

**‘Running Against the Wind in Argentina’:
The Building-Up of Technological Capabilities to Overcome Economic Adversity**

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Abstract

This article analyses how a latecomer firm facing adverse economic and policy conditions might still be able to build up enough technological capabilities to catch up with global competitors in renewable energy systems. Drawing on catch up theory and evolutionary economics, we conduct an in-depth case study of an unusually successful firm from Argentina over a 40 year period. The research indicates that the gradual and coherent formation of ‘contrarian’ technological capabilities eventually pays off in the long term.

Keywords

Catch-up, latecomer firms, evolutionary economics, renewable energy systems, technological capabilities, economic crisis, Argentina.

1. INTRODUCTION

Conventional wisdom suggests that developing countries are mostly importers of high technology capital goods because they lack the required capabilities to produce them locally (Vernon 1966, Rosenberg 1976, Bell & Pavitt 1993). However, there is growing evidence of successful, innovative firms emerging from developing countries, although they tend to focus on low-to-medium technologies such as consumer goods and commodities (Dunning et al. 1998, Chudnovsky et al. 1999, Amann & Cantwell 2012; Dahlman and Ross-Larson 1987, Amsden 1989, World Bank 1993).

Firm-level (or 'latecomer firm') studies have tended to focus on the capability-building process of exporting companies in fast growing economies (Kim 1997, Figueiredo 2002, Matthews 2006). Unsurprisingly, very little attention has been paid to the case of successful capability building in declining and/or crisis-ridden economies. By definition, successful exporting firms would be rare exceptions running counter to the general tendencies associated with decline and crisis. However, if we were able to identify outstanding latecomer firms and examine successful capability-building processes under adverse circumstances, they could perhaps provide policy insights and even strategic lessons for the many less successful firms in these countries.

Argentina is an economy which has suffered considerable and prolonged periods of macroeconomic turbulence and phases of extreme decline in its industrial base as well as technological capabilities over the past 40 years (Schvarzer 2000, Katz 2006). As a result, it is rather unusual to find innovative exporting firms that have succeed over long periods of time, especially in the internationally competitive capital goods market. Nevertheless, as we show below, one latecomer firm from Argentina appears to have built the required capabilities to become an international leader in the production of sophisticated capital goods, namely wind & hydroelectric systems.

The purpose of this paper is to examine the capability-building process of one specific, highly successful, Argentinian latecomer firm as it contended with a hostile macroeconomic and policy environment in order to assess the reasons for its survival, growth, innovativeness and catch up with international leaders. The paper focuses on the firm's acquisition, development, and nature of technological capabilities (Bell & Pavitt, 1993, 1995) and, secondarily, the organizational capabilities and structures associated with them

(Dosi, Nelson, & Winter, 2001). The emergence of other latecomer capabilities that might be contingent to the adverse context is also explored and discussed. The paper also develops an analytical framework for research capability building in emerging or developing economies.

The conceptual framework of this article draws upon the contributions of Gerschenkron (1962) on economic development and more recent firm-level research on latecomer capability building (Kim, 1997; Dutrenit, 2004; Matthews, 2006; Amann & Cantwell, 2012; Figueredo, 2003; Kiamehr et al, 2013). We also utilise the evolutionary economics studies which analyse firm's differences in capability-building (Nelson and Winter, 1982; Nelson, 1991; Dosi et al, 2010; and Teece et al, 1994).

The conceptual aim is to couple elements of latecomer capability development and evolutionary economics to propose a simple framework for studying latecomer firm capability development under adverse conditions.

We propose that certain latecomers that face unfavourable external conditions might still be able to build up the required capabilities to catch up, as a result of firm diversity, strategic discretion, heterogeneous response and ultimately the contrarian path followed by the firm itself.

To place the case examination in context, the paper characterises the macroeconomic, industrial and institutional conditions which confronted firms in Argentina across different policy regimes over the past 40 years (1970s-2010s) as the country experienced a general economic decline. The core of the paper is based on a detailed case study of IMPSA (Industrias Metalurgicas Pescarmona Sociedad Anonima: in Spanish), a latecomer firm that became a world-leading manufacturer of high-tech capital goods and more recently a leading provider of integrated solutions¹ for power generation from renewable resources (e.g. wind & hydroelectric turbines).

A single case study is adopted as, according to Eisenhardt (1989) and Yin (2009), this method is well suited for examining unusual phenomenon because they allow an in-depth investigation into processes such as capability building and allow analysis of contrasting results (e.g. individual firm success in the context of general failure). Also, specifically in the field of evolutionary economics, Nelson (2008) emphasizes the importance of using detailed

¹ See Galbraith (2002) and Davies (2004) for a definition.

firm case studies to better understand why firms differ and how it matters for industrial development. Finally, the conclusion attempts to provide government policy and strategy implications for capability-building in other firms and countries facing adverse conditions. Our approach combines historical analysis of the policy regimes in Argentina with qualitative characterisation of the firm's capability-building process, complemented by several quantitative measures of its performance (e.g. sales, exports, profitability, innovation, etc.) over time. Data for the case study are based mainly on internal documentation (e.g.: company's balance sheets, annual reports, and financial statements) and unique archival records comprising more than 250 newspaper articles (selected out of 400,000) that made references to IMPSA (and the affiliates companies) between 1979 and 2012, including full interviews with firm representative conducted by third parties, covering most of the topics of interest. These recorded interviews emerged as highly relevant as they included original and real time insights from the company's founder as well as various CEOs and key directors over a period of nearly 40 years.

The main contribution of the paper is a detailed explanation of the acquisition, development and accumulation of technological capabilities, also touching on associated organizational capabilities and the strategies underpinning them. The paper also contributes a simple analytical framework to integrate the micro-level factors that enabled the firm to build the technological capabilities to overcome macro-level economic disincentives and policy disadvantages. We hope that the analysis of this contrarian capability path will contribute to studies of latecomer firm catch up, showing how firms may adopt heterogeneous responses to policy.

The rest of the paper is structured as follows. Part 2 presents the analytical framework and includes the literature review, the analysis of the Argentine context as well as the description of data and methodology. Part 3 summarizes the evidence from the case study and discusses the empirical findings. Part 4 draws conclusions and discusses potential implications.

2. ANALYTICAL FRAMEWORK

2.1 Aim

The aim of this section is to couple elements of latecomer development theory and evolutionary economics to show how latecomer firms facing unfavourable macroeconomic and policy conditions might still have sufficient 'strategic room for manoeuvre' to catch up, as a result of firm diversity, heterogeneous response and the building-up of distinctive technological capabilities. Section 2.2 summarises the literature on latecomer development theory (macro-level); Section 2.3 contextualizes the latecomer disadvantages for the specific case of Argentina. Section 2.4 briefly examines micro-level latecomer firm theory and evolutionary economic theory depicting different levels of heterogeneity. Section 2.5 describes the data used and research methods employed throughout. Finally, in Section 2.6, a simple macro-micro analytical framework is presented as a device to guide the empirical analysis of Part 3.

2.2 Latecomer disadvantages (macro-level)

Since the late 1950s, many scholars have focused on catching-up processes at the country level, utilising a variety of theoretical and historical models (Hirschmann, 1958; Rostow, 1960; Gerschenkron, 1962), as well as empirical investigations (Baumol, 1986; De Long, 1987; Maddison, 1995) and notable studies of successful East and Southeast Asian economies (Dahlman, Ross-Larson & Westphal, 1987; Amsden, 1989, 2001; World Bank, 1993; Lee & Lim, 2001) including industry level studies (Mathews & Cho, 2000; Malerba & Nelson, 2011) and firm level studies (Kim, 1997; Figueiredo, 2002, 2003; Dutrenit, 2004; Mathews, 2006; Gao, 2014).

Gerschenkron (1962), in particular, highlights the heterogeneous and specific set of what he called 'missing preconditions' that each latecomer country would need to acquire in order to catch up. These preconditions could comprise new institutions, market mechanisms and technologies for catching up, in line with each country's own stage of backwardness, resources and opportunities. For instance, based on a study of the electronics industry in

the Asian newly industrializing economies, Hobday (1995) identified two set of latecomer disadvantages:

Technological disadvantages. Based in a developing country, firms face a latecomer context of dislocation from the most important world sources of science, technology, R&D, design engineering and technical skills.

Market disadvantages. Latecomer firms face restricted access to international markets and sophisticated users and are therefore dislocated from mainstream global markets and usually serve small and underdeveloped markets at home.

As well as disadvantages, latecomers may also have advantages over developed economies. As Gerschenkron (1962) points out, advantages may include low cost labour, land and capital and the potential for importing technology to catch up, providing nations with distinctive pathways for overcoming their disadvantages.

2.3 The Argentine context

Over a period of more than 40 years (circa 1890 to 1930) Argentina recorded one of the world's highest annual growth rates in terms of per capita GDP. While highly industrialized countries such as the US and the UK grew at an annual rate of 1.5 % and 0.7 %, respectively, Argentina's per capita GDP grew at an average annual rate of 1.6 %². As a result, by 1908 Argentina had become the 7th richest nation (in per capita income terms), well ahead of other Latin America countries and ahead of many industrialized nations, such as Japan, Germany, France and Italy. However, by 2008, Argentina's GDP per capita had fallen behind dramatically and its ranking fell to 64th in levels of per capita GDP³.

Argentina represents a striking case of 'falling behind'⁴ on the world stage, deteriorating economically from a rapidly developing nation to a crisis ridden underdeveloped nation⁵.

Different policy regimes in Argentina were associated with specific latecomer disadvantages over the past 50 years, jeopardizing the prospects of firms to catch up.

These regimes followed, in general, the lines of those observed in other Latin American nations, although with some local specificities which, in Argentina's case, further

² Calculations based on Maddison (1995).

³ See United Nations Statistical Division (2013)

⁴ Abramovitz (1986)

⁵ See Lewis (1978), Samuelson (1980), Schvarzer (1995b), Della Paolera & Gallo (2003), De Pablo (2006).

exacerbated the negative outcomes. Policy regimes can be grouped into five time periods⁶ as follows (i) import substitution industrialization (ISI), between mid-1950s and 1975; (ii) economic and financial liberalization imposed by a military *coup d'état* between 1976 and 1983; (iii) return to democracy but with an inherited foreign debt crisis and macroeconomic instability between 1983 and 1989⁷; (iv) economic, trade, and financial liberalization recommended by the World Bank and other international financial agencies (usually termed 'Washington Consensus' policies) between 1990 and 2001; (iv) economic recovery and new ISI policy regime between 2002 and the present time. Until 2002, each policy regime brought with it severe episodes of economic, political and, often, social crises (e.g. 1975, 1982, 1989 and 2001) and a seemingly endless series of economic downturns followed by partial recoveries⁸⁹.

One of the distinctive characteristics of the policy regimes observed in Argentina was the constant swing of orientation from left- to right-wing politics and *vice versa*. The latter usually emphasized Argentina's static comparative advantages (i.e. natural resource exports) while the former attempted to promote industrialization by protective means. These lurches from policy to policy hampered the country's potential to catch up and provided an unpredictable and hostile environment for firms. In addition, the policy regimes failed to enable the economy to overcome the two core latecomer disadvantages noted above.

Market dislocation. The protectionist nature of Argentina's ISI policy regime did not incentivize industrial exports due to protected domestic markets, leading to continuing dislocation from global markets. The economic and trade liberalization policies abruptly initiated by the military following the *coup d'état* in 1976, and further consolidated during the 1990s, did enable a greater engagement with global markets. However, this was not characterised by industrial catching up (Schvarzer, 2000) but, rather, the export of basic commodities (Katz, 1999) following the static comparative advantage emphasis of

⁶ For further discussion about specific periods see Prebisch (1950), Fajnzylber (1984), Williamson (1990), ECLAC (1996), Chisari, Fanelli, & Frenkel (1996), Katz (2000, 2001), Schvarzer (2000, 2002) and Katz & Bernat (2011, 2013).

⁷ This period is widely regarded by the Latin American literature as the 'lost decade' (ECLAC, 1996)

⁸ Braun & Joy (1981) termed this macroeconomic process as 'stop and go' cycles.

⁹ At the time of writing, Argentine economy seemed to be returning to 'stagflation' (i.e. a combination of stagnation and inflation) which could indicate the beginning of a new economic crisis and the end of the current policy regime (general elections are due in 2015). See The Institute for New Economic Thinking Blog on July 31, 2014; and the online newspaper Perfil.com on April 26, 2014).

Washington Consensus' policies. The more recent ISI regime also failed to succeed in incentivizing, for instance, the exports of high-tech industrial goods (Katz & Bernat, 2011, 2013). Indeed, a common feature of each policy regime has been to discourage high technology industrial firms to engage with and exploit technology-based export markets (e.g. as occurred in the case of Asian Industrialization).

Technological dislocation. While ISI had encouraged a gradual development of domestic technological capabilities, these had been largely 'cut off' from the international economy. Conversely, new state-of-the-art foreign technologies (mostly imported machinery & equipment during the 1990s) did modernize the country's production capacities in a few sectors of the economy (i.e. mostly services-related) but to the detriment of the local generation of indigenous technological capabilities (Katz, 2000). For instance, in the case of the automotive sector, Cimoli and Katz (2002:7-8) explain that 'launching the Ford *Taurus* to the Argentine market in 1974 demanded some 300 thousand hours of domestic engineering efforts carried out by a local team of 120 professionals employed by Ford's Engineering Department... Domestic content for the car was close to 90% of the total value of the vehicle'. However, under the subsequent economic liberalization regimes, the growing domestic technological capabilities of Ford Argentina and its dense industrial network of metalworking suppliers and specialized subcontractors declined along with its local R&D labs and project-engineering departments. Responding to these policy regimes, the company cut back its technological investments and concentrated on assembling imported parts and components to produce standard cars with little or no technological content (Schvarzer, Rojas-Breu, & Papa, 2003). As noted above, in the 1990s many local firms responded to the Washington consensus policies by shifting from local learning of technology under ISI to importing high technology production capacity with little investment in the capabilities needed to improve upon the imported technology as occurred, for example, in the Asian success cases.¹⁰

Other disadvantages compounded the market and technological difficulties facing local and foreign firms in Argentina. The first can be termed *macroeconomic adversity*. During the extreme shifts in policy, Argentina suffered from a high degree of macroeconomic and

¹⁰ In Bell and Pavitt's terminology (1993) this amounted to a building up of 'production capacity' but a failure to build 'technological capability'.

institutional instability¹¹, both of which gravely affected the long-term prospects of firms' ability to catch up (Fanelli & Frenkel, 1994; Schvarzer, 1995b; De Pablo, 2006). Multiple economic crises negatively impacted the investment and innovative strategies of firms, as prolonged exposure to episodes of market turbulence (including both prices and demand) induced 'short-termism' and a lack of the gradual capability building required to enable firms to compete internationally. Many firms also downsized or exited within declining industries. Indeed, the sudden opening-up to foreign competition, coupled with the initial appreciation of local currency, led to an estimated 15,000 metalworking manufacturers exiting the local market after the military coup of 1976 (Katz, 1986). Moreover, the subsequent hyperinflationary episodes which occurred between 1970 and 1992 –involving monthly inflation rates of 200 % in 1989- led to dramatic local currency devaluations which further increased long-term exchange rate volatility¹² (De Pablo, 2006).

As Fanelli & Frenkel (1994) argue, macroeconomic uncertainties produced for a majority of local firms an opportunistic and defensive microeconomic strategy¹³ of 'extreme preference for flexibility', which jeopardized long-term building-up of technological capabilities and possibilities of catch up in the 1970s and 1980s. Later, during the policy regimes of the 1990s, macro variables stabilized but very high exchange rates (as local currency were pegged to the USD) led to further speculative diversion of resources from industrial to financial and service sectors (Chisari et al., 1996; Schvarzer, 2002).

Another firm level difficulty can be termed *corporate incoherence* which resulted from extreme opportunistic and rent seeking behavior. Corporate incoherence can be defined as a lack of the specialized and focused technological investment which enables the economies of learning required for successful growth in the long term (Teece et. al, 1989). Corporate incoherence has been observed among many family-owned conglomerates that continually diversified across unrelated activities (Liebestein, 1968; Leff, 1978). Regarding rent-seeking, Schvarzer (1995a) noted that most of the business groups in Argentina prioritized the family wealth of the owner (often supported by diversification) rather than the organic

¹¹ For example, Argentina had 34 Presidents between 1930 and 2013, four of which held office in December 2001 alone, and 74 Ministers of Economy, during the same 83-years period.

¹² At the time of writing, 2014, Argentina was starting to experience a new inflationary episode, with annual inflation rates of approximately 30 %, according to unofficial estimations (<http://www.economist.com/blogs/americasview/2014/09/statistics-argentina>).

¹³ See also Freeman & Soete (1997) for a general discussion on the innovative strategies of the firm.

growth¹⁴ of specialized, competitive divisions. Using a sample of the 100 largest firms in Argentina in 1993, the author identified 62 widely diversified firms belonging to 43 holdings or economic groups, of which 26 were family-owned enterprises and the remaining 17 were public companies listed on the stock market. Similarly, Kosacoff (1999) found that, in 1997, most Argentine MNCs pursued resource- and market-seeking strategies of diversification in other Latin American countries. Many of the conglomerates were taken over by foreign MNCs during the Washington Consensus' policies although the same diversification strategies remained (Dunning et al., 1997).

2.4 Firm differences and latecomer catch-up (micro-level)

At the firm level, latecomer disadvantages do not affect all manufacturing firms equally. There are likely to be large variations across industries depending on their history and external orientation (i.e. inward- or outward-looking) as well as the accumulation of technological capabilities with respect to R&D, engineering, product design and manufacturing. In addition, within any particular industry, according to evolutionary theory (Nelson & Winter, 1982) discretionary firm differences exist and these variances matter significantly. Nelson (1991, 2008) highlights the fact that a large part of the story of the emergence of a viable industry involves the success and growth of a few firms and the failure of many others. Dosi et al. (2010) corroborate this proposition empirically for a number of leading countries showing that, at any point in time, there is a broad heterogeneity across firms in any given industry in terms of growth, productivity and profitability.

From a theoretical viewpoint, Nelson (1991, 2008) argues that the sources of firms' differences (e.g. in the way they respond to policy and external economic circumstances) are to be found in their corporate strategy, which is usually underpinned by distinctive organizational structures and capabilities. According to evolutionary theory, and in keeping with business historians and management scholars, the concept of strategy refers to the commitments (explicit or implicit) made by a company to realize its mission, values, objectives and the way that the company intends to achieve them. Therefore, we should expect a degree of variety in firms' responses to policy regimes as a result of variety in the

¹⁴ See Penrose (1959).

way they formulate and arrive at their strategies as well as marked variations in the resulting performance of particular firms.

Extending the evolutionary perspective to the context of developing countries, we should also expect latecomer firms to have different corporate strategies with which to cope with specific latecomer disadvantages and to exploit any latecomer advantages in their pursuit of catching up. Regarding advantages, Mathews (2006) argues that latecomer firms, like latecomer countries, are able to exploit their late arrival to tap into advanced technologies by importing already developed technologies from abroad, thereby accelerating their uptake and learning efforts. A latecomer firm may also benefit from utilizing various forms of collaborations with foreign firms and supporting state agencies.

Hence, the concept of a *latecomer's strategic room for manoeuvre to catch up* can be derived by combining Nelson's conceptual insights regarding firm-related differences with Gerschenkronian thinking on latecomer catching up. Hopefully, empirical research into cases which illuminate latecomers' strategic manoeuvres can assist us in understanding why and how, when facing similarly adverse economic conditions, some firms might pursue contrarian paths to catch up.

2.5 Data and research methods

As noted above, the paper takes an in-depth case study approach to the subject. As Eisenhardt (1989) and Yin (2009) show, single case studies are well suited for examining unusual phenomena because they allow in-depth investigations of dynamic processes such as capability-building and facilitate the analysis of contrasting results (e.g. individual firm success in the context of general failure). Also, in the field of evolutionary economics, Nelson (2008) emphasizes the importance of using detailed firm case studies to better understand why firms differ and how it matters for industrial dynamics.

The latecomer firm under study was selected from among the most innovative and best performers in Argentina over a 40 year period, for both the capital goods industry and the manufacturing sector overall. It is assumed that long run performance reflects a process of capability accumulation undertaken over the various policy regimes identified earlier.

The firm was chosen from a sample of 1,688 manufacturing firms reported in the Second Innovation Survey of Argentina (INDEC, 2003), which is the main dataset available on

manufacturing firms, covering investment, innovation and performance during the most recent economic crisis of Argentina (1998-2001). After reviewing the top performers, we also examined other sources of information which confirmed that the firm in question had consistently outperformed other industrial firms over a period of around four decades. In 2008, the firm chosen (IMPESA) ranked as the 3rd largest Argentine firm operating at home and abroad, according to the first authoritative report on Argentine MNCs (ProsperAr & Vale-Columbia-Center, 2009). Additionally, in 2013 *Tenaris* ranked 7th among the largest Latin American MNCs (Multilatinas), according to the online business magazine *America Economia* (2013). The purpose of choosing such an extreme case in terms of performance is justified because it promises to throw light on the capabilities required to achieve international catching up success, despite being situated in an unfavorable context where most others firms performed poorly.

IMPESA, as it is known nowadays, emerged during the 1960s in Argentina and went on to become one of Latin America's largest provider of renewable energy systems, basically manufacturing hydro- and wind-turbines and delivering associated high-tech integrated solutions. This firm belongs to the Pescarmona family, which is a relatively diversified economic group.

The case study is based on data resulting from privileged access to internal documentation (e.g. company's balance sheets, financial statements, annual reports and internal newsletters) and unique archival records consisting of more than 250 newspaper articles (selected out of 400,000) that made references to IMPESA as well as the Pescarmona family and the affiliates companies over a period of 40 years, between 1968 and 2012¹⁵. This evidence also includes in-depth analysis of interviews conducted over many years by third parties (e.g. journalists, consultants and analysts) that included the company's founder as well as subsequent CEOs and directors. Most of quotations had to be translated from Spanish to English by the first author.

Our approach relates the historical experience of policy regimes in Argentina¹⁶ –which establishes the context of macro decline- with a qualitative characterization of the firm's capability-building process, which is complemented by quantitative measures of its

¹⁵ Access was obtained for this unique dataset, which is located in the CDSA-CESPA documentation centre at the University of Buenos Aires, Argentina.

¹⁶ See Section 2.3.

performance (e.g. sales, exports, profitability and innovation) over the past 40 years. A substantial part of the qualitative analysis was carried out with help of computer-assisted tools such as keyword search, word frequency, coding, categorization, and content analysis through NVivo 10 software (produced by QSR International). The aim was to identify and match the different technological capabilities built up by IMPSA to cope with the latecomer disadvantages faced by firms in Argentina.

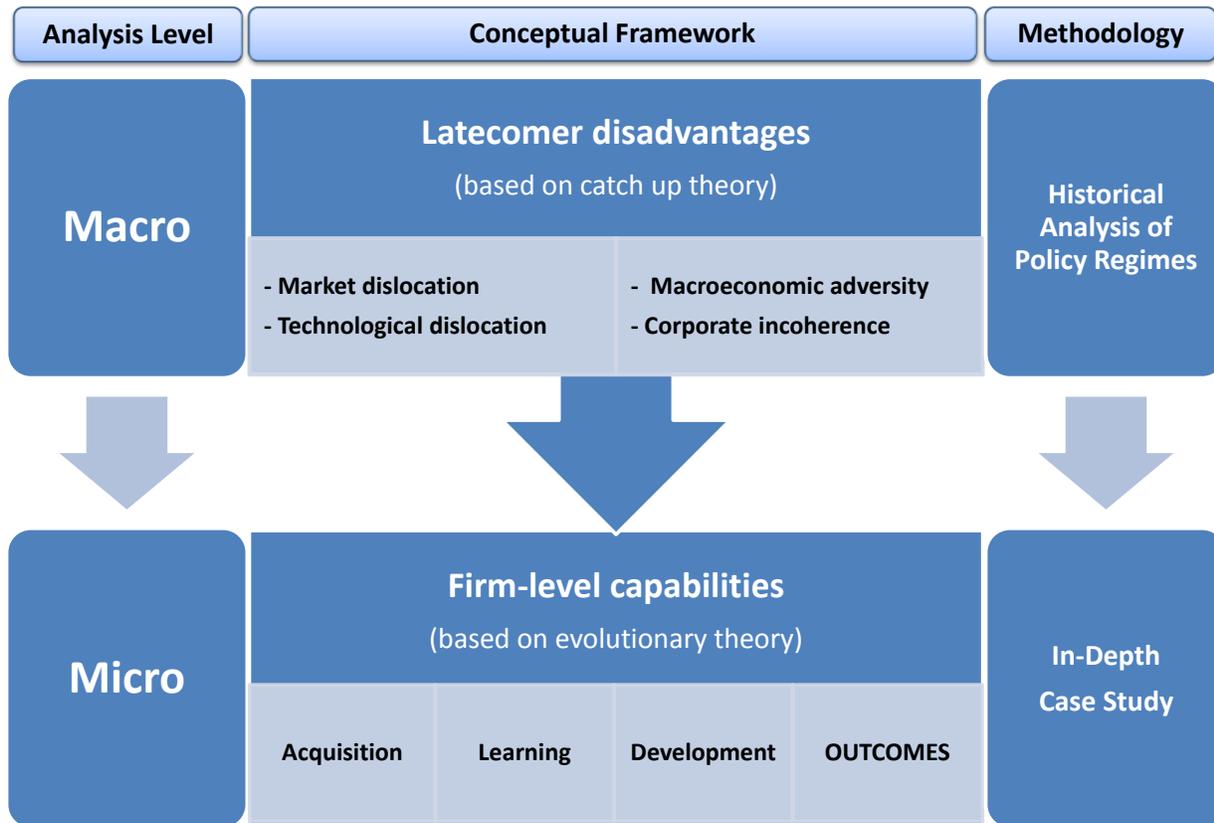
The usual research quality tests for case studies, as suggested by Kidder & Judd (1986), were adopted, including *construct validity* (i.e. triangulation of multiple sources of information to encourage convergent lines of inquiry); *internal validity* (i.e. pattern-matching techniques comparing expected outcomes, given the context, with observed outcomes of the firm); *external validity* (i.e. drawing analytical generalizations from evolutionary theory to establish the possibility of the firm's heterogeneity); and *reliability* (i.e. proper documentation of all statements and findings to allow future replications).

2.6 Analytical framework

Based on the above analysis, figure 1 depicts the dual level perspective we use to address the research question of this paper concerning how and why a particular latecomer firm that faces adverse economic conditions might still be able to survive, grow and catch up with global competitors, while many others fail to do so.

Figure 1 is used to guide the empirical analysis concerning capabilities formation through time and especially those oriented towards innovation and international markets. The consequences of corporate strategy including resulting organizational structures, export performance and the building up of non-technological capabilities are also analysed.

Figure 1: Understanding a latecomer's capabilities formation to catch up



3. CASE STUDY OF IMPSA

3.1 Introduction

This section identifies and briefly describes the major stages of IMPSA's development in both local and global markets, as well as any key strategic, organizational, and technological milestones since this firm's inception. This case study will showcase the evolutionary path by which a latecomer firm in Argentina was able to catch up with global competitors, eventually reaching world-class status as an emerging multinational company. Table 1 summarizes the main empirical findings:

3.2 IMPSA's origins and milestones

Table 1 summarizes chronologically the main empirical findings.

Table 1: Key milestones in IMPSA's evolutionary path to catching up (1907-2013)

Year	Brief Description
1907	E. Epaminondas Pescarmona migrates from Italy and sets up a metallurgic workshop in Mendoza, Argentina, manufacturing winemaking equipment and water irrigation gates.
1915	Pescarmona metallurgic workshop becomes the market leader (with more than 100 employees) due to the winemaking boom in Mendoza and the resulting extension of the water irrigation grid.
1934	The Great Depression of the early 1930s causes the company to go bankrupt, forcing it to shut down.
1936	Luis M. Pescarmona (the founder's son) takes over the company and re-opens it with a stronger specialization in structural metalworking.
1945	Thanks to increased government demand for public infrastructure, the firm again begins to grow, now employing 150 workers.
1946	The company's first industrial plant, which is about one hectare (ha.) in total area, is inaugurated in Mendoza.
1947	The first attempt is made to manufacture turbines for the hydroelectric dam in Uspallata, Argentina.
1965	Pescarmona metallurgic workshop changes its name to IMPSA (<i>Industrias Metalurgicas Pescarmona SA</i>) and starts designing and constructing large metal structures, turbines, and generators.
1967	Enrique M. Pescarmona (the founder's grandson) enters IMPSA's management and leads the way towards the modernization and internationalization of the company.
1969	IMPISA opens a commercial office in Buenos Aires, the capital city of Argentina.
1975	IMPISA acquires the first technology transfer licenses to produce hydro turbines from Kvaerner-Burg (Norway) and port cranes from Cleveland Crane & Engineering (US).
1979	The company's second industrial plant (about 20 ha.) is inaugurated in Mendoza and funded by the Inter-American Development Bank (IAD). Plant facilities include the largest hydraulic research centre in Latin America.
1979	IMPISA designs and produces the first three Kaplan turbines for the Arroyito Dam in Argentina. IMPISA goes on to supply many other hydroelectric dams in Argentina (e.g. Yacyreta, Piedra del Aguila, and Potrerillos) after this project.
1979	IMPISA signs several technological collaboration agreements with the state of Argentina for the production of nuclear equipment for the National Bureau of Atomic Energy (CNEA), the state-owned oil company (YPF), and Military Manufacturing (Rio III).
1980	IMPISA manufacture and exports two Francis hydro-turbines to Colombia, becoming the first company from a developing country to export that technology.
1982	IMPISA opens up an international office in Pittsburgh (US) and liaises with US Steel.
1983	IMPISA pioneers the use and diffusion of both CAD-CAE-CAM (computer-aided design, engineering, and manufacturing) and NASTRAN (the high-tech software for structural analysis, exclusively licensed by NASA in the US) in Latin America.
1983	IMPISA exports the first port cranes to the Dominican Republic.
1985	IMPISA opens international offices in Hong Kong to supply the Asian markets.
1986	IMPISA manufactures and exports a turnkey hydro plant (including technology transfer) to China.
1987	IMPISA manufactures and exports two hydro turbines to the US market (Oklahoma and

	Oregon) after winning a public bid against leading global competitors.
1992	IMPESA takes advantage of privatization opportunities in Argentina and diversifies into non-tradable activities such as transport, telecommunications, and insurance; unfortunately, they have very little success in any of these areas.
1994	IMPESA develops its own proprietary software for the analysis of turbines and generators, and later is awarded the ISO 9001 for its quality management systems.
1995	IMPESA opens a commercial office and third production facilities in Malaysia.
1995	IMPESA delivers integrated solutions for the first time (i.e. built–rehabilitate–operate–maintain) for the CBK hydroelectric project in the Philippines.
1995	UNIDO lists IMPESA among the top 100 most innovative firms in Latin America.
1997	IMPESA exports port cranes to the US Navy and the State of Florida, as well as to Shanghai (China); IMPESA becomes the second largest exporter of port cranes in the world.
2003	IMPESA developed wind turbines and generators for the first time, using their own technology (UNIPOWER).
2005	IMPESA manufactures and installs the world’s largest port cranes, in Malaysia.
2007	IMPESA opens up its fourth production facility (in Brazil) to produce wind turbines and generators; five years later, it opens its fifth production facility (in Brazil), to develop hydroelectric technologies.
2010	IMPESA beats out GE, Siemens, and Alstom to supply the world’s most efficient and third-largest hydropower plants in Bakun (Malaysia) and Belo Monte (Brazil), respectively.
2010	IMPESA is ranked the #1 high-growth family enterprise (by Ernst & Young), the #7 largest MNC from Latin America (by America Economia), and the #3 largest MNC from Argentina (by Vale-Columbia Centre).
2013	IMPESA becomes a global leader in both hydropower and wind-power technologies, with more than 6,000 employees worldwide and total sales of over one billion USD across 30 countries.

Source: The authors’ own elaboration, based on IMPESA’s annual reports as well as on archival records.

IMPESA’s evolutionary path (illustrated in Table 1) can be separated into five clear stages:
Building corporate coherence (1900s–1960s)

IMPESA’s roots can be traced back to 1907, when E. Epaminondas Pescarmona emigrated from Torino, Italy, and settled in the winemaking region of Mendoza, Argentina, to take advantage of the economic boom in Argentina at the time. There, he put in practice his qualifications as a mechanical technician and set up a small metallurgic workshop, manufacturing cast-iron spare parts, winemaking equipment, and gates for irrigation channels. Thanks to the increasing demand for wine from Mendoza, in less than ten years the firm became the market leader in the provision of winemaking equipment (e.g. grape crushers, grape presses, and wine barrel sinks) and water irrigation gates for ditches, employing around 120 workers. However, a couple of years later, the company was badly

hit by the Great Depression of the early 1930s. Surprisingly, instead of bailing out such a successful firm, the state-owned bank Banco Nacion forced Pescarmona's company to file for bankruptcy in 1934. Two years later, Luis M. Pescarmona (the founder's son) took over and re-opened the company, but now with a greater specialization in structural metalworking. Increased government spending on public infrastructure during the ISI regime helped the firm to resume its path to growth, and by the mid-1940s, their first industrial plant (with a total area of around one hectare) had been inaugurated in Mendoza and was employing more than 150 workers. In 1942 the firm set up its hydromechanics department, drawing on its technological background in winemaking equipment and water irrigation gates. Five years later, the firm participated, for the first time, in the manufacture of turbines for a hydroelectric dam in Uspallata, Argentina. Finally, in 1965 Pescarmona metallurgic workshop changed its name to IMPSA (Industrias Metalurgicas Pescarmona SA), its present name. IMPSA's corporate coherence was centred on core technologies in the capital goods industry; namely, the design and construction of large metal structures, as well as turbines and generators for hydropower plants.

Technological modernization and capacity expansion (1970s-1980s)

Enrique M. Pescarmona (the founder's grandson and the current CEO) joined IMPSA's management team in 1967 and led the way towards the company's technological modernization and capacity expansion. In 1969, only two years after this change in leadership, IMPSA expanded beyond the relatively isolated province of Mendoza and opened its first commercial office in Buenos Aires, the main economic hub of Argentina. Over the next decade (1975-1985), IMPSA signed nearly 20 technology transfer agreements with several mature firms, ranging from hydro turbine technology from Kvaerner-Burg (Norway) to port crane technology from Cleveland Crane & Engineering (US). In 1979, IMPSA's second industrial plant (this one, about 20 hectares in total area) was inaugurated thanks to investment funds provided by the Inter-American Development Bank (IADB). These new facilities tripled IMPSA's production capacity, and included the largest hydraulic research centre in Latin America, with a state-of-the-art test bench. As a result, in the same year, IMPSA was able to design and produce their first three Kaplan turbines for the Arroyito Dam in Argentina. Over the next couple of years IMPSA became

the leading turbine and generator provider for Argentina's main state-funded hydroelectric projects (e.g. Yacyreta, Piedra del Aguila, and Potrerillos). During this same period, IMPSA signed a number of technological collaboration agreements for the production of nuclear equipment for several public bodies, such as the National Bureau of Atomic Energy (CNEA), the state-owned oil company (YPF), and Military Manufacturing (Fabricaciones Militares Rio III). In this way, the company was able to expand and complement its technological base, moving towards the provision of a comprehensive set of capital goods for the power generation industry.

Internationalization and access to global markets (1980s–1990s)

The prior acquisition and development of advanced technologies, along with the expansion of production capacities, enabled IMPSA to gain access to global markets, starting with neighbouring countries in Latin America. In 1980, IMPSA manufactured and exported two Francis hydro-turbines to Colombia, becoming the first company from a developing country to export such a technology. A few years later, IMPSA also manufactured and exported their first port cranes to the Dominican Republic. Although IMPSA already had commercial offices in Brazil and Colombia, in 1982 the company decided to move towards more advanced export markets, opening up an international office in Pittsburgh (US). This internationalization brought new technological opportunities; for instance, IMPSA received exclusive rights to use and distribute NASTRAM—the world's most advanced software for structural analysis, developed by NASA (US)—in Latin America. This globalization strategy continued in 1985 with the opening of international offices in Hong Kong and Beijing, with a goal of supplying the growing Asian markets. In 1986, IMPSA manufactured and exported a turnkey hydropower plant to China, with an agreement that included the technology transfer. In the following year, IMPSA sold, for the first time, two hydro turbines to the US market, in Oklahoma and Oregon, beating out global leaders such as Voith-Siemens (Germany), Neyrpic-Alstom (France), Voest-Alpine (Austria), and Nissho Iwai (Japan).

Diversification attempts and little success (1990s)

During the 1990s, IMPSA continued its internationalization process, gaining access to distant markets. For example, in 1995, the company opened up another international office,

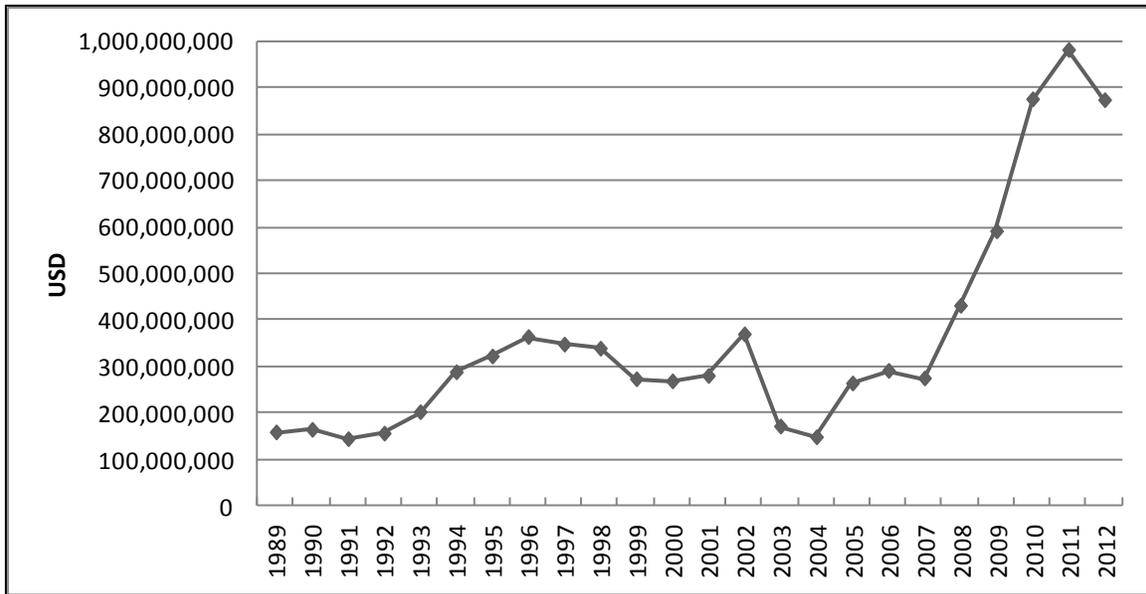
as well as its third production facility (this one in Malaysia) for the production and commercialization of both hydro turbines and port cranes. As a result of this capacity expansion, IMPSA delivered, for the first time, integrated solutions (i.e. build–rehabilitate–operate–maintain) for the CBK hydroelectric project in the Philippines. Two years later IMPSA exported automatic port cranes to the US Navy and the State of Florida, as well as to Shanghai (China), and soon became the world’s second-largest exporter of port cranes. At the same time, IMPSA worked to take as much advantage as possible of privatisation and market deregulation opportunities that opened up in Argentina, as well as throughout Latin America, under the policy reforms promoted by the Washington Consensus. For instance, IMPSA moved into transport (i.e. railways and airlines), satellite telecommunications, and insurance activities; at one point, these three sectors accounted for nearly half of the company’s turnover. However, these ventures were short-lived, and IMPSA exit all three sectors after only a couple of years, in some cases (e.g. IMPSAT telecommunications) with substantial economic losses.

Specialization and leadership in renewable energies (2000s–Present Day)

After Argentina’s devastating economic crisis in 2001–2002, IMPSA went back to their roots and restructured their business and organization towards a specialization in renewable energies. Their results were very impressive: Figure 1, below, shows IMPSA’s five-fold growth in total sales, from 200 million pesos in 2004 to nearly 1 billion USD in 2011. The reasons behind this tremendous growth began in 2003, when IMPSA became the first company from Latin America to develop a wind turbine and generator with its own proprietary technology (UNIPOWER^(R)). Brazil’s growing economy, compared alongside Argentina’s decline, convinced IMPSA to shift their main operations and assets towards their neighbouring country: In 2007 the company inaugurated its fourth-ever production facility, located in Pernambuco, Brazil, which produced wind turbines and generators. Five years later, IMPSA opened its fifth-ever production facility, in the same region, to further develop the hydroelectric technologies being used in the industrial plants of Argentina and Malaysia. IMPSA’s substantial investment in innovation and production capacity enabled them to supply the world’s most efficient and the world’s third-largest hydropower plants, in Bakun (Malaysia) and in Belo Monte (Brazil), respectively; this accomplishment brought

them into competition with global leaders such as General Electric (US), Siemens (Germany), and Alstom (France).

Figure 1. Growth of total sales for IMPSA (1989–2012)



Note: The values were deflated by the Wholesale Price Index (IPIM, Índice de Precios Internos al por Mayor). The base year for the calculations was 1993=100, which implies that the values expressed in pesos (i.e. Argentina's local currency) were equivalent to USD.

Source: The author's own elaboration, based on IMPSA's Annual Reports and Financial Statements

For their outstanding performance, in 2010 IMPSA was ranked the #1 high-growth family enterprise (by Ernst & Young), the #3 largest MNC from Argentina (by Vale-Columbia Centre), and the #7 largest MNC from Latin America (by America Economía). Today, this one-time latecomer firm has caught up with global competitors and has become a world-class leader in both hydropower and wind-power technologies, with more than 6,000 employees worldwide and total sales of over one billion USD across 30 countries.

3.3 Discussion

This section explains why and how IMPSA overcame the latecomer disadvantages prevailing in Argentina—distant global markets, technological backwardness, an adverse macroeconomy, and entrepreneurial and corporate incoherence—through their corporate strategy, organizational structure and core capabilities (mostly in the technological domain).

The empirical analysis of IMPSA's evolutionary path (partially reflected in Figure 1) shows that this latecomer firm has indeed caught up with global competitors and had reached world-class status in the renewable energies industry, despite the adverse policy regimes that have prevailed in Argentina.

IMPSA followed a contrarian path that allowed the company to catch up while many other latecomer firms in Argentina lagged and fell further behind. For example, IMPSA doggedly continued in the capital goods industry, focusing on a few core technologies, while many other firms succumbed to the temptations of short-term incentives and changed their businesses to spread across wide-ranging industries. IMPSA invested heavily in the technological modernization of their production facilities, while many other firms speculated in the financial and commodities markets. IMPSA expanded internationally to distant global markets while many other firms in Argentina were taken over by foreign corporations. IMPSA exported high-tech port cranes from a landlocked city (Mendoza) while many other firms exported, at best, natural resources, capitalizing on Argentina's comparative advantage. In line with the conceptual framework suggested in this work—coupling Gerschenkron and Nelson's ideas—IMPSA overcame the prevailing latecomer disadvantages by manoeuvring differently than other firms in terms of corporate strategy, organizational structure, and core capabilities.

IMPSA has consistently pursued a *corporate strategy* that has allowed them to overcome technological backwardness, distant global markets, an adverse macroeconomy, and corporate in-coherence. Regarding technological backwardness, IMPSA placed technological innovation at the forefront of their corporate strategy, not only as a family passion but also as a critical component to survival in the increasingly competitive markets of capital goods. Technology transfer agreements, training personnel abroad, and in-house R&D and reverse engineering were among the learning mechanisms that IMPSA used to overcome the technological backwardness prevailing in Argentina. Technology acquisition and development at IMPSA has been deeply entwined with a clearly defined strategy of gaining access to distant global markets. This latecomer firm understood from early on that it had to compete internationally to get to know the state-of-the-art technologies that were globally available; such technology would then, in turn, be crucial in allowing the firm to continue expanding and competing internationally. IMPSA was fully aware that such a co-evolutionary process would eventually form a virtuous circle between technology and exports. These results shed some light on those empirical studies that found contradictory evidence regarding the causal direction between technology and exports at the firm level. The causality here is likely to be circular, although a prior technological base might be

needed to gain access to competitive export markets. To address Argentina's adverse macroeconomy, an equally important facet of IMPSA's corporate strategy has been to pursue emerging markets that have large and stable demand, as well plenty of available credit, such as Southeast Asia and Brazil. The lack of State support to finance innovation and the export of capital goods from Argentina has been the most adverse macroeconomic condition faced by this latecomer firm, and neither high rates of inflation nor volatile exchange rates have been as detrimental to corporate development as inadequate interest rates and the consequent lack of credit proved to be. IMPSA worked around this disadvantage by following a corporate strategy of indirect financing that changed in response to the different policy regimes: this played out as compensation in the form of reciprocal credits with the State for public infrastructure works in the 1980s, quick entry into and exit from the privatization business in the 1990s to increase corporate cash flow, and financial leverage via subsidized credit from Brazilian state-funded banks in the 2000s. Lastly, to address the challenge of corporate in-coherence, the final and overarching aspect of IMPSA's strategy has been its long-term corporate coherence, which it has maintained despite the many changes in policy regimes. Unlike most family-owned economic groups, which diversified their businesses in Argentina in response to short-term incentives, IMPSA has consistently and coherently specialized in a few core technologies within the capital goods industry: hydro- and wind-power generation, and port cranes. After recording major losses during its diversification attempts in the 1990s, IMPSA realised that learning is technology- and sector-specific, and resumed its traditional family business in renewable energies.

The implementation of such a corporate strategy required IMPSA to set up *organizational structures* that were strong enough to allow for the development of specialized routines over a long period of time, as well as flexible enough to cope with the short-term changes in policy regimes that occurred so frequently in Argentina. IMPSA adjusted its organizational structure to overcome technological backwardness, distant global markets, an adverse macro-economy, and corporate incoherence in the following ways: IMPSA implemented its technological strategy by gradually upgrading from extra-organizational links with leading firms (via technology transfer and personnel training) to intra-organizational links through the early creation of its own R&D laboratory in Argentina, which specialized in hydromechanics. As their corporate strategy focused mainly on renewable energies, IMPSA set up another R&D laboratory in Brazil to specialize in wind turbines and generators. In addition to these R&D labs, IMPSA allocated substantial resources to their finance department to deal with the chronic lack of credit in Argentina, which particularly

hampered the financing of project-based organizations in the capital goods industry. Access to distant global markets would have not been possible without the creation of commercial offices abroad, which were later supported by production facilities. This involved a major *Chandlerian* transformation from the traditional vertically managed family enterprises based in Argentina, to the more bureaucratic and horizontally-managed multinational corporations based in Brazil. Unlike many other family conglomerates in Argentina, IMPSA succeeded thanks to their highly professionalized managerial succession, whereby family members were given positions according to their specific qualifications and expertise (e.g. engineering, finance, or corporate law).

Lastly, the pursuit of IMPSA's corporate strategy, as well as the functioning of its organizational structure, have been undoubtedly underpinned by a set of *core capabilities*, which allowed the company to articulate their resources in a meaningful way. In turn, the nature and scope of the latter were bounded to the firm's strategy and structure, respectively. IMPSA's evolutionary path to catching up included a great deal of experimentation, given Argentina's adverse environment of changing policy regimes. Nevertheless, IMPSA acquired, accumulated, developed, and continually improved a number of world-class capabilities that distinguished it from other Argentinean firms and global competitors alike in the capital goods industry. IMPSA's formation of technological capabilities followed a truly evolutionary process of trial and error, learning from their mistakes along a well-defined and coherent technological trajectory. Significant variations from these core capabilities—such as their short-lived and ill-fated involvements in airlines, railways, and telecommunications—have proved to be quite unsuccessful for the company. IMPSA has systematically built up its technological capabilities from its initial focus of winemaking equipment and water irrigation gates to products such as hydro turbines, metallic structures, high-altitude port cranes, wind turbines, and generators. IMPSA learned from and built on some of the adverse macroeconomic conditions prevailing in Argentina, using these situations to develop specific non-technological capabilities. The chronic lack of credit, as well as the economic and political instability in Argentina, forced IMPSA to develop debt issuance and restructuring as well as risk-management capabilities, respectively. The combination of these core (hydro and wind) and soft (finance and risk-management) technologies, along with project-related competences, supported IMPSA in developing integrated-solutions capabilities for power generation from renewable energies. Eventually, their manufacture, delivery, and provision of integrated solutions achieved world-class status through the development of export capabilities. These export capabilities were the result of the gradual and sequential accumulation of production, technological,

project finance, and commercialization capabilities. Finally, IMPSA's formation of organizational capabilities can be understood as a hierarchy of organizational routines that reflect two other distinctive capabilities. At the top executive level, all IMPSA CEOs have consistently shown strong entrepreneurial capabilities, recovering from many near-bankruptcy situations without wavering from their focus on the capital goods industry. Building upon their engineering background, they learned how to capitalize on the many problem-solving challenges that emerged from Argentina. At the lower levels of this project-based organization, managers and workers have shown outstanding management capabilities, learning from and carrying out consistent task routines across multiple projects and over four generations.

4. Conclusions and Implications

The empirical analysis of IMPSA shows that this latecomer firm caught up with global competitors and reached world-class status in the renewable energy industry by building up a distinctive set of technological capabilities, despite the adverse policy regimes that have prevailed in Argentina over the past 40 years.

IMPSA followed a contrarian path that allowed the company to catch up while many other latecomer firms in Argentina lagged and fell further behind. For example, IMPSA doggedly continued delivering hydro- and wind-power systems, focusing on a few turbine technologies, while many other firms succumbed to the temptations of the policy-induced short-term incentives and changed their businesses to spread across wide-ranging industries. IMPSA invested heavily in the technological modernization of its production facilities, while many other firms speculated in financial and commodities markets. IMPSA expanded internationally capturing advanced global markets while many other firms in Argentina were taken over by foreign corporations or exited the manufacturing sector. For example, IMPSA exported high-tech port cranes from a landlocked city (Mendoza) while many other firms exported, at best, natural resources, following the Washington Consensus' policies. In line with the conceptual framework suggested in this work—coupling Gerschenkron and Nelson's ideas—IMPSA overcame its prevailing latecomer disadvantages by manoeuvring differently than other firms and by building up a coherent set of technological capabilities over time.

IMPSA's catching up path included a great deal of experimentation, given Argentina's adverse environment of changing policy regimes. IMPSA acquired, accumulated, developed, and continually improved a number of world-class capabilities that distinguished it from

other Argentinean firms and global competitors alike in the renewable energy systems. As of 2012, and in less than 10 years, IMPSA's provision of integrated solutions has turned the company into Latin America's leading provider of renewable energies, with regional market shares of around 30 % and 15 % in hydro- and wind-power, respectively, competing hand-to-hand with global leaders like Siemens, Vestas, General Electric and Chinese companies. Nevertheless, this success story followed a truly evolutionary process of trial and error, learning from many mistakes along a well-defined and coherent technological trajectory in the provision of renewable energy systems. For instance, the firm engaged in significant ill-fated deviations away from these core capabilities—such as its short-lived involvements in airlines, railways, and telecommunications—all these excursions proved to be unsuccessful for the company, encouraging it to return to a core, organic path of expansion. IMPSA built up its distinctive set of technological capabilities from its initial focus of winemaking equipment and water irrigation gates to products such as hydroelectric turbines, metallic structures, high-altitude port cranes, wind turbines, and generators. These progressions involved step by step extensions of existing capabilities, as shown in Part 3. Technology was acquired via transfer agreements, training personnel abroad, in-house R&D and reverse engineering of leading edge foreign products. In pursuing a path of growth and smart specialization, rather than contraction and diversification, IMPSA engaged with, and in some cases exploited, the adverse conditions prevailing in Argentina, helping it to build up essential non-technological capabilities. The chronic lack of credit, as well as the economic and political instability in Argentina, forced IMPSA to develop debt restructuring and risk-management capabilities, respectively. The combination of these core (hydro and wind) and soft (finance and risk-management) technologies, along with project-related competences, supported IMPSA in developing integrated-solutions capabilities for power generation from renewable energies. By exporting to advanced markets, the firm was forced to continually improve the technological capabilities required to manufacture, deliver, and develop integrated solutions. World-class status was eventually achieved through the gradual and sequential accumulation of production, technological, project finance, and marketing capabilities.

Technological and other associated capabilities can be understood as emerging from 'higher order' leadership and entrepreneurial capabilities. For example, at the top executive level, four generations of CEOs have consistently exhibited strong entrepreneurial capabilities, enabling the firm to recover from near-bankruptcy situations without wavering from its focus on capital goods manufacture. IMPSA's corporate coherence has been highly unusual for family-owned enterprises long established in Argentina. As a result of inspirational

leadership, other levels of management learned how to carry out routines across multiple projects enabling rapid and effective technological learning over several generations of product.

The paper contributed a conceptual framework to explore the contrarian technological path of IMPSA within the unfavourable environment of Argentina, combining elements of latecomer firm theory and the evolutionary interpretations of firms' heterogeneity in line with Nelson (1991 & 2008) and Dosi et al (2010). The framework explained how it is possible for highly successful firms to co-exist with the majority of poor performers within the same domestic economic environment and over long periods of time. In line with evolutionary theorizing, the framework helped us to understand how a single firm was able to acquire, nurture, accumulate and develop a set of distinctive capabilities within a relatively well-defined technological trajectory in a complex capital goods sector, despite persistent short-term economic and policy disincentives.

Although there can be no simple generalisations or models with regard to capability building under adversity, the case does confirm that firms can respond differently to the same policy regimes and external incentives. This suggests that it is incumbent upon individual firms to pave their own way towards catching up, rather than responding to government programmes or following 'best practices' of other. In terms of implications for strategy, latecomer firms facing adverse policy regimes should (i) reject any incentives or encouragements, which result in inward-looking and short-term behaviours and (ii) build up distinctive sets of both technological and non-technological capabilities which promise continued innovation as well as engagement with more sophisticated and rapidly growing foreign markets.

Regarding policy implications, in episodes of crisis and decline policy makers should consider learning lessons from firms which are succeeding despite difficult conditions and discover the capability-building process underlying their success. Such firm level evidence may be useful for amending and adapting policies to encourage more firms to innovate and export. It is also important for policy makers to recognise that some firms may not respond to particular policy regimes in the ways expected and that this may not always be a 'bad thing'.

Further research may wish to explore the progress of other latecomer firms both in Argentina and in other countries facing extremely adverse external circumstances in order to assess the extent to which individual companies have built up distinctive technological capabilities. Researchers may also wish to assess and compare progress of successful

latecomers in other sectors to look for similarities and differences in contrarian catch up paths. The lessons from even a small number of highly successful firms like IMPSA could prove valuable and insightful, allowing us to understand the scope of latecomer firms' capability building prospects under adverse conditions. Ultimately, such evidence may prove useful for policy makers attempting to promote successful catching up under adverse or crisis conditions.

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