

Chapter 6

From Backward to Modern: The Adoption of Technology by the Pulp Industry in Portugal, 1891–2015



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6.1 Introduction

In 2015, Portugal was the third largest European producer of pulp with 7.3% of total output. National production of virgin wood pulp stood at 2,662,000 tons of which 45% was exported to over two dozen countries. Portuguese imports of paper-grade pulp stood at 129,000 tons, a level that makes the country a net exporter of paper-grade pulp. The largest Portuguese pulp producer, Navigator, is also a global producer of uncoated, wood-free printing and writing paper. This picture totally contrasts with that prevailing during the late nineteenth and early twentieth centuries. At that time, there was only one plant in operation that produced chemical pulp, whose output was sold almost entirely to export markets. In 1911 the production capacity of this plant was 3,500 tons and in 1930 it was only slightly above that level (4,343 tons). The main raw material of the Portuguese paper industry was rags and the plants were technologically backward, although some companies had already adopted continuous paper machines. The wood pulp consumed by these paper units was covered by imports, making Portugal a net importer of pulp. All this changed by the mid-twentieth century. At that time, the wood pulp industry in Portugal grew dramatically because it was considered a strategic sector under the state development policy. This factor gave birth to the first plant that processed eucalyptus to produce sulphate pulp, and the enterprise was oriented toward export markets.

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Taking a long term approach, this chapter¹ aims to address three main topics concerning the life cycle of the Portuguese pulp industry: first, the causes of backwardness for more than half a century, qualifying Portugal as a latecomer to the sector; second, the new circumstances and factors that were present in the industry's emergence phase; finally, the constraints and patterns of expansion that contributed to the industry's maturation. The long-term study of the remarkable development of the Portuguese pulp sector holds a great deal of interest for various reasons. Firstly, the country displayed a significant lag at the beginning of the twentieth century and was among the latecomers to the global pulp sector (Gutiérrez-Poch 2012; Ojala et al. 2012).

A discussion of the causes for this delay represents a contribution towards the broader historiographic debate surrounding the Portuguese economic backwardness (About this debate, see Reis 1993 and Lains 2003). Secondly, following the consolidation of the sector within the Portuguese industrial structure, it became an example of a successful, competitive industry in international markets. A long-term perspective on the Portuguese pulp industry may also shed some light on the international economic integration of a peripheral country with poor endowment of capital and natural resources (Lains 1995; Reis 2000). Finally, because the Portuguese pulp industry received substantial support from the state, this case study may also generate further contributions towards the ongoing debate around industrial policies (On the current state of this debate, see Aiginger and Sieber 2006; Pack and Saggi 2006; Lee et al. 2012; Grabas and Nützenadel 2014).

An analysis of the dynamic interaction between the institutional environment and business strategies contributes towards a broader and deeper understanding of the phases in the sector's life cycle as well as the reasons for its success. The institutional dimension takes on a crucial explanatory relevance in cases of late economic modernisation as is the case with the Portuguese economy (Gerschenkron 1962). The role of the state in the Portuguese pulp sector's path was crucial not only creating conditions for its expansion and growth but also acting as owner of pulp mills. Furthermore, the secular evolution of the industry is anchored in different economic and political regimes. Despite the relevance of institutional forces, private initiative was also fundamental to the success of the sector, specifically by taking advantage of the conditions the state had created. The state and private initiative combined to contribute towards the creation of a comparative and competitive advantage. The forest was crucial for the creation of this advantage, serving the industry well and being a good example of inter-sectoral integration.

In the next section, we set out a long-term view of Portugal's pulp sector and its most relevant features, such as the level of output and exports, product specialisation, business structure, and also the trends in Portuguese forest that allowed for the production of the industry's main raw material. It allows us to identify general trends and phases that shaped the secular evolution of the industry in Portugal. This periodisation will be the roadmap for the remaining sections.

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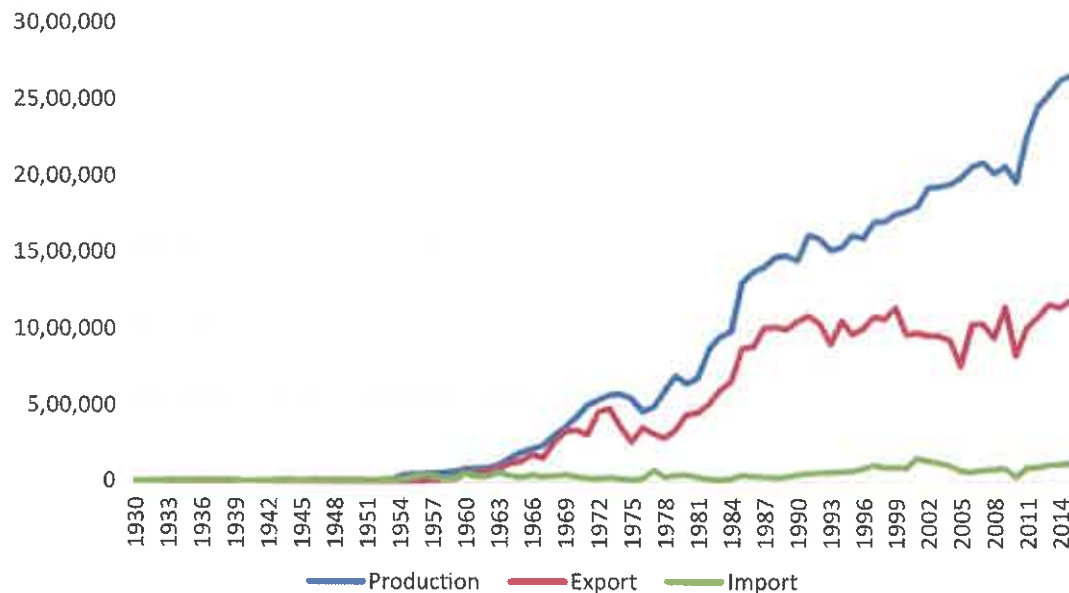


Fig. 6.1 Production and trade of pulp in Portugal, 1930–2015 (tons). *Sources* 1930 to 1974—Branco (2005); 1975 to 2015—FAOSTAT

6.2 Pulp Industry in Portugal: A Long-Term Perspective

The pulp industry in Portugal stands out as a successful case of a latecomer catching up. The wood pulp industry was set up in Portugal in 1891, and after six decades of very slow growth, the increase in productive capacity was both impressive and accompanied by an enormous increase in the volume of pulp being exported (Fig. 6.1).

The remarkable growth in Portuguese pulp production from the 1960s onwards is undeniable. Nevertheless, this broad picture hides different phases through which the pulp industry passed during the period under study. In addition to the level and growth rate of pulp production, other aspects can be taken into account in identifying these phases: export and specialisation trends, business structure, and forest coverage in the country. Institutional framework and corporate strategies are factors that shaped these indicators. Table 6.1 presents the figures for these indicators in several benchmark years for the period under study. Those benchmark years were chosen after taking into account the evolution in the institutional framework in order to assess its impact on the sector.

Up until 1953, pulp production coming from the single plant in operation remained very low, reaching 7,000 tons in that year. The prominent growth in pulp production capacity can be traced back to 1954, when the Cacia plant entered operation and signalled the industry's take-off. The production rose from 7,000 tons in 1953 to 41,600 in 1954. The industry's growth phase spanned the next three decades through the expansion of existing plants and the opening of five new ones. In the mid-1970s the production reached 547,000 tons, thirteen times more than the level in 1954. After a short period of decrease, the high growth pace was resumed by the end of the 1970s. In the second half of the 1980s, the production ramped up again due to

Table 6.1 The growth of Portuguese pulp industry

	1910	1930	1950	1960	1975	1988	2001	2015
Production (10 ³ ton) (1)	3.5	4.3	6.3	86.5	547	1,472	1,806	2,662
Exports (10 ³ ton) (2)	1.9	3.0	4.3	59.4	265	1,017	980	1,194
Imports (10 ³ ton) (3)	8.5	7.2	15.5	53.2	13.8	29	159	126
BEKP to total production (%) (4)						69	78	94
Market pulp to total production (%) (5)	100	100	100			83	65	49
No. plants (6)	1	1	1	3	8	9	7	7
No. companies (7)	1	1	1	3	7	4	5	3
Forest (10 ³ ha) (8)	1,957	2,332	2,832	2,826	2,956	3,108	3,305	3,155
Forest coverage (%) (9)	22.3	26.6	32.3	32.2	33.8	35.4	38	35.4
Maritime pine (10 ³ ha) (10)	430	1,132	1,19	1,288	1,293	1,252	978	714
Eucalyptus (10 ³ ha) (11)		8	113	99	214	386	717	812
Pulp firms' forest (10 ³ ha) (12)					45		220	167

Sources [1–3]—same as Fig. 6.1 and Mesquita (1919), Abecassis (1969); [4, 5] CELPA (several years); [8 to 11]; [12]—Baptista (1984), CELPA (several years); Mendes (2007), and ICNF (2013)

Notes in rows 8, 9, 10, and 11 the dates are—1910, 1929, 1950/56, 1963/66, 1968/78, 1980/85, 1995, and 2010

the opening of a new plant; the country's production level rose to 1,300,000 tons in 1985. The industry matured over the next three decades, as no more plants entered operation but pulp production more than doubled to 2,662,000 tons by 2015. This last growth trend did not occur at a steady pace, however, as initially there was a period of slower growth which was followed by another boost in the second decade of the twenty-first century.

The export record also displays considerable dynamism, reflecting the exporting aspect that has been outlined for the sector since its launch. Two phases stand out in terms of the increased exports. First, through to the 1980s, the trends for exports and production were aligned, with the proportion of production exported roughly 70%. Second, after the end of the 1980s, the evolution of exports did not follow the increase in production and its level became stabilised. In 2015 exports were close to the levels in 1999, and today the amount of exported pulp represents about 45% of total production.

In terms of the specialisation pattern in the Portuguese pulp sector, two main features stand out. First, since its very beginning the sector was concentrated in producing chemically bleached eucalyptus pulp, and this specialisation has been reinforced in the last few decades. Second, concerning the forward integration into paper production, there was a significant transformation over the period. Only two pulp plants were originally integrated, and others made investments during their life cycles in order to integrate paper production. The proportion of pulp produced for the open market thus decreased from around 84% in 1990 to 49% in 2015. This was the main reason for the misalignment between the production and export trajectories that was noted above. Concerning the business structure of the Portuguese pulp industry, the evolution of three trends will be analysed: the number of plants, number of firms and ownership of firms. The evolution in the number of plants has already been mentioned previously, and it should be emphasised that the great increase occurred in the 1960s and the last new plant began operating in 1985.

Among others, the institutional framework of the Portuguese economy was a relevant determinant of the changes in the number of firms and in their ownership structure. The first plant was established by a company owned by foreign capital. The second plant was set up by a company with Portuguese shareholders with the state holding a large stake in it. The plants that followed were privately owned, and were both national and foreign. Until the mid-1970s, the dominant pattern remained one company, one plant, with one single exception. The nationalisation process carried out during 1975 affected the ownership of large companies in Portugal but foreign capital was excluded from this process. The pulp industry then became composed of a state owned company controlling five plants and two foreign companies controlling the others. The last plant to go into operation was run by a company controlled by the state but it relied on foreign capital. Since the 1990s the institutional framework changed again, when the international integration and reprivatisation of the Portuguese economy was strengthened by the accession of the country to the European Community (1986). A new restructuring cycle in the pulp industry took place, and it resulted in the state's exit from the ownership of pulp companies. Another relevant feature of this period was the outflow of foreign capital from the indus-

try. The companies that had been in the hands of foreign owners were taken over by national capital and the sector became controlled by two Portuguese business groups. Only one of the re-privatised pulp companies, with only a small share of the total production, ended up in the hands of a foreign business group.

The evolution in the pulp industry traced above is inextricably linked to the dramatic expansion of forest coverage in Portugal. Three aspects can be highlighted about this topic. First, the forest coverage increased from 22% in 1911 to 35% in 2015, with most of this increase taking place prior to the 1950s. Second, there was a change in the Portuguese forest structure in terms of species. The eucalyptus area, the main raw material of the Portuguese pulp industry, was almost non-existent in the country prior to the 1940s. Thereafter, however, it overtook the maritime pine and became the most important commercial tree species. Finally, the pulp firms had an important role in the transformation of the Portuguese forest, not only through buying properties but also renting areas belonging to private and non-industrial owners.

The following sections are structured according to the phases identified above. In section three, we discuss the factors that explain the relatively late investment in the pulp industry. In section four, we analyse the role of the state in fostering the conditions for the pulp industry to take-off. We also highlight the establishment of Companhia Portuguesa de Celulose (CPC), a company that would be a key player in the sector. Section five focuses on analysing the industry's expansion phase and considers not only the business strategies of the firms that came after CPC's establishment but also how the state decisively shaped the sector. Section six maps the evolution of the sector after the nationalisation process (in the mid-1970s) until the end of 1980s. Section seven is dedicated to the most recent decades, when the sector matured, and where we identify the vicissitudes and transformations that resulted from the re-privatisation process. Finally, we present our conclusions.

6.3 A Portrait of Backwardness in the 1930s

The use of wood pulp in the production of paper across the world was increasingly adopted from the mid-nineteenth century onwards, but the pace of development of the wood pulp sector was not equal among countries. This disparity was due to the extent of the forest cover in each nation and also the relative backwardness of its paper industry (Ojala et al. 2012, pp. 345–360). British capital was behind the launch of the first pulp plant in Portugal in the late nineteenth century, and it remained the only plant producing pulp in the country until the mid-twentieth century.² The Caima Timber Estate & Wood Pulp Company Limited, known during and after the 1920s as Caima Pulp Company, Limited, had operated since 1891. Its installed production capacity stood at 3,500 tons a year (Abecassis 1969, p. 930). Initially, the firm employed

²In fact, during the 1930s, the Companhia de Papel do Prado, the most important firm in the paper industry, produced limited quantities of chemical pulp for its own consumption. However, this activity did not proceed to a larger scale.

the chemical method to make bisulphite pulp from pine. From the 1920s onwards, however, the firm switched to eucalyptus wood but still used the bisulphite method (Radich and Alves 2000, p. 163). Caima's output was sold almost exclusively on the export market, even while Portugal remained a net importer of both chemical and mechanical pulps. This situation raises two interconnected questions. Which factors caused the late emergence of the pulp industry in Portugal, and why did the pulp produced by Caima not get consumed by the domestic paper industry?

The sector's delayed take-off derived from two interwoven causes. The first is more general and underlay the country's overall economic backwardness, and the second is more specific and related to the pulp and paper industry. The broader causes behind the delay in the development of the pulp sector in Portugal involve the shortage of capital for industrial investment and the small scale of the internal market. These two factors explain the difficulties experienced in building up an industry that required high levels of investment in machinery and equipment and that depended on, for its own viability, achieving economies of scale that were only feasible with high production levels. There was also a low level of paper consumption in Portugal (about 1 kg per capita per year in the 1870s and 5 kg in the 1930s), (Gutiérrez-Poch 2012, p. 212; Alves 2000, p. 154) which reflected the country's low rate of literacy, and it greatly reduced the demand for production.

In terms of the factors specific to the sector, the Portuguese paper industry was, in general, small in size and technologically backward (On the paper sector in 1930s, Costa 1946; Alves 2000, 2001; Gutiérrez-Poch 2012). Its scale of production remained very low, with its capacity standing at 22,000 tons per year in the 1930s. Although there were more than seven dozen paper plants, only nine operated continuous production lines. Reflecting the artisanal character of the industry, rags were the most commonly used raw material. Another specific factor that restricted the industry's development was linked to raw materials and the resource endowment of the country. The Portuguese forest cover was dominated by maritime pine. The high level of resin found in this species had to be dealt using chemical products that at that time were not produced in Portugal. Thus, the production costs of producing pulp from pine would exceed those of importing wood pulp from Scandinavian countries (On the discussions around the raw materials used, see Seabra 1943, 1944a, b; Gomes 1969; Branco 2010, 2011).

Concerning the reasons for the non-utilisation of the eucalyptus pulp produced by Caima, it is difficult to arrive to an undisputed conclusion. Paper producers claimed about the whiteness and strength of the paper produced with Caima's pulp and also the higher price in comparison to imported pulp. On the other hand, contemporary studies about the pulp industry in Portugal pointed out obstacles in the use of Caima's pulp related to the technological structure of the Portuguese paper industry, namely the lack of knowledge in using wood pulp and the absence of laboratories that would support the combination of different grades of pulp. When Portuguese paper industry had to consume Caima's pulp, during the Second World War, this mill had to change the raw material mix, through rising the wood pine consumption, in order to respond to the requirements of domestic industry (Seabra 1943, 1944a, b; Gomes 1969; Branco 2010, 2011).

The portrait of backwardness described in the paragraphs above combined with the forecast of an increase in *per capita* consumption of paper and the rise of nationalism, supported the motivation for state intervention in creating conditions for the emergence of the pulp sector in Portugal. There was no declared comparative advantage to produce pulp in Portugal. On one hand, the production costs of pulp were higher in comparison with its international competitors. On the other hand, the initial investment only proved viable when the level of production reached economies of scale, which was difficult to achieve in a small market. Thus, there was a need for the enactment of an industrial policy that rewarded the first companies investing in the pulp sector and also protected it from external competition.

6.4 An Industry Taking-off—Starting Out as a Latecomer

6.4.1 *Creating the Conditions for the “Big Push”*

Notwithstanding the scenario of backwardness described in the previous section, it was during the second half of the 1930s that the first projects leading to the establishment of the pulp industry in Portugal emerged. In this process, there was a close connection between private interests and the will of the state. The state's role in this process can only be understood through reference to the new political regime that emerged in Portugal during the 1930s. The institutional framework of the new political regime, also known as *Estado Novo*, was established in 1933 by two important pieces of law: the Constitution and the National Statute of Labour. These statutes legitimised economic intervention by the state and described economic nationalism as a fundamental aim that would be accomplished by an import substitution strategy based on using national capital (On the economic regime of *Estado Novo*, see Rosas 1986, 2000; Nunes and Brito 1990; Lains 1994; Nunes 1996).

State intervention in the industry had already started through the introduction of Industrial Conditioning (IC) in 1931 (On Industrial Conditioning during *Estado Novo*, see Brito 1989; Confraria 1992). This measure sought to respond to the Great Depression but became a means to exert close government control over industry during almost the entire dictatorship of *Estado Novo*. Existing companies also had a say in the process of licensing new installations or expanding the capacities of existing ones. Those industries that depended on importing raw materials were most strongly affected by the auspices of IC as was the case with the paper industry with its great dependence on international supplies of pulp. Under this institutional framework, two questions arise regarding the role of the state in the take-off of the pulp sector in the country, and second, what conditions did the state provide for the sector to take-off in Portugal?

In the second half of the 1930s, there was an opportunity for Portugal to expand the productive capacity of its paper industry, which naturally would have led to

increased imports of wood pulp (Alves 2000). Following a request submitted to the IC for the reopening of a paper factory, an Industry inquiry took place in 1938. Based on the crucial findings of this report, the authorities recognised the necessity of setting up a pulp industry, recommending several studies about the feasibility of the doing so, particularly with regard to the kind of pulp to be produced, the desire to use domestic raw materials (maritime pine, eucalyptus and cereal straws), and the need to reorganise the paper sector (Direção Geral da Indústria 1939).

In total, this development translated into the beginning of the state's commitment to fostering this sector, and it was reflected in two governmental initiatives that drove the first wave of progress towards launching a national pulp industry. The first began in 1937, when a project for a pulp plant started to be drawn. It was intended to take advantage of the establishment of Soda Póvoa, a plant that produced sodium chlorate, a raw material used in the production of wood pulp. As part of this effort, in 1940 a licence was requested in order to establish in Portugal a mill to produce chemical and mechanical pulps, one that used wood and straw as raw materials. Another potential project was on the drawing board in 1939, and the results of a viability study were presented to the government in 1940. On the initiative of the Secretary of State for Industry, the two projects were merged into a single one that was realised through the establishment of the CPC in 1941 (AAVV 1958; Loureiro 1991).

The economic nationalism was further reinforced by problems arising out of the Second World War, in particular the difficulties the conflict posed to the ongoing operation of Portugal's industrial facilities with their heavy dependence on external suppliers of machinery, equipment and raw materials. The paper industry faced difficulties to import pulp and had to consume that supplied by Caima. Dealing with these difficulties may also largely explain the state's initiative to push for Portugal to develop its own pulp industry. The second governmental initiative would affect the nation's supply of commercial wood. In 1938, through the Reforestation Plan (1938–1968), the state embarked on its pine-based reforestation program. Among the countless objectives enunciated in this Plan, much emphasis was put on the need to supply raw materials to a future pulp industry (Branco 2010, 2011). Additionally, ongoing forestry research took place in order to ascertain the best species for pulp production. To realise this aim, the state set up the Maritime Pine Experimentation Station in Marinha Grande, and the Cork Oak and Eucalyptus Experimentation Station (that later focused only on the cork oak) in Alcobaça. Moreover, in the early 1940s it created the Cellulose Laboratory at the Higher Institute of Agronomy (Seabra 1943; Radish and Alves 2000; Alves et al. 2007).

6.4.2 Companhia Portuguesa de Celulose (CPC)

Through the Ministerial Order dated 11.3.1942, CPC was granted a license for setting up a plant to produce bleached and unbleached pulp, mechanical pulp, newsprint and writing paper. In comparison with the licence that had been requested in 1940 and was mentioned above, the license that the government ultimately granted CPC ended up

being far wider reaching because the plant in question was an integrated establishment for the production of both pulp and paper. However, it would be necessary to wait a decade for it to go into operation. The delay may have stemmed from the difficulties encountered in raising the capital necessary for this undertaking. The CPC produced several studies after receiving its license that place the emphasis on raising funds especially as the state imposed a share capital requirement of PTE 36,000,000 and that it all come from domestic sources (AAVV 1958). The lack of initial investment capital for the project did not prevent it from being granted the go ahead from state authorities, however. In general, this case reflected the already mentioned problems for a small and peripheral country that was seeking to embark on an economic growth process without any involvement of international capital.

The difficulties in raising capital were attenuated with the Law of Industrial Development and Reorganisation (Law no. 2005 of 11 March 1945) that shaped the industrial policy of Estado Novo. In the field of industrial development, the concept of “core industries” was defined whereby they were to receive different types of support including favourable customs duties and fiscal policies, and involving the direct participation of the state in the company as a shareholder. Law 2005 also went so far as to prohibit any other new plants opening within a ten-year period (Rosas 1986, p. 84).

In 1947, the Portuguese government identified the pulp sector as a “core industry” (Council of Ministers’ decision on 24 April 1947) and it became subject to Industrial Conditioning. This development facilitated the financing of the CPC through the participation of the state as a shareholder. In this same year, the company’s capital was raised to PTE 32,000,000 through the state’s investment of PTE 16,000,000, (AAVV 1978) an amount that was later further boosted through recourse to assistance supplied under the Marshall Plan (Alves 2001, p. 167). By the mid-1950s, only 40% of the capital was private capital with the state holding the remainder through the Treasury, Social Welfare Institutions and the Industrial Development Fund *Confraria* 1992, p. 85).

In 1953, the CPC plant in Cacia began to produce chemical pulp by making use of maritime pine as its raw material and with an installed production capacity of 114 tons per day of wood pulp and 100 tons per day of paper. The following years saw the launch of the other production lines: newsprint in 1955 and mechanical pulp in 1957 (AAVV 1978). Nevertheless, the project that was initially licensed ended up experiencing deep alterations that would subsequently determine the future of the sector (AAVV 1978, pp. 59–60; *Confraria* 1992). Even though the CPC’s facilities had been set up in order to consume pine wood, in 1957 a fundamental change occurred that had the greatest domino effect in the history of the pulp sector in Portugal: CPC began the production of chemically bleached eucalyptus pulp through the sulphate process. It was the first European plant to produce this type of pulp, and since it first began making this product its output was directed to external markets (Alves 2000). The success of this new production line led to the rethinking of the initial project and the production of newsprint from mechanical pulp ended up being abandoned in the late 1960s (AAVV 1978). Whether due to the fact of CPC’s loss of exclusivity, only guaranteed for a decade under Law 2005, or due to its exporting

success, the pulp industry in Portugal entered an expansionary phase with the entrance of new players during the 1960s.

6.5 Expanding Productive Capacity: New Entrants and New Investments

Having set down the conditions in the 1930s, state support proved decisive for the start-up of the Cacia plant in the 1940s. The state participated directly in the venture as an investor and granted various benefits to CPC. Additionally, there was a long term plan, for thirty years, implemented upstream that brought about the reforestation of large swaths of the country. The establishment of CPC represented the definitive starting point for the pulp industry in Portugal and its success blazed the trail for the developments that followed in the 1960s. The core foundations were already in place, and the industry entered a phase of expansion. It occurred against the backdrop of the Portuguese economy experiencing modern economic growth coupled with its increasing integration into the international economy and also a shift in industrial policy.

In effect, the 1960s clearly represented a decade of transition. It marked the changeover from an import-substitution based industrial policy, closed to international capital and with the regulation of competition, to a new institutional framework characterised by progressive economic liberalisation. The rising level of international openness constituted one of the main drivers of this new approach, leading to the rejection of the protectionist policies underlying the import substitution model. Also, the main obstacles to the entrance of international capital were removed, opening the country to a wave of foreign investment. The growing integration definitively marked Portugal's growth strategy and allowed its industries to become competitive in external markets (Nunes and Brito 1990; Brito 1993; Lopes 1996).

Concerning its integration into the international economy, Portugal became a member of the European Free Trade Association (EFTA) in 1960 and this development had several consequences for the pulp industry. Chemical pulp fell under the auspices of article 6 of Annex G, benefitting from a certain level of protection as an "infant industry".³ The transition period for this special regime ended in 1967 and this product entered into the general free-circulation regime and thus became free of any duties and tariffs within EFTA markets.

The growth in the pulp industry took place through the expansion of the productive capacity both in terms of opening new plants and boosting the capacities of existing ones (i.e., CPC and Caima). The state interfered directly in this phase through IC,

³Annex G to the Treaty of Stockholm stipulated a special disposition for Portugal in terms of its rights to imports and quantitative restrictions on exports. Annex Article 6 granted the scope for introducing or raising customs duties in order to protect the "infant industries" through to 1 July 1972 and with a broader calendar for the reduction of rights extending through to 1980. See Branco (2005).

regulating not only the number of establishments but also their productive capacity. From the late 1950s and over the course of the 1960s, over thirty requests for pulp licenses were submitted, which reflected the great interest in the sector from private capital (Confraria 1992). Some of these requests gained the technical support of CPC based upon the success and the importance of the technological innovation then implemented by this company (AAVV 1978). This offer of technical support to potential competitors of CPC was a sign of the state's willingness to diffuse innovation. Among the several requests made for new plants, authorisation was granted to Socel, Celbi, Celulose do Guadiana, Celtejo and Celnorte. Two authorisations also went to already existing plants, one to Caima for setting up another production facility⁴ and the other to CPC for expanding its installed capacity. Table 6.2 details the requests that were authorised.

The additional capacity created by these projects generated a debate about the risks of continuing to expand production due to concerns over the capacity of Portuguese forests to supply enough raw material. This concern was reflected in the Ministerial Order of 11 July 1966, from the Ministry of Industry, that stipulated the zones in which new factories might be set up and binding their authorisation to the existence of sufficient raw materials to support them. The authorisations would only be granted after the companies had enacted a forestry plan if the existing forests did not guarantee the raw materials they needed. The 27 July 1968 Ministerial Order further reinforced concerns over both the raw materials and competition and postulated the merger of pending projects.

The existing pulp companies took two paths in order to cope with these supply side difficulties. On the one hand, they sought to cut back on the number of intermediaries, forming a cartel for the purchase of raw materials; this had been the case for Caima, CPC, Socel, and Celbi (Paues 1998). On the other hand, they carried out upstream integration through establishing their own forested areas. In this case, the state supported the afforestation plans of the private sector, through the provision of both financing and technical means. From this point forward, the Portuguese forest experienced a growing impact from the expansion of the pulp sector with a steady and sustained increase in the area of eucalyptus plantations (Branco 2010, 2011).

The new mills set up in the wake of CPC were not forward integrated, with the exception of Celnorte. The largest pulp companies acquired part ownership of the major paper manufacturers, as was the case with Companhia do Papel do Prado (with CPC acquiring a stake in 1959) and Inapa (Socel being its founder shareholder). It should be noted that the three plants controlled by foreign capital remained unintegrated. As regards the business structure of the pulp sector, three trends stand out. Firstly, the sector had attracted the interest of the main Portuguese business groups, which participated in setting up the new pulp companies. In some cases, they went into partnership with foreign capital in line with the new openness of the Portuguese

⁴Already in 1949, Caima submitted a project for boosting the productive capacity to 14,000 tons per year. The project was authorised since the production of this company did not call into question the objectives of the CPC.

Table 6.2 Technical features of the authorised requests under IC

Company (Location)	Date		Production system	Raw material	Production capacity (10 ³ Ton/year)
	Proposal	Starting			
Caima			Chemical to bisulphite	Eucalyptus	
(Albergaria-a- velha)	1949/1966				14/25
(Constância)	1963				21
CPC (Cacia)	1963		Chemical to sulphate (bleached and unbleached)	Pine and Eucalyptus	119, 5
			Semi- chemical		22, 5
Celulose do guadiana (Mourão)	1952	1953	Semi- chemical pulp and cardboard (Integrated plant)	Straw	20
Socel (Setúbal)	1957	1964	Chemical to sulphate (bleached and unbleached)	Pine and eucalyptus	90
Celtejo (VV Rodão)	1963	1971	Chemical to sulphate (unbleached)	Pine and eucalyptus	60
Celbi (Figueira da Foz)	1963	1967	Dissolving pulp (only until 1969)	Pine and eucalyptus	80
	1968	1970	Chemical to sulphate (bleached)		150
Celnorte (Viana do Castelo)	1963	1973	Chemical to sulphate and paper kraftliner (Integrated plant)	Pine and eucalyptus	100

Sources Abecassis (1969), Gomes (1969), Confraria (1992), Alves (2001)

economy (Santos 1977, 1989). Falling within this scope was the case of Celbi, held by the Portuguese group CUF and the Swedish group Billerud.⁵

In 1973, the state indicated that it would reduce its stake in CPC, thereby marking the beginning of the rolling back of its presence in the ownership of the pulp industry. This retrenchment coincided with the CPC's strategy to rationalise the industry in the early 1970s aiming to merge with Socel and Inapa. This last firm, founded in 1965 with the objective of producing fine quality papers for printing and writing, was built alongside Socel and took delivery of its pulp. This therefore set off a third trend: the concentration of the sector in order to gain scale and efficiency. On the eve of the 25 April 1974 Carnation Revolution, Portugal's pulp industry was made up of seven companies (Caima, CPC, Socel, Celbi, and Celtejo, Celulose do Guadiana, and Celnorte) and eight production facilities with a combined capacity of over 500,000 tons per year, of which about 85% was being exported.

6.6 Consolidating Growth in a Nationalised Economy

As detailed in the previous section, by the mid-1970s the Portuguese pulp sector was experiencing discernible growth with the construction of new plants (and the establishment of new companies), the launch of expansion projects and the emergence of the first signs of business concentration. Following decades of substantial involvement, the state was also planning to withdraw from the sector with the intention of selling the direct stake it held in CPC. This dynamic was disturbed by the impact of the 1974 Carnation Revolution that put an end to the dictatorship of Estado Novo and established a new political and economic regime. In 1976, the main sectors of the Portuguese economy—finance, energy, telecommunications, transportation, and some manufacturing branches—were nationalised. This process correspondingly led to a dramatic increase in the state's involvement in the business sector as it took over direct and indirect ownership of almost 2,000 companies (Nunes et al. 2004; Pintado and Mendonça 1989). This also brought about the downfall of business groups that had hitherto been growing and developing since the 1960s (Silva et al. 2016). The pulp industry was one of the priority economic sectors on the agenda of the nationalisation process. The five companies controlled by Portuguese shareholders—CPC, Socel, Celnorte, Celtejo, Celulose do Guadiana—underwent nationalisation in 1975 and were merged into a single state owned company—Portucel—the following year. Celbi and Caima remained beyond the scope of this process as nationalisation did not extend to foreign capital assets.

Business consolidation, which had already emerged as a trend since the beginning of the 1970s, was driven forward by these nationalisations and this significantly altered the market structure in the Portuguese pulp industry. The eight mills became the property of three firms—Portucel with five, Caima with two and Celbi with

⁵Law 1994, dated 13 April 1943, limited the participation of international capital in national firms. This restriction was lifted in the 1960s.

a single factory. The state became the main player through Portucel, which had the largest installed capacity (53% of the sector's total production in 1977). It was also the largest paper and packaging maker and held controlling stakes in the two longstanding paper producers, Companhia de Papel do Prado and Fapajal, and as well as the new and dynamic Inapa.

This institutional shock associated with the change in the political and economic regime altered the business structure but it did not have a major impact on the industry's trajectory, specifically its rising productive capacity that it had displayed over the preceding decades. On the eve of nationalisation, pulp production in Portugal stood at 578,000 tons. One decade later, the figure had almost tripled to 1,472,000 tons, 81% of which derived from eucalyptus with the remainder being made from pine. In parallel with this rise in capacity, the market structure also changed. On the one hand, the three companies had already adopted different investment dynamics in keeping with the implementation of the expansion projects ongoing since the early 1970s. Pulp production by Portucel doubled in the decade following nationalisation while foreign owned Celbi and Caima increased by only 50% and 30% respectively.

Furthermore, a new project was launched through Soporcel in a process with peculiar origins that resulted in the construction of the largest pulp factory in Portugal, one that made a significant contribution towards the aforementioned rise in capacity. This project traced its origins to Celangol, which, in 1973, received authorisation to produce bleached eucalyptus pulp in Angola with a planned level of output of 210,000 tons. The state held a large stake in the company through an investment bank, Sociedade Financeira Portuguesa, which also proceeded to advance substantial sums in loans. Celangol acquired modern equipment in Europe that was never delivered to Angola as a consequence of the independence process of the former colonies that took place after the Carnation Revolution. The Portuguese government attempted to sell this equipment, but when it could not do so it adopted the solution of installing it in Portugal instead. Soon thereafter Celangol was converted into Soporcel in 1979 with Sociedade Financeira Portuguesa holding a 59% capital stake (Grupo Portucel Soporcel 2014). When its plant went operational in 1984, Soporcel immediately became the second largest Portuguese pulp producer, overtaking both Celbi and Caima.

In 1983, the stake held by Sociedade Financeira Portuguesa in Soporcel rose to almost 100% as a result of converting its loans into share capital. Two years later, the British paper group Wiggins Teape took up a 42.8% capital stake in Soporcel in keeping with the state's goal of getting an international strategic partner involved in the project, especially having in mind the development of the papermaking sector. In 1988, Soporcel produced 387,500 tons of bleached eucalyptus pulp, which represented around 26% of national output and it was almost entirely destined for the international market. This same year saw the launch of the paper manufacturing investment project, which began operating in 1991.

In 1988, the pulp production market shares per company stood at: Portucel 43%, Soporcel 31%, Celbi 17% and Caima 9%. Out of the total pulp produced in 1989 by these four companies, 83% was sold to the market, of which some 87% was then exported. The Portuguese pulp industry thus maintained its international market

orientation that had underpinned its growth ever since the 1960s. Only Portucel operated an integrated paper production process, and by the late 1980s sales of paper and cardboard accounted for just over a fifth (23%) of the company's overall turnover.

Control over the supply of raw materials remained high on the agendas of the companies in accordance with the prevailing notion that the forest area of eucalyptus was insufficient to meet the growth in pulp production. The Portuguese Forestry Plan, implemented between 1981 and 1988 with financing from the World Bank, was the first major public intervention program in private forestry since the Forest Service had been established in the nineteenth century. Portucel was the main actor driving the implementation of this project and it was responsible for the afforestation of 60,000 hectares either of its own or leased properties, which represented more than a doubling of the forested area under its control (Mendes and Dias 2001). The other pulp companies also registered growth in their managed areas of forest over the 1980s. The concern over raw materials compelled the pulp companies to reinforce their departments and/or subsidiaries firms that were dedicated to forest management. They furthermore also targeted efforts at fostering research that would leverage productivity gains linked to the supply of raw material.

6.7 Privatisation, Concentration and Specialisation

In the last 25 years, the Portuguese pulp industry has developed in accordance with the following trends. Firstly, production has continued to rise, up from 1,449,000 tons in 1990 to 2,662,000 tons in 2015. This achievement is all the more significant when considering that no new pulp factory opened up during this period. Secondly, there were major changes in the specialisation pattern of the main companies within the scope of the increasing integration of paper production. Thirdly, and finally, the structure of ownership underwent a complete change with both the state and foreign players departing from the sector. The institutional framework faced by the Portuguese economy evolved substantially in the decades following the shock of nationalisation. The course of the accession process to the then European Economic Community, and in particular following membership in 1986, brought with it commitments to the liberalisation of protected sectors and the types of industrial policies for which this membership allowed (Araújo 2010; Confraria 1999). Furthermore, the liberalisation of international trade and capital flows posed new challenges to Portuguese companies.

Within the scope of this chapter, the privatisation process takes on particular prominence given how it drove a sharp decrease in the state's ownership in the business sector and the corresponding emergence of new organisational solutions in the main sectors of the Portuguese economy. The privatisation process began in the late 1980s and featured differences in the timing and the models chosen by each industrial sector (Nunes et al. 2004; Sousa 1995). In some cases, the government considered that the privatisation of state shareholdings should be preceded by a reorganisation in

order to solve problems resulting either from high financial liabilities or the economic viability of firms (Amaral and Santos 1995). Pulp was one of these sectors.

At the time of launching the general privatisation process, the two pulp companies under state control, Portucel and Soporcel, were quite different organisations because of their histories. First, they were companies from different eras: the first had decades of existence and the second had only been in existence for a half dozen years. Second, Portucel was wholly owned by the state, while Soporcel had a foreign partner with a significant stake in the company's capital. Third, their product portfolios were also different. Portucel was a multi-plant company with numerous production lines as a result of a longer and more troubled history. The configuration endowed upon its foundation in 1976 remained in effect: production of pulp from eucalyptus and pine and the production of paper, cardboard, and packaging. Soporcel was focused on a single type of pulp, bleached from eucalyptus, and was at that time only starting to integrate paper production. The companies had neither links through their boards of directors nor any evidence of coordinated action.

The privatisation of the state owned pulp sector was conditioned by its restructuring, and Portucel, given both its scale and scope, would be the key actor in this process. Two questions could be raised about the privatisation of Portucel. First, should it be privatised as a single entity or in separate units? Second, was there room to explore associations with other actors in the sector, in particular Soporcel? The first step in the reorganisation took place in 1993 with the transformation of Portucel into a group of companies divided into autonomous business areas. Portucel Industrial, one of the companies emerging from this process, integrated the production of pulp and paper based on bleached eucalyptus pulp, operating the factories in Cacia and Setúbal. Gescartão incorporated the Viana mill's cardboard and packaging operation along with other packaging production units. Portucel Florestal concentrated on the ownership and management of forested properties and Portucel Tejo took over the Vila Velha de Rodão factory and its unbleached pine pulp production. Following the division of Portucel's operations into separate businesses, the privatisation process began. The original idea was to privatise Portucel by sectors with the first step occurring in 1995 when the state sold off 44.3% of its stake in Portucel Industrial. The second operation planned for the same year involved Gescartão but it did not end up happening.

Indeed, the privatisation process was suspended in 1996 and the next steps would have to wait for a "careful" restructuring of Portucel group within the framework of nurturing both critical mass on a global scale and absolute competitive advantages in some of its areas of activity. In the following years, the resumption of the privatisation process remained conditioned by the results of studies on the reorganisation of the sector.⁶ This reorganisation extended to the integration of Inapa and Soporcel into Portucel. In turn, the acquisition of the industrial operations of Inapa came about in 2000. Inapa was intimately bound up with the production of the Setúbal pulp factory

⁶Privatisation program 1996/97(Council of Ministers Decision n° 21/96 on 8 February 1996), and Privatisation program 1997/98(Council of Ministers Decision n° 65/97 on 26 March 1996).

(formerly Socel) and had started developing an office paper brand that was gaining acceptance in international markets.

In 2001, the merger of Soporcel into Portucel took place following the former's purchase of the stakes held by the Argo Wiggins group and Papercel and the launching of a takeover bid for the remainder of the firm. The integration of Soporcel proved very important to the overall reorganisation of the sector. In addition to its already large pulp production capacity, the company was engaged in consolidating its position in the paper market with the launch of a second machine and the rising international recognition of its brand. This reorganisation resulted in a company whose main focus was the production of paper based on bleached eucalyptus pulp. In 2001, 54% of pulp manufactured was integrated into the production of paper. The pulp sales of Portucel/Soporcel represented only 25% of its total turnover. The domestic market was residual, accounting for around 5% of total sales.

Following the conclusion of the restructuring process, the privatisation process then advanced through two further phases. The first, in 2004, corresponded to 30% of the Portucel/Soporcel's capital while the second, in 2006, saw the disposal of the remaining stake (25.7%). Outside the Portucel/Soporcel group, Gescartão was privatised in 1999 and Portucel Tejo in 2006. As had been the case with the nationalisations in the mid-1970s, the privatisation process represented an important landmark in the restructuring of the Portuguese corporate sector. In general terms, this was an opportunity for Portuguese capital to invest, grow and/or diversify. The privatisation of state owned pulp companies elicited interest from three private Portuguese groups: Sonae, Semapa and Cofina (later Altri).

Sonae, one of Portugal's largest and most diversified business groups, already had operations in the forest industry (i.e., wood-based panels) and was also a major consumer of paper and cardboard within the scope of its activities as a mass retailer. Sonae targeted Gescartão, Portucel Industrial and Soporcel, in which the group sought to gain a controlling position. This started out with a stake of around 10% in Portucel Industrial. In 2000, in conjunction with the Spanish group Europac, Sonae won the privatisation tender for 65% of Gescartão. Although it was one of the interested parties in the second phase of the privatisation of Portucel in 2003, Sonae ended up withdrawing from the bidding with criticisms about the way the process was being conducted. The group then abandoned the sector following the disposal of its stakes in Portucel in 2004 and in Gescartão in 2005.

Semapa is the holding company of the Queiroz Pereira family, which had been at the very origins of the sector in Portugal in playing a leading role in one of the projects that resulted in the creation of CPC. Semapa acquired a stake in Portucel in 2004 following its winning bid in the second phase of the privatisation tender and the subsequent launch of a takeover bid resulted in it ending up with 67% of the company. The third and final phase saw it slightly boost its holdings.

Cofina unsuccessfully competed in the second phase of the Portucel privatisation process, and later it won the privatisation tender for Portucel Tejo. Furthermore, its presence in the sector was also bound up with the fate of Portugal's foreign owned pulp companies. After nationalisation, Celbi and Caima confined themselves to lower levels of investment in their productive capacity and not integrating their operations

into paper production. Their owners ended up selling out to Cofina, which meant the end of any foreign controlling stakes in the Portuguese bleached eucalyptus pulp sector. The first to pull out were the owners of Caima, selling out in 1998. Stora, heir to Billerud, which had founded Celbi in 1967, alienated its holding in 2006.

Semapa and Cofina concentrated the entire Portuguese industry bleached eucalyptus pulp, and made strong investments in the last decade, but followed very different paths in doing so. Portucel maintained its growth strategy by increasing its production of paper, specifically by making the major investment to install a third paper machine that started up in 2009. Currently the company produces 1,400,000 tons of pulp, but sales of pulp represents only 9% of its turnover. The core business of Portucel is the production of uncoated wood-free paper, and it is the global leader in the premium office paper segment with its Navigator brand.

In contrast, Altri's strategy focused on the production of pulp. Between 2008 and 2009, it converted production at its Celtejo plant from unbleached pine and eucalyptus pulp to bleached eucalypt pulp, and it doubled the productive capacity of the Celbi plant. Furthermore in 2011 Caima started producing dissolving pulp. At present, Altri produces about one million tons of pulp, 93% of which is sold abroad.

6.8 Conclusions

Portugal is a country with scarce natural resources and a small-scale domestic market, and it predominantly specialises in low value added and labour intensive products. Nevertheless, it was able to become an international leader in producing several products, namely pulp and paper, that have a major technological component. The success of Portugal's pulp industry is indebted to the creation and fostering of comparative and competitive advantages, which stemmed from the coordinated efforts between the state and the country's firms. It was based in some key areas—product innovation, export orientation, business concentration, raw material supply, and forward integration into paper production—that have emerged over the 60 years since the industry first took off.

The state played an important role in all the phases of this industry's development. During the early years of Estado Novo, it created conditions for the launch of the sector. Concerning upstream measures, its forest policy aimed to supply the raw material base, first by direct afforestation and then by supporting private forest owners. The pulp industry was considered strategic under Estado Novo's economic development policy, and thus benefitted from the state's financial support. His regime took several other measures to facilitate the industry's vertical integration and were directed to a specific company.

The history of the pulp industry in Portugal is inextricably linked with that of Companhia Portuguesa de Celulose. The state chose a "national champion" and "picked its winner" by using an import substitution model and providing aid to an "infant industry", and this was the result of merging industrial policy measures with a protectionist trade policy. The strategy of CPC was fundamental to the future

of the industry and nurturing its competitive advantage. Initially its project was designed to utilise pine wood, but it ended up relying on eucalyptus wood. Similarly, the objective was to produce mechanical pulp and newsprint to supply the internal market. This goal was soon abandoned, however, and CPC was the first company to produce chemical pulp from eucalyptus using the sulphate process, and most of its production was exported. In the end, positioning pulp within the import substitution policy allowed this industry to be well placed to capitalise on the subsequent export promotion policy, which came to define the sector. As a symbol of a company that achieved success in global and competitive markets, other firms mimicked CPC. This led to an expansionary phase during which the state regulated the market under a scenario of potential scarcity of raw materials, choosing who the new players were going to be.

The strong state commitment to the sector was not jeopardised with the political transformation of mid-1970s. Nationalisation led to the concentration of ownership in the hands of the state. Over the course of twenty-five years the state controlled the industry and supported its development. The creation of Soporcel, which proved to be an enormous success, was an example of that commitment. Notwithstanding the state's role as entrepreneur, it was also front and centre in designing the privatisation scheme. In this regard, the government transformed the sector's landscape in the last quarter of a century, in what could be considered its maturity phase. Today's business structure, with two Portuguese business groups controlling the six mills that produce bleached eucalyptus pulp, reflects the decisions taken under that process.

Just as it did fifty years ago, the state forced the creation of a champion, shaping the course of privatisation to the reorganisation of the sector in order to create a company that could compete in global markets. This goal was achieved through the growing integration of pulp and paper and focusing on the production of a certain type of paper. As a result of this process, Portucel, heir to Companhia Portuguesa de Celulose, became a completely different company. Significantly, the company whose name has always alluded to pulp has recently changed its name to the paper brand with which it leads the premium segment of office paper—Navigator.

Ensuring the industry was well supplied with raw materials was a constant concern. The actions of the state, forest owners and pulp companies led to a radical transformation in the country's forest cover, with eucalyptus moving from being a species that was virtually non-existent to being the country's most important type of tree.

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