



The Automotive Cluster in Portugal

HBS 1260 Microeconomics of Competitiveness:
Project Paper

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I. Introduction

This paper provides an analysis of the automotive cluster in Portugal. It begins with a broad overview of Portugal, to familiarize the reader with the relevant background data. The paper then concentrates on an analysis of the overall economic performance of Portugal. Next the paper introduces the global automotive market before focusing on the Portuguese automotive cluster specifically. Finally, the paper identifies the main issues faced by the Portuguese automotive cluster and makes a series of recommendations for improved competitiveness.

II. Country Analysis

Geography: Portugal lies in the far southwest corner of Europe, between the Atlantic Ocean and Spain. It is about 330 miles (530km) top-to-bottom and 100 miles (160km) wide - a little smaller than Florida or Iceland.



History: In the 15th century, Portugal entered a period of overseas expansion due to the efforts of Prince Henry the Navigator and created an empire extending to India, the Far East, Brazil and Africa. This period marked the apogee of Portuguese power and wealth. In 1755, the city of Lisbon was destroyed by three major earthquakes, tremors, a fire and a tidal wave. National turmoil led to abolition of the monarchy in 1910 and the founding of a democratic republic. A Military Coup kill democracy and António de Oliveira Salazar took power, becoming de facto Dictator of the Portuguese Republic and founder of an authoritarian right-wing regime which controlled social, economic, cultural and

political life. Following the 1974 military coup against dictator, Marcello Caetano, the country moved from authoritarian rule to parliamentary democracy. After a period of instability and communist agitation, Portugal ratified a new Constitution in 1976. The Constitution placed the military under strict civilian control; trimmed the president's powers; and laid groundwork for stable, pluralistic liberal democracy. National firms and government-owned communications media were privatized. Portugal joined the EU in 1986 and moved toward greater political and economic integration with Europe. In 2006, Social Democrat Anibal Cavaco Silva, center-right candidate and former Prime Minister, won the presidential election by 50.6% of the vote.

Social Measures: Portugal has a population of 10,605,870 with a growth rate of 0.36%, above the EU average of 0.15%. Age distribution is 0-14 years: 16.5%; 15-64 years: 66.3%; and 65 years and over: 17.2% Median age is 38.5 years, making it a middle aged country that is forecast to have decreasing population growth. Urban-rural divide is 54% Urban and 46% Rural, with some observed tension between the two cultures. Portugal has a relatively homogenous population. Religion is 95% Roman Catholic. It is ethnically homogeneous with some black Africans. Legal immigrants represent 4.2% of the population, mostly from Eastern Europe.

Education: A poor educational system, in particular, has been an obstacle to greater productivity and growth. There are also concerns related to the large dropout rates (mostly in the secondary and higher education systems) and the multi generational high functional illiteracy rate, when compared with other developed countries. Enrollment and attainment are low compared to the US, Spain, Germany and most developed economies:

- Secondary diploma: 15% (USA: 85%, Spain 45%)
- Post-secondary diploma: 9% (USA: 33%, Spain 38%, Germany: 19%)
- Literacy: 93.3% (USA: 97%, Spain 98.1%, Germany: 99%)

Infrastructure: Portugal's communication system has achieved a state-of-the-art network with broadband, high-speed capabilities. There are more mobile cellular lines than people: 11.448 million in 2005. Its transport infrastructure is excellent thanks to 20 years of EU subsidies. Airports, railways, ports and especially roadways are fairly to very modern. Portugal is energy dependent, primarily on fossil fuel (64.5% of production) except for strengths in hydroelectric (31.3% of production) and the world's largest solar facility.

III. National Economic Performance

Portugal was a global colonial power in the 15th and 16th century, centering in trade and raw materials related activities to Africa and South America. Since joined European Union in 1986, it has been enjoying a diversified and increasingly service-based economy, and was classified by the World Bank as an upper-middle-income economy in early 1990s. However, in recent year since 2000, Portugal's economic performance with prolonged low GDP growth, large fiscal and external deficits has put itself at the bottom of the growth league of not only the European Union, but also the whole Europe, and earned itself a reputation of a developing economy in the developed world.

Portugal GDP growth rate rose from 0.8% in 2002 to 1.4% in 2006, supported by a slight strengthening of private consumption, but the lowest in Europe. And the GDP growth rate will be faster in 2007-2008 spurred by the whole European growth. In 2006, Portuguese GDP per capita fell from over 80% of the EU 25 average in 1999 to just over

70%.¹ In 2006, real GDP growth declined by 0.2% quarter by quarter, reflecting contractions in both investment and public consumption. Domestic demand growth was flat on a quarter-on-quarter basis and rose by only 0.5% year on year. With the recent rise in interest rates, high unemployment and subdued confidence of all economic agents continue to weigh on the Portuguese economy.²

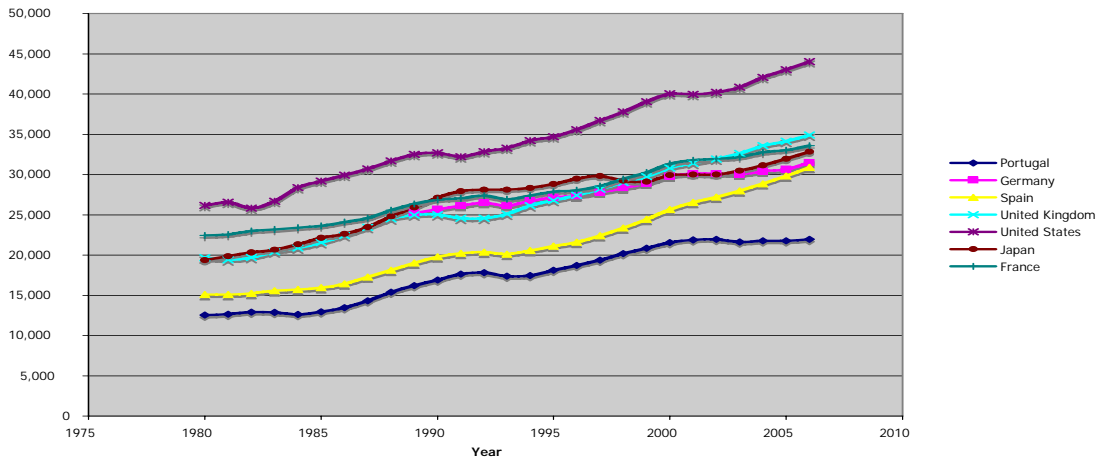


FIGURE 1: 2006 Portugal GDP per capita US\$ (converted to 2006 price levels with updated 2002 EKS PPPs)
Source: Groningen Growth and Development Centre and the Conference Board, Total Economy Database, January 2007

Agriculture and fishing contributes for about 4% of the GDP, down from approximately 25% in 1960, while still employing 13% of the whole 5.58 labor force. The tertiary sector has grown, producing 66% of the GDP and providing jobs for 52% of the working population. The remaining 30% of the GDP and 35% of the job opportunities are mainly produced by the construction, steel, energy sectors which have gradually increased along with the tourist industry, a precious source of foreign currency.³ Portugal has dropped into the backdrop of the emerging knowledge-based economies of the Information Age, and has gotten itself into a vicious cycle of providing low-valued added services in a

¹ www.economist.com

² Country Report January 2007 www.eiu.com © The Economist Intelligence Unit Limited 2007

³ www.wikipedia.org

world focused on valuable consumer products. This is the contextual background from which Portugal will have to overcome moving forward.

FDI in recent years improved slightly, although it remains weak. Portuguese investment abroad was stable at around 1bn. As a consequence of higher inflows, net direct investment therefore increased to 2.3bn in the first three-quarters of 2006. Meanwhile, portfolio investment registered a strong deficit at 1.7bn, compared with a balance in the same period in 2005. This was caused by stronger equity investment abroad and lower foreign purchases of Portuguese money market instruments.⁴

Sharing the Iberian Peninsula with the economic powerhouse of Spain, where growth has been above 3% in all but one of the past ten years makes Portugal's performance look worse.⁵ Most recently, Portugal has been referred to in the Economist, "The Sick Man of Europe."⁶

The main causes for Portugal's poor economic performance fall into two categories: public Spending and economic structure:

(1) Public Spending: One is public spending soaring out of control. Over Public expenditure in Portugal has been a hindrance to the productivity of Portugal's economy. It is imperative that the government achieves its fiscal consolidation goals, which will require strong discipline on the expenditure side. This will contribute to long-term improvement in economic performance. The biggest difference of Spain is that it reformed its public sector and disciplined its public finances before joining the EU, not afterwards. When interest rates fell and released a surge of growth in the late 1990s, Portugal responded with an

⁴ Country Report January 2007 www.eiu.com © The Economist Intelligence Unit Limited 2007

⁵ www.economist.com

⁶ www.economist.com April 12,2007

expansionary fiscal policy instead of taming its deficit. This was Portugal's big missed opportunity: one that the Socialist Prime Minister Sócrates is now seeking, belatedly, to remedy.⁷ Renewed political instability has also taken a toll: on average governments in Lisbon have lasted just two years since the return of democracy in 1974.

(2) Economic Structure: Second is sick economic structure with no distinct competitive advantages. Portugal has not positioned itself well in the knowledge-based economies of the Information Age. On the one hand, it has a poor educational system, which in particular has been an obstacle to greater productivity and growth. Participation and overall educational attainment levels remain below European standards and enrollment rates have begun to decline, largely due to demographic changes. On the other hand, Portugal has been increasingly overshadowed by lower-cost producers in Central Europe and Asia as a target for foreign direct investment. Lifting the level of human capital and increasing competition in the domestic market are also essential for raising productivity and improving Portugal's flexibility to adapt to external shocks. Due to these, Portugal is still providing low-valued added services in a world focused on valuable consumer products, and with no labor and market advantages, thus it has been suffering lower investment and consumption.

According to OECD, major changes in the governance and management of higher education institutions are needed to bring them into line with national goals, encourage responsiveness and efficiency and improve quality of provision. The government faces

⁷ www.economist.com

tough choices in its attempts to boost Portugal's economic competitiveness while keeping the budget deficit within the euro zone's 3%-of-GDP ceiling.⁸

In terms of business environment, Portuguese government has been making some significant improvement in reducing the burden of regulations. The cost of doing business in Portugal has come down and red tape has been cut. The benchmark for the Portuguese regulatory policy environment should now be the settings in the best-practice countries rather than those of the average EU countries, where regulations tend to remain excessive. Recent action to ease registration requirements for business creation is appropriate. Further measures are desirable to further reduce the cost of firm creation, cut administrative overheads of running a business and facilitate the exit of poorly performing companies. A more dynamic business environment would help Portuguese firms' competitiveness and enhance the attractiveness of the country as a location for foreign direct investment, thereby, as in the 1990s, offering opportunities for learning from international best practices.⁹

Challenges: The main challenge ahead of Portugal is to maintain the momentum of public administration reform to increase the efficiency of the public sector and facilitate the reallocation of labor to the private sector. The number of public employees should be allowed to fall. Employment conditions in the public sector should be aligned with private-sector rules to encourage mobility and an employee evaluation system should be introduced to link performance with career progression and pay.

⁸ <http://www.portugal.com/information/economy.asp>

⁹ www.oecd.org

Also, simplify the tax system and broaden the corporate tax base as the current system reduces productivity by imposing high compliance costs and encouraging inefficient informal activity. The tax system should be streamlined by reducing tax expenditures, and by making changes to the tax code less frequently.¹⁰

IV. National Competitiveness

For the most part, Portugal has positioned itself as a low cost provider offering services geared towards the lower end of the value chain (i.e. Part Assembly, Glass, Seat Installation, etc). As can be seen from the previous National Economic Section and the National Diamond, Portugal is pretty much middle of the road regarding business development; the fundamentals processes are in place, however, implementation is still slow. Portugal has positive factors such as ease of starting a business, low cost of labor, and access to the EU. However, Portugal will have to address many shortcomings. For starters Education attainment is a major issue. They have some upside; however, Portugal will have to address many shortcomings in order to compete in the knowledge-based economy.

	Opportunity	Challenges
Factor Conditions	Natural Gateway from West into Europe Infrastructure Connecting Major Cities Telecommunication Systems	Euro-Centric Outlier Inflexible Unionized Labor Force Below EU Average in Education Attainment
Context for Firm Strategy & Rivalry	Cheap Labor, Connectivity to EU, No tariffs Alignment with cross-regional and international organizations 35th worldwide in enforcement of contracts	Low Innovative Capacity Few Research Oriented Employees EU Subsidy Cut Erasing low labor competitive advantage
Demand Conditions	Local Demand on upward trend; for example Importing 3.5 bn and Exporting 2.67bn in Autos Portuguese buying more value-added cars	Competing on price/process productivity for Educated Demand Asset Intensive Operations Take Place Outside of Portugal High Transportation Costs Cuts off Portugal from Value Chain

¹⁰ www.oecd.org

Related & Supporting Industries	33rd in Plastics Production (Lighter Cars) Rubber Sub-Cluster is 21st	Value-Added Partners Far Away Labor Unions Destroy Supplier Flow (JIT) Impossible
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Factor Conditions

Opportunity:

Gateway to the East: From a Westerners’ perspective, Portugal has a strategic location for the shipment of goods headed southeast from the United States, and due east from South America. We see Portugal as a natural gateway from the West to Central Europe, the Mediterranean, Middle East and North Africa. On a small note, there is the cultural connection between Brazil and Portugal; hence, I’d assume that there are resources traveling from the West (Brazil) eastward to Portugal.

Transportation & Infrastructure: Portugal has good transportation infrastructure connecting its’ major cities playing a critical role in ease of trucking shipments. As of 1999, 14% of Portuguese roads were unpaved; a percentage that has been significantly decreased due to State Investment into infrastructure.

Telecommunication: Telecommunication systems are also a plus allowing for an efficient “information-age” exchange. This is made evident with cell phone penetration exceeding the population and 78% of companies having access to high-speed internet services.

Challenges:

Education: will be one of Portugal’s greatest challenges since it’s a long-term play. Currently Portugal is below the EU average in education attainment, and recently there has been a significant emphasis placed on tertiary education. Government officials have

admitted that in order for the country to remain competitive and innovative higher education is paramount.

Inflexible Unionized Labor: is a major disadvantage in attracting businesses to the country. Furthermore, it's 3 times as cost prohibitive to fire an unproductive employee in Portugal compared to other OECD countries.

Access to Central EU Members: To most Europeans, Portugal is considered an outlier on the Western boundary of the EU far away from the center of action. So, if you are European looking outwardly from the center, Portugal's location would be viewed as a disadvantage.

Context for Firm Strategy & Rivalry

Opportunity:

Business Environment: Overall, Portugal has done a good job of setting the procedural foundation for businesses to thrive. The country has established laws and is ranked 35th worldwide in enforcement of contracts. In addition, several factors make Portugal strategically competitive for firms. The combination of Cheap Labor, Great Infrastructure, Connectivity to EU, and no tariffs, positions Portugal well for Firm Strategy in comparison with other EU countries. Furthermore, the Portuguese alignment with cross-regional and international organizations (EU, OECD, WTO, NATO) helps firms diversify risk when considering Portugal and operate at lower costs of capital.

Challenges:

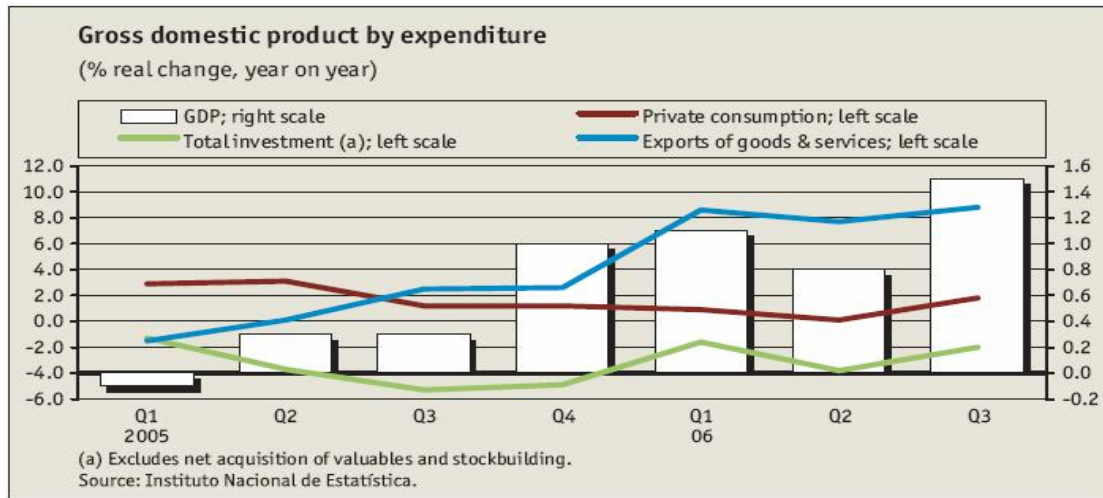
Education: Due to the lack of a proficient tertiary educational system, Portugal's national innovative capacity is low; via our research on the U.S. Patent Website, we only found 6 patents related to the automobile industry in Portugal. This presents a major

challenge when trying to attract value added automobile firms. Flows of university graduates are an indicator of a country's potential for assimilating, developing and diffusing advanced knowledge and supplying the labor market with highly skilled workers. As a percentage of total new graduates, Portugal graduated Engineers (17.5%) and Sciences (6%) compared to Korea with Engineers (38%) and Sciences (11%) and Spain with Engineers (24%) and Sciences (10%).

Lack of R&D Investment: Additionally, Portugal only has 0.5 employees per 1000 employed focused on research versus the OECD average of 4.2/1000 employed. Both of the previous statistical benchmarks (i.e. Engineer and Sciences Graduates and Employees focused on R&D) serve as a proxy that there are limited skilled workers in Portugal, which will only perpetuate the vicious cycle of an unskilled labor force competing on price and price only. To this point, EU subsidies to Portugal will be cut by 10% to 22.5 Billion Euros starting this year and completely phasing out come 2013. The financial resources once earmarked for Portugal are now being allotted to the Eastern European countries that have recently joined the EU, thus, erasing Portugal's historic competitive advantage and relative low labor costs.

Demand Conditions

Portugal's GDP over the past couple of years has been sketchy. In 2005, exports were on an up-tick, but since 2006, exports have been rather flat. During the same time period, private consumption started flat, slowly trended downward, and since the second quarter of '06 has been growing steadily. This is in fact where the opportunity and challenge lie.



Although Portugal has internal demand, they are importing more product of equal value or similar quantity amounts of greater value; both of which are negative. Intuition tells us that it's probably more likely to be the latter, which is our opportunity. Evidently, Portuguese nationals are purchasing higher value-added product outside of Portugal (e.g. Germany, Italy, and Spain); since they are currently competing on price and process productivity, this doesn't surprise at all that internal customers would have to or want to go outside the borders to purchase a more valuable product. Additionally, Portugal is squeezed from both ends of the Value Chain. Historically, they had been the low cost provider, but now China, India, and Eastern Europe are winning on those fronts. Furthermore, the asset intensive operations take place outside of Portugal; so, due to high transportation costs, Portugal is also cut off from this end of the Value Chain as well. Therefore, unless Portugal can be innovative in claiming and creating value, they risk elimination from the Value Chain altogether.

Related & Supporting Industries

Opportunity:

Plastics: Moving forward, the related industry of plastics is ranked 33rd in production worldwide and as automobile manufacturing push forward using more light-weight materials in car production, Portugal may be well positioned as an integral part of the Value Chain. Additionally, within Plastics, the Rubber Sub-Cluster is ranked 21st worldwide. This provides Portugal with an opportunity to claim real estate in the Value Chain since tires are needed for every car. Here recently realizing the need to act, the Government has become a supporting entity for Business Creation. This push for a “Business Friendly” environment creates an atmosphere fertile for entrepreneurship and innovation.

Challenges:

Proximity to Value-Add Partners: Portugal still has to address it’s proximity to Value-Added Industries like Engines and Drive Shafts. Within the automobile production cycle, most of the value is in these two areas; so, since these crucial related industries are outside of Portugal and transportation costs prohibitive this serves a competitive disadvantage.

Unions: Just as the Portuguese Government has proved to be a supporting ally for Business Development, Portuguese Unions, on the contrary, are non-supportive and destroy efficiencies. These union inefficiencies flow through to supporting suppliers; hence, making Just in Time production more difficult.

National Competitiveness Conclusion

Overall, the costs of exportation, protection of investors and procedures for starting a Business, all show promise for Portugal. On average, it costs \$495 per container shipped to export from Portugal; this represents a 40% savings compared with the OECD average.

On the Business Competitiveness Index, Portugal ranked 33rd in protecting investors, and “Starting a Business” ranking jumped +80 from 113th in 2005 to 33rd in 2006. Employee relations still present challenges for Portugal moving forward. Employing workers is ranked 155th out of 175 countries, and its triple the costs to fire an employee compared to the OECD average. Furthermore, in 2006, it took twice as long for a Portuguese business owner to obtain proper licenses versus someone on average in another OECD country. So, as is evident, the procedures and laws are in place, however, the time it takes to implement is still poor.

The Portuguese Exports by Cluster World Ranking and World Export Value mappings indicate that Portugal really does not have any knowledge intensive or patent intensive clusters in the forefront. Thus, innovation is slower in Portugal, and the country is left competing on process productivity instead of knowledge-based research and innovation. This is probably a result of the vicious cycle from being a low-cost provider. Razor thin margins beget little re-investment, which begets an inferior product and capital structure; thus, resulting in investment in the core business with little left over for R&D and Innovation.

V. The World Automotive Market

The world production of passenger cars has increased at a compound annual growth rate of 3.5% over the period from 2001 to 2005¹¹. Over the same period, new passenger car registrations have increased by 2.4%¹². However, the units of cars have outpaced the number of registrants each year implying production overcapacity in the overall industry.

¹¹ Global Market Information Database (<http://www.gmid.euromonitor.com.ezp1.harvard.edu/HitList.aspx#src5>)

¹² Ibid

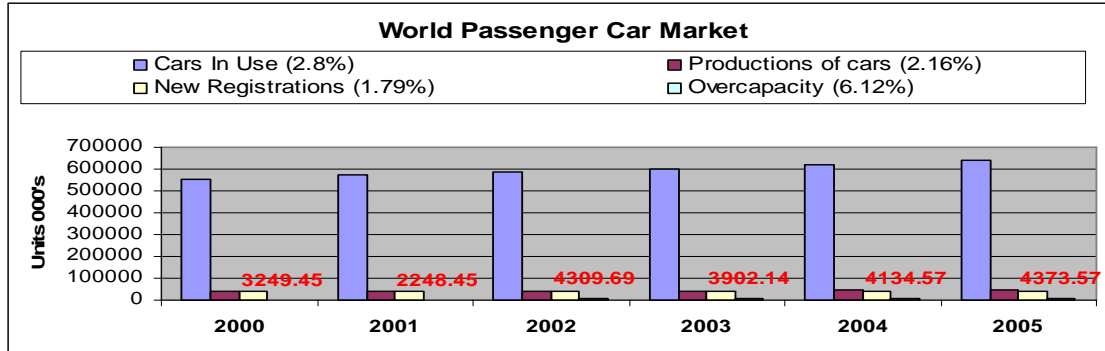


FIGURE 2: WORLD PASSENGER CAR MARKET

The export production market is valued at nearly one billion dollars (USD): motor vehicles assembly (500 mm), automotive parts (250 mm), engines (110 mm), production equipment (50 mm), automotive components (25 mm), and glass (15 mm) (Prof. Michael E. Porter, ICCP, ISC).

In general the industry can be broken down into car companies that produce the final product: commercial vehicles, passenger cars, and/or two-wheelers; and part suppliers that produce components or modules to incorporate into the final vehicle.

Car companies have long been associated with strong national ties and sales have been driven in large part by the macroeconomic environment including interest rates, disposable income levels, and consumer confidence. Over the past three decades structural hindrances have led to consolidation.¹³ More recently globalization, emerging markets, and raising input prices have exponentially increased the competitiveness of the industry¹⁴.

The largest markets for passenger car sales are Europe - includes EU 25 plus Switzerland, Norway, & Iceland - 42%, Asia 27%, and North America 22% (Autos & Auto Parts:

¹³ Standard & Poor's Global Industry Surveys Auto & Autoparts (Europe) – After consolidation of the 1980s and 1990s 7 car manufacturers accounted for 80% of Western Europe car sales.

¹⁴ Between September 2004 and March 2006 no fewer than 10 mid-sized to large suppliers filed Chapter 11

Europe Standard & Poor's Global Industry Surveys – July 2006). Cars manufacturers have long had a tendency to locate close to consumer markets in order to minimize transportation and shipment cost. However the cost advantages garnered moving east to China have begun to outweigh the benefits of proximity to consumer markets seen by the disproportionate regional sales-to-production figures.

REGION	% OF PASSENGER CAR SALES	% OF PASSENGER CAR PRODUCTION
North America	22	25
Europe	42	31.7
Asia	27	38

TABLE 1: PROPORTION OF PASSENGER CAR SALES TO PRODUCTION
SOURCE: CALCULATED FROM INFORMATION IN STANDARD & POOR'S AUTO REPORT

Aside from the aforementioned macro-indicators of automobile sales, the industry has geographical and product segment idiosyncrasies. For example, the leading regions (North America, Europe, and Asia) face different challenges in workforce issues, environmental regulations, and product mix. North America and European are more closely related in these regards than Asia which benefits from a growing economy, highly productive low-cost workforce, and loose environmental regulations – relatively speaking.

Global Trends
<ul style="list-style-type: none"> • Auto suppliers locate close to auto manufacturers • Due to dependence on auto suppliers, manufacturers purchase equity share in suppliers • Shorter product development cycle (8 years to 4 years) • Manufacturers and auto parts suppliers go East to Eastern Europe and China for lower production (labor) costs • Auto manufacturers locate close to consumer markets • Platform sharing increases product mix, decreases development time & costs but may effect customer loyalty • Regulatory issues forcing safer and eco-friendly vehicles. • Europe and Asia suffer from employee relations – US
Regional Differences: Europe v. United States
<ul style="list-style-type: none"> • European manufacturers operate industrial parks more frequently than US counterparts • Auto part suppliers have more power in EU market due to number of manufacturers • Big 3 US manufacturers have power over suppliers and force suppliers to eat raising input costs (cost of steel, resins, copper, aluminum, rubber, nickel, & lead) • European propensity to spend more in R&D as percentage of revenue than US counterparts (See Table) • North American companies have higher medical costs than Europe: GM spends \$1,800 USD/vehicle sold on retiree medical and pension benefits worldwide • European auto manufacturers give longer term contracts to auto parts suppliers

SUPPLIER	COUNTRY	2003	2004	2005
Europe				
Valeo SA	France	6.1	6.2	6.6
Autoliv Inc.	Sweden	5.8	6.0	6.2
Faurecia SA	France	5.3	5.6	5.7
North America				
Visteon Corp.	United States	5.1	4.8	4.7
Johnson Controls Inc	United States	2.1	1.9	1.5
Lear Corp.	United States	1.1	1.2	1.3

Table 2: R&D XPENSE AS % OF TOTAL REVENUES FOR SELECTED AUTO PARTS SUPPLIERS
SOURCE: STANDARD & POOR'S GLOBAL INDUSTRY SURVEYS – AUTOS & AUTOPARTS

The United States, Germany, and France, consume roughly 60% of car imports.

In order to mitigate sales declines due to longer car life¹⁵ and economic downturns,¹⁶ car companies have formed alliance to share platforms and have began to negotiate contracts with auto part suppliers for specific model life opposed to rigid year contracts. These tactics have allowed car manufacturers to cut product development time in half and have granted greater maneuverability with auto part suppliers¹⁷. Since consumers are willing to purchase new models without exorbitant rebates and discounts, auto makers have been able to increase profit margins by decreasing product development cycles.

Currently, auto manufacturers are grappling with the trade-offs inherent in the tug-of-war among safety, costs, efficiency, and the environment:

- For example, the sale of diesel cars swelled in Western Europe, going from 20% of passenger cars in 1993 to 48.2% in 2004 - due to diesel engines' greater fuel efficiency in the wake of raising fuel prices. However, diesel engines emit more harmful greenhouse gases.

¹⁵ Median age of cars on the roads: 8.3 years (2000), 8.9 years (2004), 9 years (2005)

¹⁶ After the 9/11 terrorist attack, 0% APR financing resulted in an annualized rate of U.S. sales to record high of 21.3 million light vehicles.

¹⁷ Renault and Nissan cut development time from 20 months to 10 months

- Auto manufacturers substituted plastics for specific steel body components which reduced production costs and increased fuel efficiency due to the lighter frame but safety ratings suffered.

VI. Portugal Automotive Cluster Overview

The Portugal automotive cluster is the second largest cluster (behind hospitality and tourism) in Portugal and accounts for 7% of GDP. The cluster currently accounts for 0.56% of world exports, a decrease of 0.12% from the previous year, and is the 23rd largest automotive cluster in the world with an export value of 5.5bn USD (International Cluster Competitiveness Project, Institute for Strategy and Competitiveness). As a member of the European Union, Portugal has tariff free access to the largest automobile market in the world (in sales). EU members France, Spain, and Germany serve as Portugal's primary export markets accounting for a total of 60% of total passenger car exports.

In 2005, Portugal produced 146,900 passenger cars, a 17% decrease from its 2000 level of 178,510. Comparatively, Western Europe passenger car production increased by 4.7%, from 14.9 mm to 15.69 mm, over the same period. Global production increased as well, from 555 mm to 637.2 mm, by 2.8% (Global Market Information Database).

The Portugal cluster faces similar employee and cost issues as the greater region, Western Europe. Manufacturers play Western European countries against one another to win labor concessions in order to increase productivity via longer working schedules at regular hourly rates, or flee eastward to Eastern Europe, China, or Russia:

“Volkswagen also has been playing its other Western European factories against each other in an effort to improve operating efficiencies...Strikes broke out at GM's Portuguese van factory in mid-June 2006, even as the company halted a plan to close down the plant in order to give the government time to draw up a rescue plan. GM

employs about 1,100 at the factory, whose operations cost 500 per vehicle more than other GM facilities.” Standard & Poor’s Global Industry Surveys Auto & Autoparts

Similarly, auto part suppliers relocate in China to reduce costs. Western European auto part suppliers believe they can overcome the stigma of low-quality Chinese production with European innovation, R&D, and strong focus on quality - thereby capturing the best of both worlds, low cost and high quality.

Like its neighbor, Spain, Portugal does not have a national car manufacturer. In terms of employment, the sector employed more than 45500 workforces. Assembly units and component suppliers account about 5% of the industrial workforce. According to reports, the industry was the leading attractor of foreign investment, which is now falling for the entire country.¹⁸ With Portugal low levels of educational attainment as compared to the European average, most of the component suppliers who produce small parts such as engine components, moulds, tools, electronics, plastic parts, seats, and climate control systems provide some sort of low skilled employment opportunities.

The Portuguese automotive cluster has attracted quite a good number of leading companies as well as supplies and component firms. Five of the six main component suppliers in the world are present in Portugal. Leading industry players such as VW and Opel, and all the numerous suppliers and component firms such as Visteon, Delphi Automotive systems, Robert Bosch, Faurecia, Lear and Johnson Controls are present in Portugal. Volkswagen committed an additional 500 million euros in 2003 as yearly investment plan until 2008. Visteon who began operations in 1997 in Pamela signed an investment contract amounting to 49 Million Euros, in order to establish an Engineering Centre in Portugal and a Co-located Manufacturing and Design Integration Center in

¹⁸ Group’s calculation using data from UNCTAD/WTA (2005) and World Bank (2005)

Palmela. The latter investment is predicted to have a substantial economic impact, especially on the Balance of Payments to about 1254 million Euros until the end of 2008¹⁹.

Since 2004, inbound FDI was reported to be falling after shooting up over the last couple of years²⁰. However, according to the World Investment Report of 2006, it is apparently picking up again. In fact, Portugal has gained significant position regarding its capacity to attract Foreign Direct Investment. The latest Globalization Index released by A.T. Kearney and FOREIGN POLICY magazine indicates that Portugal has moved from the 53rd to 17th position in attracting FDI just from 2005 to 2006. FDI inflows in Portugal over the last ten years constituted 34% manufacturing, of which automotive is a large part.

Of the six export sub-clusters, Portugal is a major player in three: motor vehicle assembly, production equipment, and glass, claiming .056%, 3.7%, .83%, in global export value, respectively.

Rank	Partners	Exports in value	Imports in value	Net trade in value	Exports as a share of total exports (%)	Imports as a share of total imports (%)	Exports as a share of world exports (%)	Imports as a share of world imports (%)	Growth of exports in value (% p.a.)	Growth of imports in value (% p.a.)	Net Trade (X-M)/(X+M) * 100
0	World	4,876,083	7,005,409	2,129,326	12.803	11.453	0.5361	0.7784	8	6	-17.9
1	France	1,109,402	1,299,360	-189,958	22.752	18.548	0.1219	0.1443	26	8	-7.9
2	Spain	1,033,622	2,065,862	1,032,240	21.198	29.49	0.1136	0.2295	14	10	-33.3
3	Germany	806,792	1,701,859	-895,067	16.546	24.294	0.0887	0.189		6	-35.7
4	United Kingdom	676,055	359,739	316,316	13.865	5.135	0.0743	0.04	14	11	30.5
5	Italy	247,852	211,839	36,013	5.083	3.024	0.0272	0.0235			7.8
6	Japan	1,837	350,031	-348,194	0.038	4.997	0.0002	0.0389	6		-99

TABLE 2: PORTUGAL TRADE VALUE FOR MOTOR VEHICLES
SOURCE: ITC – INTERNATIONAL TRADE STATISTICS

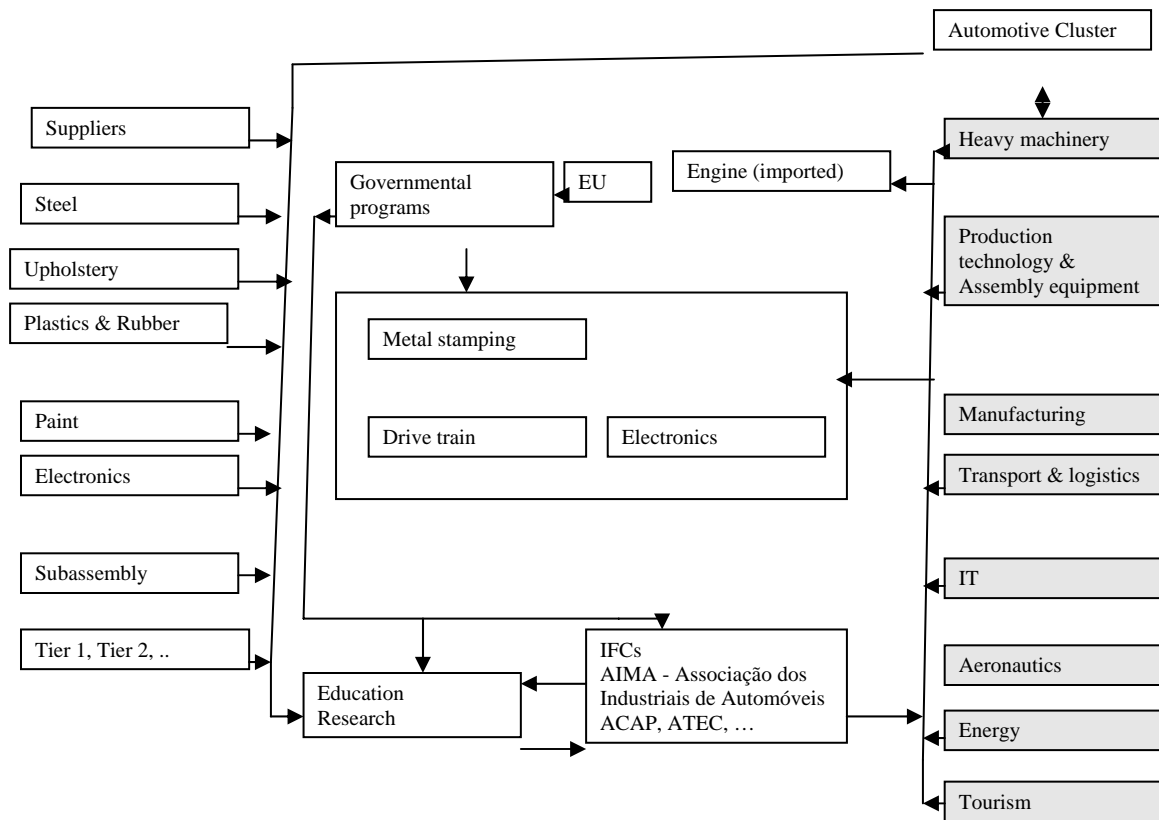
¹⁹ <http://www.investinportugal.pt/MCMSAPI/HomePage/PortugalToday/PortugalAdvantages/>

²⁰ <http://www.investinportugal.pt>

In examining the demand conditions of the cluster, a huge problem is revealed. In 2005, Portugal's automotive cluster was a net importer (in value) of passenger cars; which means that Portugal is (1) producing low-value goods as compared to trade partners or (2) domestic consumers demand comparable foreign goods over domestic goods – implying product inferiority.

STRUTUTRE OF THE CLUSTER AND DIAMOND ANALYSIS

	Advantages	Disadvantages
Context for Firm Rivalry	Leading and competing firms Creation of IFCs Improvement in overall rankings Proactive government reforms	Bureaucratic delays still prevails Labor laws still inflexible
Factor (inputs) Conditions	Infrastructure: communication and road network; coastline; reliability electricity Cheap committed and abundant labor Launched Educational & Research initiative with MIT Access to financial capital	Low educational attainment Raw materials and equipment imported
Demand Conditions	Presence of demand conditions: increased export and import Potential markets in emerging economics and Africa	Weak private sector participation Fall in production (Portugal, EU)
Related & Supporting industries	Presence of number of leading firms specialized products suppliers	



The beginning of the 1970s when the Auto-Industrial group formed signaled a great development in the Portuguese automotive industry. This development brought about the emergence of C.A.M.S.A. (Ford) in Oporto, Gilauto S.A. (Renault) and Central Parque S.A. (Opel) in Lisbon, Frota Lda. In Braga and Uniao Eborensis Lda. (Fiat) in Evora. This new strategic direction was perfectly suited to the development of the business. Even today, it constitutes one of the factors leading to the company's solidarity and viability stance in market situation. In relation to the cluster diamond analysis, the rest of this section examines the multiple parts of the diamond. The role of certain key conditions or players will be especially highlighted throughout.

Factor Conditions

For the automotive cluster, Portugal's unique geo-strategic location on the coast line is important for transport of engines and other heavy equipment. Strong with other EU

countries, some emerging economies and Africa creates a potential market for the cluster²¹. Furthermore, there has been a commitment for modernizing of infrastructure. Currently, Portugal has a wider coverage in telecommunication and road network that links to all cities and Spain. In 2006, Portugal started operating both the world's largest solar power farm and the world first commercial wave power. Importantly, the Portuguese government is channeling US \$3.8 billion into developing renewable energy²². The objective is to place Portugal in the frontline of renewable energy along Austria and Sweden, the other two that have invested most in renewable energy. Since large amount of electricity generation-furnace is needed for its production, therefore the available of low cost electricity is a great opportunity for the automotive cluster. In other sections we discuss about the proactive reform government has been undertaken. These are all important for making the cluster competitive.²³

Labor cost in Portugal is among the lowest in the EU. However, the low educational attainment and low labor productivity is cited as one of the constraints leading to the shift of assembly lines to other countries. In a bit to address this, the government and the Massachusetts Institute of Technology have entered into a long-term partnership, to significantly expand research and education in engineering and management across many of Portugal's top national universities, especially in the area of engineering design and advanced manufacturing (EDAM). Since Portugal is at the lower end value chain of the automotive cluster, such initiative is very vital put it in a better position to compete globally. The key challenge here is for Portugal to reinvent itself and develop a strategy

²¹ <http://www.investinportugal.pt>

²² <http://www.wikipedia.org/wiki/portugal>

²³ <http://www.investinportugal.pt>

of doing things in their own distinctive ways, rather than just compete to be the best in terms of all these factor conditions.

DEMAND CONDITIONS

Sophisticated local demand that forces firms to be constantly focusing on strategies to improve and make their productive distinctive in their own ways is important for both national and global competitiveness. Portugal's automotive buyers are apparently demonstrating this kind of sophistication. In 2005, export of vehicles fell by 8% from the 2004 value of US \$4.98 billion to about US \$4.87 billion. Similarly, vehicles import of 2005 grew by 6%, from US \$6.95 billion to about US\$ 7.01 billion, leaving a trade deficit of more than US \$2.1 billion (about 17.9%)²⁴. This is a clear indication of the local demand sophistication. Bulk of Portugal's export and import is within the EU. The leading export and import partners are Spain and Germany (Invest in Portugal Agency, INE); having being leaders in automotive production, we will expect them to have sophisticated consumers. The challenge now for Portugal is to transform itself from just being an assembly lines type and component supplier to major production country.

VII. Cluster Recommendations

The Portuguese automotive cluster, while enjoying minor local demand conditions, is basically competing in a global market –for domestic and for certainly all export consumption. Based on the previous analysis in this paper, and to reverse the current (-0.12% 1997-2004 decline in share of global exports, the Portuguese automotive cluster must focus on two major strategies. First, the cluster must develop every possible means to sustain its competitiveness against the major players. Second, it must develop its

²⁴ UNCTAD/WTA (2005)

unique strengths in niches where it can build relative advantage. Each of these strategies is developed in the next sections.

VIII. Sustaining Competitiveness

In order to reverse the slow decline of the automotive cluster in Portugal, we must first separate out the macro global effects over which we have no control. For example, we will not be able to reverse the addition of low wage cost countries into the European Union, nor the increasing low wage dominance found in Asia. Portugal will never again be a truly low wage cost global competitor. Therefore we must not make recommendations based on low labor costs or aimed at major labor cost reductions. That era has passed. Instead we chose to focus on competitiveness issues within the current framework that could be improved to in turn improve global competitiveness. These are tabulated below.

Issue	Recommendations
Underperforming educational system	<ol style="list-style-type: none"> 1. Increase funding into educational programs 2. Staff up with better and more teachers, train the teachers 3. Launch awareness and incentive programs 4. Change anti-attainment culture through marketing and advertising programs
Encourage research on new energy.	<ol style="list-style-type: none"> 1. Invest in energy conservation 2. Invest in local niche advantage production sources such as wind, wave and solar. Partner / subsidize private investment 3. Target Asia high-end market, improve Portuguese auto brands 4. Go nuclear 5. Develop more local oil and gas
Little industry-academia knowledge exchange to promote knowledge economy and competitiveness	<ol style="list-style-type: none"> 1. Initiate programs that facilitate automotive cluster companies approaching universities to find hires and technology solutions, etc. 2. Initiate programs that facilitate academics commercializing university-based research.
Portuguese automotive companies are used for low production costs, rather than higher value product innovators	<ol style="list-style-type: none"> 1. Support improvement of manufacturing operations up to and beyond world class – innovate in production efficiency 2. Create new product design initiatives and resources 3. Develop a flagship “future car” by funding a national

	<p style="text-align: center;">competition</p> <p>4. Maintain market share and premium segments of promising markets in Europe, using existing links</p>
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The issues and their corresponding correcting recommendations above will only bring the Portuguese automotive cluster up to the world standard across the board. This in itself will not help Portugal pull away from its competitors and gain global export share. For this to happen, the Portuguese automotive cluster must avoid competing with the dominant incumbents (Japan, Germany, US etc.) at the current game and develop unique strengths that give it an edge in emerging automotive niches.

IX. Developing Unique Strengths

Beyond shoring up the existing weaknesses, the Portuguese automotive industry needs to invest in developing new unique strengths to establish itself in emerging global growth areas. We call this initiative “future of mobility,” and it leverages various Portuguese strengths as described below.

Future of mobility:

- Lightweight automobiles - Plastics, composites
- Inner urban transportation solutions leveraging the constrained and congested local demand conditions found in Lisbon and Porto
- “Smart” roads guidance systems building off of newly modernized highways
- Green grid power supply sources from hydro, wind, solar and wave energy
- IT enabled transportation systems utilizing the >100% mobile telephone penetration
- (Fairly) low cost labor and production
- Low cost ocean-based shipping capability to Asian, European and US automotive markets

X. Promote market diversification

The most important trends in the automotive industry generally involve two related developments: competition and globalization. Portugal is currently focusing on motor

vehicle assembly, production equipment and glass, and export to mainly European markets - at the same time, a net auto importer. The reliance on low quality and less value added products and a limited number of markets exposes the cluster to less competitiveness and unnecessary risks, which could be mitigated through strategic diversification. The main strategy will be 1. Exploring new energy automobile market in high-end market, 2. improving branding and exploring new products in markets which Portugal Has little low labor competitiveness, 3. Maintaining existing markets which Portuguese products have competitive advantages in labor and transportation.