be seen in Figure 7-8, core R&D as well as advance development of components and systems remained concentrated in Japan. Development and design responsibilities located in foreign subsidiaries were strenghened and some new facilities were built to this end, for instance, in France (2000), Thailand (2003) and Australia (2003) (Toyota, 2013a). The main responsibility of these centres was to facilitite the localisation of parts as well as to introduce some adaptations in products to meet the preferences of consumers in host regions.

[192] The first initiative in this direction was adopted in 1996, when the company established the Nipponcars Motor Manufacturing North America to oversee the manufacturing operations in North America. In 2000, the holding Nipponcars Motor North America was created to manage manufacturing, R&D, financing, sales, public relations and marketing operations. Later on, in 2006, Nipponcars Motor Engineering and Manufacturing North America (TEMA) was established in order to manage R&D and manufacturing operations in the region (Shimizu, 2009; Toyota, 2013c).

[193] Nipponcars Motor Europe NV/SAS was formally created in 2005 as an European regional headquarter (Toyota, 2013c). However, already in 1998, Nipponcars had organised in Europe a regional structure to coordinate the production of vehicles and parts (Shimizu, 2009; Toyota, 2013c).

[194] Nipponcars created regional headquarters with different functions in three countries. In Singapore, Nipponcars Motor Asia Pacific Pte Ltd. was created in 1990 with the objective of supplying ASEAN countries and providing sales support for marketing in Asia. In 2001, Nipponcars Motor China Investment Co., Ltd. was established with liaison, public relations, and sales responsibilities in that country. In 2003, Nipponcars Motor Asia Pacific Engineering and Manufacturing Co., Ltd. was created in Thailand, mainly with development responsibilities and with the purpose of providing support to localisation efforts in the region (Toyota, 2013c).

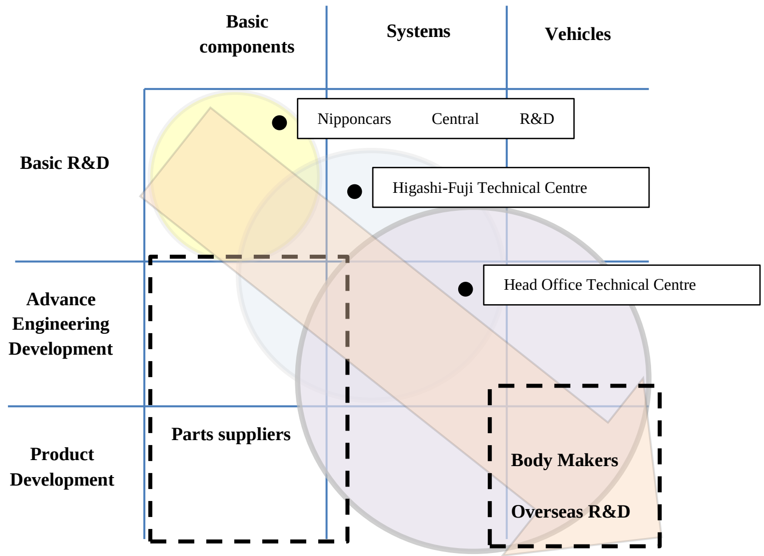

Figure 7-8 - R&D system of Nipponcars
Source: Nipponcars Motors Corporation

7.2.2 The creation of Nipponcars-MERCOSUR

In the context of the ambitious internationalisation strategy, in 2003 the company created Nipponcars-MERCOSUR. The then vice-President of the new organisation claimed that the decision also entailed a closer integration with the rest of the corporation, and reflected the increasing importance attached by the parent company to the subsidiaries located in the region.[195]

The main objetive of Nipponcars-MERCOSUR was to improve the efficacy of the management of the operations in the region in order to face the new stage of the business plan of the company in the region launched in 2002. This plan involved a substantial enlargement of the production capacity intalled in the MERCOSUR, firstly in Brazil and then in Argentina. This expansion, as will be examined below, posed significant challenges for the management of a wide range of areas demanding a better coordination at regional level, in particular, product and process engineering, procurement and sales.

The status of Nipponcars-MERCOSUR, however, was not formally that of a 'regional headquarters' as those created in the other parts of the world indicated above. Rather, it could more appropriately be defined as a coordination management unit (Figure 7-9).[196] In February 2003, the then president of Nipponcars MERCOSUR stated: "The objective of the integration is to speed up the decision-making process of the two companies, improving the

[195] According to the then Senior Vice-President of Nipponcars Mercosur, "the top leadership had the vision of transforming [Nipponcars] into a global company. […] The importance of the region is related to the growth of the subsidiaries in the Mercosur" (Econômico, 2003, own translation).
[196] It is interesting to note that neither Nipponcars Mercosur nor even Mercosur as a region are mentioned in Nipponcars' corporate report on R&D, manufacturing, sales, export activities of the company (Toyota, 2013b).

conditions for competing with the big carmakers operating in MERCOSUR" (own translation, Mercantil, 2003b). A group of directors, most of them coming from Japan, established themselves in Brazil, where the offices of Nipponcars-MERCOSUR were located. They assumed responsibility for the coordination of the activities of the Argentinian and Brazilian subsidiaries, which, however, formally remained independent units.

Nipponcars-Mercosur did not entail the existence of a formal hierarchy between the two units. However, it is worthwile noting that managers from the Brazilian subsidiary assumed executive responsibilities in the new structure. For instance, in 2003, when the organisation was created, the same person was president of Nipponcars-Mercosur, president of the Brazilian subsidiary of Nipponcars and CEO of Nipponcars Argentina. The former CEO of Nipponcars do Brasil assumed responsibility for the direction of the commercial activities and institutional relations of both the Argentinean and Brazilian subsidairies.

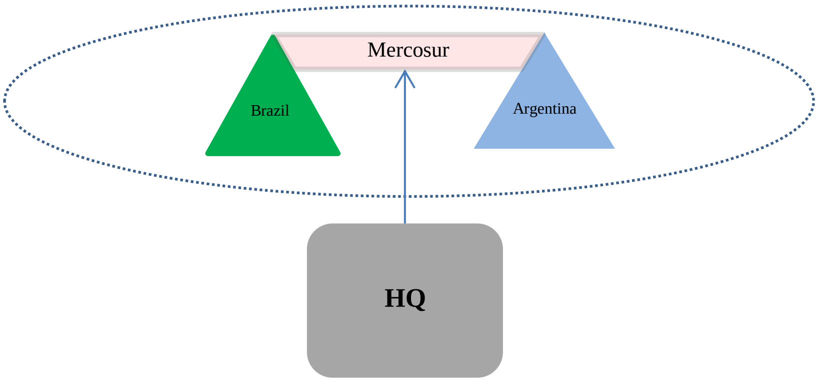

Figure 7-9 – Nipponcars MERCOSUR: a coordination management unit
Source : own elaboration on the basis of fieldwork

The second factor accounting for the creation of Nipponcars MERCOSUR was the necessity of *coping with the disputes and competition between the two subsidiaries in the region* (Interview NC-PROD1; Interview NC-PROD2). Against the backdrop of the expansion plan to be executed in the region and a closer integration with the global corporation, the conflicts between the two subsidiaries had to be neutralised. As pointed out above, these conflicts traditionally affected the commercial area. Additionally, as the chances of producing a compact car in the region increased, the competition for the allocation of this model also turned into a field of dispute between the two subsidiaries. It was clear, however, that the Brazilian subsidiary had a clear advantage by virtue of the fact that it was the largest market in the region (Interview NC-PROD1)[197].

[197] From 2003, when the regional market resumed its growth (Figure 4-3, p.91), the company rekindled its interest in producing a compact car in the region. However, once again the decision was deferred many times. A review of the news published in the Brazilian press reveals that factors affecting this decision were related to both the domestic economic situation and the hesitation in the parent company about the characteristics and the geographical scope the compact vehicle should possess. See, for instance, Diario Comercio (2004); Econômico (2003); Estado (2005); Mercantil (2003a).

Managers interviewed from different areas considered that, in practice, the centralisation of decision-making bodies in a regional managerial structure made the process more efficient, easing tensions and avoiding the duplication of functions (Interview NC-PA1; Interview NC-PROD1; Interview NC-PROC1; Interview NC-PROD2). At the same time, such structure encouraged a closer collaboration between the two plants [198], including benchmarking activities, the exchange of information on quality and outcome indicators (Interview NC-PROC1), and the development of suppliers in the region (Interview NC-PA2).[199]

7.2.3 The expansion of Nipponcars' production capacity in the region and the Innovative International Multi-purpose Vehicle project (IMV): the big leap forward for subsidiaries in MERCOSUR

- *The expansion of production of Nipponcars in Brazil (waiting for the compact vehicle)*

As indicated above, the creation of Nipponcars-MERCOSUR was closely related to the enlargement of the production capacity of the two subsidiaries in the region. In 2002 the Brazilian unit started an expansion plan which entailed an increase in the production volume from 17,000 to 41,000 units, in 2003, and 53,000 units in 2004 (Figure 7-4, p. 200). The project, which also included the construction of a test track, demanded an investment of around US$ 300 million, partially funded by the BNDES.[200] The new production line was to be used for the production of a new version of the Corolla.

The main challenge for Nipponcars in Brazil was how to *treble the production capacity* in a short period of time, increasing at the same time the *level of domestic content* of locally manufactured vehicles to 70%.[201] The concern about the degree of localisation of parts was mainly related to the necessity of reducing the exposure to exchange rate fluctuations. The devaluation of the Brazilian real in 1999 had caused significant losses to the subsidiary, whose business model was highly dependent on imports. The main obstacle, however, to increasing the level of localisation of parts was the low level of production of the subsidiary.

[198] Some collaboration experiences on specific issues highlighted by managers interviewed, concerned for instance, the process of installation of a stamping press in Argentina for the production of the new Hilux in 2003. This plant was set up in close collaboration with staff members of the headquarters and the Brazilian subsidiary. Similarly, staff members from Nipponcars Argentina moved to Brazil to collaborate with the installation of a plastic injection system in that country.

[199] However, a manager from the area of process engineering argued that benchmarking between the two subsidiaries had significant limitations: "We can share some information on some quality and outcome indicators. However, there is a significant difference in the nature of the products we manufacture in each plant. We [in Argentina] produce a vehicle whose chassis has almost 4000 parts; they [in Brazil] produce a monocoque vehicle with about 1500 parts. The complexity of the two structures is very different" (Interview NC-PROC1).

[200] According to the official information provided by the BNDES, the loan granted to Nipponcars was R$ 92,603,254 (around US$ 40 million). The local press publicized the amount of the loan as R$ 200 million (around US$ 87 million) (Estadão, 2002). When asked about this contradictory information, the BNDES responded that although the total amount of the original approved loan was of R$200 million –as informed in the press–, the contract was finally signed for a lower amount.

[201] During this period, the number of local suppliers grew from 42 to 94 (Garçon, 2002).

In 2004, the President of the company claimed that the localisation of the production of engines and suspension systems demanded a volume of production of vehicles around 150 thousands units (Diario Comercio, 2004). This made the local production of a compact car not only a condition for improving the market share of the company, but also for meeting the conditions of incorporating a higher domestic content in locally produced vehicles.

In those years the Brazilian subsidiary tried once again to convince the parent company about the necessity of producing a compact vehicle in the region. In 2006, the vice-President of Nipponcars MERCOSUR argued:

> We are competing in segments which represent less than 10% of the Brazilian market (sedan cars, pickups trucks and station-wagons). Our participation in those segments is 38%. With a compact vehicle the company would compete in a segment that accounts for 70% of total domestic consumption (own translation, Agencia Estado, 2006).

He also claimed: "It is necessary to show headquarters the importance of the Brazilian market" (Moraes, 2006). In fact, the parent company was planning the production of a global compact platform. However, it was not to be manufactured exclusively in Brazil, but also in Russia, India and China. This made things more complicated and further delayed for some years Nipponcars' decision regarding the compact car (Agencia Estado, 2006).

The expansion of the domestic production capacity did not imply any substantial upgrading in terms of the product engineering responsibilities delegated to the subsidiary (Figure 7-1, p. 196). As in the case of Francocars examined in Chapter 6 (in particular, pp. 168-172), *the lack of a product engineering area with capabilities and autonomy to introduce some developments in locally manufactured products had negative economic implications for Nipponcars*. For instance, the company was only able to launch its flex-fuel engine in April 2007, with a delay of more than four years from the first flex-fuel engine introduced by Volkswagen in March 2003. By then, the flex-fuel technology accounted for more than 76% of vehicles sold in the domestic market.[202] The engine was developed completely on the premises of the corporate engineering department in Japan, with the collaboration of engineers from the subsidiary. According to interviewed managers, the subsidiary had conveyed to the parent company the necessity of developing a flex-fuel engine with some years of anticipation. However, this was not a priority for the latter, as "they were very busy" (Interview NC-PROD2).

- *Integrating MERCOSUR into the IMV project*

In addition to the enlargement of the production capacity of the Brazilian subsidiary, in 2002, Nipponcars decided to involve the MERCOSUR region –and in particular, the Argentinian subsidary– in a global project referred to as Innovative International Multi-purpose Vehicle (IMV). This project developed a whole family of vehicles for emerging countries sharing the same platform: a pickup truck (a new version of the Hilux), a minivan (Innova), and a SUV

[202] Source: ANFAVEA

(Fortuner)[203]. It was the *first time Nipponcars developed vehicles especially targeting developing countries* and which were not to be commercialised in advanced economies such as Japan, North America and Western Europe.

The IMV project represented –as suggested by the name of the project itself– an innovative enterprise for Nipponcars as a global company. The then senior managing director of Nipponcars Motors Corporation made reference to this project as "a new chapter in the history of Nipponcars […] and in the history of the world automobile industry" (Toyota Motor Corporation, 2004: 7-8).

In order to be able to conceive vehicles which met the preferences of consumers and the driving conditions prevailing in destination markets, *Nipponcars engaged foreign subsidiaries in the process of developing the vehicles*. The strategic rationale behind this decision was that *subsidiaries operating in such territories could provide a better understanding of the common demands and pay attention to unique local needs* (Ichijo and Kohlbacher, 2007). To this end, in 2003, two product development facilities were created in Thailand and Australia. Whereas the former participated in the development of the Hilux and the Innova, the latter had a role in the development process of the derivative Fortuner/SW4. As put by Ichijo and Kohlbacher (2007) in their case study research on the IMV project:

> The success of IMV is dependent upon the leadership of local engineers. Historically, Nipponcars used to recruit only Japanese nationals to be designers and engineers, first assign them to work in mother plants in Japan to gain knowledge and skills and then transfer them to overseas factories. Product development stayed within Japan. Nipponcars realised, though, that it did not have sufficient Japanese designers and engineers to be sent to the growing number of overseas plants and, moreover, that local talent was available, which would be helpful for identifying common customer needs in emerging markets. Therefore, in the planning and development stages, this meant listening to dealers and customers in Asia, Africa and South America and repeatedly debating the issues among members of the design and engineering teams. Nowadays, Nipponcars never underestimates the importance of local knowledge. The success of the IMV is dependent upon human resource development in Asia, and more efforts are being made in this area (Ichijo and Kohlbacher, 2007: 123).

The implementation of the IMV project also entailed the development of a global network for procurement and logistics for the project. The main responsibility for the management of that network rested on the Thai subsidiary. Other three subsidiaries of Nipponcars abroad were selected as manufacturing and exporting platforms of the IMV products: Indonesia, South Africa and Argentina (Figure 7-10). From these countries, the vehicles were to be exported to Asia, Europe, Africa and Oceania. Around 95% of the vehicles components were produced in developing countries, in particular, Thailand, Indonesia and Philippines. The objective was to localise as much as possible the production in order to achieve lower procurement costs and more competitive prices (Ichijo and Kohlbacher, 2007).

[203] In Argentina this model is commercialised as SW4.

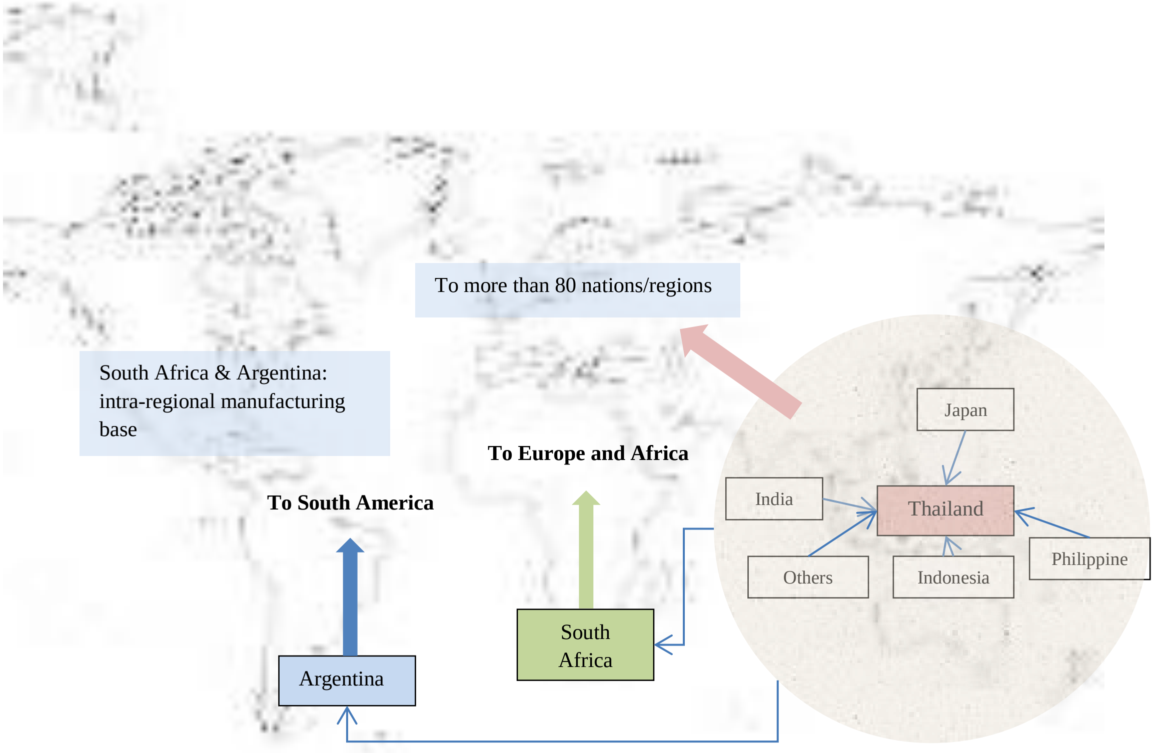

Figure 7-10 – Development of global manufacturing base and distribution network of the IMV Project
Source: Nipponcars Motors Corporation

The participation in the IMV project posed significant challenges to Nipponcars-MERCOSUR and, in particular to its Argentinean unit, which was in charge of the production of two products: the Hilux and the SW4 (Interview NC-PROC1). A substantial enlargement of the production capacity of the Argentinean subsidiary was carried out, demanding an investment of US$ 200 million (Cleide, 2002). The production grew from 19,000 units, in 2004, to 46,000, in 2005, and 64,000, in 2006 (Figure 7-3, p. 199). About 70% of the local production was to be exported. The number of destination markets served by the Argentinian plant diversified, including the South and Central American regions, and not only just Brazil and Uruguay, as used to be the case.

But, in addition to this expansion, the project required, as seen in Figure 7-10, a closer integration of the subsidiaries located in the region with the rest of the corporation. As argued by one of the managers: "This represented a big leap forward in terms of achieving a closer integration within the corporation. In the past, we were isolated; now, as we participate in the IMV project, we are part of a global network" (Interview NC-PROC1). The managers interviewed argued that challenges posed by the project were particularly demanding in the areas of logistics and production programming. The subsidiary passed from a situation in which a large share of parts were mostly imported from Japan and Brazil to a situation in which the supply of inputs came from different locations. This demanded an accurate production programming and a fine-tuned coordination with the rest of the other subsidiaries participating in the project.

The participation of the Argentinian plant in the IMV project also implied a transition from a quasi SKD-type of operation to a full-fledged production plant with in-house stamping facilities. The localisation of parts and components demanded great efforts to product engineering and procurement departments. Then, Nipponcars-MERCOSUR strengthened supplier development activities, providing support and transferring knowledge to firms operating in the region in order to improve their productivity levels (Interview NC-PA1; Interview NC-PA2).[204]

Beyond the intensification of localisation activities (level 2 in Figure 7-1, p. 196), the *participation of Nipponcars-MERCOSUR in the IMV project did not imply the delegation of new product engineering responsibilities to the region*. The product development process was fundamentally carried out by the parent company in collaboration with the Thai subsidiary, and the Australian one in the case of the Fortuner/SW4. The role of subsidiaries in Argentina and Brazil remained extremely marginal (or *peripheral* in terms of Figure 2-6, p. 43). The participation of local engineering teams continued to be fundamentally confined to the provision of technical support to corporate engineering staff members who visited the country to gather information. Over the years, however, as the project evolved and changes were applied to the original models, the parent company demanded a more proactive behaviour from the subsidiaries in MERCOSUR. For instance, the subsidiaries were asked to collect data on the experience of consumers in the region and to elaborate on proposals to meet their demands (Interview NC-PROD1). In the words of the managers interviewed, during this period:

> The parent company started to demand from us that we be more autonomous. They wanted us to develop our own strategy, to have a more intense interaction with the corporate engineering unit. They want us to have a different kind of management. I have been working in Nipponcars Argentina for many years and I can tell you that this is a radical change for us (Interview NC-PROC1).

7.2.4 Summary of Phase 2 (2003-2009)

As can be seen in Figure 7-11, summarising the analysis above, during this period the two subsidiaries of Nipponcars in the MERCOSUR region faced two main challenges: firstly, to adapt themselves to a substantial increase in manufacturing output; and, secondly, to become integrated into Nipponcars' corporate network. The *creation of Nipponcars-Mercosur was the strategic response of the parent company to this double challenge*.

[204] For instance, in 2003, the two subsidiaries created the so-called Kaizen group. They selected strategic suppliers –originally only three– and trained them in order to improve the quality of their products, delivery times, costs, management, and production process (Interview NC-PA1; Interview NC-PA2).

The *first challenge was a consequence of the intensification of Nipponcars' internationalisation strategy under the Global Vision 2010* (RQ3). As seen in Figure 7-2 (p. 198), in 2009 almost 57% of vehicles were manufactured overseas. The expansion in those years focused *particularly on emerging economies*, especially Asia, which grew from 6.6% to 23.57% surpassing the US as main manufacturing location overseas. The *Latin American region accompanied this expansion, maintaining, however, a modest participation*: the region accounted for 2.85% of total vehicle production of the company by 2009, which represented around 5% of total production abroad (Toyota, 2005; 2013c).

The second challenge –i.e. the integration of MERCOSUR into the corporate global network– materialised through the participation of the subsidiaries into the project IMV. In fact, this project represented the implementation of a *differentiated product policy for emerging markets with the purpose of accomplishing Nipponcars' aspirations for a broader geographical expansion* (RQ3). The IMV project played an important role for the growing importance of subsidiaries of Nipponcars located in emerging economies. Some units overseas –in particular, the Thai one– were able to upgrade their position within the corporate division of labour. However, the *role of MERCOSUR subsidiaries in this scheme remained peripheral* (RQ1).[205]

It is worth noting here that the creation of a *regional management structure at Nipponcars-MERCOSUR was the first step for a slow and progressive shift of the regional centre of gravity towards Brazil* (RQ2). Decision-making positions within the organisation were located in that country. Training activities in the region were mostly carried out there as well. Over the ensuing years, as the subsidiaries were given more product engineering responsibilities –even though remaining within level 2 (Figure 7-1, p. 196)– these responsibilities were mostly allocated to the Brazilian unit (Interview NC-PROD1).

[205] For instance, the delay of more than four years in the development of the flex-fuel engine highlighted the peripheral position and the limited technical capacity of subsidiaries in the region within the corporation.

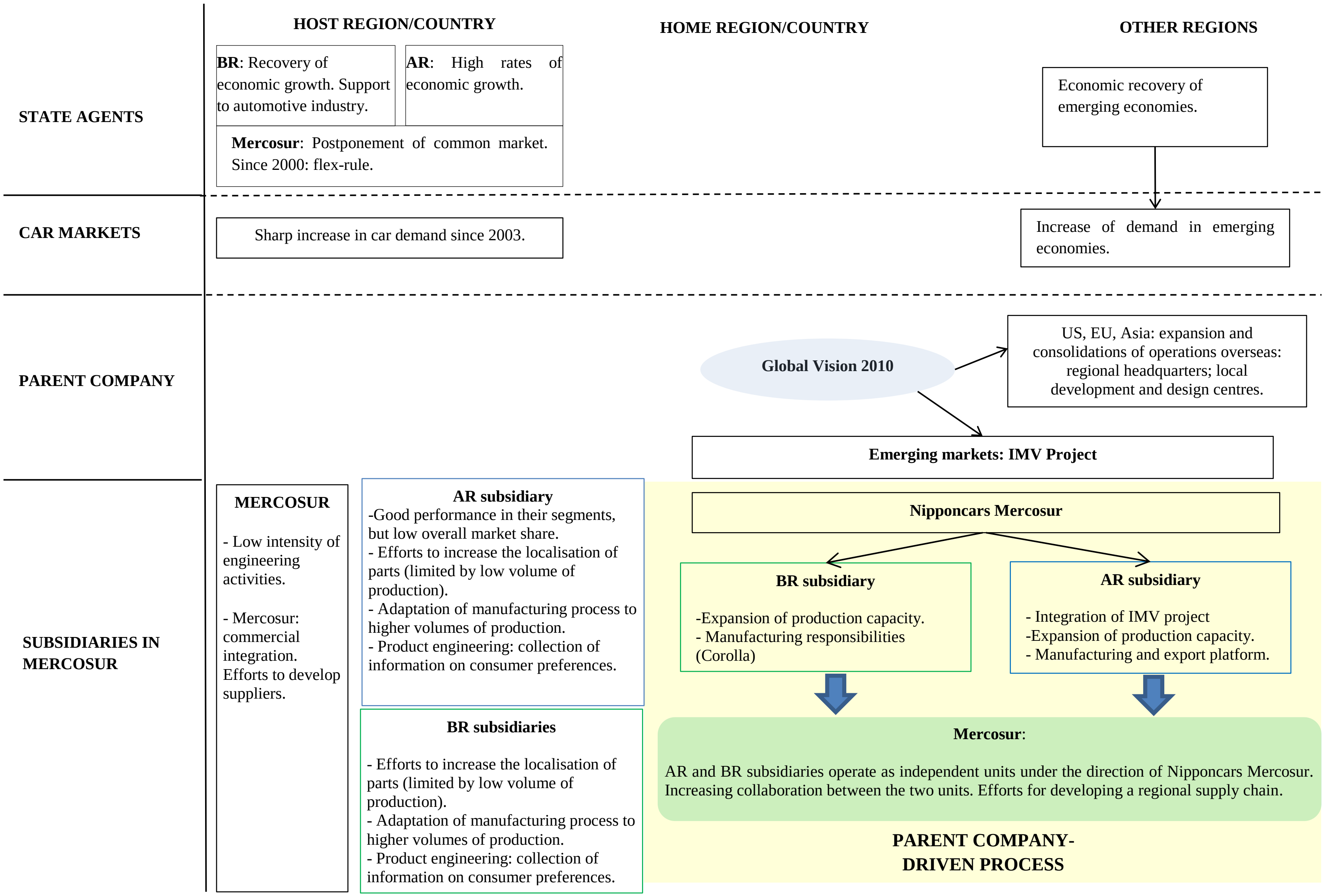

Figure 7-11- Process of technological development of Nipponcars in MERCOSUR (2003-2010)

Source: own elaboration on the basis of fieldwork

7.3 Phase 3 – A compact car finally produced in the MERCOSUR region (2010-2011)

This brief time period is marked by the allocation of a new compact car project for the Brazilian subsidiary.[206] As summarised in Figure 7-12, although this project did not entail any substantial change in the role of the subsidiaries operating in the MERCOSUR region, it affected the intra-regional balance between the subsidiaries.

7.3.1 Global vision 2020 revisited: empowering subsidiaries

In March 2011, the president of Nipponcars presented a reviewed version of the corporate strategy entitled Global Vision 2020 Toyoda (2011).[207] The core of the new 'vision' sketched in the document reflected the purpose to give more autonomy and to further strengthen the decision making bodies of Nipponcars' units overseas (RQ3). In his own words:

> Our global headquarters in Japan will provide overall direction and identify *what* we need to do. We will invest our regional operations with the authority and the responsibility for determining *how* to proceed. We at headquarters will provide the regional operations with a full measure of support as they take the initiative in addressing regional needs and circumstances. The regional operations are our customer interface. So we will equip them to make the decisions that ought to be made in the marketplace, near the customer.
>
> As we work to fulfil the global vision, the regional operations will have a bigger say than ever before in formulating policy. They will provide decisive input in determining how to provide their customers with the best possible cars and how to maximize our contribution in their regions. They will take the initiative in defining their mission and in preparing their own management plans. Our chief regional officers will spearhead that autonomy in cooperation with the executive vice president responsible for their regions (Toyoda, 2011: 4, emphasis in the original).

[206] As this section covers a brief period of time, it does not include a concluding summary .

[207] The motivation for the reformulation of Nipponcars' global strategy should be found in the quality control problems the company had experienced during the second half of the 2000s. Although the problems were mainly concentrated in the US market, they affected the company worldwide. Between November 2009 and February 2010, Nipponcars was forced to recall around 8 million vehicles produced from 2004 (Camuffo and Weber, 2012). The problem acquired such a magnitude that the president of Nipponcars was invited to testify to a bipartisan commission at the US Congress in February 2010. According to the company, the quality problems were rooted in the fast production growth experienced by Nipponcars in the last few years. As put in the words of his President:

> I fear the pace at which we have grown may have been too quick. I would like to point out here that Nipponcars' priority has traditionally been the following: first; safety, second; quality, and third; volume. These priorities became confused, and we were not able to stop, think, and make improvements as much as we were able to before, and our basic stance to listen to customers' voices to make better products has weakened somewhat. We pursued growth over the speed at which we were able to develop our people and our organization, and we should sincerely be mindful of that (quoted in Camuffo and Weber, 2012: 98).

In terms of the product engineering responsibilities delegated to subsidiaries, however, the document did not unveil significant novelties with respect to the scheme depicted in Figure 7-8 (p. 207). Japan remained as the main R&D centre, in particular, of “high-value-added models, such as the Lexus models and hybrid models” (Toyoda, 2011: 5). North America was the area most benefitting from this, as it would “attain even more autonomy and integration. For the Camry and other vehicle series –the document claimed– we plan for North America to become a global centre responsible for R&D and production, as well as exports” (Toyoda, 2011: 5). The North American area also would collaborate with the parent company in the area of information technology and “other leading-edge fields”. China deserved a special mention as a strategic pole with product development responsibilities to “enrich our Chinese model line with new product offerings” (Toyoda, 2011: 6). Other Asian countries and Oceania would specialise in the development of the IMV family and small cars. “We hope –the document stated– that our operations in these countries will grow into global bases of lean and efficient R&D and production ramp-ups” (Toyoda, 2011: 6).

Finally, the document made reference to a group of regions, among which was Latin America, which were clearly not part of the core strategic targets of the company.[208] The role of the subsidiaries sited in these countries, as defined in the Global Vision, was to “learn from the experience of other regions and maximize the benefits of motor transport while minimizing the drawbacks” (Toyoda, 2011: 6). In a nutshell, *although the new corporate strategy aimed at strengthening foreign subsidiaries, the company did not seem to have a new role for the MERCOSUR region, which remained peripheral within its global structure*.

7.3.2 A compact vehicle finally manufactured in MERCOSUR: the Etios

After various years of ongoing hesitation, in 2008, Nipponcars finally confirmed the selection of Sorocaba, in the state of São Paulo[209], as the location to build a new plant where the long-delayed project of manufacturing a compact vehicle was to be carried out (Silva *et al.*, 2008).[210]

The new project revealed that Nipponcars had finally decided to adopt a new product policy in the region to achieve its original goal of attaining a 10% market share of the Brazilian market (RQ3). The initial volume of production of the new models was, according to the expectation of local managers, of around 70,000 units (El Cronista, 2010). This implied that the Brazilian subsidiary would more than double its current capacity.

[208] The other two areas are Middle East and Africa.

[209] The global crisis of 2008/9 forced the company to postpone the construction of the new plant in Sorocaba.

[210] The competition among Brazilian states for attracting the plant of Nipponcars to their territory was very intense. In 2008, a Brazilian newspaper reported: “According to Nipponcars’ communication department, ten Brazilian states presented proposals to host the new plant of the company; however, the option for Sorocaba was not made on the basis of the public incentives, but on the good access to a qualified workforce and on a well-established automotive supplier network offered by the region” (Commercio, 2008). The ten states were the following: Sao Paulo, Rio de Janeiro, Minas Gerais, Espírito Santo, Paraná, Santa Catarina, Rio Grande do Sul, Bahia, Pernambuco e Mato do Grosso do Sul.

As confirmed by Nipponcars in 2010, the model to be produced in Brazil was the Etios. The vehicle was firstly launched onto the Indian market, but it had been conceived with the purpose of serving the other massive BRICS markets as well –i.e. Brazil, Russia, China and South Africa. The model was developed by a team of engineers from the parent company who studied the Indian market and spent some time in India in order to examine consumer habits and preferences (Schmitt, 2010).[211]

The Brazilian unit did not participate in the development process. Its role was restricted to the introduction of minor adaptations to allow local manufacturing and the nationalisation of parts to meet domestic content requirements (level 2 in Figure 7-1, p. 196). As a matter of fact, managers of the Brazilian subsidiary showed some reluctance to produce the Etios as they argued that the model did not meet the taste of domestic consumers. They fundamentally claimed that Brazilian customers were more refined than in India, and therefore liked vehicles with some level of sophistication and with advanced features, even when the price was low. These demands, however, were disregarded by the parent company.[212]

Some of the interviewed managers claimed that the *allocation of the compact car project to the Brazilian subsidiary impacted on the intra-regional balance between the Argentinian and Brazilian subsidiaries* –in particular, in what regards its future evolution (RQ2) (Interview NC-PA1; Interview NC-PROC1; Interview NC-PROD1). Although the project did not entail the delegation of more complex product engineering capabilities as measured in the scale in Table 2-2 (p. 52), it contributed to strengthening the engineering department located in Brazil in relation to its Argentinean counterpart. The change was partly a result of the increase in the production capacity of the subsidiary and the growing pressures from the parent company to localise more parts.[213] For the first time from its establishment in MERCOSUR, the intra-regional balance between the two subsidiaries in terms of the volume of production would be significantly altered in favour of one of the two subsidiaries.[214]

During this period, the Brazilian unit assumed some product engineering responsibilities related to what managers interviewed referred to as the 'preparation' or the 'launch of products' to be manufactured in the region. In particular, this implied working with local suppliers for the localisation of parts and components. In the future, they claimed, Brazil should focus more on this type of activities, whereas Argentina should concentrate on the

[211] Among other notable specific features of India, the lead engineer of the Etios project stressed that the country often has "narrow and bad roads", people "lack driving manners", there is "intense competition at the traffic lights" and "goats, cows, bicyclists and more coexist on the roads with cars that often have no rear-view mirrors". He talks of "sometimes 8 people in a car" and "a number of other people that attach themselves to the outside of the car" (Schmitt, 2010).

[212] Once the vehicle was launched, during the second half of 2012, the demands of the subsidiary proved to be right. The vehicle received very bad reviews from specialised publications and sales levels were well below the expected figures.

[213] In August 2012, Nipponcars announced that an engine plant would be built in Brazil. The plant, which is expected to be inaugurated in 2015, would produce around 200,000 engines for the Corolla and the Etios (Mendes, 2012).

[214] This change cannot be observed in Figure 7-3 and Figure 7-4, which only covers the period 1991-2011. The increase in the volume of production of Nipponcars in Brazil should be noticeable from 2013.

area of manufacturing (Interview NC-PROD1; Interview NC-PROC1; Interview NC-PROD2).

In general, managers interviewed claimed that this was part of a ‘logical’ process, mainly justified by significant differences in the market size, infrastructure, and economic stability of the two countries. They agreed that the duplication of functions had to be avoided, in particular, in the field of product engineering activities where physical presence is not as necessary as in the case of process engineering (Interview NC-PA1; Interview NC-PROD1; Interview NC-PROC1; Interview NC-PROD2) (RQ3). As put by one of the interviewed engineers:

> It does not make any sense to have product engineering departments in the two countries simultaneously working, for example, on the launch of new vehicles, or in the development of local parts and suppliers. These areas will be further integrated in the future. However, as every process in [Nipponcars], this will be a gradual process (Interview NC-PROC1).

It is worth noting that in 2012, an advisor from the International Advisory Board of Nipponcars stated for the first time that the Brazilian subsidiary could be given more complex product engineering responsibilities in the future. He argued: “If the Etios attracts Brazilians to the extent of achieving the production target of 70,000 units per year, the plant in Sorocaba can become an engineering centre and develop its own products. It is a new phase of [Nipponcars] in Brazil” (own translation, Dal Poggetto, 2012). In this regard, one of the interviewed managers asserted that the Brazilian subsidiary already has the capabilities to assume product development responsibilities. It is the parent company which does not want to delegate them” (Interview NC-PROD1).

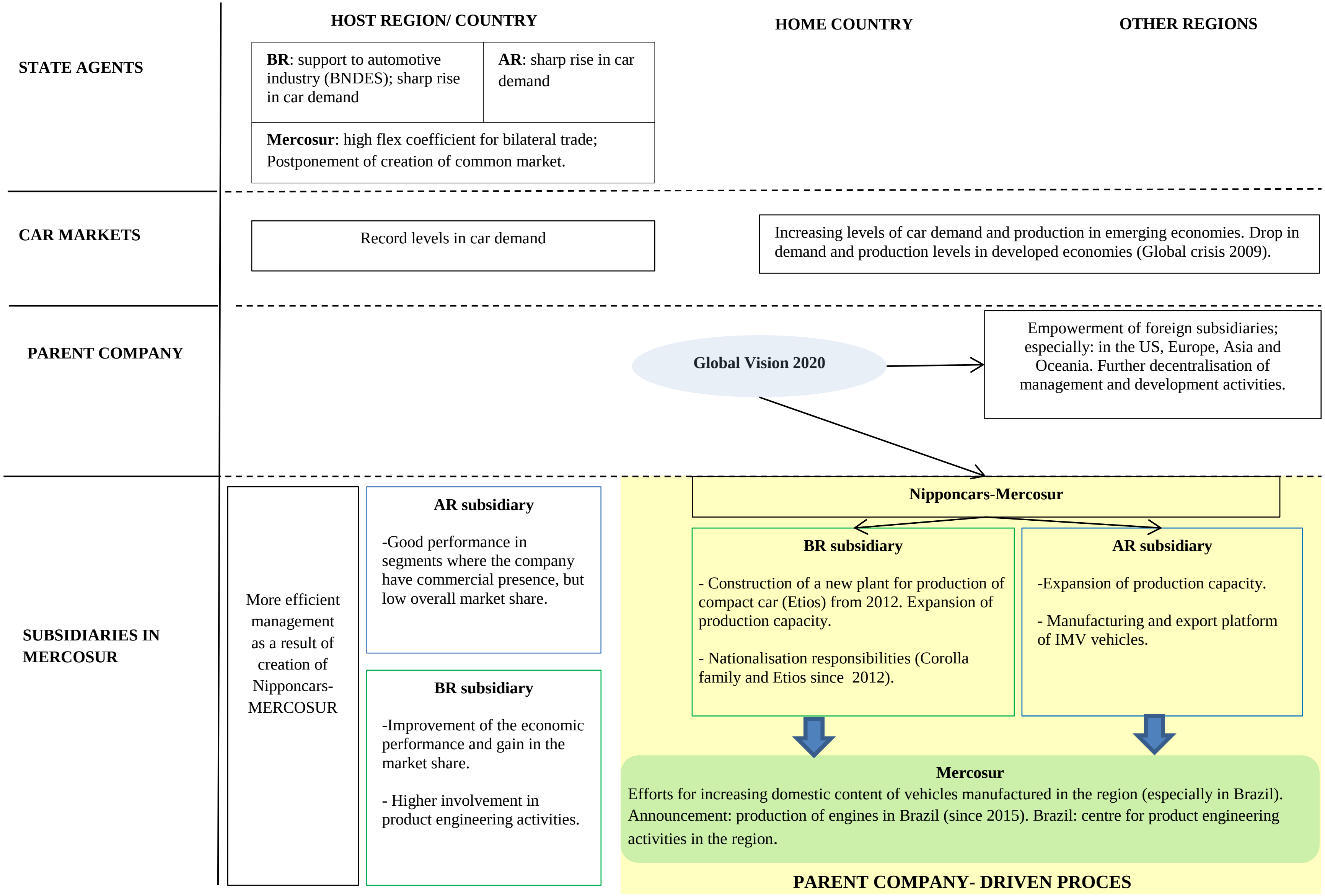

Figure 7-12 - Process of technological development of Nipponcars in MERCOSUR (2010-2011)
Source: own elaboration on the basis of fieldwork

Part III
Analysis and Conclusions

Chapter 8 Cross-case comparison

The principal objective of this study is to contribute to the understanding of the technological behaviour of MNCs operating within the MERCOSUR integration scheme and its contribution to the process of technological change of its member countries.

This matter is directly linked to broader questions which are at the core of the development conundrum of peripheral economies and have attracted the attention of Latin American scholars and politicians from the second half of the 20th century[215]: What should be the driving agents of economic modernisation in peripheral countries? What are the potentialities and limitations of relying upon MNCs to lead such a process? What is the role of the state in encouraging the modernisation of the economic structure? What are, in particular, the opportunities associated with collective regional projects for the modernising aspirations of individual member countries or the threats to them?

This study focused on the case of the automotive industry, and addressed in its empirical chapters three specific research questions:

- *Research question 1* (RQ1)*:* How did the technological strategies of automotive MNCs operating in MERCOSUR evolve between 1991 and 2011?

- *Research question 2* (RQ2)*:* How did the division of labour in product engineering activities between the subsidiaries operating in Argentina and Brazil evolve between 1991 and 2011?

- *Research question 3:* What was the role of the state agents and MNC agents (parent companies and subsidiaries) in defining the technological strategies of carmakers in MERCOSUR (RQ1) and in shaping the division of labour between subsidiaries operating in Argentina and Brazil (RQ2)?

It is clear that the nature of this study –in particular, the use of a multiple case study methodology and the focus on one specific industry– limits the possibility of generalising the conclusions drawn here (Miles and Huberman, 1994; Yin, 2009). Rather, as discussed in Chapter 3, the aim of the cross case comparison in this section is to reconcile "an individual case's uniqueness with the need for more general understanding of generic processes that occur across cases" (Miles and Huberman, 1994: 173); and to build "a general explanation that fits each of the individual cases, even though the cases will vary in their details" (Yin, 1994: 112).

[215] As already pointed out In Latin America, these issues have been particularly studied within the sphere of the ECLAC and the so-called Latin American structuralist school. For a review of this intellectual framework and how it approached the issues pointed out above, see Bielschowsky (1998); 2009); Rodríguez (2006).

This chapter is organised in three main sections. The first one explores issues related to RQ1 and RQ3, in particular, the corporate factors hampering the adoption of more knowledge-intensive technological strategies in the MERCOSUR region. In the same vein, the second section is devoted to the analysis of RQ2 and RQ3, as it examines corporate factors giving shape to an increasingly hierarchical division of labour among subsidiaries in the MERCOSUR automotive space. Finally, the third section discusses the role of state agents as 'regulators' of the MERCOSUR automotive space and the limitations of the automotive regulatory framework to promote the internalisation of modernisation forces in the region in a balanced way (RQ3).

8.1 The difficulties for internalising exogenous sources of technological change in the MERCOSUR automotive for space

This section analyses the corporate factors limiting the localisation of more knowledge-intensive technological strategies within the MERCOSUR territory. Or, to put it differently, the limited capacity of subsidiaries to become 'carriers of modernisation' as was expected of them when the regional integration scheme was put in place in 1991. The section is organised as follows: firstly, the evolution of the technological strategy adopted by carmakers in MERCOSUR is described. Secondly, the structural nature of intra-firm hierarchies is examined. Finally, a cross-case comparison is presented to shed light on the specific corporate dimensions affecting the technological trajectory of automotive MNCs in the region.

8.1.1 The persisting technological gap within MNCs

Figure 8-1 (below) shows the evolution of the technological strategy followed by the three automotive MNCs examined in this study. The technological strategy is understood as the degree of innovativeness of the product engineering activities conducted by automotive subsidiaries in the region, as measured with the capability scale included in Table 2-2 (p. 52).[216] In accordance with the 'revealed capability' approach used in this study (Figueiredo and Brito, 2011), the technological strategy gives an indication of the relative position of subsidiaries in MERCOSUR within the corporate division of labour.[217]

As indicated in the figure, a significant technological gap existed between 1991 and 2011 between subsidiaries in the region and other units of the corporation carrying out more knowledge-intensive activities. In essence, activities with greater capacity to promote technological change remained located in Triad countries. Corporate engineering departments in home-countries maintained an exclusive control over the bulk of R&D activities as well as

[216] Figure 8-1 shows the highest level of the technological activities carried out by any of the two subsidiaries of the examined companies in the MERCOSUR region as measured by the scale included in Table 2-2 (p. 43).
[217] As explained in Chapter 2 (pp. 40-43), the notion of 'revealed capability' indicates that the level of capability attained by firms is inferred from the knowledge required by the *actual activities they carry out*. From this perspective, it is possible to deduce the relative position of subsidiaries in the MERCOSUR region within the intra-firm division of labour in the sphere of product engineering activities.

the development of products for richer countries incorporating leading edge innovative technologies (levels 7 and 8 in Table 2-2, p. 52).[218] From an evolutionary approach to economic development, the limited accumulation of innovation capabilities by subsidiaries in the MERCOSUR region highlights their inability to become driving agents of an endogenous processes of technological change (Bell and Pavitt, 1995; Kim, 1997; Lall, 1992).

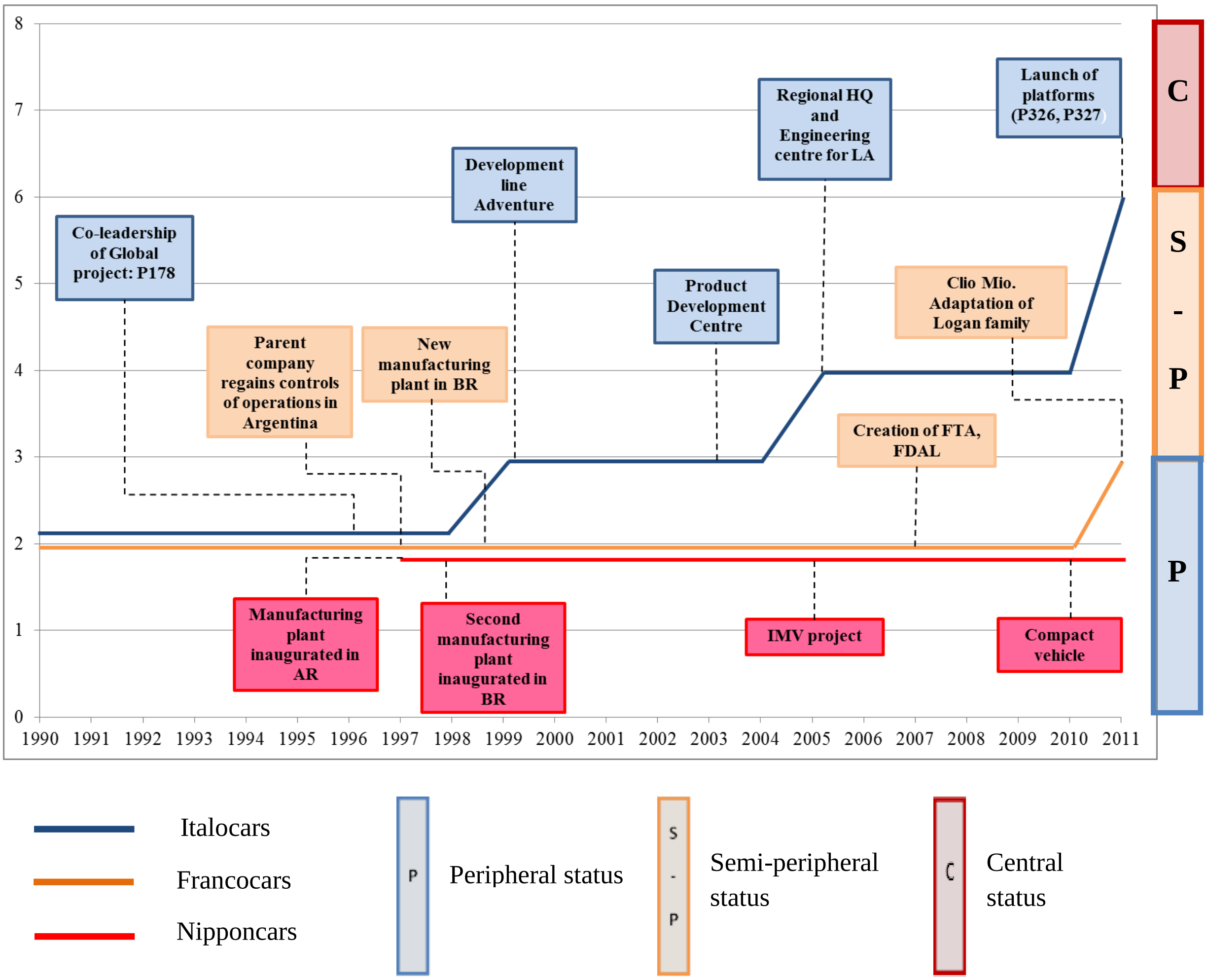

Figure 8-1 - Technological strategy of Italocars, Francocars and Nipponcars in MERCOSUR
Source: own elaboration

However, Figure 8-1 also highlights the fact that the evolutionary paths of the three companies were not homogenous. Building upon the classification of automotive spaces proposed by Humphrey *et al.* (2000)[219] it is possible to identify the configuration of two

[218] The activities of the centre are not only focused on the area of automotive engineering but have applications also in other sectors: for instance, advanced materials, ICT and electronics.

[219] As discussed in Chapter 2, Humphrey *et al.* (2000) identifies three different types of automotive spaces (pp. 32-36). The 'peri-central' scheme corresponds to automotive networks organised around one or more countries belonging to the group of Triad nations (e.g. NAFTA, EU). The 'peripheral regional integration' corresponds to the case of developing regions where automotive MNCs from Triad nations follow market-seeking strategies with the objective of exploiting regional markets. Finally, 'Protected national markets' corresponds to the situation of some big countries (e.g. China and India) where automotive production networks are largely

different forms of regional integration schemes within MERCOSUR. The first one, corresponding to the cases of Francocars and Nipponcars, resembles the structure of a 'peripheral regional integration' –depicted in Figure 2-6 (p. 43). Subsidiaries in the region progressively gave shape to a functionally integrated network around the MERCOSUR area. In the sphere of manufacturing and commercialisation activities, as indicated by the 'peripheral' adjective, local product engineering activities were maintained at low levels of knowledge intensity, and more advanced innovation activities were carried out outside the MERCOSUR region.

The case of Italocars offers a different and original scheme, which was not included in the classification of automotive spaces identified by Humphrey *et al.* (2000): that of a 'semi-peripheral regional' area. In this case, the company established a development centre in the MERCOSUR region –specifically in Brazil– which was given knowledge-intensive product development mandates within the corporate division of labour. As a result, the Brazilian subsidiary assumed a 'semi-peripheral' status –corresponding to the intermediate level in Figure 2-9 (p. 48)– and some management responsibilities over 'peripheral' subsidiaries both in MERCOSUR and outside of the region. The semi-peripheral status of the subsidiary entails that the product engineering activities it carried out were behind the technological frontier and geographically circumscribed to emerging markets. The parent company, in Italy, kept its monopoly of more advanced engineering activities (level 7 and level 8 in Table 2-2, p. 52).

Before examining the corporate factors accounting for the hierarchical division of labour in automotive MNCs, it is worth stressing a significant contribution made by this study with respect to other pieces of work which dealt with the technological behaviour of automotive subsidiaries in the region. As discussed in Chapter 2 (in particular, pp. 48-54), most of these studies evaluated the technological evolution of subsidiaries using a capability scale of the type proposed by Consoni and Quadros (2006b) –see, for instance, Amatucci and Mariotto (2012); Balcet and Consoni (2007); Quadros and Consoni (2009). This scale was not capable of grasping the persisting technological gap between subsidiaries in the region and the parent companies in Triad countries, giving in some cases the impression that disparities had been bridged. This was mainly a consequence of excluding from the apex of the capability pyramid functions more knowledge-intensive such as R&D activities.

In fact, those studies were more concerned with the development of subsidiaries in terms of the accumulation of capabilities in their own national context. And, therefore, the problem of the corporate division of labour at global level was not explicitly raised. The capability scale used here sought to address this shortcoming, including more advanced levels of technological capabilities corresponding to consistent R&D activities; and the differentiation between the development of vehicle platforms for world or richer markets and those for emerging regions.[220] Additionally, with the purpose of evaluating the relative position of

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protected from foreign competition. Differently from the other two cases, public and local private domestic companies have a significant participation in the network. They establish different types of partnerships with subsidiaries of MNCs and become major vehicle producer.

[220] For a more developed explanation of the technological capability scale, see Chapter 2 (pp. 43-46).

subsidiaries within what can be called the corporate division of labour, levels of technological capabilities were divided into three main categories: centre, semi-peripheral and peripheral.

8.1.2 The structural nature of the intra-firm hierarchies

The contrasting experience of Italocars, on the one hand, and Francocars and Nipponcars, on the other, in terms of the technological strategies followed in the MERCOSUR region raises important questions concerning the driving forces behind technological upgrading within the corporate division of labour. In terms of the conceptual discussion developed in Chapter 1, the following questions may be posed:

- Does technological upgrading originate in a differentiated access to geographically bounded resources, as argued by analytical approaches conceiving of the MNC as a knowledge network (Barlett and Ghoshal, 1989; Cantwell and Iammarino, 2003; Cantwell and Zhang, 2009; Castellani and Zanfei, 2006; Papanastassiou and Pearce, 2009)?
- Does upgrading result from the autonomous implementation of more effective learning mechanisms (Jensen *et al.*, 2007) at the level of the subsidiary?
- Or, rather, is it centrally determined by decisions made by parent companies within the broader frame of the global business strategies (Ariffin and Bell, 1999; Coe *et al.*, 2008; Dicken and Malmberg, 2001; Geppert and Dörrenbächer, 2011; Hobday and Rush, 2007)?
- Is upgrading an indication that subsidiaries may ‘catch up’ –to use a term commonly used in the evolutionary innovation literature– with ‘central’ peripheral units of the corporation?

As pointed out above, the nature of this study does not allow for a generalisation of conclusions drawn from case studies. However, evidence from empirical findings offers two interesting insights on the nature of automotive MNCs which would be worth exploring further in subsequent studies. *Firstly, the technological gap between central, semi-peripheral and peripheral units seems to be a structural feature of MNCs.* As examined in Chapter 2, the global restructuring carried out by carmakers from the early 1990s as a response to the so-called globalisation process, initially entailed the (re)concentration of product engineering activities in the home countries of MNCs (see discussion in pp. 35-48). Local engineering teams of subsidiaries which until then operated within protected national automotive spaces were downsized or completely dismantled. In sum, the creation of more integrated global production networks allowed for a more efficient allocation of resources at aggregate corporate level, causing however, on the other hand, the destruction of capabilities accumulated within national automotive spaces.

The upgrading of some selected subsidiaries to a semi-peripheral status in the last decade should not be interpreted as a result of a ‘catching-up’ process resulting from the autonomous implementation of in-house technological learning mechanisms in subsidiaries. It was rather an ‘evolutionary mutation’ –to use the expression by Nelson and Winter (1982)– carried out by parent companies under the same global network logic. The purpose of such a mutation was that of improving the performance of the company in emerging markets to maintain the profitability at the global level. Semi-peripheral automotive subsidiaries were given very specific responsibilities mainly circumscribed to the geographical area in which they operated or in markets with similar characteristics. These units had proved to be better prepared than parent companies to provide faster, more effective and cheaper responses to the particular necessities of these types markets. Minor adaptations were insufficient to meet the requirements posed by local consumption profiles, in particular in most popular segments of small and compact vehicles. The internationalisation of intermediate and low development activities seemed to follow a pattern of 'concentrated dispersion' –to use Ernst's (2002) expression–, which explained the emergence of selected semi-peripheral locations. Against this background, automotive parent companies maintained a strong preference for keeping their control over strategic R&D and more advanced product development activities.

The second feature of automotive MNCs brought to light from the case studies is the highly hierarchical nature of these companies. The mobility of subsidiaries within the corporate division of labour was essentially regulated by the parent company in a unilateral manner. Autonomous in-house technological efforts were very limited, making the technological gap unbridgeable.

Although empirical findings in this study clearly show that the degree of verticality and rigidness of the 'Hymerian' MNC (1970; 1971) happened to be relaxed, subsidiaries were far from being "drivers of their own technological evolution" as argued by knowledge network approaches ((Barlett and Ghoshal, 1989; Cantwell and Iammarino, 2003; Cantwell and Zhang, 2009; Castellani and Zanfei, 2006).[221] In accordance to this latter approach the efficacy of hierarchical power of the parent company over subsidiaries has been very limited. The privileged access to geographically bounded resources embedded in differentiated economic and institutional domains is supposed to have been a significant source of autonomy for subsidiaries enabling them to undertake their own development path (1990).

Subsidiaries of the three companies examined here in fact did not have autonomy to devise more intensive technological learning strategies. Parent companies showed a strong preference for monopolising more knowledge-intensive activities, and had power to do this by exerting strict control over subordinated units. As a matter of fact, as put in evidence by the case of the development of the flex-fuel engine in Francocars and Nipponcars, parent companies *were reluctant to allow subsidiaries to exploit location-specific resources to which they had privileged access*. They preferred to 'reinvent the wheel' of flex-fuel engines internally rather than rely on local agents which had already mastered the technology –even at the expense of a long delay in the launch of products incorporating this technology with respect to pioneering local subsidiaries.

Therefore, although it may sound like a contradictory idea, the *three companies underwent a process which might be referred to as a 'Hymerian' de-verticalisation of intra-firm hierarchies*. This means that decentralisation of intermediate knowledge-intensive activities was a top-down process fundamentally controlled by parent companies, rather than a bottom

[221] For a discussion on Hymer's ideas on intra-firm hierarchies and corporate division of labour, see Chapter 1 (pp. 15-17).

up one propelled by subsidiaries, as originally argued by the 'differentiated network' advocates (Barlett and Ghoshal, 1989; Cantwell, 2009; Castellani and Zanfei, 2006).[222] *Subsidiaries had little room to upgrade their relative position within the corporate division of labour through autonomous in-house technological efforts*.

As pointed out before, within the framework of strategies fundamentally driven by market-seeking motivations, the main factor motivating the technological upgrading of the relative position of subsidiaries in the MERCOSUR within the corporation was to be found in a large and strategic host-market. This represented a significant limitation to the autonomy of subsidiaries, as the market –differently from some resources, such as knowledge– was a factor completely external and out of the control of subsidiaries. It was also subject to the strong fluctuations produced by macroeconomic instability characterising peripheral economies (O'Connell, 2001) –more on this in the next section.

Reflections on the technological perspectives of subsidiaries with efficiency-seeking mandates, in as discussed in Chapter 1, seems to be valid for the case of subsidiaries with market-seeking motivations as well:

> The sources of the differentiated position enjoyed by these subsidiaries within the MNC network are completely external to them: they stem from the juxtaposition of advantages provided, on the one hand, by the technology developed by the corporation; and, on the other, by a specific resource availability offered by the host-environment (p. 30).

In the case of subsidiaries with market-seeking mandates, the 'specific resource' underpinning their differentiated role within the corporation is therefore the size and growing perspectives of the regional market. Against this backdrop, the efficacy of public policies aimed at promoting the modernisation of economic structures relying upon MNCs is very dependent on its capacity to control a large and strategic market (this issue will be explored below, where the experience of MERCOSUR will be contrasted with that in other regions).

Among the three case studies examined here, it was only the Brazilian subsidiary of Italocars which was able to assume during the second half of the 2000s, control over its technological trajectory (see Chapter 5, pp. 140-149). The creation of the Product Development Centre was the milestone marking the transition from a parent-driven to a subsidiary driven technological learning process. Drawing on this particular case and the conceptual discussion conducted in Chapter 1 (in particular, discussion in pp. 29-30), it is therefore possible to conceive of the existence of a 'capability threshold' from which subsidiaries are able to undergo with a higher level of autonomy a 'creative transition' from low to more advance technological capabilities (Papanastassiou and Pearce, 2009). But even in the experience of Italocars –in line with findings reported, for instance, in studies by Ariffin and Bell (1999) and (Hobday and Rush, 2007)– conditions for the subsidiary to be able to attain such threshold and to drive its own technological trajectory were generated by external decisions made by the parent company.

[222] For a review of the 'differentiated network' approach, see Chapter 1 (pp. 17-20).

In sum, *the scope for autonomous upgrading of subsidiaries operating functionally integrated global networks and governed through hierarchical structures seems to be very limited*. Management and technical responsibilities as well as the resources necessary to perform more knowledge-intensive functions are centrally allocated according to a network logic which avoids duplication of activities with large economies of scale such as R&D activities. In essence, the driving forces for subsidiaries to become 'carriers of modernisation', making a transition from a peripheral to a semi-peripheral status, were out of the control of the subsidiaries themselves.

As stated in the literature review in Chapter 1, "the capacity of subsidiaries to embark in a virtuous learning trajectory should therefore be analysed taking into consideration how it interfaces with different dimensions of the corporate strategy which are largely controlled by the headquarters" (p. 31). With the purpose of addressing the problem raised in RQ3, building upon the cross-case comparison the section below will analyse three 'dimensions of the corporate strategy' which happened to be relevant to explain the evolution of technological trajectory of the three firms in the MERCOSUR automotive space between 1991 and 2011:

- the *product policy* of the company at global and regional levels;
- the *organisational structure of corporate R&D activities*;
- the *strategic importance* attributed by the company to the host region within the internationalisation strategy pursued.

The three dimensions should not be seen as independent factors. As argued in Chapter 2, they are interrelated components of corporate business strategies pursued in the last two decades and oriented towards gaining a presence in strategic emerging markets (see pp. 35-48).

8.1.3 Three dimensions of the corporate strategy shaping technological strategies in peripheral areas

- *Differentiated product policies for emerging regions*

The three case studies provide evidence supporting the notion that the first condition for an automotive MNC to make in the decision of adopting a more knowledge-intensive technological strategy in emerging regions was the implementation of a differentiated product policy for such a specific type of market. After some internationalisation initiatives based on home-country or global platforms product policies which yielded poor results, parent companies adjusted their product policies. This entailed the development of families of products developed to accomplish the particular preferences and conditions prevailing in those 'peripheral' automotive spaces. As discussed in the case studies, parent companies relied on selected subsidiaries hosted in emerging destination markets to advance the development of new products: Italocars selected its Brazilian subsidiary; Francocars, its Romanian subsidiary; and Nipponcars its Thai subsidiary.

This strategy justifies referring to this process as a case of 'Hymerian' decentralisation. The boost for the decentralisation of product engineering responsibilities did not come from the increasing power and autonomous initiatives of subsidiaries (Cantwell and Zhang, 2009; Ghoshal and Barlett, 1990). Rather, it originated in decisions centrally adopted in the headquarters with the purpose of expanding the presence of the company overseas.

Local engineering teams were considered (and proved to) be better prepared than central corporate engineering departments to grasp local preferences and requirements, and therefore to provide useful insights for the development of vehicles. Their geographical proximity to final consumers allowed them to have a more profound knowledge of the profile of local customers and of the driving conditions partially motivating consumer choices. Furthermore, they could provide faster responses to changes in local market conditions. Last, but not least, the cost of engineering manpower services in peripheral areas allowed for a reduction of development costs.

The experience of Francocars is probably the one that more clearly highlights the linkages between the adoption of a differentiated product policy for emerging countries and the delegation of more knowledge-intensive responsibilities subsidiaries overseas. Until the mid-2000s, this company tried with little success to expand its presence in non-European countries selling products developed for richer European regions. The determination to internationalise the Logan project with the intention of achieving a "deeper penetration in non-Western European countries" is at the core of the decision to empower engineering teams in emerging regions.[223] In MERCOSUR, the technological consequences of this product policy materialised in the creation of the FTA and FDLA (see Chapter 6, pp. 183-190). Within this context, the two centres progressively assumed more advanced responsibilities with the purpose of adapting the products of the Logan platform to South American 'tastes'.

Also in the case of Nipponcars, a company which proved to be very reluctant to decentralise product development responsibilities, the implementation of a differentiated product policy for emerging regions resulted in a more knowledge-intensive strategy in subsidiaries overseas. As seen in Chapter 7, the IMV project was accompanied with the creation of engineering centres in the Thai and Australian subsidiaries, which assumed some product engineering responsibilities in the project.

Italocars was the carmaker which was first to adopt a product policy to serve differentiated consumption profiles at a global level.[224] Differently from the other two companies, which selected a non-MERCOSUR subsidiary to perform co-leading functions in the differentiated product policy, Italocars chose the Brazilian subsidiary to play this role. The selection of the

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[223] As seen in Chapter 6, until the development of the Logan family in the mid-2000s, the product policy of the company in emerging countries was based on the same range of products conceived for affluent markets (see pp. 179-181). Models developed by the Technocentre, in France, were commercialised with no significant changes overseas. These products were at the top level of their respective segments and proved to be highly inadequate to gaining a larger market share in MERCOSUR and other emerging markets.

[224] However, as discussed in Chapter 5, as a consequence of its failure, the global scope of the P178 became in practice largely limited to the MERCOSUR territory.

Brazilian subsidiary as an 'anchor site' for the P178 was, as will be further analysed below, closely related to the strategic importance of that specific market for the profit strategy of the corporation.

- *R&D decentralisation strategies*

The decision made by the parent company of implementing a differentiated product policy for emerging markets was, as pointed out above, a necessary condition for subsidiaries to assume more knowledge-intensive product engineering responsibilities. The *strategy adopted by the parent company to decentralise R&D activities determined the actual perspectives allowing subsidiaries to upgrade in the longer term their relative position within the corporate division of labour*. More specifically, this strategy defined the type of activities delegated by parent companies to subsidiaries, the level of autonomy of subsidiaries, and the type of linkages they established with the rest of the corporation.

As illustrated in Figure 8-2, the companies examined in this study opted for different decentralisation strategies. However, as pointed out above, in the three cases control over the process remained the full responsibility of the headquarters and subsidiaries in the region had no capacity to alter the situation.

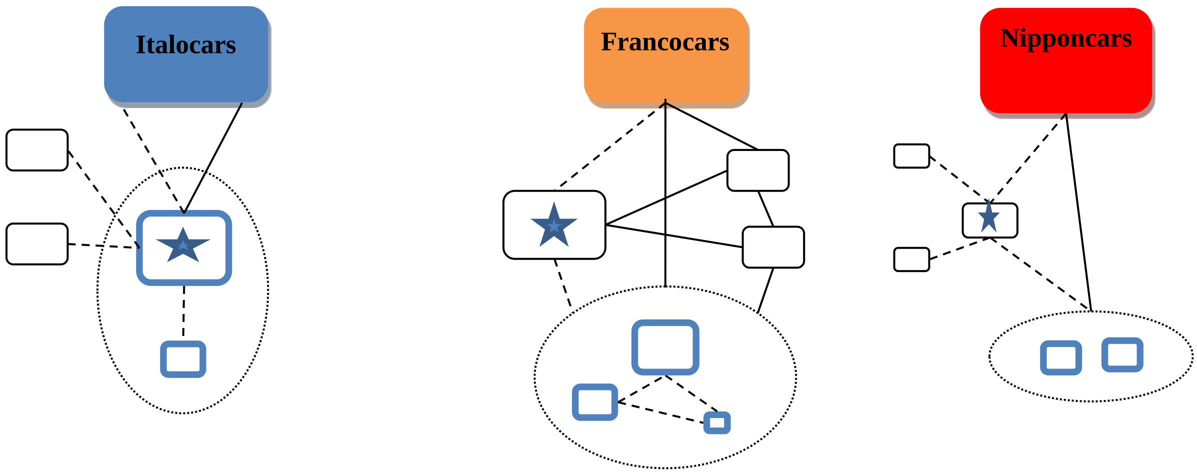

Figure 8-2 – Decentralisation of R&D activities for emerging countries and the role of subsidiaries in MERCOSUR
Source: own elaboration

References

- - - - - - - - - Product engineering activities related to product policies for emerging regions

——— Product engineering activities related to other types of product policies

MERCOSUR automotive space

Subsidiaries in MERCOSUR/Americas region

Other subsidiaries

Parent company

Subsidiary with co-development responsibilities

Italocars showed an early preference for the geographical decentralisation of R&D activities, with the development of the P178 in the early 1990s. The Brazilian subsidiary was chosen to assume a co-leadership role in the project. Whereas in early stages the subsidiary played a collaborative role, as the P178 evolved the parent company transferred more complex responsibilities to it. In 2003, Italocars established in Brazil a fully-fledged product development centre which was the largest of the corporation outside of Italy. The centre endowed the subsidiary with the infrastructure and resources necessary to assume more knowledge-intensive product development responsibilities. From then on, the technical and managerial position of the Brazilian unit within the corporation became increasingly relevant: it assumed product engineering responsibilities for the Latin American region; it turned into a centre of excellence in the area of suspension systems; it assumed the governance of the P178; and, in 2010, it launched into the market the first model completely developed in Brazil. In sum, the progressive decentralisation strategy controlled by the headquarters, accompanied by a significant investment in infrastructure, finally gave the Brazilian unit a great deal of autonomy to control its own technological strategy and that of other subsidiaries in the Latin American region.

As illustrated in Figure 7-8 (p. 207), Nipponcars showed a strong preference for centralising in the parent company R&D, as well as the bulk of advanced development activities in more complex systems and components A gingerly first move towards the delegation of product development responsibilities to foreign units was made in the early 2000s with the adoption of the so-called Global Vision 2010 strategy. However, the actual degree of delegation was very limited and geographically circumscribed to a few subsidiaries located in strategic markets for the company –primarily, the US.[225] In regards to the Thai subsidiary in the IMV

[225] Some specific subsidiaries with product development functions were delegated with some responsibilities in the last stages of the development process of the vehicle. As seen in Chapter 7, in recent years, mainly as a response to the quality control problems experienced by the company in the US, the parent company decided to

project, the level of development responsibilities given to it was very limited, concerning some specific adaptive and evaluation engineering functions.

Although this study has not specifically addressed the question, the position of Nipponcars is in line with findings reported in other studies regarding the traditional reluctance of Japanese MNCs to decentralise R&D activities (Barlett and Ghoshal, 1989; Hobday and Rush, 2007; Whitley *et al.*, 2003). From the perspective of the so called-'varieties of capitalism' literature (Amable, 2003; Whitley, 1998; 1999), scholars argued that this preference originates in specific characteristics of the home-country institutional and ideological setting (see, for instance, Doremus *et al.*, 1998; Pauly and Reich, 1997).[226] The importance of pointing out this issue is related to the fact that limitations to localising activities with higher learning potential in peripheral regions would not only be rooted in the corporate decisions of parent companies but would link back to the regulatory and cultural characteristics of the home country.

Francocars represents an intermediate case of decentralisation of product engineering activities which is at its early stages. As in the case of Nipponcars, until 2007, the French company had an extremely centralised R&D organisational structure under the authority of the Technocentre.[227] In the frame of the so-called Commitment 2009, Francocars created a global engineering (FTX) and design network. From then on, some subsidiaries were able to agree with the parent company on a process of delegation of responsibilities accompanied by a training programme which resulted in the accumulation of capabilities overseas.

It is worth noting that although, on the one hand, the FTX contributed to empowering local engineering teams, on the other, the network organisational structure seems to represent a limitation to the possibility that any member of the network become a fully-fledged product development centre as in the case of the Brazilian subsidiary of Italocars. The distribution of responsibilities among the various centres integrating the FTX is centrally coordinated by the parent company. With the purpose of avoiding the duplication of functions, subsidiaries are given specific responsibilities regarding technical functions (*métiers*) or the management of specific platforms.

- Strategic importance of the region within the corporate internationalisation strategy

As seen above, the implementation of a differentiated product policy for emerging economies and the decentralisation of R&D activities resulted in the implementation of more knowledge-intensive technological strategy overseas. As seen in Figure 8-2, only in the case

take a step forward towards decentralisation, delegating more responsibilities to local product engineering department.

[226] This idea was strongly supported by interviewed managers in the region, who were very clear about the preference of the parent company for a centralised corporate R&D structure and its great resistance to further decentralisation (Interviews NC-PROC1; Interviews NC-PROD1; Interviews NC-PROD2).

[227] See Chapter 6 (in particular pp. 181-183) and Annex E for a detailed analysis of the product development organisation of the company.

of Italocars was the anchor site of the decentralisation strategy located in the MERCOSUR region, giving shape to a *semi-peripheral* integration scheme in the region. The role of the subsidiaries of Francocars and Nipponcars in MERCOSUR was totally different. In both cases, and beyond the progress observed in the former company after 2007, subsidiaries operating in the region maintained a *purely peripheral* position within the corporate division of labour.

The cross case comparison shows that the selection of the subsidiary playing the co-leading role in the development and management of the differentiated product policy was largely influenced by the combination of two factors: i) the strategic importance of the host region within the corporate internationalisation strategy in emerging markets; and ii) the level of development of the subsidiary at the moment of designing the new product policy.

The first factor is directly related to the market-seeking motivations of the internationalisation strategies of automotive MNCs. For reasons already discussed above, companies sought to locate co-development teams close to the largest markets where the new products were to be commercialised.

However, beyond the positive perspectives of host markets, the performance of a co-leading development functions required that subsidiaries have previously accumulated technological capabilities. In all the three cases examined in this study co-leading subsidiaries had a history of technical collaboration with the parent company. The exclusion of newly opened subsidiaries from co-leading positions –even when they were located in strategic markets, as in the case of the Brazilian unit of Francocars– gives an indication of the incremental nature of the capability accumulation process discussed in Chapter 1 (see pp. 25-28) (Bell and Pavitt, 1995; Kim, 1997; Lall, 1992).

In the selection of the Brazilian subsidiary of Italocars the two above-referred factors clearly converged. In the early 1990s, the Argentinian and Brazilian markets were already of strategic importance to Italocars (Figure 8-3). The implementation of the "popular car" policy in Brazil and the perspectives for the creation of a common market in MERCOSUR raised positive expectations in the firm and strengthened the strategic character of the whole region. As stated in Chapter 5, in the early 1990s the company made public its goal "to penetrate into markets where demand will be higher in the next 20 or 30 years: East Asia, Latin America and Eastern Europe" as this was considered to be "the only way of guaranteeing a long-term future for the company" (Fiat Auto Argentina, 2009: 234).[228]

At the time of the planning of the P178, the Brazilian subsidiary was already an important manufacturing site for the corporation.[229] Furthermore, Italocars had a long history in the region and a vast knowledge of the domestic market. The local subsidiary had a tradition of

[228] The strategic nature of the MERCOSUR market within the internationalisation strategy of Italocars for emerging markets is illustrated by the forecasted production figures of the P178. As seen Table 5-1 (p. 137), the Argentinian and Brazilian subsidiaries were expected to account for around 50% of the global production of the two main models of the P178.
[229] Whereas in 1991, the subsidiary accounted for 13% of the total corporate production, in 1993 that figure rose to 22%. Source: Fiat and ANFAVEA.

technical collaboration with the headquarters for the development of features for the domestic market.

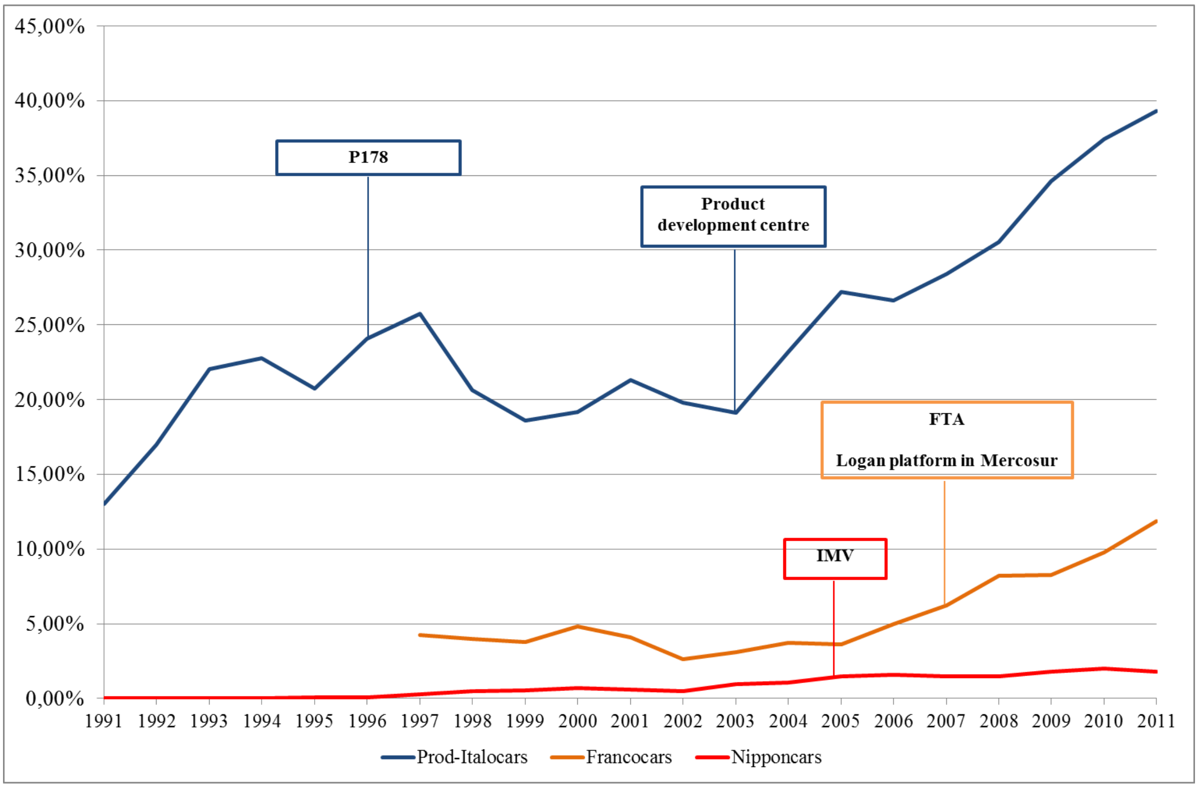

Figure 8-3 – Share of production of the Argentinian and Brazilian subsidiaries over the total production output of the company

Source: own elaboration on the basis of fieldwork and data from companies' reports, ADEFA and ANFAVEA

The relative position of the MERCOSUR region is clearly the opposite in the case of Nipponcars. When, in 2002, the IMV project began, the parent company chose the Asia Pacific region to create product development centres to provide support to corporate engineering department. Thailand was at the time the largest manufacturing pole and market destination of the IMV products.[230]

Moreover, the Thai subsidiary had already collaborated with the parent company in product development activities. In 1996, the subsidiary had collaborated with the parent company in the so-called Soluna project, consisting in the development of a derivative vehicle for the domestic market based on the Tercel model.[231] In the mid-1980s, Thai managers gained

[230] That year, the Asian market (excluding Japan) explained 8.94% of total Nipponcars' sales and 50.2% of sales in emerging regions.[230] In contrast, back then the whole Latin America area accounted for 2.33% and 13.1%, respectively. In terms of manufacturing output, the Asian area also accounted for the largest share among Nipponcars' emerging regions in the world. It represented around 6.6% of the total vehicle production of the corporation, and 78.3% of production in emerging region. Latin America represented only 0.49% and 5.8%, respectively (see Figure 7-2, p. 184). Source: Nipponcars.

[231] The project was then suspended as a result of the Asian financial crisis erupting in 1997.

power in the local subsidiary through a process put in place by the parent company referred to as 'Thainization' (Amano, 2008).[232] The implementation of the IMV project and the creation of the centre contributed to further strengthen the strategic position of the Asian pole which, in 2011, accounted for almost 30% of Nipponcars total production.[233]

In the case of Francocars, the process of selection of the Romanian subsidiary as a co-leader in the development and management of the Logan project was different from that of the other two companies. When Francocars acquired Dacia in 1999, the state of the plant was very bad: tools and equipment were obsolete; manufacturing processes highly inefficient; productivity levels very low, and so forth. The parent company put in place a recovering plan in which participated staff members from different parts of the corporation.[234] The ultimate objective of the plan was to manufacture a new economic model which would carry the Dacia badge, i.e. the Logan (Jullien *et al.*, 2012). [235] However, initially the global aspirations of the Logan project were not as marked as in the case of the P178 and the IMV. As put by Jullien *et al.* (2012):

> Even though product teams started off with the idea of a global deployment, over the course of the project's lifetime, generally there was a strong focus on Eastern Europe, at least during the first few years, substantiating the product's positioning and ensuring its plausibility. It was only subsequently that the original ambition of going global would be resuscitated and attempts made to take the Logan 'on the road' when and opportunity presented itself (Jullien *et al.*, 2012: 14-15).

Once the Logan succeeded in its own home region, and Francocars decided to advance with the geographical expansion of the project, the Romanian subsidiary which had originally hosted the product became the co-leader of the Logan programme. The formal status of product development centre was given only with the creation of the FTR. Over the years, the Romanian centre became the largest member of the network of the FTX network (See Chapter 6, see pp. 179-183).

The MERCOSUR region and, in particular, the Brazilian market had been singled out as a strategic destination by Francocars' managers.[236] The country was perceived as a destination with good growth prospects fostered by the economic structural reforms and the regional integration agreement. However, the subsidiary in Brazil was very young and established in a region with no automotive tradition –the state of Parana. At the same time, the company did

[232] This process was similar as that reported by Whitley *et al.* (2003) concerning the growing importance given by Japanese carmakers to local managers in subsidiaries located in Europe and the US during the same period.
[233] From the expansion of the production capacity carried out between 2002 and 2005 the share of the Latin American region in the global operations of Nipponcars increased. However, the statements included in company reports reveal that the region is far from becoming a strategic objective for the company (see pp. 243-244). Source of data: Toyota Motors Corporation.
[234] For a report on the participation of staff members of the Argentinian subsidiary, see Les Echos (1997).
[235] As seen in Chapter 6, in some countries the Logan was sold under the Francocars brand.
[236] As seen in Chapter 6, even before the French company decided to advance with a more ambitious internationalisation strategy in 1995, it had already started the negotiations to settle down in Brazil (see pp. 177-179).

not have good knowledge of the domestic consumer profile.[237] As illustrated in Figure 8-3, the participation of the production by subsidiaries in MERCOSUR in the corporate manufacturing output was very low, averaging 3.8% between 1998 and 2006. The lack of capabilities of the subsidiary at the time and the bad market performance in the domestic country[238] made it very difficult to think of it as a potential leader in the development of the entry-level range of models.

The situation was only reversed once the Logan family started to be manufactured and sold in the MERCOSUR market, and the FTA was created in 2007. From then on, Francocars was finally able to gain participation in the strategic MERCOSUR region –although still far from the original goal of achieving a market share of 10%. Along with this process, the parent company and the subsidiary agreed on a process of technological learning and delegation of responsibilities to the region.

8.1.4 Conclusions

The Table 8-1 below summarises the cross case comparison conducted in this section on the corporate factors shaping the evolution of the technological strategy adopted in the MERCOSUR region (RQ3). Empirical findings clearly put in evidence the "relentless power of the parent company" (p. 30). The technological strategy adopted in the MERCOSUR region essentially depended on factors centrally controlled by parent companies and external to subsidiaries.

The Brazilian subsidiary of Italocars was the only one that managed to transcend its peripheral status. In the framework of a differentiated product policy for emerging regions, the parent company selected early on the strategic South American region to decentralise development functions. The upgrading process was slow and incremental. Its advancement was underpinned by the good economic and technical performance of the subsidiary.

By contrast, centralised R&D structures such as those adopted by Nipponcars and Francocars (before the creation of the FTX) did not provide subsidiaries with any opportunity to adopt a more knowledge-intensive technological strategy. It is worth noting that, in addition to the lack of a mandate from the parent company, the low levels of capabilities as well as the deficient endowment of human and material resources represented a substantial impediment for subsidiaries to undertake autonomous actions to 'climb up the capability ladder'. In sum, subsidiaries did not have the minimum level of capabilities to autonomously exploit local resources, unlike the claims made by the 'knowledge network' approach.

The experience of the Brazilian subsidiary of Italocars with the development of the Adventure line provides a noteworthy example which highlights how accumulated capabilities sometimes gave subsidiaries *some* room for undertaking autonomous

[237] Precisely, as seen in Chapter 6, in 2001 the company created the Department for Planning and MERCOSUR Product in order to have a better understanding of the profile of consumers in the country (see pp. 183-187).
[238] For an analysis of the market performance of Francocars in Brazil during the period 1998-2007, see pp. 187-191.

initiatives.[239] The subsidiary was capable of developing this particular line of models of the P178 family without an explicit mandate from the parent company –which, as a matter of fact, was against the project. In the end of the 1990s, although the subsidiary was then still performing nationalisation activities, it had a relatively large product engineering team of around 350 people[240] with the skills needed to advance with the development process.

[239] See Chapter 5 for a more detail account of the development of the line Adventure, in particular pp. 139-142.
[240] About 150 out of 350 members of the team were engineers. Source of data: Quadros and Queiroz (2001).

Table 8-1
Corporate factors shaping technological strategy of the corporation in MERCOSUR

		Italocars		**Francocars**		**Nipponcars**	
		1991-2002	**2003-2011**	**1998-2006**	**2007-2011**	**1997-2002**	**2003-2011**
Parent company	**Product policy (emerging markets)**	*Differentiated product policy* Global car project P178	*Differentiated product policy* P178 and new platforms for emerging markets (P326, P327)	*Undifferentiated product policy* Home-country based product policy	*Differentiated product policy* Logan platform	*Undifferentiated product policy* Home-country based product policy	*Differentiated product policy* IMV project
	Organisation of corporate R&D activities	*Moderately decentralised* Selective decentralisation (Brazil)	*Highly decentralised* Product development centre (Brazil)	*Highly centralised* Technocentre	*Moderately decentralised* Global network of engineering centres (RTX)	*Highly centralised*	*Moderately decentralised* Selected regions: US, Europe, Asia Pacific
	Strategic importance of the region	High	High	Intermediate, but poor knowledge of Brazilian market	High	Low	Low
Subsidiaries	**Previous accumulation of capabilities and economic performance of the subsidiary**	<u>Brazil</u>: Good market performance; technical collaboration with parent company <u>Argentina</u>: Greenfield investment in Argentina	<u>Brazil</u>: Good market performance Accumulation of capabilities Autonomous initiatives	<u>Brazil</u>: Well below expectations in Brazil Greenfield investment in Parana (region with no automotive tradition)	Substantial improvement (especially in Brazil) Accumulation of product engineering capabilities	Good, but low scale of production and excluded from most popular segments	Good, but low scale of production and excluded from most popular segments
Technological strategy in MERCOSUR (Position within corporate division of labour: Figure 8-1)		**Peripheral (Level 3)**	**Semi-peripheral (Level 6)**	**Peripheral (Level 2)**	**Peripheral (Level 3)**	**Peripheral (Level 2)**	**Peripheral (Level 2)**

Source: own elaboration

8.2 An increasingly hierarchical division of labour among subsidiaries in the MERCOSUR automotive space

8.2.1 Structurally hierarchical regional automotive spaces

As stated in the Introduction, the modernisation aspirations of the MERCOSUR regional integration initiative were to be pursued on the basis of a principle of 'balance', as explicitly stated in the Treaty of Asunción (*ACE Nº 18 - 1991 (ALADI)*). In terms of the specific matter addressed in this study, this implied that no significant differences were expected to exist in the relative position occupied by subsidiaries operating in the various MERCOSUR member countries within the intra-firm division of labour. Or, to put it differently, that individual subsidiaries would not follow a divergent path of accumulation of technological capabilities.

The exceptional magnitude of structural disparities prevailing within the region posed a significant challenge for member countries to meet equality conditions (Giordano *et al.*, 2008; Masi *et al.*, 2008).[241] With specific regards to the vehicle market, as seen in Figure 4-3 (p. 102) the differences in size between the countries are very large. The ratio between vehicles sold in the Brazilian and Argentinian market averaged 5, between 1991 and 2011 (with a peak above 11 in the triennium 2001-2003; and a low point of 2.4 in the period 1992-1994). Furthermore, the growth potential of the vehicle market, as measured by the number of inhabitants per vehicle, was much greater in Brazil. This was a strong force of attraction leading investment to agglomerate in this country (see Table 2-1, p. 40).

The three companies examined here provide evidence demonstrating that, contrary to original expectations, carmakers organised their regional production networks in MERCOSUR in a highly hierarchical manner. The empirical chapters have clearly shown that, as automotive MNCs advanced with the creation of a MERCOSUR automotive space and adopted a more knowledge-intensive strategy in the region, *the technological gap between the Argentinian and Brazilian subsidiaries widened in favour of the latter*. In other words, *the deeper the integration among subsidiaries and the more intensive the technological strategy in the region, the more hierarchical the division of labour among them*.

Therefore, subsidiaries not only showed serious limitations to their capacity to be 'carriers of modernisation', but also to bring about technological change in a balanced manner. As the integration process advanced, Brazil consolidated as a central power within region. In a sort of fractal effect, the MERCOSUR automotive space ended up reproducing the centre-periphery hierarchical relations prevailing between units in central and peripheral countries.

Following the reasoning in the previous section, the question must be asked whether this intra-regional hierarchical division of labour has a structural nature or, by contrast, whether it is the result of a divergent learning performance which could plausibly be bridged. And, if the latter was the case, where the origins of these divergences are to be found: in the characteristics of the host environment, the power of initiative of subsidiaries to conduct in-house technological efforts, and so forth. In terms of the discussion developed in the literature

[241] See Introduction for figures illustrating disparities in country area, population, GDP.

review, the question is what the drivers behind the divergent technological learning of subsidiaries were (see discussion in Chapter 1, pp. 28-34).

Empirical findings support the conclusion that the driving forces shaping the division of labour within regional areas are quite similar to those operating at the level of the global automotive network. Companies gave shape to functionally integrated hierarchical networks within the MERCOSUR's regulatory framework which were centrally controlled by parent companies. In line with Rugman *et al.* (2011), *the hierarchical character of the network resulted from the asymmetrical redistribution of value chains activities within the region, leading to the concentration of more knowledge-intensive functions in one single location*.

In the field of manufacturing activities, the three companies organised their activities in different ways. Nipponcars and Francocars opted for allocating exclusive regional production mandates to subsidiaries in the two countries. This was the prevalent response of most carmakers in the region.[242] By contrast, Italocars preferred to concentrate exclusive platforms in Brazil and to produce in Argentina only two models which the shared platforms used in the neighbouring countries –i.e. to adopt a *bi-locating strategy*.

But in the field of product engineering and development activities the concentration of responsibilities and resources largely favoured Brazilian units. Local engineering teams were initially downsized in the two countries. However, as companies advanced with their 'evolutionary mutation' at global level, which led them to delegate more product development responsibilities to emerging regions (see Section 8.1.2), Brazil was chosen as their preferred 'anchor' engineering site.

Summing up, the reduction of institutional distances and trade barriers between member countries favoured the manufacturing specialisation of subsidiaries thus allowing for a more efficient use of resources increasing the productivity of firms. On the other hand, however, as MNCs adopted a more intense technological strategy in the region, they opted for concentrating the most knowledge-intensive activities in Brazil, from where they provided 'services' for the rest of the subsidiaries operating in the area. This had a positive impact for the corporation as a whole, but a differentiated effect for individual subsidiaries and their host countries.

As will be further discussed in the next section, the multi-level automotive regulatory framework adopted in MERCOSUR did not address this growing imbalance. As a matter of fact, although studies measuring the actual impact of policies are not available, it might have rather contributed to widening it (Baruj *et al.*, 2008; Bouzas, 2008).

In the process of restructuring the automotive space within the regional space, the parent company maintained a leading position. It retained the power to centrally control the allocation of mandates and resources in accordance to their market seeking-motivations and broader corporate strategies. Going back to the discussion developed in Chapter 1, it is clear

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[242] See Table 4-2 (p. 79), Table 4-3 (p. 82); Table 4-4 (p. 85); and Table 4-5 (p. 88) showing the growing importance of exclusive platform policies adopted by carmakers in the MERCOSUR area.

that, on the one hand, images of current regional automotive spaces are now closer to descriptions of the MNC as a 'heterarchy' (Hedlund, 1986), a 'differentiated network' (Ghoshal and Barlett, 1990), or a 'federation' (Yamin and Forsgren, 2006), than to the rigid Hymerian MNC where dyadic headquarters-subsidiary relations prevailed (Hymer, 1971; 1979) –for a graphical representation, see Figure 8-2 (p. 232). However, on the other hand, the nature of such networks in the three companies examined here proved to be highly hierarchical and still centrally regulated by parent companies.

Within the framework of centrally-controlled MERCOSUR hierarchical automotive networks, it is therefore difficult to conceive of the possibility of an autonomous 'catching-up' process by Argentinian with Brazilian subsidiaries. The hierarchical organisation seems to correspond to a strategic response of automotive MNCs searching for more efficient structures around wider regional spaces.

This is the reason justifying the adoption of an 'embedded' case study research design, which constitutes an original contribution to the literature of this thesis. As discussed in Chapter 3, the driving forces behind divergent technological trajectories of subsidiaries can only be understood from a multi-level systemic approach encompassing the global, regional, national and local dimensions of automotive networks. This is not possible with comparative approaches considering the technological trajectories of individual subsidiaries as if they were autonomous processes.

As pointed out above, although hierarchical forms of organisation prevailed in the MERCOSUR region, the three firms opted for a diversity of structures and strategic options. Building upon the insights by Rugman *et al.* (2011) discussed above (see Chapter 1, pp. 25-27), the section below will analyse the strategies pursued by the three companies to integrate their activities around the MERCOSUR automotive space. The analysis will deal with two specific dimensions of the value chains activities: manufacturing and product engineering activities.

8.2.2 Parent companies articulating a hierarchical MERCOSUR automotive space

- *Regional product policy: exclusive platforms versus bi-location strategies*

As examined in Chapter 4, most automotive MNCs sought to exploit the partial liberalisation of the regional car market by adopting complete specialisation regional product policies (see discussion on pp. 88-100). However, some companies preferred to maintain bi-location strategies. Italocars (Figure 8-4) opted for this latter type of policy. In fact, it was an asymmetrical bi-location: whilst the Brazilian subsidiary had some 'exclusive' models, it was the Argentinian subsidiary which was only allowed to produce vehicles already also manufactured in Brazil. At the other extreme, in the case of Francocars (Figure 8-5) and Nipponcars (Figure 8-6) each subsidiary was entrusted with the responsibility of producing some specific vehicles for the whole region which did not share platforms with models produced in the other country.

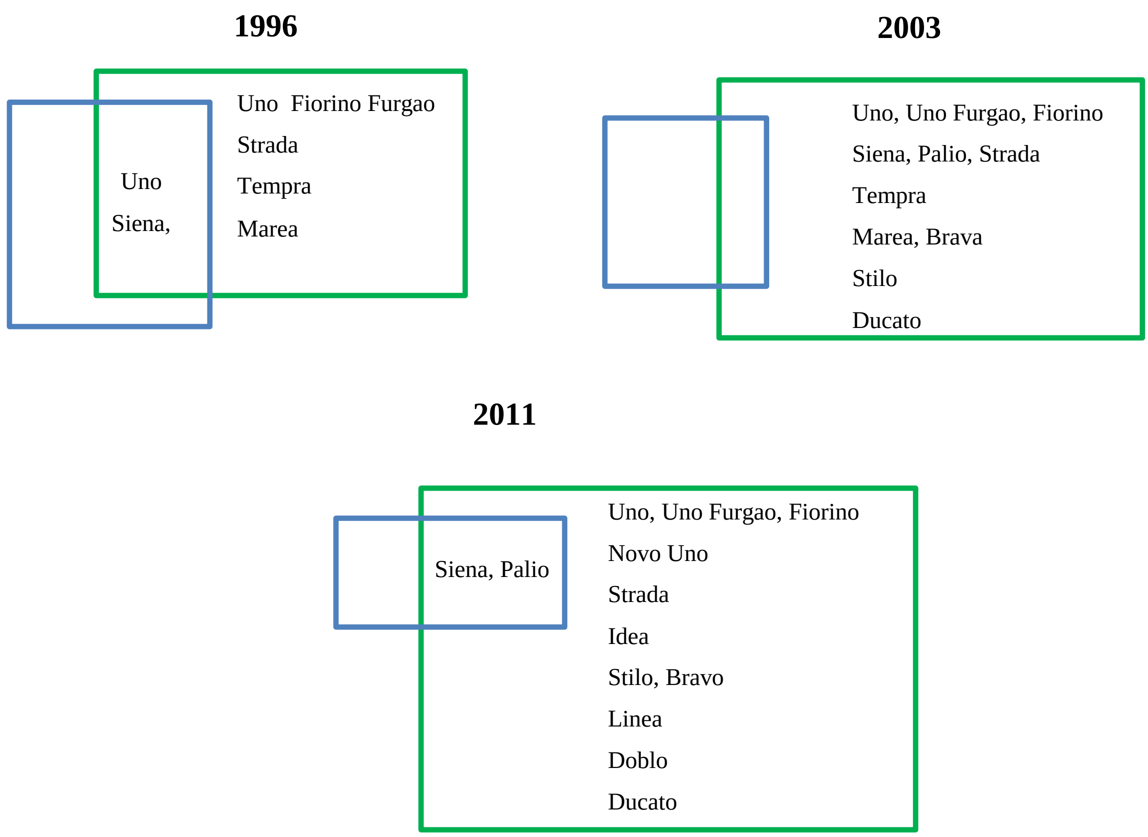

Figure 8-4– Product policy of Italocars in MERCOSUR (selected years)
Source: Own elaboration on the basis of information from ADEFA and ANFAVEA

Models produced by the Argentinian subsidiary

Models produced by the Brazilian subsidiary

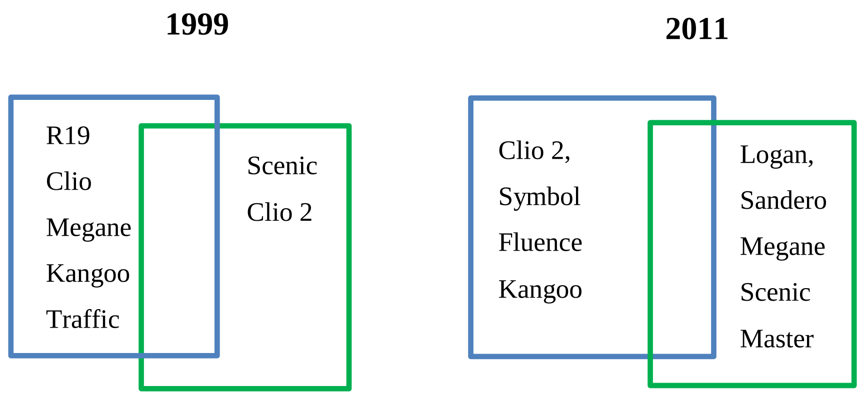

Figure 8-5 - Product Policy of Francocars in MERCOSUR (selected years)
Source: Own elaboration on the basis of information from ADEFA and ANFAVEA

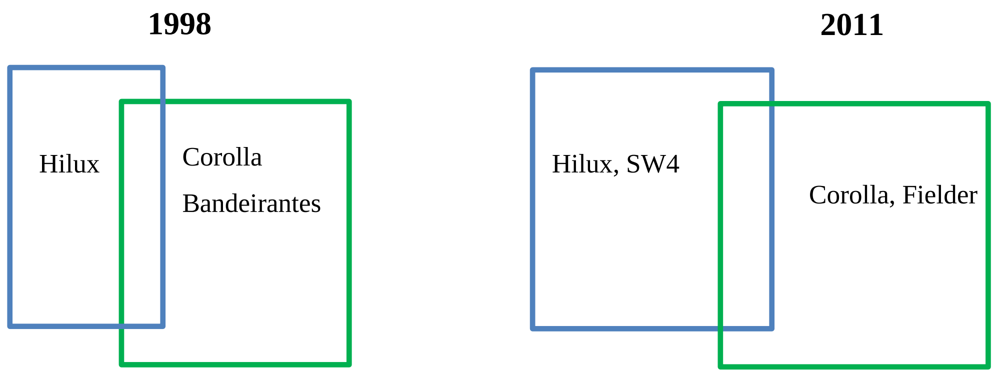

Figure 8-6 - Product Policy of Nipponcars in MERCOSUR (selected years)
Source: Own elaboration on the basis of information from ADEFA and ANFAVEA

It is worth noting that the allocation of 'exclusive' regional platforms was important for restraining significant imbalances and volatility within the region. As can be seen in Figure 8-7 below, the ratio between the manufacturing output of the Brazilian and the Argentinian subsidiaries of companies adopting complete specialisation policies within the region (Francocars and Nipponcars) proved to be much lower and stable than those applying a bi-location strategy (Italocars).[243] The bi-location strategy of Italocars allowed for a more flexible reallocation of production between the two subsidiaries in the region, putting the smaller Argentinian subsidiary in a position of vulnerability. The production mix among the subsidiaries depended on some macroeconomic which were unstable during the period under study, including production costs, real exchange rate, level of domestic demand, and the

[243] The calculation of the standard deviation of the ratio between the manufacturing output of the Brazilian and the Argentinian subsidiaries shows the higher volatility in companies which adopted bi-location product policies. Italocars 1996-2001: 7.03; Italocars 2009-2011: 1.33; Francocars 1999-2011: 0.97; Nipponcars 1999-2011: 0.65.

bilateral regulatory framework, among others. Italocars led this reallocation to the extreme point of interrupting the production of vehicles in Argentina in 2001 (see a more detail account in Chapter 5, pp. 130-132).

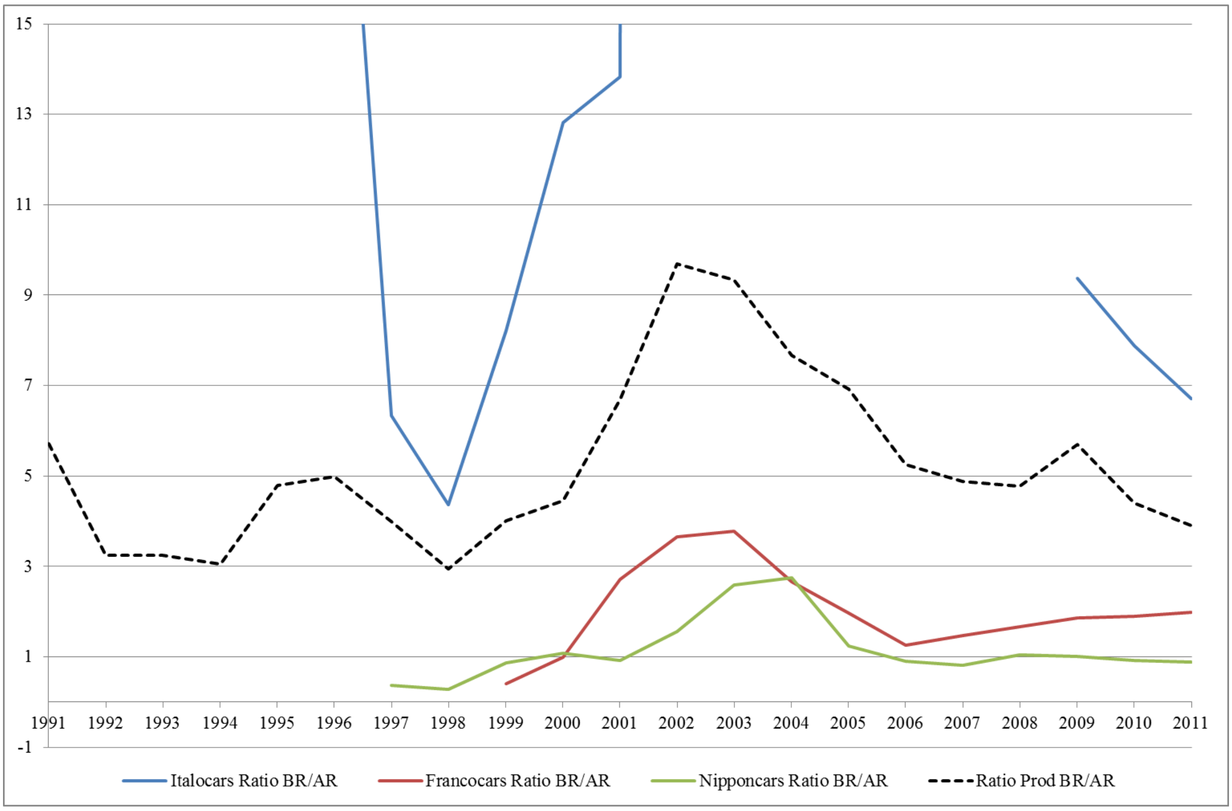

Figure 8-7 – Ratio of production Brazilian/Argentinian plants
Source: own elaboration on the basis of data provided by companies' reports, ADEFA and ANFAVEA
Note: The Argentinian subsidiary of Italocars did not produce vehicles between 2002 and 2009

Exclusive platforms were also important to improving the productivity performance of subsidiaries as they allowed for a higher manufacturing output per platform. Within subsidiaries, sectors related to process engineering departments were particularly interested in obtaining regional exclusive mandates from their parent companies. Their importance –and, sometimes even their *survival*– within subsidiaries was directly related to the possibility of maintaining high and stable volumes of production as well as renewing the models produced regularly.

The importance of exclusive platforms for the evolution of subsidiaries partly explains the competition among them for the allocation of new models. In the case of the three companies examined in this study, this competition was clearly illustrated by the case of the compact vehicle in Nipponcars and, notably by the experience of Francocars during the period of renewal of products in 2006. However, disparities among markets were so significant that Brazilian units had a great advantage over their Argentinian counterparts. As put by a manager of Francocars:

> I think that in the case of Brazil there was no real competition. The establishment in this country was a big market opportunity for the company […] Therefore, at the moment of making decisions on the allocation of products among subsidiaries, Brazil never had to compete. On the contrary, […] there were the other subsidiaries which had to compete to prevent the models they produced being given to Brazil (Interview FC-PROD2).

As will be seen below in greater detail it is worth noting that complete specialisation schemes allocating 'exclusive' platforms to subsidiaries also contributed to partially counterbalance the hierarchical organisation of labour within in the region. Such schemes were associated with a more balanced distribution of product engineering capabilities between subsidiaries in the region (Figure 8-8, below). Regardless of the knowledge-intensity of the technological strategy pursued by each company in MERCOSUR, it was observed that assuming management responsibilities for the platforms produced required the localisation of some product engineering functions. Depending on the level of complexity of the responsibilities delegated to the country, this could entail the co-development of parts with local suppliers, or the management of technical and design restyling works. By contrast, the bi-location strategy of Italocars reduced the necessity of delegating more product engineering functions to the Argentinian subsidiary (Figure 8-9, below). In this scheme, this subsidiary only assumed responsibilities concerning the support to local suppliers or minor adaptations and calibrations in the P178 and P326 vehicles manufactured in the country.

- *Organisation of product engineering activities and intra-regional division of labour*

Figure 8-8 and Figure 8-9 below depict the technological trajectory of individual subsidiaries in the region and, respectively, offer a 'snapshot' of the current organisation of R&D departments.[244] As stated above, although a hierarchical division of labour can be acknowledged in the three firms, the degree of 'verticality' of the existing intra-firm hierarchies within the region is different in each case.

[244] It is worth noting that the technological capability scale proposed in Table 2-2 (p. 45) proved not to be adequate to fully reflect the existing gap between Brazilian and Argentinian units. As a matter of fact, as can be seen in Figure 8-8, only in the case of Italocars was this analytical tool able to demonstrate the divergent process of technological accumulation between subsidiaries in Argentina and Brazil.

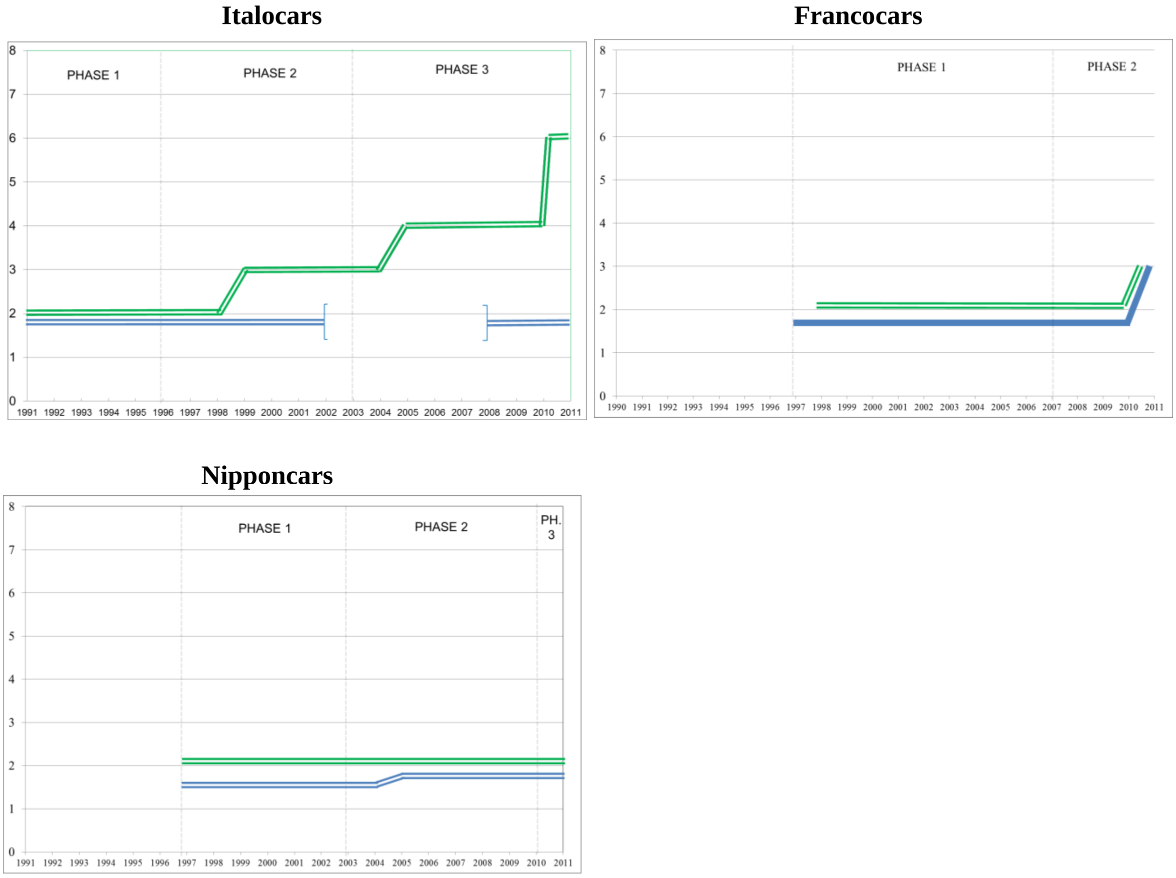

Figure 8-8 - Technological trajectories of individual subsidiaries in Argentina and Brazil[245]

Source: own elaboration on the basis of fieldwork

References

Argentinian subsidiary

Brazilian subsidiary

[245] Replication in miniature of Figure 5-5 (p 121), Figure 5-7 (p. 125); and Figure 6-9 (p. 168) originally presented in the empirical chapters.

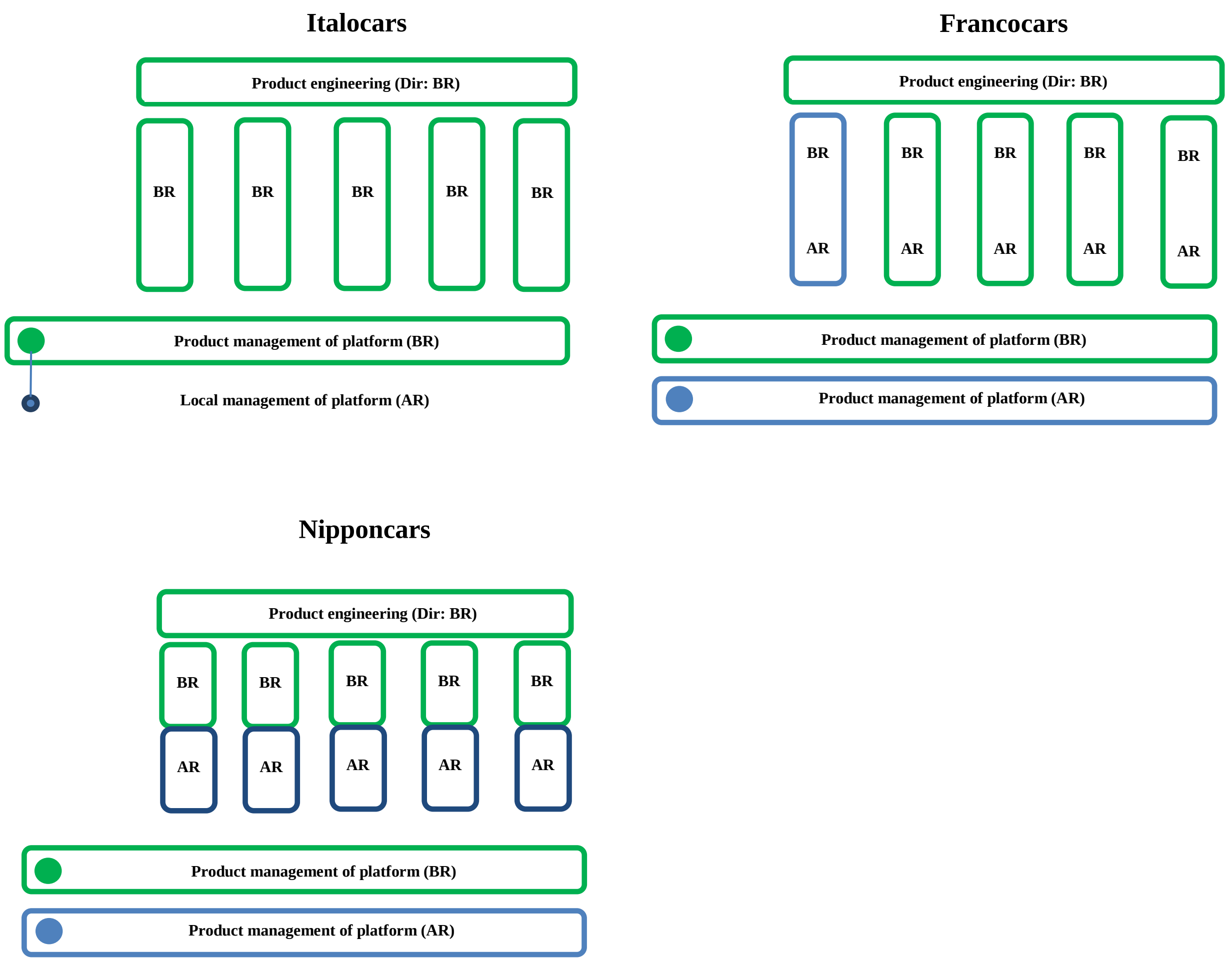

Figure 8-9 - Organisation of product engineering departments in the MERCOSUR area (2012)
Source: own elaboration of the basis of fieldwork

References

BR Area under the responsibility of the Brazilian subsidiary

AR Area under the responsibility of the Argentinian subsidiary

As discussed in Chapter 5, from the very return of Italocars to Argentina, the company organised its activities around the MERCOSUR space. The division of labour between the two units was extremely hierarchical. From its participation as co-leader in the development of the P178, the Brazilian subsidiary was able to initiate a steady process of accumulation of product engineering capabilities. By contrast, the Argentinian unit, born in the light of such a global project, was from the beginning conceived as a sort of 'assembly' unit subordinated to its Brazilian counterpart.

The technological gap and hierarchies between the two units progressively widened over the years. The more knowledge-intensive the technological strategy adopted by the company in the region, the more pronounced the hierarchical nature of the intra-regional division of labour. Whereas in 2010 and 2011 the Brazilian subsidiary launched onto the market vehicles using new platforms completely developed by the local Product Development Centre, the Argentinian subsidiary maintained its basic nationalisation responsibilities. As seen in Table 8-2 below, in 2011, the Brazilian unit had gained control over all product engineering functions and the management of platforms produced in the region.

The growing imbalances between the two subsidiaries are clearly reflected in the evolution of the number of staff members of product engineering departments. Although data is not available for the first two periods in Argentina, from the figures presented in Table 8-2 significant differences can be inferred.[246]

Table 8-2
Evolution of number of staff members of product engineering departments in the subsidiaries of Italocars in Argentina and Brazil

	1991-1996	1997-2002	2003-2012
Argentina	n.d.	n.d.	2012: 18[b]
Brazil	1996: ~200 (~100 engineers)[a]	1999: 350 (150 engineers)[c]	2005: 490 (250 engineers)[d] 2009: 650 (450 engineers)[e] 2009: 800 (600 engineers)[f] 2012: ~1000 (~700 engineers

Source: own elaboration on the basis of data from sources indicated below

[a] Source: Interview IC-PROD2
[b] Source: Interview IC-PROC1
[c] Source: Quadros and Queiroz (2001)
[d] Source: Balcet and Consoni (2007)
[e] Source: Quadros and Consoni (2009)
[f] Source: Fiat Automóveis (2009)

The experience of Francocars and Nipponcars differed from that of the Italian company. As seen in Figure 8-8, in these two cases the capability scale proved not to be adequate to grasping the existing technological gap of Brazilian subsidiaries over the Argentinian units within the regional division of labour. According to this tool, the two subsidiaries in the region performed activities corresponding to the level 2 and level 3 of the capability scale (Table 2-2, p. 52). Hierarchies manifested themselves in the *distribution of responsibilities* within regional product engineering departments.

[246] Data had already been presented in different sections of Chapter 5. It was compiled here and included in Table 8-2 with the purpose of allowing for a clearer visualisation of the evolution of the human resources' endowment of the product engineering departments.

As in the case of Italocars, Francocars organised its business activities around the MERCOSUR area as early as it established in Brazil. However, differently from the Italian firm, it maintained a low technological profile in MERCOSUR until 2007, when the FTA was created. The distinguishing feature of the FTA is the fact that it is organised on the basis of a regional structure. As seen in Table 5-2 (p. 138), other engineering centres of the FTX network were located in one single country, responsible for subsidiaries operating in neighbouring areas. The FTA encompassed the product engineering departments of the subsidiaries in the Americas region –the three main units being located in Argentina, Brazil and Colombia. Product engineering responsibilities are delegated from the parent company to the FTA as a whole and then allocated in accordance to the internal distribution of responsibilities.

To some extent, this organisational structure challenges the agglomeration forces leading to the concentration of this type of activities in one single location as observed by Rugman *et al.* (2011). The main motivation of Francocars' parent company for opting for this particular type of organisation was to avoid the destruction of valuable engineering capabilities in the Argentinian unit and to provide support to the 'infant' Brazilian subsidiary. When Francocars opened its manufacturing plant in Brazil in the late 1990s, the company had already a long history in Argentina which could be traced back to the 1950s. Furthermore, by contrast with the province of Córdoba in Argentina, the state of Parana –where Francocars established in Brazil– was not a traditionally automotive region. As argued by managers of the firm, at the moment of creating the FTA, both the parent company and the Argentinian subsidiary agreed on the fact that the latter should participate in the newly created engineering centre. The capabilities accumulated by the subsidiary, the resources offered by the host territory should not be wasted. The case of Francocars is an example clearly illustrating the incremental and spatially bounded nature of the capability accumulation process as conceived by the evolutionary approach (for a critical review of this approach, see Chapter 1, pp. 15-22). However, it is important to stress, that within MNCs, the accumulation process is largely controlled by parent companies. This is not adequately stressed by the evolutionary perspective which conceives of subsidiaries as agents with a greater level of autonomy.

Therefore, although the division of labour within the FTA favoured the Brazilian unit, its regional structure allowed a more balanced organisation within MERCOSUR. For instance, the distribution of human resources between the two subsidiaries in MERCOSUR was more balanced that that of Italocars. In 1999, when Francocars established in the region and adopts a low-knowledge intensive technological strategy, the number of staff members in product engineering functions was 35 in Argentina –in the past, it had reached more than 200 (Interview FC-PROD1)– and 30 in Brazil (Quadros and Queiroz, 2001). After the creation of the FTA, the size of this department grew substantially in the two subsidiaries. Growth was much higher in the Brazilian unit. According to data provided by the company, out of the 844 members the FTA had in 2012, around 60% worked in Brazil, 30% in Argentina and 10% in Colombia. Proportions, however, are not significantly different from the distribution of the total workforce occupied in the region: the Argentinian and Brazilian units gain participation to the detriment of the Colombian subsidiary.

Table 8-3
Distribution of staff resources of Francocars in the Americas region (December 2012)

	Argentina[a]	Brazil[b]	Colombia
% Total workforce of Argentina and Brazil region (total 8,857 employees)[c]	26.7%	55.1%	18.2%
% workforce of FTA (total 844 employees)	30%	60%	10%

Source: own elaboration on the basis of data provided by interviewed manager (Interview FC-CA1) and Renault (2013d).

[a]: includes staff members from the aluminium casting plant.
[b]: includes staff members from the engine plant
[c]: This figure does not include 560 staff members from the gearboxes plant in Chile

However, when observing the distribution of management responsibilities in Table 8-3, it can be clearly noticed that managers of the Brazilian subsidiary assumed *higher responsibilities*. In 2012, they were responsible for the management of the whole FTA structure and of most its functional areas (or *métiers*). The Brazilian unit was also responsible for the management of the Logan platform (M0). As discussed in Chapter 6, models of the entry-range Logan family of vehicles are more ‘flexible’ when it comes to incorporating design changes to address local preferences. It is not a coincidence, therefore, that the technical areas regarding the ‘appearance’ of vehicles –i.e. internal and external body and equipment– remained under the responsibility of the Brazilian subsidiary. And also that these two areas are the ones –together with that responsible for flex-fuel engines– in which the FTA was delegated with a higher level of autonomy from the parent company. It is precisely to work on these design issues that the FDLA was located in São Paulo, geographically close to the Brazilian FTA team (Interview FC-PROD1). Within the FTA, the Argentinian unit is responsible for the technical area of chassis equipment and systems. However, this area was given a lower level of autonomy by the parent company. As for the management of platforms, the Argentinian unit is in charge of the mature *Gamme I*, corresponding to the platform used by the Clio and Symbol models (only produced in Slovenia and Turkey).

By contrast, Nipponcars established in the region with the view of serving the MERCOSUR market. However, it adopted a regional management structure only in 2003 with the creation of Nipponcars-MERCOSUR. In the case of this company, the divergence between the product engineering responsibilities of the two subsidiaries is less evident and more recent in time (Figure 8-9). Furthermore, it took place at a lower level of knowledge intensity of the activities carried out. The differentiation, as seen in Chapter 7, started to take shape when the production of the compact vehicle Etios in Brazil was confirmed by the parent company in 2010. Although maintaining the same technological strategy in the MERCOSUR region based on nationalisation activities, Nipponcars started to concentrate product engineering activities of Nipponcars-MERCOSUR in the Brazilian subsidiary.

The size of the product engineering area in the subsidiaries of Nipponcars is very small, reflecting the low knowledge-intensity of the technological strategy pursued by the company in MERCOSUR. In 2012, the company reported that the number of staff members in product engineering areas was 75 in Brazil and 31 in Argentina (Interview NC-PROD2). This figure reveals an overrepresentation of the Brazilian subsidiary in this particular area: whereas the Brazilian subsidiary accounts for the 70.7% of the total product engineering staff of Nipponcars-MERCOSUR, its participation in the total staff of the company in the region is 55%.[247]

The comparative empirical evidence presented above confirms that the gap in the sphere of product engineering activities –in terms for instance of capabilities, management responsibilities and human resources– become more evident in automotive MNCs with more knowledge-intensive technological strategies.

8.2.3 Conclusions

The Table 8-4 below summarises some elements of the discussion above regarding the issues addressed in RQ2 and RQ3. The comparison between the technological trajectories of the three carmakers seems to be in the same vein as the arguments advanced by Rugman *et al.* (2011) concerning the organisation of functionally integrated networks of MNC subsidiaries around regional areas. *Although firms offered different strategic responses, the progressive reorganisation carried out by carmakers from national markets to a single regional automotive space was hierarchical. The gap between the Argentinian and Brazilian subsidiaries widened as the technological strategy in the region became more knowledge-intensive*. In order to avoid an inefficient overlapping of functions in subsidiaries operating in the same area, parent companies of the three brands decided to progressively concentrate product engineering functions in the Brazilian units. This process entailed a geographical concentration of managerial and technical responsibilities, investment in infrastructure (e.g. labs, software, and test tracks) and human resources.

Beyond personal concerns about the effects this process had on the relative position of Argentinian subsidiaries, managers from the two countries justified this decision as they considered the duplication of product engineering functions completely inefficient (Interview IC-PROC1; Interview FC-PROD1; Interview FC-PROD2; Interview NC-PROD1; Interview NC-PROC1). Differently from process engineering operations, which require physical closeness to the manufacturing site, communication technologies now allow for a remote management of product engineering activities from one single location.

In sum, the *empirical evidence in this study seems to support an apparent paradox which undermines the very foundations and goals of the regional integration process: as business operations of MNCs become more functionally integrated and technologically advanced*

[247] Calculated on the basis of data from Toyota (2013c).

within the region, the division of labour among subsidiaries operating in the region becomes more hierarchical. That is, the very accomplishment of the integration goal goes hand in hand with the creation of network structures setting the conditions for an unequal path of development of member economies.

These dynamics are a direct consequence of the private profit-driven rationality of global corporations, and the regulatory framework put in place by state agents to advance with the integration process proved to be ineffective to counterbalance them. Or rather, as will be seen in the next section, in fact, *it actively contributed to widening divergences.*

Table 8-4

Corporate factors defining the distribution of capabilities and hierarchies between subsidiaries in the MERCOSUR

		Italocars		**Francocars**		**Nipponcars**	
		1991-2002	**2003-2011**	**1998-2006**	**2007-2011**	**1997-2002**	**2003-2011**
Parent company	**Organisation of R&D activities in the region**	Brazil partially responsible for product development activities and management of platforms	Brazil responsible for product development activities and management of platforms in the Latin American region	Small local engineering teams reporting to parent company	FTA: Brazil responsible at regional level for most product development functions	Small local engineering teams reporting to parent company	Small local engineering teams. Brazilian unit responsible for management.
	Regional product policy	*Bi-location* Most products concentrated in Brazil)	*Bi-location* Most products concentrated in Brazil)	*Complete specialisation*	*Complete specialisation*	*Complete specialisation*	*Complete specialisation*
Subsidiaries	**Subsidiaries: previous accumulation of capabilities**	Brazil: highly active in nationalisation activities Argentina: nil (greenfield investment)	Brazil: learning experience P178 Argentina: limited to nationalisation activities	Brazil: nil (greenfield investment) Argentina: highly active in nationalisation activities	Brazil: low Argentina: drain of professionals. Learning experience overseas	Argentina and Brazil: limited to nationalisation activities with low scale of production	Argentina and Brazil: limited to nationalisation activities with intermediate scale of production
	Subsidiaries: market performance	Brazil: very good Argentina: poor	Brazil: very good Argentina: poor	Brazil: well below expectations Argentina:1998-2002: good in declining market; From 2003: sharp drop in market share	Brazil: sharp improvement Argentina: moderate improvement	Good, but low scale and excluded from most popular segments	Good, but low scale and excluded from most popular segments
Division of labour between subsidiaries in Argentina and Brazil		**Moderately hierarchical structure**	**Highly hierarchical structure**	**Low hierarchical structure**	**Moderately hierarchical structure**	**Low hierarchical**	**Low-intermediate hierarchical structure**

Source: own elaboration

8.3 The role of the state regulators in shaping the MERCOSUR regulatory framework

8.3.1 The MERCOSUR automotive policy in the framework of open regionalism

As pointed out in Chapter 2, this study focused on a particular aspect of the activities of state agents: that of 'regulators' of the MERCOSUR automotive space (Dicken, 2011). That is, as agents with the ability to shape the multilevel regulatory framework within which carmakers articulate their regional production networks.

As discussed in the Introduction, the MERCOSUR integration process launched in 1991 should be examined in the light of the two profound transformations: firstly, the emergence of GPNs in the world economy (Coe *et al.*, 2008; Gereffi, 2005; Henderson *et al.*, 2002); and, secondly, the implementation of the market-oriented reforms of the so-called Washington Consensus reforms which, among other goals, aimed at integrating the domestic economies into those GPNs.

The nature and objectives of what became known as open regionalism were clearly expressed in the already quoted definition given by the ECLAC as:

> [...] a process of growing economic interdependence at the regional level, promoted both by preferential integration agreements and by other policies in a context of liberalization and deregulation, geared towards enhancing the competitiveness of the countries of the region and, in so far as possible, constituting the building blocks for a more open and transparent international economy (ECLAC, 1994: 2).

The above cited paragraph –of a marked prescriptive nature indicative of the thinking dominant at the time– openly states the *subordination of the integration process to the primary objective of a "more open and transparent international economy"*. The policy tools deployed to put the integration initiative into practice have been in line with this goal. Accordingly, inward-looking schemes in which incremental concessions included in positive lists were regularly negotiated were abandoned in favour of an outward-oriented strategy. Automatic tariff reduction schedules covering most of the tariff lines were adopted by member countries. Against this backdrop, integration was now much more of a *market-driven* than a state-driven process. Public interventions would be restricted to punctual situations involving sensitive sectors or significant imbalances.

Moreover, according to the perspective of open regionalism, agreements could not be limited to trade in goods but other areas such as services, investment, and intellectual property rights had to be covered by the agreement. In order to effectively constitute a 'building block' for the liberalisation of the international economy, commitments assumed at regional level would be more ambitious than those made at the multilateral level, which led some authors to refer to these integration schemes as 'WTO-plus' agreements (Kuwayama, 1999).

The policy approach adopted for the integration of the automotive sector adhered more strictly to the principles of "gradualism, flexibility and balance"[248] than that used for most of

[248] As stated in the Treaty of Asuncion *(ACE Nº 18 – 1991 (ALADI))*.

the rest of economic sectors. However, the overall objectives of integration remained the same. As analysed in detail in Chapter 4, initiatives adopted by the Argentinian and Brazilian federal governments with regards to the automotive industry during the period 1991-2011 chiefly aimed at achieving three objectives: the *enlargement* of the production capacity, the *modernisation* of manufacturing processes and models produced, and the *regionalisation* of the automotive network. Although not directly investigated in this study, a fourth objective concerned the whole value chain. It established a minimum level of localisation (set around 60%) of auto parts, components and systems in the region. That is, the agreement intended to foster the *embeddedness* of carmakers in the regional territory, multiplying linkages with other actors located in the area.

The market-driven automotive policy adopted by Argentina and Brazil matched the market-seeking motivations of carmakers. As seen in Chapter 2, at the time, automotive companies were in search of emerging markets with low motorisation rates and growing consumption capacity. The saturation of their home-Triad markets jeopardised profitability, as it gave companies little scope for further expansion in those areas. The MERCOSUR region provided carmakers with the opportunity of exploiting a growing regional market with perspectives of a complete liberalisation in the near future. In fact, carmakers put great pressure on governments to adopt national and bilateral automotive regimes. They had a strong lobbying capacity exerted through ADEFA and ANFAVEA, the two business association representing carmakers in Argentina and Brazil, respectively.

As already discussed above, the automotive regulatory framework in MERCOSUR clearly failed to contribute to the accomplishment of two critical objectives of the integration process: firstly, it did not promote the adoption of a technological strategy by carmakers directed to the upgrade of the position of subsidiaries in the region within the corporate division of labour –i.e. to convert them in driving agents of technological change; secondly, it contributed to consolidating a hierarchical division of labour between Brazilian and Argentinian subsidiaries.

8.3.2 Policy approaches to modernisation in peripheral spaces

As seen in Chapter 4, as a consequence of the enactment of the national automotive policies and the partial liberalisation of bilateral trade, Argentina and Brazil received large flows of investment from carmakers in the 1990s. Initially, investment came from companies already established in the region. During the second half of the decade, newcomers established in the region or took over local licensees in order to have a manufacturing presence in the two countries and exploit benefits provided by the automotive agreement. A second investment cycle initiated once domestic demand recovered from the macroeconomic crisis, especially during the second half of the 2000s.

The three objectives indicated above –i.e. *enlargement, modernisation, and integration*– were attained with an acceptable degree of success.[249] However, for the purposes of this study it is

[249] Production levels in 2011 reached almost 4 million units, more than four times higher than production levels observed in the early 1990s (Figure 4-2, p. 90). Sales, as seen in Figure 4-3 (p. 91), grew even more. The region

worth noting that the type of 'modernisation' brought about by the restructuring of the automotive industry did not imply the endogenous development of activities that could result in the incremental accumulation of technological capabilities (Bell and Pavitt, 1995; Fagerberg and Godinho, 2005; Fagerberg *et al.*, 2010; Kim, 1997; Lall, 1992).[250] It was rather limited to the adoption of manufacturing best practices, technology embodied in imported tools and capital goods, and the production of new models.

The automotive policy within the MERCOSUR region did not put in force provisions aimed at 'obligating' (Liu and Dicken, 2006) firms to localise innovation activities with higher modernisation potential. In terms of the discussion developed in Chapter 1, *the automotive framework put in place by Argentina and Brazil embraced a notion of 'obligated embeddedness'* (Liu and Dicken, 2006) *restricted to the manufacturing sphere*. In exchange for having access to the regional market under the terms of the automotive agreement, companies had to –i.e. they were 'obligated'–integrate a certain level of domestic or regional parts. *No provision was included in the agreement regarding the performance of innovation activities*.

As seen above, the exception to this general trend was the progressive delegation of some specific product development responsibilities to some Brazilian subsidiaries which allowed them to achieve a semi-peripheral status within the division of labour of their corporations. In this study, it was only the case of Italocars. However, evidence in the literature indicates that this has been also the case of other Brazilian subsidiaries of Ford, General Motors and Volkswagen (Balcet and Consoni, 2007; Carneiro Dias *et al.*, 2011; Carneiro Dias and Salerno, 2004; Consoni and Quadros, 2006a; Quadros and Consoni, 2009).

That is, a modernisation boosted by the market-seeking motivations of automotive MNCs. The delocalisation of intermediate product development responsibilities was seen as a mechanism centrally regulated to expand the market share in emerging markets. In terms of Liu and Dicken (2006), this was an 'active' embeddedness. Differently from the 'obligated' version discussed above, active "embeddedness reflects the situation in which a TNC [a multinational corporation] seeks out localised assets and incorporates them, as a matter of choice, within its operations" (Liu and Dicken, 2006: 1232).

The lack of public mechanisms actively promoting the localisation of technological activities by MNCs is to a large extent the result of the notion of modernisation embraced by the Washington Consensus and 'open regionalism' projects. In a nutshell, *the underlying*

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also increased its participation in the world production, accounting for 5.13% of global vehicle manufactured output between 2009 and 2011, more than doubling the participation of 1986-1989 (2.14%). In regards to modernisation, subsidiaries in the region managed to bridge the gap with parent companies in terms of the models produced and their production processes. Finally, subsidiaries in Argentina and Brazil progressively advanced with the articulation of functionally integrated networks. This was reflected, for instance, in the complementation of their respective product policies, the adoption of regional management structures, and the intensification of technical collaboration. A closer integration was also attained with the global corporation, which was reflected in a more intense exchange of products, services and knowledge with the parent company and subsidiaries in other regions. For a more detailed analysis, see pp. 74-80.

[250] For a discussion on the incremental nature of the technological learning process and the role of technological capabilities, see pp. 8-11.

rationale for integrating neighbouring countries under such an approach was that the alteration of market structures would positively affect systemic factors that determine productivity. The removal of trade barriers, the adoption of common rules, and the coordination of specific policies would boost information and trade flows and, at the same time, would enable member countries to take advantage of specialisation and scale (ECLAC, 1994). According to the ECLAC, as market competition became more intense, incentives for the generation of knowledge would rise since firms would try to develop new products and process to gain competitiveness. At the same time, the standardisation of domestic regulations would reduce the cost of conducting R&D activities (ECLAC, 1994). In essence, *open regionalism relied on a market-friendly host environment to "boost information and trade flows" and to raise "incentives for the generation of knowledge"*.

It is worth noting that the lack of provisions to 'encourage' the localisation of technological activities was not limited to the national sphere, but also concerned sub-national political units. The dismantling of industrial policy instruments with the implementation of Washington Consensus reforms was accompanied in Argentina and Brazil by the de-centralisation of competences from federal to sub-national units. In the framework of this movement, those sub-national units with autonomous resources sought to deploy some kind of 'industrial policy' tools to counterbalance the withdrawal of the federal government. In the particular case of the automotive sector, this phenomenon was concentrated in Brazil as reflected in the fiscal war between states (see Chapter 4, pp. 67-85).

However, sub-national policies were essentially directed to attracting foreign resources to their territories with little attention paid to innovation activities. No technological requirements were included in the agreements signed between Brazilian states and carmakers. The notion of embeddedness embraced in these agreements was, as in the case of national policies, rather purely 'physical': states intended to have vehicle manufacturing plants to be constructed in their territories, attracting suppliers to the area and employing local people.

Although the international comparison of the 'peripheral' MERCOSUR integration scheme with other types of 'automotive spaces' is beyond the scope of this study it is worth bringing in briefly into the discussion the experience of other regions . The first one corresponds to the case of the European 'peri-central' integration scheme (Figure 2-5, p. 42), and the second one to the Chinese 'national protected market (Figure 2-7, p. 45). The purpose is to briefly examine how the question of modernisation was approached by these two regions.

Economic transition from communist regimes in Central and Eastern European countries had similar characteristics to market-oriented economic reforms in Latin America. These countries also embarked in a regional integration initiative through a long accession process to the EU that began in the early 1990s and started to become effective in 2004. The EU could be also seen as one of the first experiences of open regionalism –or 'new regionalism' (Telò, 2001). EU countries had already implemented the so-called market-oriented reforms in the 1970s and 1980s, and advanced with the construction of the common market in the mid-1980s –with the signing of the Single European Act.

The driving agents behind the modernisation of the automotive industry –and, in fact, of most economic sectors– were mostly MNCs from Western European countries (van Tulder, 2004). Differently from the MERCOSUR automotive space, the main motivation of Western carmakers for the constitution of a peri-central integration scheme in Europe was to use the Eastern side of the region as a "production site for cheap re-imports back into the home base" (van Tulder, 2004: 88). The operations of subsidiaries in that region were motivated by efficiency-seeking purposes rather than market-seeking ones as in the case of MERCOSUR.

The 'peripheral' status of Central and Eastern European countries within the European peri-central automotive space is clearly depicted in the following paragraphs by Bartlett and Seleny (1998):

> Eastern Europe's emergent auto industry displays a quite different profile. It is clearly '*hierarchical'* to the degree that (1) the *former communist states are capital importers and will remain dependent on Western technology* and distributional outlets for the foreseeable future, and (2) a *pecking order within the region has emerged, with Hungary, Poland, and the Czech Republic receiving the dominant share of FDI and the Balkan countries relegated to secondary status in the MNCs' regional strategies*. But in contrast to East Asia, whose auto industry is shaped by high levels of protectionism and state intervention, Eastern Europe's regional *production system is built on liberal principles*. Far from discouraging re-export to their home countries, European-based MNCs are encouraging it by *exploiting liberalized trade and investment flows to leverage their East European subsidiaries as platforms for reverse exporting* (Bartlett and Seleny, 1998: 335; emphasis in added).

It is interesting to note the similarities with the MERCOSUR automotive network. Points of contact points not only concern the peripheral status of subsidiaries in Central and Eastern countries with respect to parent companies in Western European region; but also the hierarchical division of labour –the "pecking order"– among peripheral subsidiaries themselves.

The policy approach towards 'modernisation' in Central and Eastern Europe region also resembles that of MERCOSUR. On the one hand, the market-oriented reforms and the prospective membership within the European integration process made the region more attractive for foreign investment –in particular for Western European MNCs. On the other hand, however, the EU competition policy strongly constrained the possibility of adopting industrial policy instruments at the national level to promote the technological 'embeddedness' of Western MNCs 'rushing' to the East (Bartlett and Seleny, 1998).[251]

[251] In the case of European MNCs, pressures to develop local suppliers in Central and Eastern European countries did not resulted from the regulatory framework, but from emerging "lean production" modes of production which "heightened pressure on MNCs to develop local supplier networks capable of rapidly delivering high-quality components to their East European subsidiaries". However, more intensive knowledge creating activities in these cases remained fundamentally localised in Western European countries (Bartlett and Seleny, 1998). Differently, EU's local content-rules were applied to compel non-European firms to encourage the local components industry (van Tulder, 2004). van Tulder (2004) describes how EU institutions –such as the European Bank for Reconstruction and Development– and business associations influenced the restructuring of the automotive market in Central and Eastern European Union. In essence, they favoured the establishment of European producers and created impediments for non-European producers by means of funding mechanisms, technical regulations, tariff barriers, etc.

Integration is fundamentally based on 'liberal principles' providing market incentives for Western companies to establish subsidiaries in the East.[252] Although this would require empirical validation, it is reasonable to assume that the geographical proximity of headquarters and the fact that integration operates within the same regulatory framework for both headquarters and subsidiaries, with almost no institutional barriers to intra-regional trade, give fewer incentives to MNCs to localise technological activities in peripheral European regions than in MERCOSUR, the issue of cost factors being put aside.

China provides an interesting contrasting case to the MERCOSUR and European experiences with regards to the role of state in promoting an endogenous modernisation process. As seen in Chapter 2, the car sector in this country experienced skyrocketing growth in the last decade (see pp. 36-41). From the late 1990s, the Chinese automotive policy sought to attract automobile-related foreign direct investment to construct domestic capabilities in the industry. Through this policy the government intended to accelerate the development of the domestic automotive market relying upon MNC carmakers, but avoiding ceding full control of the industry to these foreign agents. The government used its control over a growing continental market to 'obligate' MNCs to localise and transfer technology to domestic firms. In addition to requisites of domestic content (set between 40% and 60%), MNC carmakers were forced to establish joint ventures with domestic firms which were subject to official approval (Liu and Dicken, 2006).

Joint ventures were a major instrument for the incremental development of capabilities in domestic actors. This was not only made possible by means of knowledge transfer, but also by technology imitation, reverse engineering, original product architecture innovation, etc. (Wang and Balcet, 2012). As pointed out by Wang and Balcet (2012) a distinguishing feature of the process of development of the Chinese automotive industry is what they referred to as a 'dual internationalisation trajectory'. In their own words:

> On the one hand, foreign multinational OEMs entered, developed, and consolidated their market position and their brands in China during the last three decades, attracted by the size and by the growth rate of the domestic market. For them, the main way to access the market was through Sino-foreign equity JVs [joint ventures] with Chinese companies, under the obligation of Chinese government regulation, even after the WTO accession.
>
> On the other hand, Chinese carmakers and suppliers, both state-owned and private, have jointly built sound industrial value chains. In the early 2000s, these firms took early but very significant moves to expand abroad, via exports, foreign assembly plants and acquisitions of foreign firms. This move represents a remarkable strategic change. Till the new century, this industry was much less export-oriented than other Chinese industries, as the huge domestic market has been the powerful driving force for its growth (Wang and Balcet, 2012: 314).

There are circa 120 companies producing vehicles in China (Donnelly *et al.*, 2010). A few of them have already initiated an internationalisation process with the purpose of becoming

[252] Differently from MERCOSUR, in the EU parent companies operate within the same regional institutional frameworks as their peripheral subsidiaries in Central and Eastern Europe. To the best of the author's knowledge, no research has investigated from a comparative perspective the implications of this difference on the development perspectives of subsidiaries.

global players within the next few years. According to Wang and Balcet (2012), this expansion overseas "may be mainly explained by, the process of technological catching up, the creative absorption and assimilation of knowledge and the building of innovative capabilities by Chinese carmakers" (Wang and Balcet, 2012: 314). It is clear that this performance is the result of an active intervention a powerful government which adopted a policy approach completely different from the liberal one embraced by MERCOSUR and the EU.

MERCOSUR was shaped as a regulated automotive space which left decisions regarding innovation activities in the hands of MNCs. As shown by the three cases examined in this study, the activation of forces encouraging technological modernisation depended exclusively on decisions made by parent companies, based on their market-seeking aspirations. To put it differently, no policy efforts were made to 'internalise' the process of technological progress 'obligating' MNCs to transfer knowledge to subsidiaries themselves. As a matter of fact, in a seemingly paradoxical situation, the notion of modernisation informing the market-driven economic reforms approved the replacement of local engineering efforts considered to be inefficient by more modern imported technology 'embedded' in capital goods, manufacturing solutions, and vehicle models.

As pointed out by a consultant specialised in the automotive industry, it is of no surprise that Argentina and Brazil adopted a policy approach with these characteristics, which left the aspirations for technological modernisation in the hands of private agents motivated by market-seeking strategies (Interview S-3). According to him, the priority of the two governments in the early 1990s was to promote the 'resurrection' of an automotive industry close to bankruptcy after a 'lost' decade of deep economic stagnation. In line with the liberal approach of the structural reforms, and considering the lack of financial resources in domestic economies, such reconversion was only possible with the import of foreign capital and technology.

It was only during the second half of the 2000s, and with a substantial delay from private initiatives already adopted in this direction, that the Brazilian government unilaterally started to support innovation activities in the automotive industry. As seen in Chapter 4, an early attempt was channelled through the Programme for Automotive Engineering and the Pro-Engineering facility of the BNDES, which between 2007 and 2012 granted loans to the automotive industry for a total of R$1.3 billion (see pp. 83-85). Only in 2012 –i.e. beyond the time frame of this study– Brazil approved a comprehensive legislation commonly referred to as *Inovar-Auto programme* which seeks to promote R&D activities in the automotive industry.[253] This initiative embodies a more knowledge-oriented view of 'obligated' embeddedness, as conditions for companies to have access to the benefits of the automotive regime include some standards of technological performance (Ibusuki *et al.*, 2012a).

[253] The Program to Promote the Innovation and Intensification of Production Chain of Motor Vehicles (Programa de Incentivo à Inovação Tecnológica e Adensamento da Cadeia Produtiva de Veículos Automotores - INOVAR-AUTO) was implemented through the Lei 12.715/12 (Brasil) and regulated with the Decreto 7.818/12 (Brasil). It established, among other measures, that automotive companies have to invest a minimum of 0.5% of their total revenue in local R&D and activities related to product innovation (Ibusuki *et al.*, 2012a).

In Argentina, a change in the policy approach towards the promotion of innovation activities could also be noticed during the second half of the 2000s. This changed crystallised in the creation of a Ministry of Science, Technology and Innovation in 2007. However, this did not result in substantial changes with regards to the policy approach adopted for the automotive sector at the level of carmakers. Rather, priorities were focused at the level of suppliers, fundamentally with regards to the development of innovations in the field of materials, electronic, and hybrid energy.[254]

8.3.3 A regulatory framework amplifying intra-regional hierarchies

As discussed in Section 8.2, automotive networks in the MERCOSUR region organised according to a hierarchical division of labour. Regardless of the degree of innovativeness of the technological strategy, Brazilian subsidiaries occupied the highest positions in relation to Argentinian units. The 'verticality' of intra-regional hierarchies became more accentuated as the integration process advanced. As claimed above, whereas this hierarchical verticality is a structural feature of automotive networks, it was reinforced in MERCOSUR by the existence of large structural disparities among member countries (Giordano *et al.*, 2008).

The multi-level automotive regulatory framework in MERCOSUR did not do much to curb imbalances generated by structural conditions. Actually, although there are as yet no empirical studies evaluating their impact, disparities in national and sub-nationals regulatory frameworks may have contributed to accentuating these imbalances (Baruj *et al.*, 2008; Bouzas, 2008). At the bilateral level, agreements included different kinds of provisions (quotas, compensated exchange, flex rule) but which only looked after trade imbalances. Other type of disequilibria remained uncovered by the automotive policy. Brazil was the country with the largest national market in MERCOSUR and therefore the one with better structural conditions to attract investment from carmakers with market-seeking strategies. It was also the country where sub-national political units more actively put in place support measures for carmakers. This was clearly inconsistent with the principle of 'balance' on which the integration process was supposed to be based.

As a matter of fact, the lack of effective mechanisms to avoid the deepening of intra-regional imbalances was not exclusive to the automotive framework but a characteristic of the MERCOSUR process as a whole (Baruj *et al.*, 2008; Bouzas and da Motta Veiga, 2008). At regional level the MERCOSUR institutional setting allowed the free circulation of goods – with limitations and exceptions, with progress and setbacks. At a lower level, national and sub-national units maintained their autonomy to put in force different types of measures to provide support to the industry.

Differently from the EU, MERCOSUR neither put in place a regional competition policy restraining national incentives nor well-endowed structural and cohesion funds aimed at

[254] For more detailed information on strategic plans, see Ministerio de Ciencia (2013); (Ministerio de Industria, 2012).

narrowing the development disparities among member states (Baruj *et al.*, 2008; Bouzas and da Motta Veiga, 2008). Neither was such a thing as an industrial policy at the regional level, funded by a regional budget.[255]

According to Baruj *et al.* (2008), policy and structural disparities within the region are, so to say, two sides of the same coin. In their own words:

> It is evident that, although the member countries' competitiveness policies are generally based on similar approaches and instruments, and also suffer from relatively similar failures of coordination and implementation, the *scale of the available resources favors Brazil*. To some extent, and without minimizing differences in the effectiveness of and commitment to the implementation of the instruments, it could be said that some of the *structural asymmetries (basically in terms of economic size and financial capacity) are at the heart of the evident regulatory asymmetries*. Hence what might seem to be a game in which all take an equal part (either following or breaking the same rules) is in fact a permanent reflection of completely different powers of intervention and action. In this sense, MERCOSUR follows a path in which *policy asymmetries reproduce and deepen structural differences* (Baruj *et al.*, 2008: 185-186; emphasis added).

The observations made above shed light on the inherent tensions of the integration process and the delicate balance on which it is built. On the one hand, *Argentina and Brazil put in place collective measures to strengthen their control over strategic resources*. In the case of the automotive industry, Argentina and Brazil provided MNCs with access to the large regional market they controlled, the condition being the 'embeddedness' of the operations of carmakers in the MERCOSUR automotive space (Liu and Dicken, 2006). On the other hand, *however, below the umbrella of the bilateral automotive agreements, significant differences among national and local political units with diverse cultures, institutions, practices and resource endowment persisted*. And, political units at this lower level of governance endeavoured to attract companies and capture as much as possible of the value created within their boundaries. The net impact on the national 'wellbeing' of the fiscal war resulting from the competition of sub-national units is likely to be negative, MNCs being the agents that benefitted most from such type of policy (Arbix, 2000; 2002; Rodríguez-Pose and Arbix, 2001).

As discussed in Chapter 4, the Brazilian federal and state governments made extensive use of a diversity of regulations and resources to attract investment by carmakers to their territories. For instance, the special regime least developed regions of the North, North-East, and Central-West –*Lei 9.449/97 (Brasil)*–[256]; and the BNDES facilities for the car industry. This federal institution co-funded carmakers' investment projects for the expansion of production capacity, the renovation of models, the promotion of exports. By means of new funding facilities created in 2007, the BNDES provided financial support for innovation activities conducted by automotive subsidiaries. In the same vein, the enactment in 2012 of the new

[255] A regional industrial policy has been lacking also in the European integration process. An interesting historical study about the political disputes in Europe around this issue during the early years of the integration process can be found in Holland (1980)

[256] Under the benefits provided by this regime, for instance, Italocars made in 2010 the decision of opening a new plant in Pernambuco.

policy *Inovar-Auto* brings to light significant differences in the policy mindset of the two governments which may result in a wider intra-regional technological gap.

The autonomous national initiatives on the Argentinian side rather had an essentially defensive character. The federal government had fewer financial resources than its neighbouring country. Fiscal benefits were much less generous in volume and experienced important enforcement problems.[257] Beyond the so-called Bi-Centennial facility, created by the federal government, no significant supporting measures were put in place in Argentina.[258] Some isolated actions were unilaterally adopted to limit intra-regional trade flows of vehicles. In general, these *ad hoc* measures were of a temporary nature and were implemented in fragile macroeconomic situations to avoid trade imbalances.[259]

Disparities were notorious at the sub-national level as well. By contrast, Argentinian sub-national governments lacked the resources to grant carmakers similar fiscal benefit packages. Some specific direct subsidies and tax exemptions, as in the case of the province of Buenos Aires to Nipponcars, or the province of Córdoba to Italocars and Francocars were granted to carmakers. However, the amounts were negligible compared to those granted by Brazilian states.[260]

The question of national incentives has spurred heated disputes between the Argentinian and Brazilian governments. However, no agreement was reached. In particular, it was the Argentinian government which lacked the power to negotiate an effective and enforceable limitation on benefits offered by federal and sub-national Brazilian governments. Although the Argentinian government asserted several times the necessity of restricting the use of unilateral actions at national and subnational levels, the two countries failed to agree and enforce effective mechanisms to do that.

Other types of policy disparity which may have contributed to widening intra-regional hierarchies concerns the lack of coordination to avoid the dissimilar evolution of national macroeconomic conditions (Heymann and Ramos, 2008). Although, this issue exceeds the analytical scope of this study, the macroeconomic dimension, as discussed in Chapter 1, proved to have exercised great influence in the difficulties experienced by firms in developing countries in efforts to accumulate technological capabilities (see pp. 19-22). As argued by Cimoli and Katz (2003), the preference for fixed exchange rates, trade opening and the liberalisation of capital account proved to be discouraging for the incorporation of local knowledge and the accumulation of capabilities. Against the background of a more instable

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[257] This included tax refunds to carmakers using local auto parts, or to the export of vehicles. Companies claimed that the government refunds suffered significant delays.
[258] Italocars, as seen in Chapter 5 was the only company of the three cases studied here which was granted a loan from this facility.
[259] For instance, the inclusion of the automotive sector in the non-automatic import licensing regime put in place by the Argentinian in 2012.
[260] The analysis of the causes of the differences between the Argentinian and Brazilian approach towards industrial and innovation policies exceeds the disciplinary boundaries of this study, falling in the sphere of 'developmental state' studies. In the case of sub-national political units, the examination should focus on the different nature of fiscal federalism prevailing in the two countries which allows Brazilian states to have great autonomy to collect taxes and make decisions on the application of fiscal resources.

world economy in the post-Bretton Woods era –in terms of economic activity, interest rates, exchange rates, international trade, etc.– (Eichengreen, 1996), the opening up of Latin American economies to trade and financial flows in the 1990s, put these countries in a more vulnerable position to external shocks (O'Connell, 2001).

Economic fluctuations proved to be wider and more volatile in Argentina than in Brazil. Probably, a much deeper liberalisation left the former country more exposed to negative effects in movements in the international terms of trade and capital flows. In the framework of automotive business strategies strongly motivated by market-seeking purposes, the adoption of a more knowledge-intensive technological behaviour by carmakers was closely related to the ability of maintaining high and sustained levels of demand for vehicles.

As can be seen in Figure 8-10, the Brazilian market was not only much larger than the Argentinian one, but it was also more stable and less affected by macroeconomic crisis episodes (in particular during the period 1999-2002). The Argentinian average rate of growth of the vehicle market between 1992 and 2011 was higher than the Brazilian one (16.6% and 9.1%, respectively). However, the volatility of the market, calculated as the standard deviation of the growth rate of annual sales, was much higher in Argentina (0.44) than in Brazil (0.16) –own calculation on the basis of data from ADEFA and ANFAVEA.

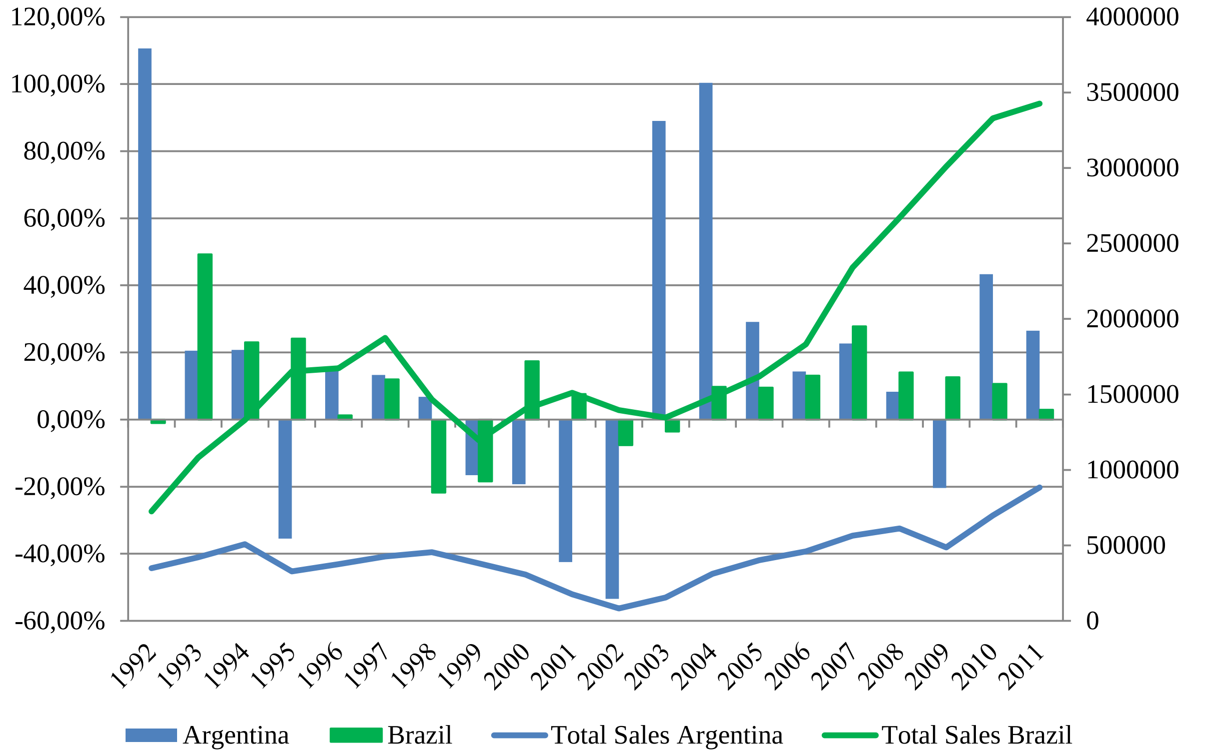

Figure 8-10 - Vehicle sales (% change in the units sold in the domestic market over the previous year; and total sales
Source: ADEFA and ANFAVEA

As seen in the empirical chapters, the initiative of Italocars to rely on the Brazilian unit as a co-leader of the P178 was adopted in the context of the strong recovery of the Brazilian car demand –in particular, in the segment of small vehicles as a consequence of the popular car policy (Figure 4-3, p. 102). Likewise, the creation of the Product Development Centre and the works to develop the new platforms P326 and P327 took place during the phase of strong recovery in the demand for cars (2003-2011). In the case of Francocars, the establishment of the FTA and the upgrading of the centre in terms of its product engineering capabilities (Figure 6-1, p. 152) also took place during this period (2007-2011).

On the other hand, negative macroeconomic scenarios led to the deferment or cancellation of manufacturing projects in the region. In Argentina, in particular in the case of Italocars and Francocars, the negative macroeconomic conditions between 1999 and 2001 generated severe disruptions in local subsidiaries (Figure 5-6 and Figure 6-6, in p. 126 and p. 165). Whereas the Italian firm decided to discontinue the production of vehicles in the country in 2001, the local subsidiary of the French company did not receive any new model from the parent company for a period of almost ten years. As a result, engineering teams were reduced to minimal levels, professionals being reallocated to other points of the corporation. Likewise, it was pointed out in Chapter 7 that the allocation of a small vehicle to the region was postponed on several occasions, as a consequence of the unstable macroeconomic environment.

Building upon the comparison between the three case studies examined in this thesis, three clear conclusions can be drawn: firstly, automotive MNCs showed evident *limitations for being carriers of modernisation* as originally expected when the open regionalism programme was put in place. These companies, organised on the basis of regional and global production networks, have a strong preference for concentrating knowledge-creating activities in their home countries. Furthermore, the parent companies proved to be inclined to retaining great power to manage the allocation of knowledge-intensive responsibilities among subsidiaries.

Secondly, against the principle of 'balance' on which the integration was supposed to be built upon, the *organisation of the MERCOSUR automotive space gave shape to a hierarchical division of labour within subsidiaries in the region*. According to this scheme, as the technological strategy in the region became more intensive in knowledge, the technological gap in favour of Brazilian subsidiaries became wider.

Thirdly, the *institutional framework regulating the MERCOSUR automotive space was incapable of addressing the above referred shortcomings*. The *market-driven approach embraced by the open regionalism programme left decisions on technological behaviour completely in the hands of multinational agents*.

Conclusions

The principal objective of this study was to contribute to the understanding of the technological behaviour of MNCs operating within the MERCOSUR integration scheme and its contribution to the process of technological change within the member countries in which these are present. Conclusions drawn in Chapter 8, based on the experience of the automotive industry highlighted the limitations of MERCOSUR to promote the modernisation of its member countries in a balanced manner.[261] For reasons already pointed out, the scope for generalising and extrapolating findings to other sectors is limited.[262] Drawing on the insights obtained, the discussion below rather intends to open new avenues of research to expand the analysis on this problem to other sectors and geographical areas.

Reflections are related to three "false promises" associated with the use of economic regional integration to respond to the challenges of globalisation. By 'false promises', I refer to expectations created by the integration process launched in 1991 which were never properly fulfilled. Sometimes, because they were based on wrong assumptions; sometimes because member countries could not or did not actually want to develop the instruments that would have produced the desired outcomes.

The first promise is inspired by the utopia of globalisation itself, that is, that of the fulfilment of a global market controlled by truly global corporations. The second one is the promise of open regionalism being a force promoting the modernisation of peripheral areas. The third one refers to the utopia of a balanced integration across the different states of the region.

- *The false promise of 'hyper-globalists': heterogeneous firms in a regionally- fragmented world*

The evidence presented in empirical chapters contrasts with the ideas advanced by the group of so-called 'hyper-globalists' (Dicken, 2011). Both the left- and right-wing perspectives of this group predicted the emergence of a borderless world shaped by the progressive removal of trade barriers and the accelerated reduction of communication and transportation costs.[263] The corollary of this process would be the emergence of a 'global market' where the national dimension was no longer relevant. The diversity among consumption patterns derived from differentiated tastes, preferences, and purchasing capacity would vanish. Evidently, the policy recommendations offered by each group were exactly the opposite. At the risk of oversimplification, it can be stated that whereas pro-right-wing globalisers advocated for the acceleration of the globalisation process as free markets would maximise benefits for society

[261] As pointed out in the introduction, due to the structural and regulatory characteristics of the automotive industry in MERCOSUR the study focused on Argentina and Brazil. However the insights gained have validity for the integration process as a whole.

[262] As Malerba (2005) points out, innovation greatly differs across sectors in terms of the R&D intensity, market structure, the range of viable R&D strategies, the role of competition policy, etc.

[263] Dicken (2011) makes reference to Friedman (1999); 2005) as an example of a the right-wing version of the hyper-globalist approach and Greider (1997) for the left-wing one.

as a whole; the left-wing anti-globalist groups argued in favour of a return to the local dimension.

However, contrary to the predictions of hyper-globalists of both persuasions, MNCs, leading agents of the world economy, showed a strong preference for organising their manufacturing and commercial activities around *regional areas*. Beyond industry differences this intermediate layer was preferred to global and country level markets (Rugman and Oh, 2013; Rugman and Verbeke, 2008). In the field of R&D activities, the advancement of globalisation was even less pronounced. MNCs retained the more knowledge intensive operations in their home countries –usually located in the Triad region–, only delocalising some specific activities (Dicken, 2011; Doremus *et al.*, 1998; Pauly and Reich, 1997). Furthermore, as argued by Ernst (2002), the delocalisation towards the developing world followed a pattern of 'concentrated dispersion' mostly focused in Asian countries (ECLAC, 2011; UNCTAD, 2005).

In the particular case of the automotive industry, Freyssenet (2009b) referred to the 'hyper-globalisation' forecast as the:

> […] utopia of global homogenisation that animated the first theorists and practitioners of globalisation, who imagined that with trade liberalisation and increasingly homogenous demand global firms could one day apply the same production organisation (design, manufacturing, distribution, services) everywhere, choosing the most profitable locations based on their competitive situation and freeing themselves not only from their country of origin but also from any territorial determinism (Freyssenet, 2009b: 20; emphasis added).

Going against these pronouncements, the empirical evidence gathered in this thesis demonstrates that the automotive sector did not acquire a global scope. Ambitious initiatives adopted by leading carmakers to advance towards the development of 'world' cars and platforms were reconsidered soon after some resounding failures. In the 2000s, the meaning of 'global' was reinterpreted in order to express, more modestly, the efforts of carmakers to "be present commercially and industrially in the world´s main regions" (Freyssenet, 2009b: 21). As seen before, this resulted in the regional segmentation of product policies with the purpose of meeting the specific preferences and conditions prevailing in those regions. The consolidation of regional automotive spaces was further accelerated by the enactment of regional regulatory frameworks such as MERCOSUR, NAFTA, ASEAN, etc. (Dicken, 2011; Van Tulder and Audet, 2004).

The limits of the so-called globalisation process did not only manifest in the regional segmentation of the global market. A borderless world had been presenting as giving rise eventually to nationless companies. Hyper-globalists, sometimes implicitly, therefore also forecast the convergence towards a sort of 'corporate isomorphism' which would give rise to a unique model of a 'global corporation' (Doremus *et al.*, 1998). This agent was supposed to be emerging as the driving agent behind the 'global market'.

However, in practice, corporate isomorphism also proved to be essentially limited. Significant differences among firms with respect to their internal mechanisms of governance, organisation of R&D, internationalisation strategies, etc. continued to be influential (Doremus *et al.*, 1998). These differences do not remain confined to the boundaries of the firm but also affected the way they internationalise and 'govern' their GPNs (Lane and Probert, 2009; Whitley, 1998).

Empirical findings in this study illustrate how carmakers addressed the challenge of the shaping regional automotive spaces in different ways. In line with evolutionary ideas discussed in Chapter 1, the behaviour of the three companies 'mutated' over time –to use Nelson and Winter's (1982) metaphor. Some firms like Italocars, early in the piece, put in place a differentiated product policy for emerging countries closely involving a subsidiary in the MERCOSUR region in the product development process. By contrast, it took more time for others companies –like Francocars and Nipponcars– to adopt a similar approach. But even when they eventually did, these latter companies opted for different strategic responses. Whereas Francocars created a functionally integrated network of engineering centres located in different regions, Nipponcars maintained the bulk of product engineering activities firmly anchored in the parent company. The various strategic responses observed had different implications for the upgrading perspectives of subsidiaries in MERCOSUR.

Although the differences among the examined firms have been clearly highlighted, the origins of such heterogeneity were not explored in this study. However, this field of inquiry constitutes an area that has already started to be investigated in academic research. As claimed by different streams within the 'varieties of capitalism' approach, far from disappearing, differences in the institutional setting of home-countries reflect in the characteristics of firms (see, for instance, Amable, 2003; Doremus *et al.*, 1998; Hall and Soskice, 2001; Lane and Probert, 2009; Whitley, 1998; 1999; 2007). This encompasses the way the firm relates to suppliers and clients, how they fund their activities, how they manage industrial relations, how they manage innovation activities, etc.

When companies internationalise their activities, their medium term sustainability requires these 'internal' features to be adapted in order for them to be not only internally coherent but also externally relevant in the new institutional context of the host country (Boyer *et al.*, 1998). This may even give rise to a sort of 'hybridisation', that is, the necessity of transforming "industrial models (not short term changes), through their interaction with social and economic systems which are different from those in which they first developed" (Boyer *et al.*, 1998: 27).

Implications for future research agenda:

This study clearly contributed to highlighting the limits of globalization when it comes to understanding the real scope of MNCs operations. From the perspective of an academic research agenda, this idea opens avenues of research raising some interest research questions. For instance:

- What are the factors that cause MNCs from some countries or regions to be more open to the de-localisation of innovation activities than others? How do these trends vary across sectors?
- Considering that the institutional setting of the home country or region of the firm impacts on its internationalisation strategy: Do companies from countries participating in integration processes operate in a distinctly different manner overseas? Are MNCs from member countries of 'well-developed' integration agreements such as the EU more prone to organising R&D activities on a regional basis than, for instance, US or Chinese companies?
- More broadly, is there a difference in the disposition to de-localise R&D activities between MNCs originating from developed countries and those from emerging regions of the world –in particular China, whose firms have gained presence in the MERCOSUR region in the last years?

Policy implications:

It has been discussed in this study how the 'old geographies' were disrupted, and the "local and the global intermesh, running into one another in all manner of ways" (Dicken, 2011: 7). However, the actual state of the so-called globalisation process after more than thirty years of remarkable progress sheds light on the inextinguishable importance of the local dimension in the development of economic activities. Despite the greater mobility of capital, processes of production, distribution and consumption are geographically grounded, affected by distances and –without falling into isomorphism– moulded by local institutions.

The policy making process requires having a good knowledge of the agents whose behaviour it is trying to affect, among other things, in order to create a realistic sense of what can be expected from them. What can be expected, just to give an example, from the arrival of Chinese carmakers in the MERCOSUR region? Will they have the same possessive behaviour as Japanese companies in regards to R&D activities? Or, should policy-makers make special efforts to foster capital mobility of MNCs from the developing countries through the signing of investment agreements? Answering these questions to inform policy-making requires good knowledge of the 'political geography' of MNCs and the nuances among them.

- *The false promise of open regionalism as a way to modernisation*

As already pointed out, the MERCOSUR integration project was, especially until the mid-2000s, an archetypal example of 'open regionalism' (ECLAC, 1994; IADB, 2002). These projects were essentially conceived as a stepping stone towards the hyper-globalist utopia of global market capitalism. Seemingly paradoxically as a consequence of their success, 'open regionalism' projects were supposed to melt into the 'global' market (ECLAC, 1994).

As discussed in the Introduction, subsidiaries of MNCs were expected to play a key role in open regionalism. The crucial assumption was that subsidiaries, because of their two-sided nature, would act as a bridge between the modern developed world and the technologically backward South American region. They would channel the driving forces that would bring about technological change: competence, trade, knowledge (ECLAC, 1994; IADB, 2002).

The empirical evidence presented in this study highlighted the shortcomings of the market mechanism as a promoter of modernisation and the idealised role attached to subsidiaries. The in-depth case studies contributed to opening up the ‘black box’ (Rosenberg, 1982) of technological change in automotive MNCs. In line with evolutionary studies, micro-level analysis offered clear evidence against the neo-classical notion of knowledge as a public good that freely flows across markets and can be shared at no cost –even within the same organisations. Although the relaxation of intra-firm restrictions and hierarchies allowed for a more ‘fluid’ circulation of knowledge within MNCs, the control of these flows proved to be to a large extent the exclusive responsibility of the parent company. Furthermore, the accumulation of technological capabilities proved to require more than a simple ‘passive’ exposition to knowledge, but rather, active learning and knowledge conversion mechanisms at the level of both individuals and firms (Dutrénit, 2000; Figueiredo, 2001; Nonaka and Takeuchi, 1995).

As clearly shown by the successful experience of some Asian countries (Amsden, 1989; Evans, 1995; Wade, 1990), the ‘endogenisation’ –if such a neologism be permitted– of the process of technological change in peripheral economies requires a diversity of active public policies – or what has become known as a ‘developmental state’ (Chibber, 2003; Evans, 1995; Kohli, 2004). This did not entail a disconnection from the international economy. On the contrary, the expansion of MNCs and international trade was used as a channel to build local capabilities, and then to export them to the rest of the world. This was the central feature of successful growth experiences. In the early 1990s, Latin American countries applied neo-liberal reforms which dismantled policies schemes which, with mixed results, had sought to actively promote technological change in the region (Cimoli and Katz, 2003; Katz and Kosacoff, 1998; Thorp, 1998). Contrary to successful Asian countries, reforms in Latin America did not manage to internalise the sources of technological modernisation. In the case of the automotive sector, successful experiences of technological learning in local subsidiaries were, as seen in empirical chapters, the consequence of autonomous market-driven decisions made by private agents in their attempt to improve their profit performance.

Successful development experiences of countries or regions in which MNCs had a prevalent importance in internalising the process of technological change required the building of coalitions. This was done through an “active intervention” and “intentional action” of a large number of agents (Yeung, 2009: 213) involving governments and groups of firms, but also labour, consumers, and civil society organisations. These social constructions are time-space contingent and subject to disruptions and changes (Coe *et al.*, 2004; Yeung, 2009; 2011).

Implications for future research agenda:

Taking the reflection on the developmental state to the regional level, it would be interesting to compare different types of integration regulatory frameworks (e.g. ASEAN, EU, NAFTA, etc.) in order to understand how they intended to promote the 'endogenisation' of the sources of technological change (i.e. market-driven integration, restrictions to foreign capital, obligated embeddedness approaches, etc.). A brief exercise in this sense was carried out in Chapter 8 with the comparison between MERCOSUR and Eastern European countries.

Going a step further, research should also explore the social process giving shape to this variety of regulatory frameworks, ranging from bureaucratic elites, multinational and domestic firms, non-member countries, labour unions, etc.

Policy implications:

It is clear that in the last two decade, nation-states have seen their power of influence and autonomy significantly curtailed (Cimoli *et al.*, 2009b; Rodrik, 2011). The expansion of GPNs, the growing importance of information technology and services, the consolidation of multilateral economic institutions, and the formidable pressure from global financial markets to maintain a balanced budget, just to mention a few factors, have contributed for this to happen. Not all countries have the Chinese power to define and enforce active policies to 'obligate' MNCs to 'embed' economic activities in their territories.

In this context, the innovation system approach highlighted the importance of strengthening knowledge resources in local territories. This study showed the limitations of this approach in peripheral areas. On the one hand, it is true –as shown by the experience of Francocars– that the strengthening of resources in the local territory is a necessary condition for subsidiaries to be given more knowledge-intensive mandates. Once parent companies decide to delegate responsibilities overseas, local capabilities should exist. Otherwise, opportunities may be lost. Also, although this issue has not directly been addressed here, the strengthening of local resources is also important to reinforce the ability of domestic agents to get involved in GPN networks; on the basis of which they may upgrade their own capabilities.

On the other hand, however, empirical evidence offered here showed that local resources alone proved to exert a limited influence on the ability of automotive subsidiaries to gain autonomy from their parent companies. The relationship between headquarters and subsidiaries, at least within automotive MNCs, remained vertical and the possibilities of promoting the autonomous development of the latter seems to be limited. This is something policy-makers have to bear in mind so as not to place too great an expectation on the modernisation capacity of subsidiaries.

This is why the geographical expansion of integration –and therefore of the market's size– could be a powerful option to increase the relative power of countries in relation to MNCs. However, as in the Chinese case, the market dimension should be complemented with other policy instruments promoting the internalisation of the sources of technological change.

- *The false promise of balanced regional integration processes*

As discussed above, MERCOSUR was originally conceived as an integration process which should be built upon a principle of balance among its member countries. Reality, however, showed that the opposite was obtained. As pointed out in Chapter 8, empirical evidence on the automotive sector seems to demonstrate the existence of a paradox undermining the very foundations and goals of the regional integration process: as business operations of MNCs become more functionally integrated and technologically advanced within the regional automotive space, the division of labour among subsidiaries operating in the region becomes more hierarchical. To put it differently, as integration become deeper, intra-regional imbalances in fact become wider. Although evidence shown in this study is restricted to the performance of automotive MNCs, it is very likely that the situation is the same in other sectors and fields of activity. This state of affairs has led to a virtual stalemate on the regulatory level, at least in regards to the economic dimension of the integration process.

The complexity of this problem would warrant a new research project. Here, two aspects related to the question of intra-regional imbalances will be briefly pointed out. The first one concerns the very notion of 'imbalance' and the tools used to measure it. The second one regards the political limitations of MERCOSUR member countries in the current political context to overcome the tensions generated by imbalances through the deepening of the integration process.

- *A 'tangible' notion of imbalance*

As in most integration or world trade-related agreements, the notion of 'balance' in MERCOSUR is fundamentally based on the information provided by trade indicators. In the case of the automotive industry, for instance, the 'flex' coefficient is a ratio between export and import figures. However, the validity of these indicators to provide accurate and meaningful information about the foreign trade profile and, ultimately, of the level of development of countries has been put into question by the consolidation of GPNs and the geographical fragmentation of the value chain of production in the last two decades (Coe *et al.*, 2008; Gereffi, 2005). Likewise, as seen in this study, these indicators lack the ability to grasp less tangible imbalances, related, for instance, to the hierarchical organisation of business activities within a regional area or the technological trajectory of firms.

In this regard, Sturgeon and Gereffi (2009) point out three specific shortcomings of current trade indicators and propose the collection of data on the 'geography of business functions' to develop new indicators:

> […] trade data contain no actual information about the process by which products are made. […] the technological content of high-technology exports may be embodied in imported components, subsystems, or production equipment. […] Even when production is carried out by local firms and is truly technology-intensive, the reality of GVCs is that the innovative work of product conception, design, marketing and supply-chain management may well continue to

> be conducted outside of the exporting country. These "intangible assets" cannot be measured by current international trade statistics (Sturgeon and Gereffi, 2009: 16-17).

One can possibly argue that the fact of relying exclusively on trade indicators to monitor the evolution of intra-regional imbalances reflects a particular conception of modernisation and technological change which does not incorporate organisational changes undergone by the world economy. Traditional indicators seem to be more adequate for a different type of 'geography', that of the national-based industrialisation, in which although playing an important role MNCs did not have the current levels of functional integration and interconnectedness at a global and regional levels (Dicken, 2011).

Implications for future research agenda:

The discussion above shows a big gap in the present state of our knowledge about the organisation and functioning of the world economy. As already pointed out, a necessary condition for creating accurate measuring instruments is the development of solid analytical frameworks. This requires abundant empirical and ground theory building research.

Research at firm and network levels might certainly contribute to improving our understanding about the mechanisms of creation, distribution and capture of value and knowledge within GPNs. Projects like the Global Value Chains Initiative (2013) or, from the perspective of economic geographers, the Global Production Network studies at the University of Manchester (2013) have pioneered this field of inquiry, being many of their findings referenced here (for, instance, Coe *et al.*, 2008; Ernst and Kim, 2002; Gereffi, 2005; Gereffi *et al.*, 2005; Gereffi and Korzeniewicz, 1994; Hamilton and Gereffi, 2009; Henderson *et al.*, 2002; Morrison *et al.*, 2008; Schmitz and Strambach, 2009; Sturgeon *et al.*, 2008).

In what regards, in particular, the functioning of production networks organised around regional spaces, the state of our ignorance is even greater, especially in the field of innovation studies. It may be desirable to replicate studies like this one in order to, for example: i) covering other sectors of economic activities; ii) examining a broader range of domestic and foreign agents participating at the regional production network (in particular suppliers and clients); iii) explicitly incorporating the analysis of the labour dimension.

It is expected that such research efforts may contribute to improving our understanding about the regional integration dynamics in Latina America, and may also allow for a better informed policy-making for the construction of more balanced integration processes in the region.

Policy implications

One important task for governments is the strengthening of the statistical system, designing indicators and surveys to measure more accurately the creation and capture of value within their boundaries. Given the tendency of GPNs to organise around regional areas, a coordinated "mapping" effort with neighbouring countries would be desirable.

International institutions such as the OECD and the WTO have already taken up the gauntlet and jointly embarked in the so-called Trade in Value-Added (TiVA).[264] This project intends to develop indicators and to collect data "considering the value added by each country in the production of goods and services that are consumed worldwide".

- *Tensions between nationalism and integration*

It has been discussed here that the growing intra-regional disparities pose a double challenge to the integration process: it undermines the possibilities of achieving a balanced distribution of the expected beneficial effects of the integration and, at the same time, it challenges the political sustainability of the collective project.

In the heyday of the neo-liberal agenda, during the 1990s, the problem of disparities, in particular in sensitive products was mainly addressed with temporal exemptions to free trade. In times of open regionalism, the market-driven integration approach did not admit any redistributive mechanism or active regional industrial policy to achieve more balanced outcomes.

When these countries began to emerge from the depth of the crisis they expressed in unison their rejection of the market-driven Washington Consensus reforms, which they blamed for the collapse of their economies. The new left-wing nationalist governments –as they identified themselves– which took office in Argentina, Brazil and Uruguay between 2003 and 2004 brought about a deep change in the integration discourse. The open regionalism model was seen as part of a neo-liberal domination project of domination by foreign powers. It was suggested that it should therefore be buried and replaced with a new integration model strengthening its social dimension, strengthening productive integration, bridging intra-regional disparities and promoting the participation of civil society (Bouzas, 2011; Caetano, 2011; Quijano, 2011; Vázquez, 2011)[265].

Beyond some pilot and poorly funded initiatives, such as the Programme for Productive Integration and the Fund for Structural Convergence of MERCOSUR (Bouzas, 2011;

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[264] Indicators include:

i) Decomposition of gross exports by industry into their domestic and foreign content
ii) The services content of gross exports by exporting industry (broken down by foreign/domestic origin);
iii) Bilateral trade balances based on flows of value added embodied in domestic final demand;
iv) Intermediate imports embodied in exports.

For more information, see OECD (2013b).

[265] Probably, the episode that best illustrates the epochal change was the collective refusal led by Argentina, Brazil and Venezuela, in the Summit of the Americas in 2005, in the Mar del Plata, to endorse the US project for a Free Trade Area of the Americas. An important document crystallising the new principles and objectives of the integration process was the Buenos Aires Consensus signed by Presidents Kirchner (Argentina) and Lula da Silva (Brazil) on 16th October, 2003.

Quijano, 2011), the new approach was incapable of addressing the roots of the intra-regional imbalances amplified by the market-driven integration. Rather, member countries maintained the status quo in the sphere of economic integration and changed the focus of integration by creating coordination mechanisms in other policy areas such as social policy, education or health (Caetano, 2011; Perrotta, 2011; Vázquez, 2011).

In practice, member countries, especially Argentina, became more careful of their domestic markets. The reconstruction of the domestic economy after the crisis required taking a step back from open market –including neighbouring ones. In an apparent contradiction, the rebirth of integration coincided with the intensification of trade disputes. Regional conflicts were addressed by means of bilaterally negotiated ad hoc mechanisms – in particular applied by Argentina (Caetano, 2011).

As a result, the change in the integration paradigm resulted in an early abandonment of the aspirations to deepen and change the paradigm of the economic integration project. In the specific case of the automotive sector, the implementation and periodic renegotiation of the flex coefficient is a clear example of the preference for status quo. The creation of a common market for vehicles was postponed indefinitely but there was no alternative way for advancing with the integration process through alternative ways more beneficial to economic development.

The regulatory stalemate at regional level did not entail, however, a step backwards in the real (or *de facto*) integration carried out by MNCs. Rather, as the empirical evidence in this study shows, the most significant progress in the adoption of regional-scope business strategies by carmakers crystallised from 2003. The lack of alternative measures in the field of economic integration left the field open for subsidiaries to continue shaping their regional networks according to their own preferences. Seemingly paradoxically, it was in the 2000s – during the time of left-wing nationalism governments– that the real technological gap took definite form. The status quo proved to be conducive to the widening of technological gap between subsidiaries. The enactment of the Inovar-Auto initiative, unilaterally adopted by the Brazilian government in 2012, may still contribute, as pointed out before, to taking the technological gap between subsidiaries to a higher level.

Implications for future research agenda:

Why does MERCOSUR find it difficult to advance in the construction of a collective project promoting technological change in a balanced manner, even when governments of the member countries agree in their overall political views –in particular, in regards to the role of the state in promoting innovation activities? One hypothesis will be briefly advanced here. It is fundamentally related to the question of nationalism and the tensions it raises in regards to regional integration. Its examination could be the object of further academic research.

In the prologue to the Spanish edition of *The Uniting of Europe* (Haas, 1958), Ernst Haas (1966) intended to provide some insights to understanding the flourishing –but already stagnated– integration processes in Latin America. He built upon the European experience –which, in fact, was the case Haas had studied in depth– to identify interpretative variables which might be useful to explain this case.

Drawing on Stanley Hoffman's (1966) conceptualisation of nationalism, he focused on the importance of this variable as one of the crucial explanatory factors accounting for the initial impetus of the European integration process. Haas argued that, in the post-Second World War years, the pessimism about nationalism in Europe, the absence of a national conscience and ideology, and the limited material resources and manoeuvrability of devastated European countries created the conditions for the big push towards regional integration to happen.

Back in 1966, Haas acknowledged that nationalism in Latin America was following the opposite path to that of Europe. In the former continent, nationalism was vigorous and the national conscience strong. No historical event had come to undermine its legitimacy. Rather, it was inflamed by the presence of a foreign hegemon which threatened its autonomy. The intensity of nationalism in Latin America, according to Haas, was a factor hindering the progress towards forms of integration which required, precisely, some delegation of sovereignty and the restructuration of domestic economic structures.

Haas claimed that this made integration in the region to have primarily a 'reactive' nature. The protection from external dominant powers –in particular, the US– provided an integrative force much stronger than any positive purpose. This was a weak foundation for the integration project: "Fear of the foreigner constitutes a weak cement for regional conscience, because it depends on the behaviour of the foreign" (Haas, 1966: 30).

Haas's parallels between the European and Latin American integration back in the 1960s provides an interesting insight into the apparent puzzle of current state of affairs in MERCOSUR. The blossoming nationalist spirit inspiring the post-Washington Consensus governments from 2003 clashed, despite its pro-integrationist discourse, against the demands of a progressive integration process. There seems to be an intrinsic tension between the imperatives for (firstly) the reconstruction and (then) the consolidation of nation states after the crisis, on the one hand, and their aspirations for a wider, deeper, and more equitable integration process, on the other. Furthermore, in the context of democratic systems where governments are accountable to their electorate, the need to maintain the support of local constituencies becomes more important. So far, every time tensions have come to light and domestic groups clamoured for protection, the national interest defined in a narrow way has prevailed and responses tended to limit the advance of the regional integration (as well as extra-regional) by means of a variety of measures. Governments did not prove to be willing and, maybe, not capable either of advancing with a design of a multi-level regulatory framework capable of overcoming these tensions, promoting integration in a balanced manner.

Policy implications

Until now, governments have opted for changing the focus of the integration process to less conflictive policy areas, maintaining an apparent status quo in the field of economic integration. However, as discussed above, such option has not contributed to constraining the growing intra-regional imbalance generated, for instance, by business choices made by MNCs.

An alternative positive integration agenda, focused on promoting endogenous technological change, could focus on new strategic sectors where domestic interests are less developed and more opened to internationalisation. Conflicts arise recurrently in traditional sectors –many of which developed under the import substitution industrialisation strategy before the implementation of structural reforms– such as footwear, paper, wooden furniture, electronic appliances and some auto parts.

A sort of two-speed integration process could be conceived to overcome the stalemate, whereas a more conservative integration approach could be implemented for traditional sectors with competitive problems; a positive agenda could be adopted to collectively develop strategic activities in areas with potential for technological change. As stated above, the political difficulties associated with government action in a context of democratic electoral accountability, however, remain a major challenge, reminding us of the essential socio-political embeddedness of all economic phenomena.

Part IV
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Decreto 2072/1996 (Argentina)

Brazil

Decreto 76593/1975

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ALADI and MERCOSUR

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ACE Nº 14 - Protocolo 28 (ALADI)

ACE Nº14 – Protocolo 31 (ALADI)

ACE Nº14 – Protocolo 35 (ALADI)

Decisión 70/2000 (Consejo Mercado Común)

Part V
Appendices

Appendix A – Interviews: list of interviewed people and overview of the issues addressed in the interviews

- *List of interviewed people*

Table A-1
List of interviewed people

Code	Company	Country	Position	Date of interview	Place of the interview	Length of the interview
IC-CA1	Italocars	Argentina	Corporate Affairs– Senior manager	3rd July, 2012	Buenos Aires, Argentina	70 minutes
IC-PA1	Italocars	Argentina	Purchasing área – Senior manager	7th August, 2012	Córdoba, Argentina	60 minutes
IC-PROC1	Italocars	Argentina	Process engineering area – Senior manager	7th August, 2012	Córdoba, Argentina	60 minutes
IC-PROD1	Italocars	Brazil	Product Engineering area – Senior manager	9th August, 2012	Buenos Aires, Argentina	40 minutes
IC-PROD2	Italocars	Brazil	Product Engineering area – Senior manager	18th December, 2012	Betim, Brazil	70 minutes
IC-CA2	Italocars	Brazil	Corporate Affairs – Former Senior Manager	19th December, 2012	Betim, Brazil	90 minutes
IC-CA3	Italocars	Brazil	Corporate Affairs – Senior Manager	18th December, 2012	Betim, Brazil	30 minutes
Total interviewed managers of Italocars: 7						
FC-PROC1	Francocars	Argentina	Process engineering area – Senior manager	13th September, 2012	Córdoba, Argentina	60 minutes

FC-PROC2	Francocars	Argentina	Process engineering area – Senior manager	13^{th} September, 2012	Córdoba, Argentina	60 minutes
FC-PA1	Francocars	Argentina	Purchasing area – Senior manager	13^{th} September, 2012	Córdoba, Argentina	60 minutes
FC-PROD1	Francocars	Argentina	Product engineering area – Senior manager	13^{th} September, 2012	Córdoba, Argentina	60 minutes
FC-CA1	Francocars	Brazil	Corporate Affairs – Senior manager	20^{th} December, 2012	São José dos Pinhais	45 minutes
FC-PROD2	Francocars	Brazil	Product Engineering area – Senior manager	20^{th} December, 2012	São José dos Pinhais	70 minutes
Total interviewed managers of Francocars: 6						
NC-PA1	Nipponcars	Argentina	Purchasing area – Former Senior manager	17^{th} April, 2012	Buenos Aires, Argentina	90 minutes
NC - CA1	Nipponcars	Argentina	Corporate Affairs – Senior manager	6th July 2012	Buenos Aires, Argentina	60 minutes
NC - PA2	Nipponcars	Argentina	Purchasing area – Senior manager	29^{th} June 2012	Buenos Aires, Argentina	60 minutes
NC - PROD1	Nipponcars	Argentina	Product Engineering area – Senior manager	29^{th} June 2012	Buenos Aires, Argentina	60 minutes
NC - PROC1	Nipponcars	Argentina	Process engineering area – Senior manager	29^{th} June 2012	Buenos Aires, Argentina	60 minutes
NC – PROD2	Nipponcars	Brazil	Product Engineering area – Senior manager	17^{th} December 2012	São Bernardo do Campo, Brazil	60 minutes
Total interviewed managers of Nipponcars: 6						

BA-1	Auto-Parts Association	Argentina	Senior manager	10th April, 2012	Buenos Aires, Argentina	60 minutes
BA-2	Auto-Parts Association	Argentina	Department of commercial and economic affairs	10th April 2012	Buenos Aires, Argentina	60 minutes
BA-3	Automotive Engineers and Technicians Association	Argentina	Senior manager	14th April 2012	Buenos Aires, Argentina	40 minutes
BA-4	Automotive manufacturers Association	Argentina	Senior manager	14th April 2012	Buenos Aires, Argentina	60 minutes
BA-5	Automotive Engineers and Technicians Association	Brazil	Senior manager	14th December 2012	São Paulo, Brazil	60 minutes
BA-6	Automotive Manufacturers Association	Brazil	Senior manager	12th December 2012	São Paulo, Brazil	60 minutes
S-1	Universidad de Quilmes	Argentina	Senior Lecturer	29th March 2012	Buenos Aires, Argentina	60 minutes
S-2	Centro Universitário da FEI	Brazil	Senior Lecturer	11th December 2012	São Paulo, Brazil	90 minutes
S-3	Consulting firm	Argentina	Manager	20th April 2012	Buenos Aires, Argentina	70 minutes
Total interviewed managers of business associations and specialists: 9						

- *Issues addressed in interviews*

As pointed out in Chapter 3, interviews with managers of subsidiaries were prepared with specific questions for each person. Below, a general overview of the issues addressed in the interviews can be found:

- Product engineering department

Evolution of objectives and functions of local and regional product engineering departments.

Evolution of product engineering capabilities of the subsidiary.

Evolution of the product engineering responsibilities assumed by the subsidiary. (autonomous, negotiated with parent company, top down delegation).

Engineering responsibilities of the subsidiary in the development/adaptation of specific vehicles.

Innovations resulting from in-house technological efforts.

Division of labour between subsidiaries in MERCOSUR in the field of product engineering activities (organisation of local/regional product engineering department).

Evolution of staff in product engineering department.

Evolution of infrastructure: (laboratories, test tracks, software, etc.).

Environmental factors affecting the technological trajectory of the subsidiary.

- Linkages with parent company and other units of the corporation

Mechanisms for the definition of regional product policy (participation of the subsidiary).

Evolution of the degree of autonomy to define the regional technological strategy.

Evolution of the degree of autonomy to define in-house technological efforts.

Competition/collaboration with subsidiaries in the region.

Appendix B - List of codes

Table B-1
List of codes

Firm	Unit	Description	Code
Italocars	*Parent company*	Organisation of corporate R&D activities	IT-PC-RD
		Product policy	IT-PC-PP
		Internationalisation strategy	IT-PC-IS
		Strategic motivation in the region	IT-PC-SM
	Regional organisation	Organisation of product engineering activities	IT-MS-PE
		Product policy in the region	IT-MS-PP
	Argentinian subsidiary	In-house product engineering activities	IT-AR-PE
		Performance of the subsidiary	IT-AR-PF
		Competition/collaboration for resources and corporate mandates	IT-AR-CP
	Brazilian subsidiary	In-house product engineering activities	IT-BR-PE
		Performance of the subsidiary	IT-BR-PF
		Competition/collaboration for resources and corporate mandates	IT-BR-CP
	Government actions	Italocars-government relations	IT-GV
Francocars	*Parent company*	Organisation of corporate R&D activities	FC-PC-RD
		Product policy	FC-PC-PP
		Internationalisation	FC -PC-IS

		strategy	
		Strategic motivation in the region	FC -PC-SM
	Regional organisation	Organisation of product engineering activities	FC -MS-PE
		Product policy in the region	FC -MS-PP
	Argentinian subsidiary	In-house product engineering activities	FC -AR-PE
		Performance of the subsidiary	FC -AR-PF
		Competition/collaboration for resources and corporate mandates	FC -AR-CP
	Brazilian subsidiary	In-house product engineering activities	FC -BR-PE
		Performance of the subsidiary	FC -BR-PF
		Competition/collaboration for resources and corporate mandates	FC -BR-CP
	Government actions	Francocars-government relations	FC -GV
Nipponcars	*Parent company*	Organisation of corporate R&D activities	NC-PC-RD
		Product policy	NC-PC-PP
		Internationalisation strategy	NC -PC-IS
		Strategic motivation in the region	NC -PC-SM
	Regional organisation	Organisation of product engineering activities	NC -MS-PE
		Product policy in the region	NC -MS-PP
	Argentinian subsidiary	In-house product engineering activities	NC -AR-PE
		Performance of the	NC -AR-PF

		subsidiary	
		Competition/collaboration for resources and corporate mandates	NC -AR-CP
	Brazilian subsidiary	In-house product engineering activities	NC -BR-PE
		Performance of the subsidiary	NC -BR-PF
		Competition/collaboration for resources and corporate mandates	NC -BR-CP
	Government actions	Nipponcars-government relations	NC -GV
Government	*Regional/Bilateral level*	Regional integration policy (automotive sector)	GV-MS-IP
	Argentina	Macroeconomic environment	GV-AR-ME
		Sectoral policy (national/sub-national)	GV-AR-SP
		Public support to automotive industry	GV-AR-PS
	Brazil	Macroeconomic environment	GV-AR-ME
		Sectoral policy (national/sub-national)	GV-AR-SP
		Public support to automotive industry	GV-AR-PS

Appendix C - A brief historical review of the activities of Italocars in Argentina and Brazil

Italocars was founded in Turin, Italy, in 1899. In that same year, it started its manufacturing operations as a car producer. Over the years, the group expanded the scope of its operations, encompassing a wide range of activities including the production of aircraft engines, passenger rail coaches, agricultural machinery, electrical material, etc. As most European carmakers in the aftermath of the Second World War, Italocars implemented a mass production system which found its roots in that developed in the United States in the 1910s and 1920s. In the 1950s, it was one of the flagship companies of the post-war Italian reconstruction. As for the production of automobiles, between the 1950s and 1960s, the growth in the production levels was outstanding: in 1950, the company produced 100,000 units; in 1960, 500,000; and, in 1966, 1 million. Italocars specialised in the mass production of small engine cars. The preference for this segment was induced by the strong fiscal pressure on bigger cars and fuels exerted by the Italian tax policy. In 1968, Italocars accounted for a 78% share of the domestic car market and its dominant position was undisputable. As a result of its remarkable expansion, in that year, Italocars was ranked 5th world car producer, after the American 'Big Three' –Chrysler, General Motors and Ford– and the German Volkswagen (Camuffo and Volpato, 2000).

The post-War period, especially the 1960s, was also a time of international projection for Italocars. The internationalisation strategy went beyond arm's length trade or commercial transactions with authorised car dealers located in third countries. Already in the 1950s, Italocars established different forms of association with foreign companies, providing them with technical assistance to start up their manufacturing operations or with licenses to produce its models. In 1953, for instance, it participated in the launch of the Spanish Seat; a year later, an agreement was signed with the Yugoslavian *Zavodi Crvena Zastava* (ZCZ) to assemble Italocars cars; in 1968, Italocars acquired a stake in Citröen, but the agreement was finally broken in 1974 as a consequence of its rejection by the French government. In the mid-1960s, Italocars exported around of 38% of its production –mainly to the European market– and had a presence in a variety of countries (Camuffo and Volpato, 2000).

The appearance of Italocars in Argentina and Brazil dates back to the early years of the 20th century. Already in the first decade of the 1900s, Italocars exported cars to Argentina. The first Italocars' authorised dealer opened its doors in the wake of the First World War. It was not only involved in the car business, but in the early times following its arrival in the country, Italocars diversified its operations, importing and selling tractors, ploughs, trucks and spare parts, among other goods. Commercial exchange was interrupted during the Second World War, when the company engaged in the production of military vehicles and aircrafts and war material. The activities of Italocars in Argentina were resumed with the visit of the President of Italocars Italia to the country in 1948 with the objective of evaluating the potential of the domestic market. Following his visit, the Italocars Delegation for Latin

America was created. Initially, it had responsibilities for the distribution and maintenance of tractors and diesel engines (Fiat Auto Argentina, 2009).

Italocars' manufacturing activities in the country started in 1953 with the creation of Italocars Someca Construcciones Córdoba. It was a joint venture among Italocars, IAME (*Industrias Aeronáuticas y Mecánicas del Estado*) –a stated-owned company–, and Sevitar –a subsidiary of a French producer of tractors with Italocars licences. The company established its production facilities in Ferreyra, a suburb of the province of Córdoba, where it started to produce tractors in 1954. A year later, the subsidiary initiated the production of locomotives, and then expanded into the production of naval engines, oil pumps, power plants, and passenger rail coaches.

With the enactment of the so-called Automotive Regime (*Decreto 3693/59 (Argentina)*) by President Frondizi's administration in 1959, Italocars stepped into the car manufacturing business in Argentina.[266] In September of that year, the government authorised Italocars Someca Concord S.A. (Italocars Concord) –the name was a contraction of "Construcciones Córdoba"– to produce cars. The manufacturing plant was built up in Caseros, in the province of Buenos Aires. The first model manufactured in the assembly line of Caseros, in April 1960, was the Italocars 600 D.

By 1966, Italocars was the private company with the highest turnover in the country. In 1967, it turned into the main producer of automobiles, with an annual production of more than 40.000 units (Sourrouille, 1980). During the 1960s and 1970s, Italocars held a leading position in the domestic market, offering a great variety of locally produced models, chiefly concentrated in the segment of cars with engine sizes up to 1600 cc.[267]

[266] The automotive regime was part of a broader policy aimed at attracting foreign capital. The two normative pillars of such a policy were the *Ley 14.780/58 (Argentina)* on foreign capital and the *Ley 14.781/58 (Argentina)* on industrial promotion, which indicated the priority sectors for the government.

[267] For a chronological history of the models produced in Argentina, see Fiat Auto Argentina (2009).

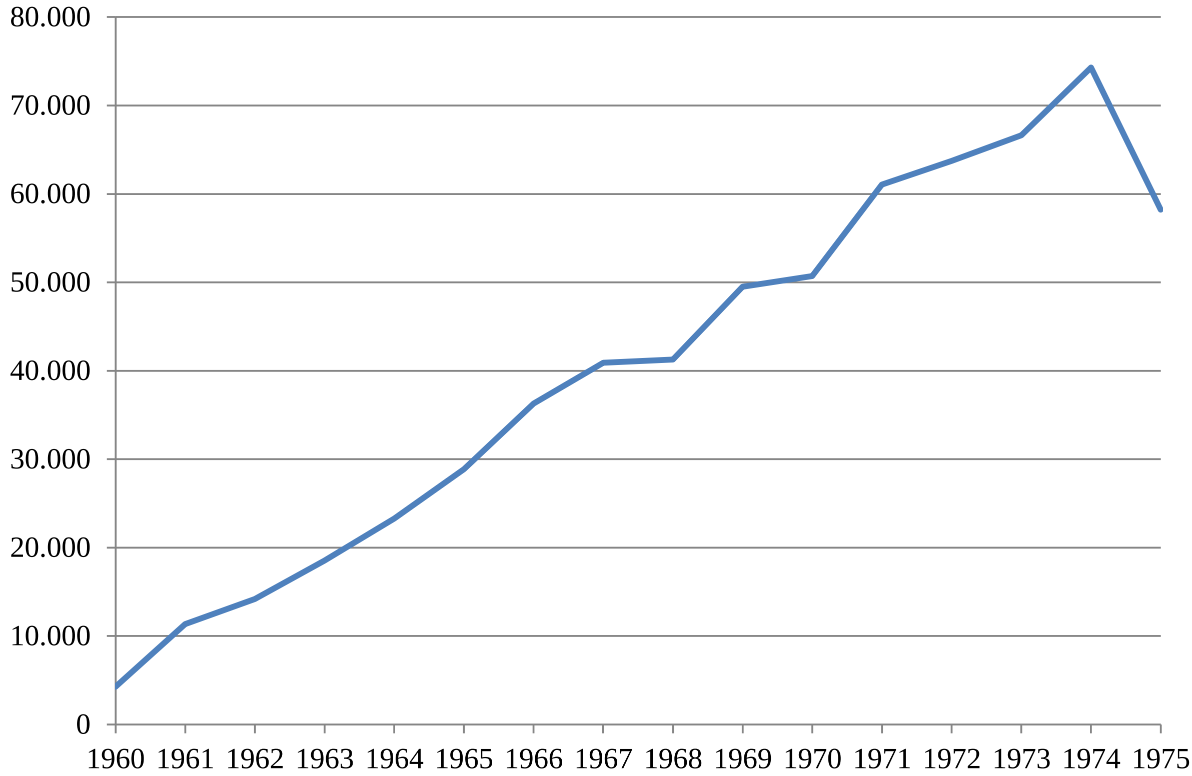

Figure C-1 - Volume of production of Italocars Concord Argentina (units; 1960-1975)
Source: Sourrouille (1980)

In contrast with the successful experience of the previous years, the 1970s were a time of economic, political, and social turmoil both in Italy and in Argentina. The intensification of conflicts with trade unions and the deterioration of the economic situation in Italy as a result of the oil crisis, forced the Italocars group to engage into a progressive automation of its methods of production. The company also engaged in a process of decentralisation of its excessively rigid and integrated organisational structures (Camuffo and Volpato, 2000). In Argentina, the economic instability was accompanied by an extremely fragile political situation against a backdrop of intensifying political violence.[268]

The worsening of the situation in Argentina concurred with the decision by Italocars in 1973, to set up manufacturing facilities in Brazil. Even though this country was itself not exempt from economic and political problems it was experiencing a high rate of economic growth.[269] Moreover, under the *II Plano Nacional de Desenvolvimento* –The National Development

[268] Between 1972 and 1976, four managers of Italocars Concord –including its Director-General, Oberdan Sallustro– were kidnapped by different guerrilla groups in Argentina and then assassinated (Fiat Auto Argentina, 2009).
[269] Between 1968 and 1973, the average change in the Brazilian GDP was above 11% (Source: Central Bank of Brazil).

Plan– the federal government had put in force a strategy to attract foreign capital promoting the creation of joint-ventures with public companies and local business groups[270].

The determination of the government of the Brazilian state of Minas Gerais to foster the development of manufacturing industries in the region was conclusive for Italocars's decision to install a plant in a suburb of the city of Belo Horizonte, Betim, in 1976. The government had an original equity participation in Italocars Automóveis of 45%, later increased to 49% (Ferreira Avellar, 2001).[271] A study commissioned by the Development Bank of Minas Gerais to evaluate the situation of the regional economy and provide policy recommendations, had depicted a dismal landscape: the region was economically backward, transport infrastructure was poor, and it excessively relied on the iron and steel industry and the production of agricultural and apparel goods with low levels of productivity.[272] The diagnosis offered in the study informed the industrial policy put in force by the government of Minas Gerais. It fundamentally aimed at developing strong backward and forward production linkages pivoting around the capital good industry and the automotive sectors (Borges Lemos *et al.*, 2000).

The first model produced by Italocars in Betim was the 147, the Brazilian version of the 127, produced in Italy since 1971. Between its installation in Betim and 1990, Italocars Automóveis managed to join the club of the big three carmakers then operating in Brazil, namely Ford, General Motors and Volkswagen. During this period, it produced more than 2.2 million vehicles of the models 147, Fiorino, and Uno.

[270] This model of joint-venture in Brazilian economic history is usually called "tripê", a reference to the "triple alliance" involving the state, local and foreign business groups. See Nunes (2005).

[271] The government of Minas Gerais did not only contribute financial resources for the installation of Italocars in its territory. It did also provide fiscal benefits; it acted as a guarantor for international, national and state loans; and it allowed the remittance of profits overseas. The government also gave Italocars a 2 million square metre piece of land for the establishment of the plant, to be paid in forty years with no monetary adjustment. In return, the state of Minas Gerais had a stake of 45% of the share capital of Italocars. In 1987, the state's share was reduced to 18.17%; in 1988, Italocars acquired 100% of the company Ferreira Avellar (2001).

[272] This 'diagnosis' resulted from a comprehensive study of the economy of Minas Gerais commissioned by the BDMG. The economist Fernando Antônio Roquette Reis, then Director of the Department of Studies and Planning of the BDMG, is credited for having proposed carrying out such a study. It was coordinated by Reis himself together with Élcio Costa Couto e Álvaro Fortes Santiago and published in 1968. See BDMG (1968); Ernst (2002).

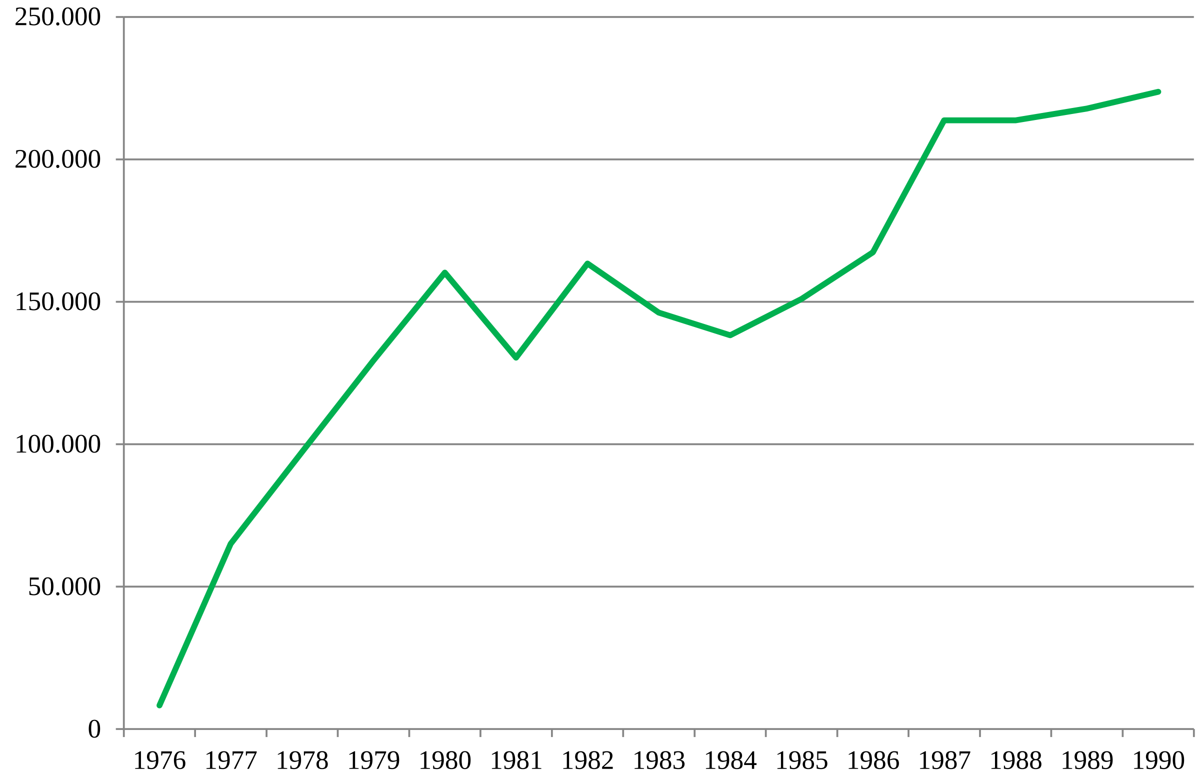

Figure C-2 - Volume of production of Italocars Automóveis (units; 1976-1990)
Source: ANFAVEA.

As illustrated by the data on production –reproduced in the Figure C-1 (p. 313) and Figure C-2 (p. 315)– from the mid-1970s Italocars progressively started to change the focus of its business operations in South America in favour of Brazil. A milestone in this process was the decision of Italocars to delegate the control of its activities in Argentina to a local business group. In February 1980, replicating the agreement reached by their parent companies in Europe –which had given birth to the *Società Europea Veicoli Leggeri* (Sevel) in 1978–, the Argentine subsidiaries of Italocars s.p.a (Italocars Concord) and PSA Peugeot Citröen (named Safrar[273]-Peugeot) were merged into Sevel Argentina S.A.[274] In August 1981, Italocars assumed control of the joint-venture and initiated the reorganization of the manufacturing operations. The production of passenger cars by the two companies was reallocated to the plant Italocars owned in Caseros. In 1981, Franco Macri, an Italian businessman who had acquired Argentinian nationality joined the Board of Directors and, in 1982, assumed the majority stake of Sevel. Italocars held minority participation. Between that year and 1996, when the company came back to Argentina and took direct control of its operations, Sevel produced Italocars vehicles under license.

[273] Acronym for *Sociedad de Automóviles Franco Argentinos*.
[274] The original meaning of the acronym SEVEL was changed in Argentina for *Sociedad Europea de Vehículos para Latinoamérica*.

Appendix D - A brief historical review of the activities of Francocars in Argentina and Brazil

During the second half of the 1950s, Francocars adopted what Boyer and Freyssenet (2000) referred to as a 'volume and diversity' profit strategy (or Sloanian model).[275] This implied the development of a complete product range in which models shared a number of parts and components. According to the President of the company, this strategy was adequate for simultaneously attending to the lower range demand and, at the same time, matching the quality preferences of a clientele with rising income levels.

This strategy could only be profitable with a scale of production which largely exceeded the size of the French market. This led Francocars to reinforce its internationalisation strategy, both through the expansion of exports and production overseas. As for the exports, Dreyfus set a target of 50% by the end of the 1950s. According to the data provided by Freyssenet (2000a), the goal was achieved in 1959, when exports accounted for 60% of total production. The growth in exports was largely explained by the growth in exports to the US which that year accounted for nearly 30% of total exports (Freyssenet, 2003).[276]

With the creation of the European Economic Community (EEC), in 1957, and the progressive removal of trade barriers among member states, the European market turned into the main target of Francocars' internationalisation strategy during the 1960s. Between 1958 and 1972, whereas exports to EC member states multiplied by a factor of 11, sales to the rest of the world grew only 2.7 times (Freyssenet, 2003).

With regard to the expansion of its manufacturing operations abroad, Francocars sought to advance with the signing of additional licensing agreements (e.g. Israel, Philippines, and New Zealand). By the end of the 1960s, the volume of production overseas represented more than 10% of Francocars' total production. In the 1970s, the company further increased its presence abroad: overseas plants and production agreements in foreign countries came to a total of twenty five in 1975 (Freyssenet, 2000a).

It was in this context that Francocars made its arrival on the Argentinean and Brazilian markets. The arrival to the former took place in 1959, when it was associated to *Industrias Kaiser Argentina* (IKA), a company integrated by the state-owned IAME, the US firm Kaiser Motors Corp., and local investors. Since 1956, IKA had had its manufacturing premises in Santa Isabel, a suburb of the city of Córdoba. From the alliance, IKA-Francocars was born. Francocars started to produce in the country in 1960.

Francocars's decision to produce in Argentina was largely influenced by the promotion policy implemented by the federal government in 1959 (Sourrouille, 1980). During the first five years of the automotive regime (1959-1964), IKA-Francocars was the main vehicle manufacturer of the country, accounting for around 33% of the total production –the second

[275] For a more detailed account of the history of Francocars, see Freyssenet (2000a).
[276] In 1956 they represented only 7% (Freyssenet, 2003).

and third ones (Ford and Fiat, respectively) represented about 11% each (Sourrouille, 1980). The alliance covered a broad range of segments. A division of labour among the two main partners prevailed. It followed a pattern commonly observed in their respective domestic market, according to which European firms specialised in the production of vehicles of up to 1.5 cc., and American firms manufactured the bigger models (Sourrouille, 1980). Accordingly, whereas Francocars produced models like the Dauphine or the Gordini; IKA manufactured larger cars, such as the Carabela or the Rambler. In 1967, after some years of poor performance, Francocars assumed the majority stake in the company and replaced the American group in the management of the firm.[277]

In the mid-1970s, Francocars bought IKA and, in 1975 it turned into Francocars Argentina. For many years, the company had a significant presence in the Argentinian car market. It produced models based on platforms developed by the parent company, in France, which had a large market share, such as the R4, R6, and R12. In the late 1970s, the company initiated an investment plan aimed at modernising the range of vehicles. As a result, models like the R18 (1981), the R11 (1984), the R9, the Trafic (1987), and the R21 (1989), all of them already commercialised in Europe, were launched onto the Argentine domestic market.

The presence of Francocars in Brazil was more ephemeral than in Argentina. In the early 1960s, it associated in a partnership with the US company Willys Overland to produce vehicles under license with the French carmaker. In 1961, the Willys Interlagos, a sport vehicle based on the Francocars' model Alpine A110, was introduced into the Brazilian market. Later on –always under the Willys brand– the Dauphine and Dauphine Gordini were produced in the country. However, this partnership did not last long, in 1968, Willys was bought by Ford and the production of Francocars' models in Brazil was discontinued. In the 1970s, the country was closed to car imports and, therefore, Francocars did not have any presence in Brazil until the moment when the import of Francocars vehicles was resumed in 1993.[278]

[277] Sourrouille (1980) argues that this negative performance was largely due to the fact that the alliance IKA-Francocars did not attend to the intermediate segment.

[278] In the words of the current vice-president of Francocars do Brasil, Francocars "left Brazil at the end of the 1960s and completely forgot about Brazil for three decades" (quoted in, Tavares, 2010: 58).

Appendix E - Organisation of product development activities of Francocars during the period 1998-2007

In 1989, ten years before the effective inauguration of the Technocentre, Francocars initiated a profound reorganisation of its engineering activities. This reform embraced the concept of 'simultaneous engineering' which definitely left behind an engineering scheme that was still dominated by a sequential conception of the product development process (Boboc, 2002).

During this period, the position of Project Director was created to replace that of the Development Project Manager. The new position director had greater autonomy than his predecessor, remaining in charge of the coordination of all the areas involved in the process of a new platform's development: product engineering, process engineering, and manufacturing. In a nutshell, the role of the Project Director was conceived as being that of the 'conductor' of the 'project platform team' (see Figure E-1). With the deployment of this strategy Francocars aimed at achieving a substantial reduction in the development time and costs of new models (Renault, 1998).[279]

The engineering area of Francocars then adopted a matrix structure along two main axes (Figure E-1). The horizontal axis, corresponding to the 'projects', was under the management of Project Directors. The vertical axis involved the participation of two management teams: i) the Direction for Project Proposals, Research and Service Provision (*Direction des Avant-projets, de la Recherche et des Prestations*, DARP); and, ii) the Direction for Vehicle Engineering Development (*Direction du Développement de l'Ingénierie des Véhicules*, DDIV). Under the DDIV, various management sub-teams corresponding to the different parts of the vehicles operated on –internally referred to as *métier*– (e.g. chassis, body, accessories, electric and electronic systems) (Boboc, 2002).

[279] Freyssenet (2009b) reports a sharp fall in development times for new models. For example, whereas the Megane I (1995) was developed in 45 months, the Megane II (2002-2003) took 29 months. The Modus (or Clio III, 2004) was developed in 29 months, compared to the 50 months of the Clio II (1998).

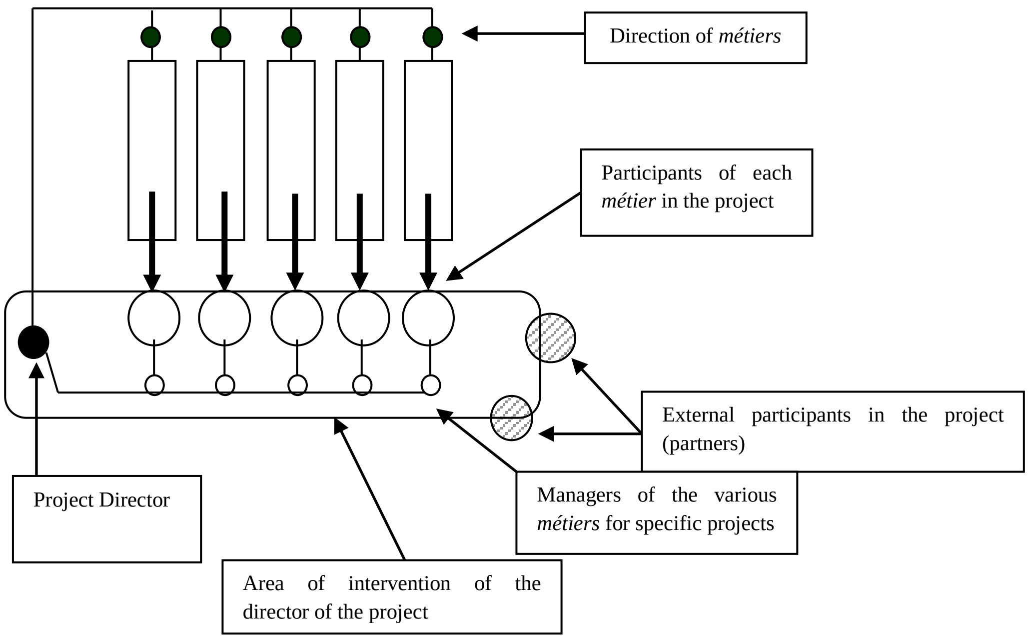

Figure E-1 - Organisation of product engineering activities in Francocars since the mid-1990s
Source: Boboc (2002)

Three different types of groups intervene along the lifecycle of the vehicle programmes. When a new project is planned, the DARP is the first area involved. The DARP participates in the preparatory phases of the project development stage. This direction includes the areas of ‘drafting’ (*avant-project*), research, services for clients and incidents in vehicles. When a project is ‘received’ by the DARP, it is delivered to the so-called Upstream Strategy Group (*Groupes Stratégie Fonction Amont*; GFSA). This group is made up of developers and designers working on different parts of the vehicle (*métiers*), and staff from the areas of purchasing and sales. Depending on the project, people from other areas of the company –e.g. research– or even suppliers can participate in GFSAs. The main tasks of the GSFAs are to identify what the technological policies of the company are at that moment, and to select the innovations to be effectively incorporated into the new platform. This task is carried out in close collaboration with suppliers in order to plan and work on prospective innovations. During this process the GFSAs has to take into consideration the conditions prevailing in the locations where the vehicle will be manufactured and commercialised. This information is generally collected by the engineering, product planning or marketing areas of the subsidiaries (Boboc, 2002; Carneiro Dias, 2003)[280].

Once the stage of project conception is finished, the responsibility is assumed by the DDIV and the directions in charge of the different parts of the vehicles (*métiers*). The GFSA maintains a monitoring role, in order to ensure that the parameters defined in the previous

[280] The area involved in this process depends on the organisational structure of the subsidiary.

stage are respected. At this stage, the Project Director is appointed and assumes control of the programme. Two groups initiate its participation in the project: the Groups for Basic Functions (*Groupes Fonctions Élementaires*; GFE) and the Groups for Series Functions (*Groupes Fonction Série*; GFS). Whilst the mission of the former is to develop a vehicle which complies with the specifications defined by the GFSA, the GFS are primarily in charge of the products already in the manufacturing phase. These groups have an important role in providing inputs for future 're-conceptualisations' and continuous improvement of the product. The Figure E-2 indicates the main responsibilities of the three groups –GFSA, GFE and GFS– and schematically shows their sequential input into the lifecycle of the vehicles.

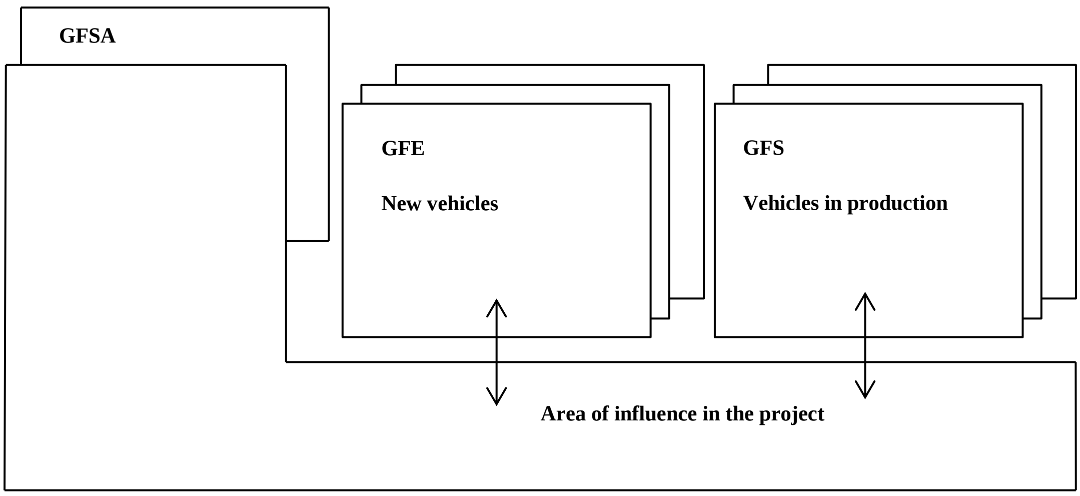

Figure E-2 - Participation of the GFSA, GFE and GFS in the lifecycle of a vehicle
Source: Carneiro Dias (2003)