

THE CATCHING-UP OF THE BRAZILIAN AGRIFOOD SYSTEM: NATIONAL DEVELOPMENT STRATEGIES, INSTITUTIONS AND FIRMS

Ana Célia Castro

Professor at the Centre for Law and Economic Sciences, Federal University of Rio de Janeiro - CCJE/UFRJ. Also, Post-graduate Course in Development, Agriculture and Society, Rural Federal University of Rio de Janeiro - CPDA/UFRRJ. MINDS Coordinator - Multidisciplinary Interinstitutional Network on Development and Strategies - www.minds.org.br .

Abstract:

Catching-up is deemed as the technological parity or equivalence to international “state-of-the-art” standards. It is a process that tends to occur in a concentrated manner within a determined time span, and is accompanied by high economic growth rates, with an increase in productivity and international competitiveness for both sectors and firms.

It is here defended that the agro-food catching-up process could be better understood if we take into consideration the existence of three different phases in time, as far as institutions, knowledge base, co-evolution, firms and other actors, networks and demand, are concerned. The development of those ideas, applied to the Brazilian case, is the purpose of this article.

Resumo:

Entende-se como catching-up o emparelhamento ou equiparação tecnológica ao “estado das artes” internacional. Trata-se de um processo que tende a ocorrer de forma concentrada, num período de tempo determinado, acompanhado de altas taxas de crescimento da economia, com elevação da produtividade e da competitividade internacional de setores e empresas.

E aqui defendido que o processo de catching-up pode ser melhor entendido a partir de três diferentes fases, do ponto de vista das instituições, base tecnológica, co- evolução, firmas e outros atores, redes e demanda. O desenvolvimento dessas idéias, aplicadas ao caso brasileiro, é a proposta deste artigo.

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1. Characteristics and driving factors.

According to a widely shared belief, “in contrast to other sectors such as automobile, pharmaceuticals, telecommunications and software, that are all “modern” industries and often serve as leading sectors in catching-up, the agro-food sector is traditional and never had played such a role. The roles of the agro-food sector in catch-up are, in short, in providing subsistence foundation and in serving as “catalyst” to successful catch-up (Sisler and Edwin Oyer 2000)” (Shulin Gu, Outline of the Agro-food Sector, February 2006). Additionally: “The six sectors (...) - pharmaceuticals, auto, software, telecom, agro-food, semiconductors – (...) represent a good range both according to the Pavitt taxonomy, to the agriculture-manufacturing-service classification, and to the R&D and traditional distinction. We have science based sectors such as pharmaceuticals, R&D intensive such as telecom and semiconductors, scale intensive such as automobiles, specialized supplier and service sectors such as software, traditional sectors such as agro-food.” (Malerba, Franco – Catching up in the PASTAS sectoral systems, April 2007).

My suggestion is to consider the following hypothesis, as far as the Brazilian Agro-food Catching-up case is concerned:

1. On the contrary of the usual view, there was a catching-up process in the Brazilian agribusiness system during the second half of the twentieth century^{1/} Not only was the growth intense, but new technological processes had been introduced..
2. The agrifood catch-up is part of a broader catching-up process of the Brazilian economy^{2/} and tended to occur in periods when development strategies come to be implemented^{3/}, reinforcing competitiveness on the international markets and at the national and enterprise level. Indeed, the origins of agricultural catching-up - the introduction of the “seeds of

* Professor at the Centre for Law and Economic Sciences, Federal University of Rio de Janeiro - CCJE/UFRJ. Also, Post-graduate Course in Development, Agriculture and Society, Rural Federal University of Rio de Janeiro - CPDA/UFRRJ. MINDS Coordinator - Multidisciplinary Interinstitutional Network on Development and Strategies - www.minds.org.br.

^{1/} Catching-up is deemed as the technological parity or equivalence to international “state-of-the-art” standards. It is a process that tends to occur in a concentrated manner within a determined time span, and is accompanied by high economic growth rates, with an increase in productivity and international competitiveness for both sectors and firms. The most important reference texts for the catching-up studies are: Gerschenkron, A. (1960); Abramovitz, M., (1986); e Hikino, T. e Amsden, A., in Baumol, J. Nelson, R.R. and Wolff, E. (Editors), (1994). See also Nelson, R. R.; Mazzoleni, R.; Cantwell, J.; Bell, M.; Hobday, M.; Von Tunzelmann, N.; Metcalfe, S; Henry, C.; Odagiri, H. (2006)

^{2/} Antonio Barros de Castro was the author responsible for introducing this approach and who interpreted the Brazilian industrial development as a catching-up process. The article “Renegade Development: Rise and Demise of State-led Development in Brazil”, in Smith, W. et al (Organizer), Miami: Transaction Publishers, 1993, inaugurated this discussion, which was developed, for example, in Castro, A.B. and Proença, A. in Velloso, J. P. R. (Coordinator) (2001), as well as in Castro, A.B., (2003).

^{3/} Both historical periods were relevant as far as national strategies are concerned: the JK Presidency and the II PND (National Development Plan).

change” and the institutions of the “Green Revolution” - had even coincided with the starting point of industrial catching-up, in the latter half of the 1940’s and the 1950’s.

3, The agriculture sector could no longer be consider as “a traditional sector” as a whole. Some of the new technologies for the agro food sectors (in the 2000’s) could be, instead, classified as: science based - the new and controversial transgenic revolution, the bio-reactors for the production of new bio molecules for agro food sector, plants as vaccines; or R&D intensive – plants with certain “resistances” for salinity, aluminium and process of catalysis for ethanol production; and scale intensives, as the application of GPS (global positioning system) for increasing productivity in agriculture and livestock in general.

Summing up, although the Pavitt taxonomy is extremely useful in almost all cases, it can’t necessarily grasp the technological transformation of the Brazilian agro-food system, today a leading “industrial complex” of the Brazilian economy - with higher rates of growth, higher export rates, and leading in biotech and software applications, some of them emergent from inside the agro food system.

Instead, it is here defended that the agro-food catching up process could be better understood if we take into consideration the existence of three different phases in time, as far as institutions, knowledge base, coevolution, firms and other actors, networks and demand, are concerned. The development of those ideas, applied to the Brazilian case, is the purpose of this article.

1.2 Brazilian Agro-food Catch-up: Phases

The first phase – from the late 1940’s to the 1970’s – could be characterized, on one side, by the institutional setting – research, technical assistance and extension services, credit system - and on the other side, by the introduction of the material base for agricultural modernization – transport and commercial infra-structure, seed companies, machine and tools sector, fertilizers and agrochemicals⁴.

It should be mentioned the catalysing and modernising role played by the Brazil-United States Mixed Technical Commission (the Abbink Mission), from the end of the 40’s to the mid of the 50’s, which was to a great extent responsible for policy articulation and for setting up institutions that promoted profound technical-economical and social changes: the creation of the BNDES (National Bank for Economic and Social Development) in 1952, and the proposals that were to reach fruition in the Targets Plan (Plano de Metas), during the government of President Juscelino Kubistchek (1956-1961), especially the implantation of a transport and communication infra-structure, as well as some key industrial sectors (basic or heavy industries), which were all requirements for implementing and modernising the agribusiness system (machinery industry and basic inputs such as fertilizers and agro-chemicals).

⁴ / The “Green Revolution” knowledge base depends on the introduction of the new seeds and plants, necessarily adapted to the environmental conditions of the tropical and sub tropical agriculture. The case of corn is a paradigm: seeds coming from the USA couldn’t be grown in Brazil (because of the higher incidence of the sun) unless re adapted to local conditions. In short, the pre-condition was the existence of a research background, public and private.

The public policies and institutions responsible for the catching-up – the early articulation in the beginning of the 50's, of the tripartite structure: 1. Public agronomical research within the DNPEA (National Department of Agriculture and Livestock Research) including the old Institutes – Agrônômico de Campinas (coffee, corn, cotton), Biológico de Campinas, Agrônômico do Paraná (mainly cotton), de Pernambuco (sugar cane), to mention the most notorious; 2. Technical assistance and extension, from the ACAR system (created in the 1950's); and 3) the modernization of the farmer credit, the Carteira Rural do Banco do Brasil which existed since the 1930's.^{5/} The agricultural food sector was still very backward at that moment, and the family farm subsistence agriculture was predominant, as far as rural employment is concerned.

It's also important to mention the study, capacity building and exchange programs abroad, intended for academic and corporate leaderships. They had also a role to play, as was the case in the history of hybrid corn in Brazil, at the beginning of the 1940's.^{6/} These academic and entrepreneurial relationships could be considered the establishment of different networks, and one of the elements of the evolution of the knowledge base. Later on, with EMBRAPA (Brazilian Enterprise for Agricultural Research), but even before, training programs abroad, and Professors interchange, were considered part of the capacity building in agro-food technological research.

The successful cases of corporate catching-up, as for example, the leader hybrid corn producer Agrocere, founded in 1945, or the known Sadia enterprise, Brazilian leader in food industry and one of the presently world's leading producers of chilled and frozen foodmeat, or the Aracruz Celulose, founded in the 1960's, presently the world's largest exporter of short fibre cellulose,^{7/} lead us to the explanatory pioneering elements of these firms: recurrent patterns and technological trajectories, compulsive sequences, search and selection routines for profitable opportunities and new technologies both in country and abroad, their corporate structure and their strategies.^{8/} (The list should include also firms from other sectors, as agricultural machinery and fertilizers).

The second catching-up phase - during the 1970's – could be characterized by the show-case of soybeans, which boomed with the rapid growth and transformation of Brazilian economy, and by the strengthening of agricultural public research with the foundation of EMBRAPA, in 1973, mentioned before. It could also be seen as part of a broader, two-way, cross linked process which involves the economic conditions and consequences of the petroleum crisis, the Second National Development Plan (II PND) as a strategic response, and the agro-food system and the industry as a whole. The formulation of a science and technology project for the agro-food system within the

^{5/} Castro, A.C. (1984). See also Castro, A.C. in *Pensamiento Ibero Americano, Revista de Economia Política*, (1985), p. 171-212.

^{6/} The hybrid corn introduction and adaptation in Brazil was possible after an exchange program abroad, when Antonio Secundino de São José, at the time teaching at the University of Viçosa, Minas Gerais, went to Purdue University and brought to Brazil some Mexican maize strains, that gave birth of the first commercial crops of the Sementes Agrocere S.A., enterprise founded in association with Rockefeller and a group of University geneticists, in 1945.

^{7/} Castro, A.C. (1988). See also Gertner, D., May, P., Castro, A.C., Vinha, V. and Leme, C. (1997).

^{8/} Castro, A.C. in Teixeira da Silva, F. C; Santos, R. e Costa, L.F.C. – *Mundo Rural e Política, Ensaios Interdisciplinares*, (1999), pgs. 177-208. Castro, A.C. - in Costa, L.F., Moreira, R.J.; Bruno, R., Orgs. *Mundo Rural e Tempo Presente*. (1999).

National Economic Development Plans, was backed by the creation of the EMBRAPA⁹, at the eve of the II PND; furthermore, current specific interaction between public research institutes (EMBRAPA, Institutes, Universities) and research institutions from the private sector, both agricultural and agro industrial, as well as the part played by research funding institutions – namely, the FINEP [Research and Projects Financing].

To a certain degree, the technological and productive transformation, and the rapid acquisition of capabilities by the Brazilian agribusiness, was also accompanied by social changes and possessed common features with other historical experiences. Just to mention, it was remarkable the consequences of international technical missions, that both advised innovative changes and help to find financial investments. In the case of soybeans, for instance, the introduction of soil correction with the employment of calcareous, initially in the State of Rio Grande do Sul, at the very South, at the beginning of the 1960's, could be considered a major improvement and the starting point for the spread of soybeans in the Cerrados, centre-west of Brazil, almost one decade later. The Federal University of Rio Grande do Sul and the University of Wisconsin, working together, made viable the soil analysis and its "correction" with calcareous. The rural credit by Banco do Brasil was the needed resource to complete the transformation.¹⁰

The importance of certain agro-industrial chains that work as engines and showcases of the process – such as that of soybeans, or of oranges and of poultry, had consequences that by far outreach the effects of catching-up. The soybean boom in the 70's, as it was said, caused an agrarian redistribution that enabled small and medium producers in the south of Brazil, mainly by allowing the production of both wheat and soybeans in the same agricultural year. The knowledge base was transformed by the introduction of a biannual crop system, with good results in terms of productivity and profitability. The consequences were not only in terms of the necessary introduction of the modernized production system, but mainly because it made viable the small farm agriculture in the South, and its movement towards the Centre-West (mainly in the 1980's) where the cheap land and the terrain made possible the large scale production of soybeans, corn, cotton and cattle. This movement had redefined, in depth, the space configuration of the Brazilian agro food system.

As well as allowing effective parity with the US and Argentina, the agricultural boundaries shifted to the mid-west and the mid-north¹¹, which dramatically increased Brazilian production potential.¹² This led to finding solutions to the technological problems brought about by the expansion of these frontiers, made production cheaper and

⁹ The foundation of Embrapa, in 1973, gave unprecedented impulse to the Sistema Nacional de Pesquisa Agropecuária [National Agriculture and Livestock Research System], but should not be taken as being its start. The state research institutes, such as the Instituto Agronômico de Campinas [Campinas Institute of Agronomy], established at the end of the 19th century, the IAPAR (Paraná) at the 1930's, the Agrônomo de Pernambuco [Pernambuco Agronomic], as well as the IAA (Instituto do Açúcar e do Alcool [Sugar and Alcohol Institute] existed before as part of the DNPEA (Departamento Nacional de Pesquisa Agropecuária [National Agriculture and Livestock Research Department]) when Embrapa was created.

¹⁰ The correction of the soil was a local government program, known as Operação Tatu, with the participation of the University of Wisconsin through Professor John Murdock. Soja 80 Anos de Produção 1924-2004 (Soybeans 80 Years of Production 1924-2004), Edição comemorativa aos 80 Anos de produção de Soja em Santa Rosa, RS, promovida pela 15ª Fenasoja.

¹¹ See Castro, A.C. and Fonseca, M.G.D., in *Revista de Economia Política*, (Jan.-Mar. de 1994), p. 63-84.

¹² Castro, A.C. (1995)

put pressure on the build-up of an, as yet inexistent, inter-modal transport network, thus further reducing costs. Brazilian research with soybeans stressed biological nitrogen fixing in the soil, since the beginning, thus reducing the use of fertilisers and allowing continued sustainable expansion.^{13/}

By means of implementing grain-bran-oil and grain-animal feed-meat chains, soybeans enabled the industry to provide more diverse and sophisticated foods, which are not only more competitive but also attend to new consumer demands (functional foods, transgenic versus traditional versus organic. The second phase of catching up was, in short, backed by the demand side, not only for the exports increase, but also thanks to the huge diversification in food industry for the internal market. In the international scene, the trend was for the substitution of animal grass by vegetable oils, at one side, and for the increasing meat consumption (cattle, chicken and pork), in the other, besides non tariff barriers that introduced more rigid quality controls. Supermarkets and food industry were crucial to impose the new products and the quality grades and standards.

The third phase of Brazilian Agro Food System Catching up, it's my concern, started in the middle of the 1990's and could be characterized by the enhanced agro-food capacity in being ready for the increasing international competition, with the following pre conditions:

1. The available resources: land (50 millions of ha utilized versus the potential of 400 millions of ha, and 90 millions of free available land for the production of sugar cane)^{14/}; qualified technical personnel from the Universities, who wants to live in the country side^{15/}; a declining supply of labour that will enhance social benefits in the agricultural sector; reasonable supply of credit and capital, but a high level of previous unpaid debts.
2. The international strong demand for agricultural and livestock products supported by a 3% growth rate of the global economy until 2020, growing urbanization and aging of the population; strong demand for meat products.^{16/}
3. The existence of competitive firms, well established in global market.^{17/}
4. The existence of the needed institutions, built in the two previous catching up phases, and well established actors, all embedded in almost common shared beliefs – sustainability, export leadership, production cost concerns (including land competition for different crops, as sugar cane and bio-diesel raw materials), grade and standards regulation, WTO rules, demand trends (organics, functional food, other niches) and technological frontiers;

^{13/} The biological nitrogen fixing in the soil is still today an important trend of the biotechnological research. The Embrapa Soybeans, had founded an alternative to increase the biological nitrogen fixing in the soy production, by the utilization of the soybean seed enriched with molybdenum. The new technology will introduce the element in the process of seed production, avoiding its application in the process of planting the soybean seeds.

^{14/} See Rodrigues, R. in Reis Velloso, J.P., *O Desafio da China e da Índia. A Resposta do Brasil*, (2005).

^{15/} The number of undergraduate courses related with agribusiness in Brazil increased from 3 in 2000, to 100 in 2005 (Gepai/UFSscar) in *Anuário Exame, Agronegócio 2006/2007*.

^{16/} Contini, E.; Gasques, J.G.; Leonardi, R.B.A; Bastos, E.T., in *Revista de Política Agrícola, EMBRAPA*, (Jan/Fev/Mar 2006). References: FAPRI, FAO, IFPRI, OCDE, USDA, IBGE.

^{17/} Cargill, Bunge, Sadia, ADM do Brasil (Archer Daniel Merchants), Louis Dreyfus Commodities, Aracruz Celulose, Klabin, Perdigão, several cooperatives as Itambé, Coama, Cocamar, in the seed industry, Syngenta, Monsanto, Pfizer, Agroceres, between others.

5. The existence of a solid knowledge base, available in EMBRAPA and other Institutes¹⁸, Universities, and a network of research teams including the private sector foundations – as the Fundação Mato Grosso, in the State of Mato Grosso, and the COPERSUCAR, Cooperativa dos Produtores de Açúcar, in São Paulo, as good examples.
6. The existence of huge number of networks in public agro food research (what can be shown by the number of research groups registered in CNPq, National Research Council, data base).
7. The reasonable knowledge of the technological frontier and the capacity to reach it: new hybrid seeds based in the technology protection system (TPS); molecular male sterility; “apomixia”, for the hybrid strength in traditional crops; biotic and no biotic resistances; high nutritional value (vitamins, amino acids, oils and iron); more efficient plants in the capacity for absorption soil nutrients, reduction in fertilizer utilization; plants and animals as bio reactors for the production of new bio molecules; transgenic animals with resistance to common diseases; vaccines and other genetic recombinant inputs for farming; new trend for bio energy. The co-evolution of new technologies, new paradigms, institutional change and capacity building at the level of firms.¹⁹
8. The renewal of the Brazilian Innovation System with a new set of policies: the Industrial and Technology Policy; the Innovation Policy; the Biotechnology Program; the innovation incentives and financial support at BNDES; the strengthening of the Fundos Setoriais [Sector Funds] at FINEP; the new incentives and policies at the INPI (Brazilian Patent Office), the establishment of a capacity building in intellectual property with special concerns on development and catching up, amongst others innovation incentives.

Summing up: the Brazilian agro-food system is an example of a very successful case of catching-up. This can be seen by its performance during the entire period: comparative growth rates; competitiveness (measured by increase participation) in the global markets; work productivity and land yield; prices and product diversification; and finally by its resources to face the new trends and innovation challenges of the third Millennium.

Taking into account the above background, the following section intends to concentrate on a possible conceptual frame that may help to better understand this rich historical process.

2. The Development Conspiracy and the Polanyian “Double Movement”

The catching-up process may be (indeed, tends to be) associated to national development strategies. The historical moment for preparing development strategies tends to coincide with a favourable international conjuncture, where the circumstances seem to conspire towards ruptures.

Moses Abramovitz²⁰ states that all three elements necessary to the rapid growth

¹⁸/ Good examples are the Institute for Technological Research - IPT, the Institute of Metrology - INMETRO, the National Institute for Technology - INT, besides other private Foundations, organized by large agribusiness companies. See, Zackiewicz, M ; Bonacelli, M B M ; Salles-Filho, S. L. M. . in São Paulo em Perspectiva, v. 19, n. 1, p. 115-121, (2005).

¹⁹/ Contini et al, op. cit.

²⁰ Abramovitz, M., op. cit., p. 395.

characteristic of catching-up were to be encountered in the period following the Second World War, namely: “large technological gaps; enlarged social competence, reflecting higher levels of education and greater experience with large-scale production, distribution and finance; and conditions favouring rapid realisation of potential”. The author further points out that: “a strong reaction to the experience of defeat in war, and a chance for political reconstruction (...) weakened the power of monopolistic groupings, brought new men to the fore, and focused the attention of governments on the tasks of recovery and growth” are among these conditions. Inasmuch, favourable international conditions presented themselves, and these could be reinterpreted by means of a Polanyian approach.

Thus, deeply marked by the trauma of the Second World War, the late 1940’s saw the implementation of the now well known global governance structures – the General Agreement on Tariffs and Trade (GATT), the World Bank (WB) and the International Monetary Fund (IMF) – instated at the Bretton Woods Conference. The European reconstruction by means of the Marshall Plan and the creation of institutions favourable to development all seem to be fundamental components for triggering the social and political forces necessary for the consolidation of these processes.

The concept of the “double movement”, advanced in the brilliant interpretation of K. Polanyi, according to which periods of belief in the lack of regulations and the free play of market forces alternate with periods of market protection and planned State strategies, seems to be highly explanatory. Merely as an example, the international backdrop for the historical moment of the start of Brazilian catching-up – the famous “50 years in 5” of the Juscelino Kubistchek de Oliveira government – was the existent wave of reconstruction and development. Another example could be sought in the Vietnamese catching-up in agriculture, in which the modernisation of export agriculture, more especially coffee and tea, commenced after the long war for freedom. It is also possible to associate current international circumstances relatively favourable to development, in the aftermath of the Washington Consensus and the UN Millennium targets, with the emergence of institutions favourable to the modernisation of some African agriculture, as seems to be the present case of Nigeria.

This Polanyian-based analytic stance produces interpretations that differ from other views relating to ongoing globalisation processes.²¹ The Polanyian criticism argues that market economies do not work along the lines of market liberalism²². In summary, it

²¹ While it will not be possible to expound the interpretations mentioned above, we wish to propose that it seems possible to discern (mainly, but at least) three generations contemplating the theme of globalisation, namely: the theories concerning early 20th Century imperialism (Lenin, V. I. – *Imperialism, The Highest Stage of Capitalism*, Lenin Collected Works and Hilferding, R. – *Finance Capital. A Study of the Latest Phase of Capitalist Development*. 1910); the United States hegemony thesis, developed in Brazil mainly by Tavares, M.C. and Fiori, J.L., *Organisers – Poder e Dinheiro. Uma Economia Política da Globalização*. Petrópolis: Vozes, 1997, and Delgado, N.G. – *O Regime de Bretton Woods para o Comércio Mundial: Origens, Instituições e Significado*. Doctorate Thesis, CPDA/UFRRJ, 2000, systemising the idea of Hegemony and Empire; the institutional viewpoint, which is the focus of our argument. Many authors such as Peter Evans, Fred Block and Ha-Joon Chang will be duly cited below.

²² Peter Evans and Fred Block, lecture notes – International Post-graduate Program in Development Policies, Organizations and Strategies. Whilst coordinating the International Post-graduation Program in Development Policies, Institutions and Strategies (CPDA/UFRRJ and Instituto de Economia, UFRJ), I had the privilege of participating in several courses where many of the ideas presented herein were debated both with professors and students. In this sense, they constitute a shared knowledge that is being evolved since 2001, which was the first year of the international post-

would be possible to affirm that the “*laissez-faire*” was planned and that protection is spontaneous, with market societies being intrinsically formed by the double movement. Market economies are always and ubiquitously historically embedded or deep-rooted. The greatest historical successes always stemmed from a combination of respect for certain historic roots and the deliberate acceleration of changes on other levels. Uprooting is merely a trend; in practice, uprooting and rooting always go together²³. History always seems to show – and this is the case at present – that it is not the self-regulated and autonomous markets that achieve the greatest successes. This was highlighted by the huge contrast between the Russian and Chinese experiences in the 90’s²⁴.

The Institutionary Approach

I believe that the main theoretical and conceptual frame for interpreting the catching-up process, which cannot be left out of this analysis, is the institutionary approach. A vital aspect consists in delving into the vast reserve of ideas provided by the profound and complex interest it has attracted in different authors²⁵ so as to expose the different institutionary outlooks – and the specific combination of institutionary approach and evolutionary view.

My starting point will be the following concise definition of institutions: “*Institutions are the long-lasting systems of established and rooted social rules that structure social interaction*”²⁶ (Hodgson, 2004). Furthermore, as Evans and Chang point out, “in modern societies, they [institutions] generally consist of competently coordinated organisations, having formal rules and with the capacity of imposing coercive sanctions, such as the government or firms”²⁷ (Chang and Evans, 2000). These authors bring attention to three dimensions of the concept: “There is a third view of institutions, which receives relatively little attention from the economists, but, in our opinion, is crucial. This view perceives the institutions not just as *enablers* or *constrainers*, but also as being *constitutive*.”²⁸ This, because all institutions have a symbolic dimension and, consequently, impress certain values (or a view of the world) on the persons under their influence”

graduation program. I would like to thank professors Antonio Barros de Castro, Adriano Proença, Benjamin Coriat, Erik Reinert, Fred Block, Gary Dymksi, Geoffrey Hodgson, Giovanni Dosi, Jan Kregel, Leonardo Burlamaqui and Peter Evans for their contribution to the dissemination of such prolific ideas.

²³ The article by Qian, Yingyi, “How Reform Worked in China”, in Rodrik, D., In Search of Prosperity. Analytic Narratives on Economic Growth, Princeton: Princeton University Press is definitive. The author shoes how transition institutions proved efficient for promoting reforms respecting old Chinese institutions and traditions.

²⁴ See UNCTAD, *Trade and Development Report*, 2002. Developing Countries in World Trade, e UNCTAD, *Trade and Development Report*, 2004, “Policy coherence, development strategies and integration into the world economy”.

²⁵ See the interesting article by Nelson, R.R. “Making Sense of Institutions as a Factor Shaping Economic Performance”. See also World Bank – Beyond the Washington Consensus: Institutions Matter.

²⁶ Hodgson, G., “Institutions and Economic Development: Constraining, Enabling and Reconstituting”, in G. Dymksi and S. De Paula, *Re-imagining Growth*, 2005. Although this definition derives from Douglas North (1990), it is also compatible, as noted by the author himself, with old institutionalism, such as in Veblen (1919) and Commons (1931).

²⁷ Evans, P. and Chang, H-J. (2005), in Dymksi, G. and De Paula, S. - *Re-imagining Growth*, 2005. E. Elgard Publishers.

²⁸ Hodgson (2000) characterizes this view as assuming a “downward reconstituted causation”, from institutions to individuals, cf. Chang e Evans, op. cit., 2005.

(Chang and Evans, 2000).

This same view is shared by Douglas North: “It is culture that provides the key to *path dependence* – a term used to describe the powerful influence of the past on the present and future. The current learning of any generation takes place in the context of the perceptions derived from collective learning. Learning then is an incremental process filtered by the culture of a society that determines the perceived payoffs, but there is no guarantee that the cumulative past experience of societies will necessarily fit them to solve new problems. Societies that get stuck embodied belief systems and institutions that fail to confront and solve new problems.”²⁹

In relation this analysis, it seems fundamental to distinguish the hypothesis of an *a historical social behaviour* from a *path dependent behaviour* (conduct continually shaped by pre-existent institutions)³⁰. For neo-institutionalism, by contrast, the critical dimension appears to be the type of coordination (or governance) shaped by opportunism and the quest for personal benefits. Coordination is, above all, a question of hierarchy. As for the institutional/evolutionary approach, and with respect to coordination, the concepts of opportunism, private interests, cooperation and organisational routines are all interrelated, but that the interaction between the institutions, innovation and organisational strategy should form the core for the analysis relating to formulation and the analysis of development strategies³¹.

Combining the Institutional and Evolutionary Approach with the Analysis of Corporate Strategies

As Evans and Chang point out, in order to acquire a broad understanding of institutions, it becomes necessary to go beyond the traditional institutional stance that defines institutions as “restrictions” or game rules that condition the behaviour and social interaction of individuals: they constitute part of the formal and informal restrictions (conventions, codes of conduct, etc.), *determine* the regularity, reduce uncertainties and afford a structure for economy and society to work (North, 1990).

However, it is also necessary to extend beyond the functionalist viewpoint of institutions, whereby these are efficient instruments that allow attainment of certain objectives which require individual coordination, according to the authors of the NIE (New Institutional Economy). Indeed, even go beyond the Keynesian view that institutions are necessary to ensure contract compliance.

It is also necessary to transcend the instrumentalist perspective, which believes that institutions are formed and modify themselves to mirror the exogenously defined

²⁹ North, D. - “Economic performance through time”, in: Alston, L. J., Eggertsson, T., North, D. (eds.) *Empirical Studies in Institutional Change*, NY: Cambridge University Press, 1996, p. 349.

³⁰ “History matters. It matters not just because we can learn from the past, but because the present and the future are connected to the past by the continuity of a society’s institutions. Today’s and tomorrow’s choices are shaped by the past. And the past can only be made intelligible as a story of institutional evolution.” North, D. - *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, 1990, p. vii.

³¹ This original interpretation of very different forms of coordination within organizations is due to Benjamin Coriat’s teachings at the International Post-graduation Program in Development Policies, Institutions and Strategies (CPDA/UFRRJ and Instituto de Economia, Universidade Federal do Rio de Janeiro).

interests of the powerful, or that constitute the interests and world views of the economic agents, such as from an economic policy viewpoint.

The authors concluded: all these elements are present in the definitions of institutions – as restrictions, efficient instruments, and reflection of interests. But, without doubt, there is a fourth view of institutions, which perceives them as “constitutive”, since they possess a symbolic (cultural) dimension and, therefore, disseminate certain values or beliefs common to the different players. As result, the incorporated values are internalised within these institutions. “It is our intent to go beyond this ‘shallow’ view of institutions and attain a ‘dense’ view, which recognises the fundamental role of culture and of ideas, and the constitutive role of institutions in shaping the manners in which groups and individuals define their preferences” (Chang and Evans, 2005).

As mentioned before, we adopt the following synthetic definition: “*Institutions are the long-lasting systems of established and rooted social rules that structure social interaction*” (Hodgson, 2005). Thus, institutional changes require changes in the world outlooks that are inevitably at the root of the institutions’ structures: institutional changes – or rather the “new institutionalisation”, as the institutions seems to modify themselves during phases of rupture or, mainly, in compliance with the mutating environment – demonstrate how societies evolve in time and, therefore, constitute the key to understanding changes and social action.

According to Douglas North, (1990), institutions are the combined rules of the game, but these rules had to be distinguished from the players. Organisations are players that, by means of their capacity, their strategies and their coordination, also exert influence on the definition or the evolution of the actual game rules, or, in other words, on the existing institutions and/or new ones.

Hodgson provides further clarification: “What is the difference between an organisation and an institution? North wrote: ‘If the institutions are the game rules, the organisations and their owners are the players.’ Certain people interpreted this assertion by North as meaning that the organisations themselves are not institutions. But that is not really what he is says. North is simply stating his primordial interest in the economic systems, and not in the internal workings of organisations when considered individually. Furthermore, in a manner corresponding to this author, he makes clear his belief that organisations are also institutions. He admits that the organisations themselves have players and internal rule systems, which, by implication, constitute a special type of institution”³². In summary, organisations are also institutions, and their institutionalisation process is not ensured (Selznick, 1997).³³ In other words, not all organisations or firms institutionalise themselves. Despite organisations also being institutions, the fact that the former are entities capable of a strategic dimension should be taken into account.

In the famous introduction to their book *Organizations*, Simon and March define

³² See Hodgson, Geoffrey “Opportunism is Not the Only Reason Why Firms Exist: Why an Explanatory Emphasis on Opportunism May Misdlead Management Strategy”, *Industrial and Corporate Change*, vol. 13, n° 2, 2004, p. 401-418. My hypothesis follows the same direction as Hodgson’s arguments

³³ Concerning this subject, see, the classical article by Selznick (1957, 1997) which brings attention to the distinctive competency of firms , which serve as base for their institutionalisation process. Selznick, P., “Leadership in Administration: A Sociological Interpretation”, in Nicolai J. Foss (org.), *Resources, Firms and Strategies - A Reader in the Resource-based Perspective*, Oxford: Oxford University Press, 1997, p. 21-26.

organisations in terms of the elements that comprise them: the dimension of interests, the dimension of information and the dimension of knowledge and learning. Coordination is fundamental to enable the full integration of the three constitutive elements of an organisation. For neo-institutionalism, hierarchy is the main form assumed by this coordination. In broader terms, however, the forms of coordination within organisations may include not only hierarchy, but, above all, the *x-efficiency*, the incentives, the penalties, the organisational routines, the corporate culture and the cooperation³⁴.

The analysis of organisations (even those of different natures) – small and large firms, cooperatives, public sector organisations, including those that generate new technology or devise and respond to public policies, teaching organisations, research organisations, social organisations, etc.³⁵ – takes into account their behavioural patterns: norms, successful heuristics, routines (Nelson and Winter, 1982) and organisational culture. These analyses serve to identify the organisations' strong and weak points as well as indicating necessary institutional/organisational changes.

Organisations define themselves by their objectives (or, more precisely, by their strategies). The strategic dimension cannot be dissociated from the concept of organisations and their aptitudes. Without this strategic dimension, it would not really be possible to understand the specific nature of organisations. Obviously, the institutional changes, the context of environment or the demand faced by them also alters their strategies, in order to re-adapt them to the new situations. The strategic efficiency of organisations is measured through competitiveness.

The study of organisations leads to an interesting debate concerning their working and/or coordination. The hierarchies (firms) and the markets are opposite alternatives to the theory. As seen above, authors such as Ménard (1997) pointed out the importance of the hybrid forms of organisation, following the example of the company and franchise networks and social-technological networks, amongst others. The arrangements made between firms (transactions occurring outside the market) demand cooperation as a requisite. Thus, it is cooperation, and not opportunism, that better characterises the relationship between different organisations and individuals. It is important to stress that the cooperation mentioned here is not the result of strategic interaction (as in the game theory)³⁶, but consists of *bona fide* cooperation.

The working of institutions/organisations therefore depends on behavioural hypotheses concerning individuals. The concepts already incorporated by neo-institutionalism – opportunism, limited rationality, adverse choice and moral risk, – or, in overall terms, the concepts of predominant private interests or with traits of profit seeking behaviour, would seem to limit the possibilities of institutional changes and reduce the strategic options of the agents. The advances of the game theory, now based on the viewpoint of cognitive psychology³⁷, point to cooperation as a factor that stems from reiterated social interaction. In other words, cooperation is a requisite for the repeated

³⁴ See also H. Liebenstein, *X-Efficiency Theory and Economic Development*, 1978. Benjamin Coriat is responsible for this integrated view concerning the different forms of coordination.

³⁵ The market itself is an institution with its own regulation and restrictions. This institutional concept opposes its conception as the free *locus* for economic forces of supply and demand.

³⁶ In the game theory, as we know, cooperation results from rational behaviour, guided by private interests.

³⁷ Cognitive psychology studies the cognitive processes implicated in learning and the adaptation of species to the environment. See Barkow *et al.*, 1992.

social interaction between individuals within the scope of organisations.

The hypotheses concerning human behaviour are crucial, however, and influence the strategies of the organisations and their coordination. Furthermore, it seems fundamental to distinguish the hypothesis of an a historical social behaviour from a path dependent behaviour (or, conduct continually shaped to some degree by pre-existent institutions). The preponderant interest for neo-institutionalism, as already seen, is the coordination of the organisations rather than their strategies. Thus, the issue of coordination, particularly within the organisation, depends on hypotheses concerning opportunism, personal benefit, cooperation and organisational routine. Hierarchy within firms means authority, such as compulsory action mechanisms. The forms of governance that assume distinct organisational arrangements become more complex due to the existence of hybrid forms and of association between firms, which places the role of hierarchical authority in firms and organisations in doubt.

Resource-based perspective as an Approach for Understanding Firms in Catching-up Processes

The environment in which firms are to be found has always been considered as being of prime importance for determining corporate strategies. In the structure-conduct-performance approach (broadened so as to include Michael Porter's model), the market structure would *almost* be determinant to the definition of strategies. In the hypothesis of relative environment stability, the behavioural patterns and sector competences also remain stable. The firm is not characterised by assuming a single strategy: either it adapts to the environment and the standards of sector competence, or it will simply collapse. Conduct and performance are determined by structure, which defines the sector competence standards, and, in contrast, the characteristics and/or resources of the firm lose value. Porter's concept of the five forces was included as an advance in respect corporate knowledge of the environment.

In a permanently mutating environment, in which instability and risk are inherent structural features, note must be given to the hypothesis that the environment should be considered from the outlook of what the businessman perceives as possibilities and limitations for his firm. Strictly speaking, without this hypothesis – first advanced by Edith Penrose in 1957³⁸ – firms would be paralysed by the uncertainty of the environment.

The great contribution of the authors identified to the resource-based perspective and principally the classic contributions of Penrose (1997), Chandler (1997), Nelson and Winter (1982) and Nelson (1997), had no main concern for the analysis of corporate strategies. These authors accorded priority to the interaction of firms with the environment and concentrated on the unique collection of resources by the firm. Thus, the growth assessment of a firm begins with an analysis of its resources, and not of the environment in which it exists, and only later introduces discussion of the effects of certain environment conditions on its strategies. Penrose's hypothesis which is that, primarily, the environment is affected by the actions of the firms themselves, and afterwards alters its reactions, in an interactive feedback process. The strategic issue³⁹ is

³⁸ According to Foss, 1997.

³⁹ The main references concerning this strategy may be found in the classic works of Mintzberg *et al.* *Readings in the Strategy Process*, (1998), and Guemawat *et al.* (1999).

the acquisition and maintenance of a competitive edge. Considering that firms are inherently different, on the heterogeneous base of their resources, they rely on differentiated strategies to compete on the market. The fact that the resources (or services) are unique or that the corporate strategies are different is unimportant. The crucial issue is maintaining these differences over the long term, avoiding imitations, and the implementation of some protective barriers to safeguard the different incomes generated in the course of the competitive process. Thus, the RBP (Resource-Based Perspective) gains ground in business management schools (and particularly the Harvard Business School) as the dominant approach in any debate relating to corporate strategies, being firmly ingrained in the rationale of corporate theory economists. The resources and services may be tangible, such as the physical productive capacity, or intangible, such as the elements that compose the organisation and internal culture of a firm, the trademark, or the trust of consumers in their products. There is no doubt that the most valuable intangible resource is knowledge, since it confers firms a degree of capacity (see box below). This capacity, which distinguishes a firm from all others, is its core competence (Prahalad and Hamel, 1997).

The concept of resources. Despite the fact that proponents make very literal use of the term, the *resources* imply, in very ample terms, something which may be considered a strong or weak point of the firm. The practical use of RBV demands a more precise definition of what “resources” really are. The central proposal is that a resource is an attribute of the firm that cannot be altered in the short term. The resources may assume various forms, ranging from traits common to production and extending to highly differentiated assets. But their nature must always be perceived as a stock, as opposed to corporate activities which are the source of income, investments and expenses. The resources may be defined as tangible and intangible. The tangible resources are the visible assets of the firm and are easier to assess. These include real property, installations and stocks of raw materials, amongst others. Typically, (as they are liable to purchase), they contribute little to the competitive edge. There are exceptions: a chain of well established and well located firms may represent an inestimable competitive edge over competitors; another example would be the exclusive property rights over a rich lode of precious metal.

Intangible resources include a reserve of assets such as the trademark, the culture, the technological know-how, the patents and the accumulated learning and skills, amongst others. These resources have an important role, either boosting (or undermining) the competitive stance, or enhancing (or reducing) the value of the firm. Furthermore, these resources frequently possess the advantage of not being lost or waste over time. On the contrary, their intelligent use may render them stronger and more efficient. This last factor (the capacity of the firm in the use of its resources) gives rise to a concept of a “special” type of intangible resource: the organisational capacity of a firm.

When highlighting the importance of capacity, Penrose (1997) noted that these services are obtained through a special resource that cannot be encountered on the market and has to be produced internally, namely its organisational capacity. This may be defined as a combination of resources, persons, values and processes within an organisation. It includes the capacity of producing at low cost (efficiency) and of knowing how to decide what to do (effectiveness). It also includes the capacity of

improving the firm's performance, whether in terms of new products or services, or in new processes for production, sales, financing or advertising, etc. These skills, as Penrose remarks, are fundamental aspects when determining the competitive edge of firms.

Corporate growth was the object of an analysis by Penrose (1997). This growth is shown to be a consequence – and not necessarily an intention – generated by the internal forces of the firm and results from the improved use of the services for productive resources obtained by business owners⁴⁰. Limits on growth are “management” imposed: the firm is unable to encounter the productive services on the market at constant prices affording continuous growth, including “organisational” services.

Despite management capacity restricting the growth of firms, this capacity continues to be permanently generated within the firm. There is a boost for corporate growth and for the diversification of its activities: in the course of a firm's growth, the resources that will allow its future growth also necessarily expand. The expansion of a firm's bases of operation brings about an excess of capacity which imposes future growth.

But there is a subset of skills that responds to the continuity of a firm's growth. Dynamic capability is the competence that permits the firm to design new products and processes and confront the mutable market circumstances. Competence and capacity are intangible resources, typically, because they have to be built up and cannot be purchased.⁴¹ Such skills should not be confused with the concept of management culture. Corporate culture refers to the values and beliefs of a company (of its employees, officers, etc.). This concept assumes that culture is in fact the governance system of a firm and is responsible for mediating between the behaviour of individuals and the economy of coordination costs.

The maintenance of a competitive stance based on the strategies of a firm is ensured by the capacity of retaining market leadership. The dynamic capability mentioned by Teece (1998) – the aptitude of “*sensing and sizing*” a market – alludes to the Schumpeterian origins of competitive edge, which may be considered a consequence of unique innovation.

According to Schumpeter (1957), innovation produces exceptional profit – incomes, in the Ricardian sense – whose maintenance/renovation depends on the capacity of introducing innovations to the market, thus perpetuating the competitive edge of a firm. The objective of any strategy (i.e. the exceptional revenues (incomes)) is the result of unique assets, which are specific to the firm and cannot be readily reproduced; these *Ricardian incomes* derived due to their scarcity occur because of intrinsically rare and valuable factors, and are difficult to obtain. Thus, the RBP differs from the discussion concerning the positioning of products on the market, and again shifts the focus of this analysis to the corporation. In the competitive game, dynamic capability is the core dimension of the strategy, but this depends on the reaction of other firms that may attempt to imitate it (with products, processes, marketing, etc.).

Margaret Peteraf⁴² established four conditions for retaining competitive

⁴⁰ The limits on growth derive from the restricted management capacity for expanding the services that these factors provide the firm.

⁴¹ This concept, introduced by David Teece in his analysis of firms, helps understand other organisational and corporate processes – integration, learning, reconfiguration and transformation, position (localisation), capacity for imposition (“assessment”), reproduction and imitation of the organisational process.

⁴² Peteraf, 1997. Peteraf's contribution represents an advance with respect the idea of strategy derived from

leadership, which she defined as the “cornerstones” of competence. For a firm to maintain its advantage, it must first satisfy certain conditions:

- Its resources must truly be heterogeneous.
- Prior competition must be limited, or in other words, the resources may be acquired at prices inferior to the income that the services of these factors will generate for the firm.
- There must be *ex post* limits for the competitors, or in other words, it must be difficult for competitor organisations to imitate, purchase or reproduce the resources liable to generate income.
- Lastly, the mobility of factors must be imperfect, in the sense that the resource is truly specific to the organisation, and consequently, the latter shall be the sole beneficiary of the income generated.

As can be seen, the concept of “dynamic capability” is crucial to the discussion of how Schumpeterian revenues are generated. In the context of Schumpeterian competence, however, the subset is particularly important, as it allows the firm to produce and develop new products, processes and routines, thus efficiently confronting the changes in the environment.

These ideas had the main objective of proposing a conceptual frame for the catching-up process of the Brazilian agrifood system. With this intent, the following approaches are hereby proposed:

1. Since both multinational capital and international relations and institutions play important roles in the technological parity of the agrifood system, this particular historic phase may, or tends to be associated with favourable international conjectures, which themselves require explanation. The approaches of classic imperialism and of the predominant hegemony of the central powers possess arguments containing undeniable historic validity. However, they do not explain the existence of breaches or degrees of freedom that allow certain countries to find the paths leading to their development. We seek to suggest that the Polanyian double movement interpretation, entailing a succession of rooting and uprooting market phases, conforms more closely to historical evidence. As Polanyi pointed out, the *laissez-faire* was planned and it is the protection that is spontaneous. And this protection is indissolubly linked to the processes of catching-up in all known historical experience, including that of the countries that kicked away the ladder after climbing it to the level of the central economies – to use an image devised by Lutz⁴³.

2. A second interpretative frame was sought in an institutional approach. There is a great diversity of institutional outlooks that have been well described and expounded in the mentioned articles by Evans and Chang, on one side, and Richard Nelson, on another⁴⁴. However, given the relative predominance of neo-institutionalism in the Brazilian academic environment, I have sought to discuss their contributions

resource-based perspective, although it constitutes a more static outlook, when to the concept of “dynamic capability”, which permanently renews the competitive strategy based on the heterogeneity of the firm’s resources, or shifts the frontiers of knowledge in a permanent manner.

⁴³ See Chang, H-J., *Kicking Away the Ladder – Development Strategy in Historical Perspective*, London: Anthem Press, June 2002.

⁴⁴ Nelson, R. - *Making Sense of Institutions as a Factor Shaping Economic Performance*, ob.cit..

confronting them to what is sometimes termed the institutional/evolutionary approach. Although consisting in a more far reaching research agenda, my belief is that the institutional/ evolutionary approach will produce a very different view from that which stems from neo-institutionalism based on the concepts of limited rationality, transaction costs and opportunist behaviour on the part of agents.

The institutional approach that helps understand the co-evolution of shared beliefs and conventions that shape individual behaviour and produce pro-development synergies, does not constitute part of the neo-institutionary rationale. All the more so if we are to take seriously the postulate of opportunist behaviour with definite intent, cunning, or malice – or any other adequate analogy for “opportunism with guile”. However, it must be acknowledged that I did not explore Douglas North’s approach, which may have been useful to explaining institutional change⁴⁵.

Lastly, this particular institutional approach suggests that the specificity of the historical processes redefines the actual concept of “the best” institutions. As Dani Rodrik states: “The narratives in this volume (*In Search of Prosperity*) go beyond asserting that “institutions matter”. Indeed, one advantage of case studies is that they can provide a richer account of where good institutions come from, the shape they take, and how they need to evolve to support long-term growth”⁴⁶. This notion goes hand in hand with the Gerschenkronian affirmation that “the more backward was a country’s economy, the greater was the part played in its industrialization by special institutional factors...”⁴⁷. In summary, during phases of transition “substitutive institutions” need to be sought, so as to allow a better understanding of the historic processes in the midst of complex international relations and with the globalisation process in full swing.

3. Finally, a third conceptual frame helps understand the role of the leading firms in the process of technological parity, considering that parity occurs at a microeconomic level and in the context of firms and sectors. An attempt was made to contrast the neo-institutionary approach to organisations, whereby these are contract chains and hierarchies in which coordination is a question of enforcing pre-existent rules, with the evolutionary approach. According to this perspective, organisations are taken as entities that learn, coordinated by different mechanisms such as reward and penalties, interests, routines, beliefs and cooperation. Above all, it affords a view of the behaviour of firms – assuming as premise the notion that these should be considered as a collection of resources. It seemed that this conceptual frame had great explanatory power for the study and explanation of the growth of firms and their productive transformation – which are simultaneous processes that result in economic catching-up.

In summary, the evolutionary approach to firms was considered as being of great use (as well as closely conforming to empirical evidence) for the study of corporate processes for technological upgrading, inasmuch that it takes as models the firms that

⁴⁵Douglas North’s ideas seem very close to the institutional tradition, especially his pertinent analysis of the historical processes of institutional change. See the article by North, D. - “Economic performance through time”, in: Alston, Lee J., Eggertsson, T., North, D. (eds.) *Empirical Studies in Institutional Change*, NY: Cambridge University Press, 1996. On the subject of labels, (i.e. neo-, new, old institutionalism), I wish to make clear that these do not necessarily constitute alternative views, but rather should be seen as complementary approaches contributing to a better understanding of the historical processes

⁴⁶Rodrik, D., op. cit., p. 12.

⁴⁷Gerschenkron, A., op. cit., p. 428.

incessantly seek to introduce changes in products and productive processes by exploring all the perceived possibilities of recombining resources. Furthermore, the hypothesis that there is regularity in the behaviour of firms interlinked to their “institutional genetics”, which is confirmed and transmitted in the course time (Nelson and Winter, 1982), seemed very relevant. The key idea for studying the leading Brazilian firms prominent in attaining parity with international firms was the concept of “organisational routine” – taken to be the standard procedure for making decisions based on the capacity of the firm and in recurrent selection processes. This routine possesses certain operational traits concerning strategic decision making, investment activities and the capacity of the firm for altering its organisational characteristics. Changes in the direction of a firm’s growth may be decided in the R & D (research and development) departments, as well as through systematic or asystematic planning activities. Nelson and Winter (1982) propose a special type of method for their study: the “routines for the selection and search for profitable opportunities”.

The concepts introduced by Nelson and Winter gave rise to a continuously expanding series of contributions. The theory of the dynamic capability of firms is one of these fundamental contributions which seem most pertinent when analysing the processes of technological parity. Dynamic capability is the quality of sensing and appraising new opportunities as they arise, and of responding by introducing opportune changes. This is deemed particularly important in environments under great competitive tension which is a feature of the globalize markets.

However, it does not suffice that firms possess dynamic capability and are able to revert this ability into productive and competitive capacity. It is necessary to protect the differential incomes in some way, which is where the contribution by Margareth Peteraf and her cornerstones for competitive edge come into play.

Finally, I advance the points detailed below as a summary of the contributions of the resource-based perspective for understanding catching-up processes. Thus, the strategic courses or options adopted by a company should take into account:

1. The specific attribution of productive resources (Penrose).
2. Its “core competence” (Prahalad and Hamel).
3. The capacity to readapt to environment changes and consumer demands, or, more generically, to institutional changes (Hodgson).
4. The “dynamic capability” of a company (Teece), which is fundamental in times of change and is demonstrated by the ability to “*sense and size the market*”.
5. The possibility of producing “differentiated incomes” (Peteraf), which may occur from: the *quasi* monopoly of certain innovation (*ex post* barriers for competitors, such as patents) or the existence of *ex ante* barriers derived from the capability of better exploiting the services from the results obtained by the firm on the market, whether due to the heterogeneity of the resources, or due to imperfect mobility, with both these last factors being associated to Ricardian income).
6. The capacity of “capturing the value of the asset represented by knowledge” in the differentiated income and of retaining this value within the firm (Teece, 1998).

7. The network of technical, productive, commercial and legal relationships, as well as trustworthiness, established with other firms and with its stakeholders.

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