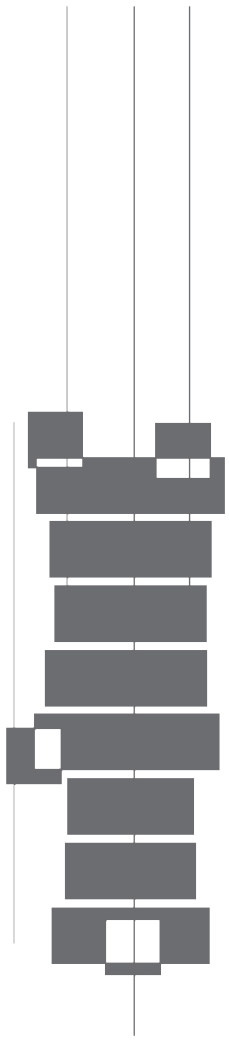
ESTUDOS REGIONAIS

Revista Portuguesa De Estudos Regionais
Publicação quadrimestral- Nº 23 - 2010



APDR

catalogação recomendada

REVISTA PORTUGUESA DE ESTUDOS REGIONAIS. Coimbra, 2010
Revista Portuguesa de Estudos Regionais /
Ed. APDR-Associção Portuguesa para o Desenvolvimento Regional
1º Quadrimestre - Coimbra APDR, 2010
Quadrimestral
ISSN 1645-586X

www.apdr.pt

A Revista Portuguesa de Estudos Regionais encontra-se referenciada nas bases bibliográficas EconLit, JEL on CD, e-JEL e no Journal of Economic Literature.

ficha técnica

| Secretariado Executivo: Ana Rita Jacinto
| Composição: Eduardo Oliveira
| Capa: Eduardo Oliveira | Impressão: quatro /quatro soluções gráficas - Junho 2010
| Tiragem: 290 exemplares | Depósito Legal Nº 190875/03
| Preço: Avulso € 15.00 (IVA incluído) / Assinatura € 30.00 (IVA incluído)

ÍNDICE
INDEX

THE USE OF Q-METHODOLOGY TO OBTAIN STAKEHOLDER DISCOURSES ON THE FUTURE DEVELOPMENT OF RIA FORMOSA COASTAL ZONE, SOUTH OF PORTUGAL*

Maria Helena Marques Enes Guimarães - Universidade dos Açores - E-mail: helenaguimaraes@uac.pt

Resumo:

Uma estratégia eficiente de conservação da natureza implica a análise de interesses dos intervenientes envolvidos. O presente artigo apresenta a metodologia Q como ferramenta no desenvolvimento dessa análise. O objectivo é a análise de intervenientes locais através dos seus próprios termos e categorias, não apresentando ideias pré formadas de quais as suas necessidades e ou problemas. O estudo revela a existência de 4 perspectivas sobre o desenvolvimento futuro da Ria Formosa: pró educação ambiental e capacitação; desenvolvimento turístico e pesqueiro; burocracia, condições do sector pesqueiro e ordenamento do território; qualidade ambiental, integração e organização. Finalmente, estas perspectivas foram comparadas com as acções do plano POLIS 2008. Verificou-se que o plano responde transversalmente à maioria das preocupações identificadas. O ponto de maior conflito é a questão da demolição das casas existentes nas ilhas barreira.

Palavras-chave: Análise de intervenientes interessados, metodologia Q, Gestão Costeira Integrada.

Códigos JEL: Q24 ; Q28

Abstract:

Any effective strategy for nature conservation necessarily involves stakeholder analysis. This article focuses on Q-methodology for this analysis. The objective is to understand both the identities and desires of local stakeholders in their own terms and categories, instead of making assumptions about their problems and needs. The study revealed 4 discourses on the future development of the Ria Formosa: Environmental education and information exchange; economic development supported and taking advantages of the environmental values; land planning and decrease of bureaucracy; and environmental quality, integration and organization. Finally, these discourses are compared with the Ria Formosa action plan - POLIS 2008 - that includes investment to improve and develop this coastal system. In conclusion, the action planned in POLIS 2008 covers most of the concerns that stakeholders identified. The major conflict area identified is related to the demolition of houses existing on the barrier island of the lagoon system.

Keywords: Stakeholder Analysis, Q sort, Integrated Coastal Management.

JEL Codes: Q24 ; Q28

* "Artigo vencedor do Prémio Bartolomeu 2009, outorgado pela APDR, para a melhor comunicação de um autor jovem – menos de 33 anos – submetida ao seu Congresso anual"

I. Introduction

Ria Formosa (fig.1) is a unique area in Portugal and Europe due to its exceptional environmental and landscape quality with high ecological, cultural, social and economic value (POPNRF, 2009). It is a mesotidal coastal system with a surface area of 84 km^2, two peninsulas, five islands and an exposed intertidal area of about 80% (Andrade, 1990). The lagoon system is connected to the ocean by six tidal inlets. Environmental variation across the lagoon is the reason for a wide variety of habitats: salt marshes, sand banks, mud flats, seagrass beds, channels, dunes, inlet deltas, barrier islands and sandy shores (POPNRF, 2009). This variety of habitats is also the reason for the existence of high biodiversity including several endemic and rare species. The identified species include: 693 plant species, 18 mammals, 15 reptiles, 11 amphibians, 79 fishes, 184 mollusks and 214 birds. All these characteristics led to the Ria Formosa's protection under national law since 1979, its inclusion in the Habitat Directive and in international conventions such as Ramsar.

The Natural Park of Ria Formosa (PNRF), of approximately 18000 hectares, covers the whole area of the lagoon system and its municipalities: Loulé (partially), Faro, Olhão, Tavira and Vila Real de Santo António. Traditional activities dating back to ancient times are still important: fisheries (90000 tonnes caught in 2001), shellfish exploitation (80-95% of national production) and salt farming (98% of national production in 2001) (POPNRF, 2009).

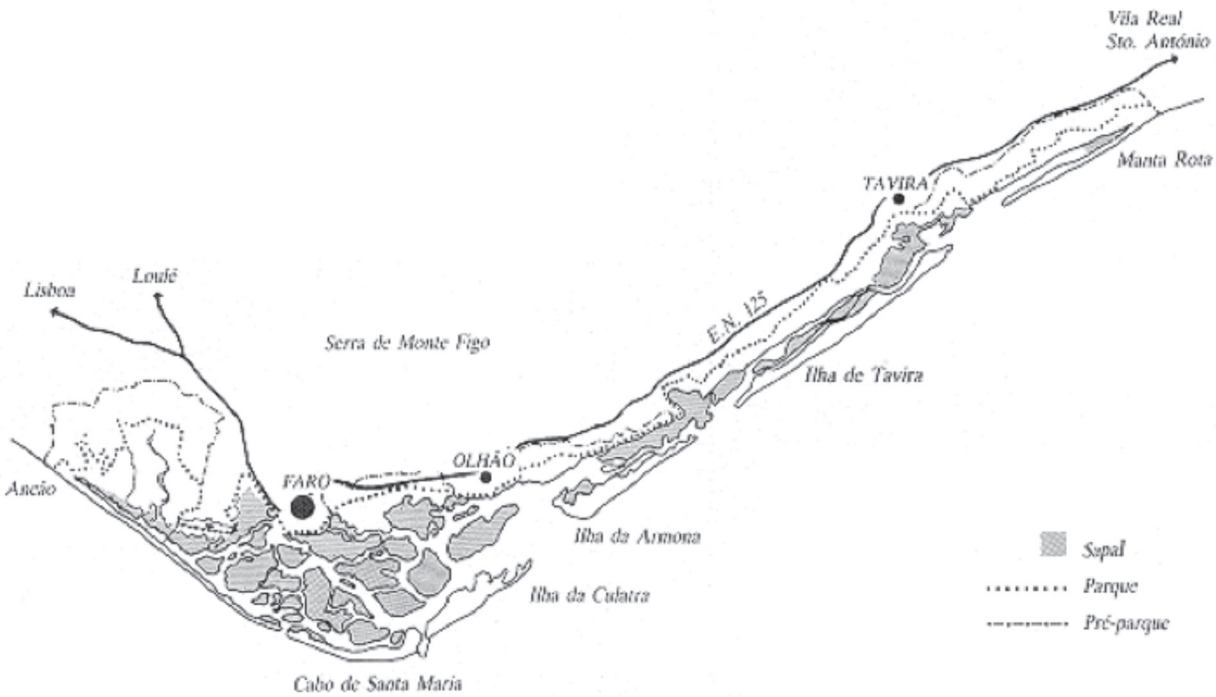
In the past few decades, increasing threats to the area have appeared (POLIS, 2008). Urban pressure due to tourism development, inappropriate urban occupation on the barrier island, replacement of fishery communities in tourism areas, increase in toxic substances from domestic and industrial waste water, disorganized recreational activities, increase of boats and motor craft, invasion of exotic species, dredging activities, lack of environmental infrastructure (fences, elevated walkway, delimitation of beach access), lack of control and inspection of illegal activities, declining fish and shellfish stocks, and coastal erosion. In socio-economic terms the problems identified include an exodus of young people linked to a decrease in work opportunities, insufficient professional qualification and degradation of cultural heritage. These threats are identified in the different management plans that include this area (e.g. Coastal Zone Management Plan, Ria Formosa Natural Park Management Plan and POLIS 2008 – Action Plan for Ria Formosa requalification), however, institutional complexity has delayed the development of effective and direct solutions.

Ria Formosa, due to its individuality, geographic conditions and dimension, is managed by several institutions: Biodiversity and Nature Conservation Institute (ICNB), Water Institute (INAG), Regional Development and Coordinating Commission of the Algarve (CCDR), Ports and Maritime transportation Institute (IPTM), Municipalities, etc. (POLIS, 2008). The existence of several institutions with management responsibilities makes decision-making a complex, bureaucratic and slow process. In 2006, a working group was created with the aim of defining a future strategy for the Ria Formosa Coastal Zone capable of solving identified problems. An Action Plan was developed, *Polis Litoral Ria Formosa* (2008-2012), and a new entity - Sociedade de Requalificação e Valorização da Ria Formosa SA - was formed to implement the plan and provide financial support. This Action Plan aims to present an intervention that is consensual among defined stakeholders and that makes Ria Formosa a reference in terms of sustainable development. As explained in POLIS 2008, this document combines the work performed by several institutions, management plans and follows the guidelines of the National Strategic Plans for Integrated Coastal Management, Biodiversity and Nature Conservation, Sea issues, Fisheries and Ports.

Any effective strategy needs to take into account the socio-cultural needs of the society that it influences. For the plan to work, we need a stakeholder analysis. Stakeholder analysis describes possible conflicts over any intended measures, who the local stakeholders involved in the conflicts are, what they believe and want, and the trade-offs they are willing to make (Addams and Proops, 2000). Such knowledge is critical if the participatory decision strategies and action plans are to respond meaningfully to the political and social realities in which decision-making takes place. Without these steps, policies and measures may fail to gain sufficient political support to be made into rules, and even if they are, they will often lack enough support among local people to be effective. Many implementation attempts have failed because

FIGURE 1

Map of the study area: the lagoon system of the Ria Formosa, located on the south coast of Portugal, the Algarve region (source: ICNB).



local people saw measures as being imposed on them, making the enforcement of the rules much too expensive to be effectively implemented. The answer to this dilemma is a facilitated process in which all local stakeholders – i.e. the people who are in the best position to undermine the effort if they choose to do so – are involved. Such processes may not lead to everyone agreeing, and will often involve compromise, but they do lead to instruments that have a much better chance of actually working in the long run.

The methodological challenge in the design of an effective negotiation process is to create a realistic picture of the political landscape. Q-methodology (Stephenson, 1953) has been used for a long time in psychology and increasingly in other disciplines, such as political science (Brown, 1980). The most important advantage of this method is the possibility of understanding both the identities and desires of the local stakeholders in the terms and categories they themselves are using, and not making preliminary assumptions about whether groups have a legitimate stake in any related conflicts (Smith, 2001). This type of analysis is called discourse analysis; it takes the statements of the stakeholders about the conflict and expresses them in their own terms as an interactive process. In particular, it is interested in the intersection of facts, values and interests in the things that people say about the conflict (Watts and Stenner, 2005). Understanding how people link these three makes a number of contributions. Concerning the facts, discourse analysis helps to uncover where the presentation of validated scientific information may aid in reconciliation. It also may identify real disagreements that may benefit from, or even require, further research that will lead to potential solutions. Concerning values, discourse analysis helps to uncover those areas where compromise is possible and where it is impossible based on strongly held beliefs. Concerning interests, it gives information about where possible compromises and/or win-win outcomes are possible. The structural approach sees society as made up of groups that form the attitudes of their members through world views or ideologies. These world views take the form of and are expressed as values. Hence, values are bound up in group identities, which is what makes them such a barrier to compromise. Group solidarity is the most important source of social power beyond the control of economic interests, so compromising on values becomes a betrayal. The product of the discourse

analysis is a description of discursive themes (Brown, 1993, 2002). Themes are repeated patterns in which facts, values and interests are linked in the same way by participants in the discourse.

This article applies Q-methodology in order to understand the discourse of stakeholders on the future development of Ria Formosa Coastal Zone. The results of this analysis are compared with the actions that will be developed by POLIS Litoral Ria Formosa in order to understand how stakeholders react to its implementation and suggest improvements.

II. Methods

This study is based on Q-methodology and the main aim is to understand what stakeholders perceive as important actions towards the future use and development of the Ria Formosa coastal zone. In order to apply this method, 30 interviews were given to 10 different groups of stakeholders: tourism companies, fishermen, researchers, NGOs, government, residents, tourist, real estate agencies and local authorities. From these interviews, 31 statements (table 1) were taken as being the most common discourse among the interviews.

Using these statements, a questionnaire was given to 22 individuals related to the groups of stakeholders mentioned above. Participants were asked to sort the 31 statements according to their importance to them. A seven-point scale was used: -3 -2 -1 0 +1 +2 +3. Here -3 corresponded to the two statements participants considered as least important and +3 the two most important statements. The ranking of the statements by an individual is known as that individual's Q sort, and reflects how much individuals value each statement. Participants are forced to make choices because the number of statements in each of the seven-point scale was defined previously. The number of statements that had to correspond to each element of the scale is described in table 2.

TABLE 1

Statements use in Q sort questionnaire.

1	We should work towards a tourism industry dedicated to nature and respecting its limits.
2	We should preserve cultural heritage and improve the conservation of historical buildings.
3	We should develop tourism with content. Knowledge increases respect by the area.
4	Traditional economic activities should be connected with tourism.
5	Overfishing is making species disappear.
6	Protection is important so that fish stocks do not diminish.
7	The number of fishermen is decreasing.
8	Circumstances are not created so that fishermen have better working conditions.
9	Marine resources are decreasing.
10	The lack of control is threatening marine biodiversity.
11	Most of the times things fail when law is being applied.
12	People must be better informed to preserve biodiversity.
13	Society is increasingly aware of political measurements for environmental protection.
14	We should invest in environmental education for adults.
15	There is a lack of infrastructure so people can enjoy nature in a balanced way.
16	There are too many ugly buildings, with no regard for scenery.
17	The houses on the barrier island are a landscape and environmental attack.
18	The Natural Park institution does not correctly carry out its nature conservation responsibilities.
19	The management institutions are too prohibitive, which does not allow the development of economic activities.
20	The supply is disorganized; economic activities are not integrated with the others that occur in the same space.
21	It is necessary to increase communication between the scientific community and the population.
22	Tourism needs to be organized. At the moment people use everything as they want, they pass everywhere with boats and the police do not go after them.
23	We should do environmental education for tourists and local people, based on coexistence with nature.
24	There is too much bureaucracy, which discourages investors.
25	We are starting to develop nature tourism but with no rules.
26	There are too many management institutions, there's a lack of integration and common aim.
27	The municipalities are too dependent on the financial support of the building lobbies.
28	We need to improve the Wastewater Treatment Plants.
29	Black markets are limiting the development of economic activities.
30	Dredging inside the lagoon system is important to maintain its current use.
31	We should have an environmental tax for the users of this area that could be used for nature conservation.

table 2

Number of statements that had to be allocated in each scale score.

Scale score	-3	-2	-1	0	1	2	3
No. Statements	2	4	6	7	6	4	2

Twenty-two Q sorts were performed. Delineating the various discourses within the survey was accomplished by factor analysis of the Q-sorts.

The analysis was done using PQ method version 2.11, a freeware program devoted to Q analysis (http://www.rz.unibw-muenchen.de/~p41bsmk/qmethod/pqmanual.htm). One enters each Q sort in the study as data and the package then correlates each Q sort with every other sort. This intercorrelation matrix is then factor analyzed using a Principal Components Factors Analysis.

In this study, 22 variables were ultimately reduced to four factors, or idealized social discourses. During the factor interpretation process, each factor was examined individually and compared with other factors for the purpose of illustrating the characteristics of the various discourses, as well as the points of agreement and disagreement.

III. Results and Discussion

The purpose of this study was to reveal distinct perspectives concerning the future development of the Ria Formosa coastal zone. A specific perspective is obtained by the interpretation of a specific factor obtained using the statistical procedure. In this study, four factors were extracted. All these factors had at least two participants giving them significant loading. Consensus and disagreement were identified among all the factors, and some statements were identified as distinguishing elements. Below is a description of each discourse based on various elements of the analysis. Some statements gained positive and negative extreme scores in more than one discourse; this fact decreases statements' importance when we try to analyze each perspective by itself. Other statements with rather neutral scoring, e.g. 0, can provide valuable information if all the other factors ranked them extremely high or low, respectively (Watts and Stenner, 2005). For this reason, the discourses are also interpreted by using statements that distinguished factors statistically significant at the 99% confidence level ($P < 0.01$), followed by those statistically significant at the 95% confidence level ($P < 0.05$). A careful and rigorous selection of the Q statements was made. Finally, interpretation also depends on in-depth interviews conducted in the first stage of the methodology, so that research bias could be minimized as much as possible.

A. The four discourses on regime effectiveness

A.1) Discourse A

Discourse A explains 17% of the total variance (table 3). This discourse (table 5 and 5.1) is most concerned with the need for information and education to better preserve the environmental quality of the Ria Formosa coastal zone (stat. 21, 12, 23). There is much concern about the environmental situation of this area (stat. 10, 9, 6, 17, 22). This perspective understands value through contingency, giving high importance to the potential threat that lack of control represents for marine biodiversity (stat. 10) and the Q-methodology heavy human pressure on the barrier islands (stat. 17). The focus on contingent valuation is also demonstrated by the emphasis given to preservation of natural areas and the need to constrain human activities along the lagoon system (stat. 22). In this perspective, the value of Ria Formosa is not recognized for all users and therefore it emphasises the need to increase investment in information and environmental education. During most of the interviews this issue was identified and linked with the lack of wastewater treatment facilities, that cause bad odors, mainly in the Ria Formosa area closest to urban centers, which contributed to a negative view of this ecosystem.

Administrative and economic issues are not regarded as important. Investors are not considered to be affected negatively by an excess of bureaucracy (stat. 24), implying that economic development is allowed with a positive or negative impact on environmental quality of the area.

Environmental education through coexistence with nature is perceived as important to achieve societal awareness of environmental issues and values (stat. 23). The current form of ecotourism is considered well organized (stat. 25). However, other forms of tourism are perceived as unorganized and threatening to environmental quality (stat. 22). Economic issues related to market and fisheries are minor concerns for this discourse, as well as the possible relationship between municipalities and construction lobbies (stat. 29, 24, 8). Land planning is also a minor concern (stat. 26, 27, 25).

Information and education seem to be the main vehicle of change in the Ria Formosa coastal zone. Concerns about environmental quality are identified but not about economic development. Considering the contingent nature of this perspective's valuation of the environment, one could surmise that a focus on environmental education would be a logical investment, as education is a form of current investment in future behavior modification; in other words, a present investment that pays off into the future. Discourse A focuses to a certain extent on participatory processes and dissemination of information on the process of governance in general. From this analysis we can call discourse A *Pro Environmental education and information exchange*.

A.2) Discourse B

Discourse B explains 12% of the total variance (table 3). This discourse is very concerned with the exploitation of marine resources in a sustainable way (table 6 and 6.1). In contrast to the previous discourse, it is believed that people are increasingly aware of environmental issues (stat. 13). In addition, discourse B shows a strong belief that conservation of natural resources will improve human welfare and economic development. By the rank given to statement 6 and 9, nature protection is an important issue. On the other hand, fishery activities and tourism development are also highly ranked. Fishermen's work conditions (stat. 8), as well as market dynamics, including the existence of parallel markets (stat. 29), are relevant issues. Discourse B considerers that parallel markets diminish the importance of the fishing sector in official economic data. The true economic importance of same fishing activities, such as clam gathering and farming, is not reflected in official data and this has negative effects when it comes to distributing economic incentives. Other research projects have identified this issue (e.g. Praça, 2004; Van Den Belt, 2000; Michler, 2003), as well as the lack of a current strategy to overcome this difficulty.

Spatial organization of tourism is not considered an important topic in contrast with the previous discourse (stat. 22 and 25). However both perspectives present a common perception of the Ria Formosa's contingency value, although discourse B is more related to the value of direct use and discourse A presents concerns related to indirect value and existence values (Boyle and Bishop, 1985). Following the same line of thought, it is not surprising that discourse B considers the eco-tourism sector as an important area for development (stat. 3, 1).

The minor concerns of this discourse relate to administration and land-use planning (stat. 26, 11, 31, 27, 26). This result suppresses the great importance of economic development. Development occurs slowly due to financial constraints and lack of incentives, rather than due to administrative problems. Discourse B strongly agrees that the Ria Formosa coastal zone should be managed taking into account environmental benefits, rather than political interests and, on the other hand, it considers that economic development should be a primary concern. For this reason discourse B is called *Pro economical development supporting environmental values.*

A.3) Discourse C

Discourse C explains 11% of the total variance (table 3). It focuses primarily on institutional performance and secondly on the environmental results obtained (table 7 and 7.1). This discourse gives greater importance to issues related to administration and city planning. Bureaucracy is identified as the main issue (stat. 24), which might be related to the rank attributed to land-use planning. From this discourse's point of view, issues related with law enforcement and management institutions are two of the main obstacles in nature conservation and future development (stat 6, 8, 2, and 15). Environmental awareness of society was ranked low (stat.13) and education towards sustainable development is not a topic of concern, which reinforce the importance given to short-term actions rather than long term. Institutional issues were a common topic discussed in the interviews and,

although the institutional functionality of Natural Park of Ria Formosa is not a major concern for discourse C (stat. 18), the same issues are identified for this institution (Guimarães et al, 2010).

This is the only discourse that gives a high value to cultural heritage (stat. 2) and the need to preserve it. In addition, discourse C considers that there is not sufficient infrastructure for people to enjoy nature without damaging it (stat. 15). Also, waste water treatment facilities are an important topic (stat. 28). All these concerns are strongly linked with administration, distribution of investment and the priorities of local governance.

The fishing industry (stat. 6, 7, 8, 9, 5), as in discourse B, is one of the main issues for the future development of the area. In terms of tourism development, this discourse does not show a clear concern (stat. 1, 25, 3). Environmental tax is not considered an important action towards nature conservation (stat. 31). Economic issues related to lobbies (stat. 27) and black markets are not a concern (stat. 29). From these results it is clear that discourse C focuses attention on administrative issues being one of the main points for improvement in the future development of Ria Formosa. For these reasons discourse C is called *Pro land planning and anti red tape.*

A.4) Discourse D

Discourse D (table 8 and 8.1) explains 9% of the total variance (table 3). In this discourse, primary concern is with administrative organization and the lack of integration among institutions (stat. 26, 19, 11). Cooperation between and coordination among institutions is perceived as a necessity for effective growth. It is the only discourse that considers municipalities as dependent on construction lobbies (stat. 27). One hand management institutions are not considered too prohibitive (stat. 19) and on the other hand laws are respected (stat. 11), which means that regulation is adequate and development can occur. This is the only discourse that does not negatively rank the use of an environmental tax (stat. 31) demonstrating that environment quality is an important topic. In addition, lack of control (stat. 10), water quality (stat. 28) and eco-tourism (stat. 1) demonstrate this concern. Economic development is not perceived as a major issue. Tourism organization is a concern (stat. 22) although not much attention is given to this sector. In the same vein, the fishery sector is not highly ranked (stat. 8, 5, 9).

In relation to nature conservation, the houses in the barrier island (stat. 17) and the effectiveness of the Natural Park (stat. 18) are considered minor concerns. This viewpoint believes that problems affecting growth and development of the Ria Formosa exist at the level of regulations and coordination, and therefore as potentialities. These issues can be related to the discursive and pragmatic tension between the institutionalized regulations and their actual implementation, as well as problems related to institutional organization and coordination. The same issues are identified by previous works as a common problem on a national scale (Garcia, 2004). Taking this into account, discourse B is defined as *Pro-environmental quality, integration and organization.*

B. Stakeholder group loadings on each factor or discourse

The number of stakeholder group loadings on each factor is summarized in Table 3. It is important to note that all stakeholder groups loaded on one of the factors and none loaded on two or more factors.

The *Pro Environmental education and information exchange* discourse is defined by a total of 8 stakeholders: four of them are related to environmental sciences and education, one is an employee of Ria Formosa Natural Park Institution, one is related to ecotourism activities and fisheries, one is a recreational diver and one works in real estate.

The *Pro economic development supported and taking advantages of environmental values* discourse combines the opinions of a real estate worker, the vice-chief of the Maritime Police , an environmental NGO worker, a fishermen and a foreigner who owns a house in the area.

The *Pro land planning and decrease of bureaucracy* discourse is supported by a former canned fish industry worker, a resident, a municipal worker related to water treatment, and a staff member of the Regional Tourism Authority for the Algarve.

The *Pro-environmental quality, integration and organization discourse* was defined by a researcher at the government fishery research institute, a Port Authority worker, a tourist, a member of the Natural Park Institute and a construction industry worker.

From the loadings described we can see that there are clear patterns in the relationships of subgroups to each discourse. However, discourses are loaded with individuals that can easily be recognized or linked with the defined discourse. Discourse A is loaded with participants linked with education, discourse B participants included business and environmental protection participants, discourse C includes government workers, as does discourse D.

C. Areas of Consensus and Disagreement

The purpose of this study was to reveal the existence of any distinct discourses on the future development of the Ria Formosa coastal zone. It is significant that, even though the participants were drawn from very specific groups, all of whom were involved in some way in the issue, the application of Q-methodology has revealed four distinct discourses. Interestingly, all four discourses were broadly represented by the

TABLE 3

Reordered factor matrix with grey shading indicating the Defining Sorts.

Participant Code	Discourses			
	A	B	C	D
Q4	0,5671X	-0,1626	0,0278	-0,0217
Q51	0,4842X	0,2391	0,0483	0,2104
Q39	0,6784X	0,198	-0,0725	0,091
Q23	0,6363X	-0,0773	-0,1638	0,1305
Q37	0,6615X	0,1705	-0,0556	0,0603
Q1	0,7831X	0,2224	0,1384	-0,2036
Q16	0,5630X	-0,091	0,2244	-0,294
Q60	0,7089X	-0,1664	0,031	0,2639
Q12	0,2609	-0,7064X	0,3388	-0,0447
Q13	0,1658	0,5591X	0,2051	-0,1723
Q56	0,1235	-0,5888X	-0,0402	0,1228
Q58	0,2903	0,5329X	0,311	-0,0111
Q42	0,1839	0,6469X	0,0256	0,1578
Q17	-0,2927	0,268	0,6038X	-0,1129
Q9	0,0247	-0,0362	-0,7679X	-0,1727
Q46	0,2022	0,142	0,7226X	0,1097
Q59	0,064	-0,2173	0,4732X	0,3873
Q28	-0,1324	-0,0142	0,2974	0,4427X
Q11	0,1226	-0,2675	0,2145	0,6200X
Q25	0,0628	0,464	0,1934	0,5182X
Q21	0,1861	-0,0074	-0,4261	0,6975X
Q41	0,0428	0,0418	0,0394	0,4482X
% Expl. Var.	17	12	11	9
Total q sorts	8	5	4	5

TABLE 4

Correlation between factors.

	A	B	C	D
A	1	0.096	0.059	0.174
B	0.096	1	0.07	0.028
C	0.059	0.07	1	0.123
D	0.174	0.028	0.123	1

TABLE 5

Discourse A - major concerns about the present and future of the Ria Formosa coastal zone.

Statements defining Discourse A major concerns	Factor score			
	A	B	C	D
Information and education				
21- It is necessary to increase communication between the scientific community and the population.	3*	1	1	1
12- People must be better informed to preserve biodiversity.	2*	-1	0	-1
23- We should conduct environmental education for tourists and local people, based on coexistence with nature.	2	0	1	1
Environment				
10- The lack of control is threatening the marine biodiversity.	3	0	0	3
9- Marine resources are decreasing.	2*	1	-1	-2
6- Protection is important so that fish stocks diminish.	2	2	2	2
17- The houses on the barrier island are a landscape and environmental affront.	1*	-1	0	-2
22- Tourism needs to be organized. At the moment people use everything as they want, they pass everywhere with boats and the police do not go after them.	1*	-2	-1	1

Note: Values in place 1 or 0 are only shown when statistically significant

(P<0.05; asterisk (*) indicate significance at P<0.1).

TABLE 5.1

Discourse A - minor concerns about the present and future of the Ria Formosa coastal zone.

Statements defining Discourse A minor concerns	Factor score			
	A	B	C	D
Administration and economy				
29- Black markets are limiting the development of economic activities.	-3	3	-2	0
24- There is too much bureaucracy, which discourages investors.	-3*	1	3	0
31- We should have an environmental tax for the users of this area that could be used in nature conservation.	-2	-2	-3	0
8- There are no circumstances for fishermen to have better working conditions.	-1*	2	2	-3
Land use planning				
26- There are too many ugly buildings, with no correlation to scenery.	-2	-2	0	0
27- The municipalities are too dependent on the financial support of the building lobbies.	-2	-3	-1	2
25- We are starting to develop nature tourism, but with no rules.	-2	0	-2	-1

Note: Values in place 1 or 0 are only shown when statistical significant

(P<0.05; asterisk (*) indicate significance at P<0.1).

TABLE 6

Discourse B - major concerns about the actual and future of Ria Formosa coastal zone.

Statements defining Discourse B major concerns	Factor score			
	B	A	C	D
Economy				
29- Black markets are limiting the development of economic activities.	3*	-3	-2	0
6- Protection is important so that fish stocks do not diminish.	2	2	2	2
8- Circumstances are not created so that fishermen have better working conditions.	2	-1	2	-3
9- Marine resources are decreasing.	1*	2	-1	-2
Tourism developments (direction to go)				
3- We should develop tourism with content. Knowledge increases respect by the area.	3	1	-1	1
1- We should work towards a tourism industry dedicated to nature and respecting its limits.	2	1	0	2
13- Society is increasingly aware of political measurements for environmental protection.	2	-1	-2	1
25- We are starting to develop nature tourism but with no rules.	0*	-2	-2	-1

Note: Values in place 1 or 0 are only shown when statistical significant

(P<0.05; asterisk (*) indicate significance at P<0.1).

TABLE 6.1

Discourse B minor concerns about the actual and future of Ria Formosa coastal zone.

Statements defining Discourse B minor concerns	Factor score			
	B	A	C	D
Administration and economy				
11- Most of the times things fail when law is being applied.	-3*	0	1	-2
26- There are too many management institutions, there's a lack of integration and common aim.	-2*	0	1	3
31- We should have an environmental tax for the users of this area that could be used for nature conservation.	-2	-2	-3	0
Land use planning				
27- The municipalities are too dependent on the financial support of the building lobbies.	-3*	-2	-1	2
26- There are too many management institutions, there's a lack of integration and common aim.	-2	-2	0	0
22- Tourism needs to be organized. At the moment people use everything as they want, they pass everywhere with boats and the police do not go after them.	-2	1	-1	1

Note: Values in place 1 or 0 are only shown when statistical significant

(P<0.05; asterisk (*) indicate significance at P<0.1).

TABLE 7

Discourse C major concerns about the actual and future of Ria Formosa coastal zone.

Statements defining Discourse C concerns	Factor score			
	C	A	B	D
Administration and economy				
24- There is too much bureaucracy, which discourages investors.	3*	-3	1	0
6- Protection is important so that fish stocks do not diminish.	2	2	2	2
7- The number of fishermen is decreasing.	2	-1	0	-1
8- Circumstances are not created so that fishermen have better working conditions.	2	1	2	-3
Land use planning				
2- We should preserve cultural heritage and improve the conservation of historical buildings.	3*	0	1	0
15- There is a lack of infrastructure so people can enjoy nature in a balanced way.	1*	-1	-1	0
Environment				
28- We need to improve the Wastewater Treatment Plants.	2	0	0	2
1- We should work towards a tourism industry dedicated to nature and respecting its limits.	0	1	2	2

Note: Values in place 1 or 0 are only shown when statistical significant

(P<0.05; asterisk (*) indicate significance at P<0.1).

TABLE 7.1

Discourse C minor concerns about the actual and future of Ria Formosa coastal zone.

Statements defining Discourse C minor concerns	Factor score			
	C	A	B	D
Environment				
18- The Natural Park institution does not correctly carry out its nature conservation responsibilities.	-3*	1	1	-1
13- Society is increasingly aware of political measurements for environmental protection.	-2	-1	2	1
5- Overfishing is making species disappear.	-2	0	-1	1
25- We are starting to develop nature tourism but with no rules.	-2	-2	0	-1
9- Marine resources are decreasing.	-1	2	1	-2
3- We should develop tourism with content. Knowledge increases respect by the area.	-1*	1	3	1
Economy				
31- We should have an environmental tax for the users of this area that could be used for nature conservation.	-3	-2	-2	0
29- Black markets are limiting the development of economic activities.	-2	-3	3	0
27- The municipalities are too dependent on the financial support of the building lobbies.	-1	-2	-3	2

Note: Values in place 1 or 0 are only shown when statistical significant

(P<0.05; asterisk (*) indicate significance at P<0.1).

TABLE 8

Discourse D major concerns about the actual and future of Ria Formosa coastal zone.

Statements defining Discourse D concerns	Factor score			
	D	A	B	C
Administration and economy				
26- There are too many management institutions, there's a lack of integration and common aim.	3*	0	-2	1
27- The municipalities are too dependent on the financial support of the building lobbies.	2*	-2	-3	-1
6- Protection is important so that fish stocks do not diminish.	2	2	2	2
22- Tourism needs to be organized. At the moment people use everything as they want, they pass everywhere with boats and the police do not go after them.	1	1	-2	-1
31- We should have an environmental tax for the users of this area that could be used for nature conservation.	0*	-2	-2	-3
29- Black markets are limiting the development of economic activities.	0*	-2	-3	3
Environment				
10- The lack of control is threatening marine biodiversity.	3	3	0	0
28- We need to improve the Wastewater Treatment Plants.	2	0	0	2
1- We should work towards a tourism industry dedicated to nature and respecting its limits.	2	1	2	0

Note: Values in place 1 or 0 are only shown when statistical significant (P<0.05; asterisk (*) indicate significance at P<0.1).

TABLE 8.1

Discourse D minor concerns and disagreements about the actual and future of Ria Formosa coastal zone.

Statements defining Discourse D minor concerns	Factor score			
	D	A	B	C
Fisheries				
8- Circumstances are not created so that fishermen have better working conditions.	-3*	1	2	2
5- Overfishing is making species disappear.	-3	0	-1	-2
9- Marine resources are decreasing.	-2	2	1	-1
Administration				
19- The management institutions are too prohibitive, which does not allow the development of economic activities.	-2	-1	-1	-1
11- Most of the times things fail when law is being applied.	-2*	0	-3	1
18- The Natural Park institution does not correctly carry out its nature conservation responsibilities.	-1*	1	1	-3
Environment				
17- The houses on the barrier island are a landscape and environmental attack.	-2	1	-1	0

Note: Values in place 1 or 0 are only shown when statistical significant (P<0.05; asterisk (*) indicate significance at P<0.1).

various groups of stakeholders, thus confirming the capacity of Q-methodology to reveal the patterns shared across individuals. This makes the method suitable for the study of contentious and widely debated social phenomena such as the environment (Addams and Proops, 1999).

Discourse A (*Pro Environmental education and information exchange*) is the only one that put education and information as priority (fig.2). Although other discourses put environmental education on the positive side, they do not consider better and increased information concerning biodiversity a priority. In addition, the environmental conscience of local people varies among discourses (fig.3). Discourse A considers society as having a lack of environmental conscience, as in discourse C (*pro-environmental quality, integration and organization*). Discourse B (*Pro economical development supporting environmental values*) and D (p*ro land planning and anti red tape*) present a more positive view and consider that environmental conscience is important and present in local society.

Both discourse A and B are concerned with the decline of marine resources (fig.2); discourse C and D are not - their view is more directed at administrative and *red tape* economic issues, while the others present a clear concern about environmental issues. However, discourse A and D present a shared concern with the lack of control in terms of depletion of marine resources.

Houses on the Ria Formosa's barrier islands are an important topic that has been discussed for many years. It represents an important area of conflict between local people and governance. Earlier actions have failed to eliminate or decrease urban occupation on the island. The present work shows that this might continue to be an area of conflict because only discourse A (fig. 2) positioned the related statement (17) in a positive position; all other discourses considered it a minor concern.

The possible lack of organization of tourism activities (fig. 2), in terms of areas used is a concern for discourses A and D and a minor concern for discourses B and C. The existence of black markets seems a concern only for discourse B, while fisheries are a concern for discourses B and C, connected with the importance of economic development.

Discourse C was the only discourse that considers ecotourism (fig. 3) a minor concern. However all discourses agree that nature tourism is, at the moment, well regulated and that limiting tourist development is important.

Bureaucratic issues (fig.4) are the main concern for discourse C and a minor concern for discourse A. Concern with cultural heritage is also a major concern for discourse C and, to a lesser degree, Discourse B; the remaining discourses consider it of intermediate concern.

Waste water Treatment Plants are a major concern for discourses C and D. The lack of integration (fig. 5) is a major concern only to discourse D. Figure 5 shows statements that are agreed upon by all discourses. The development of tourism activities linked with traditional activities is not considered an important issue, and environmental tax is not well accepted.

All discourses consider protection of marine resources important and environmental education for adults is considered an intermediate concern.

D. POLIS action plan 2008-2012: comparison

The existence of too many institutions managing the Ria Formosa is considered an important issue for most of the discourses identified. Discourse C and D are very concerned with integration and organization. These discourses are defined mostly by government workers. The POLIS action plan is managed by a new institution created solely for this purpose: Sociedade de Requalificação e Valorização da Ria Formosa SA. This strategy might not be well accepted, mainly by stakeholders connected with governmental institutions that might consider this as yet another institution. In order to overcome this possible barrier, a well organized and sensible interface should be defined by the Sociedade de Requalificação e Valorização da Ria Formosa SA and all other institutions involved.

FIGURE 2

Agreement and disagreements using discourse A as reference.

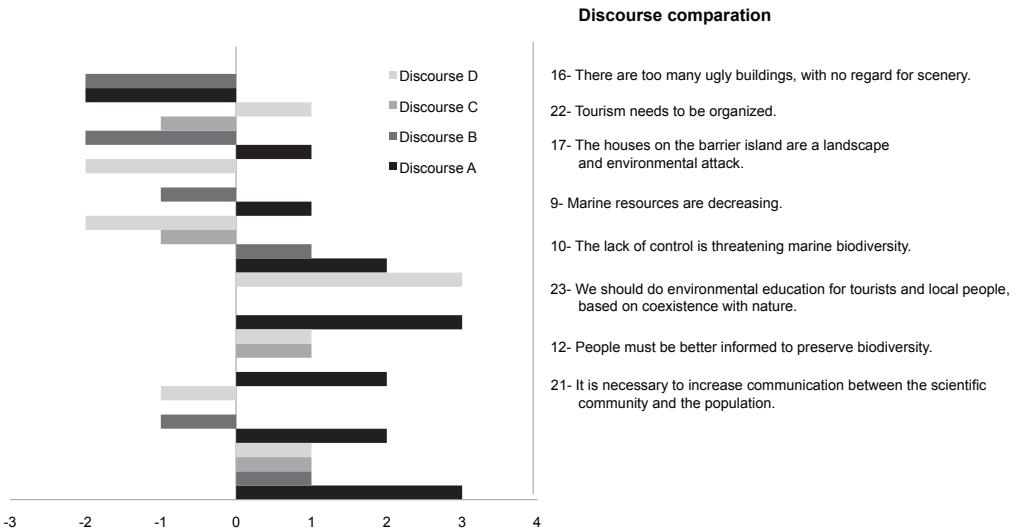


FIGURE 3

Agreement and disagreements using discourse B as reference.

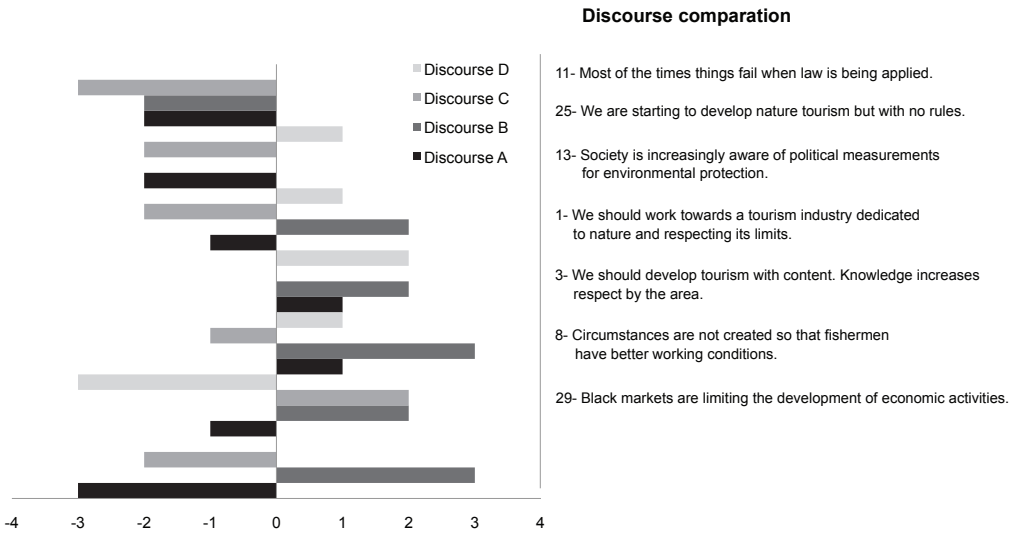


FIGURE 4

Agreement and disagreements using discourse C as reference.

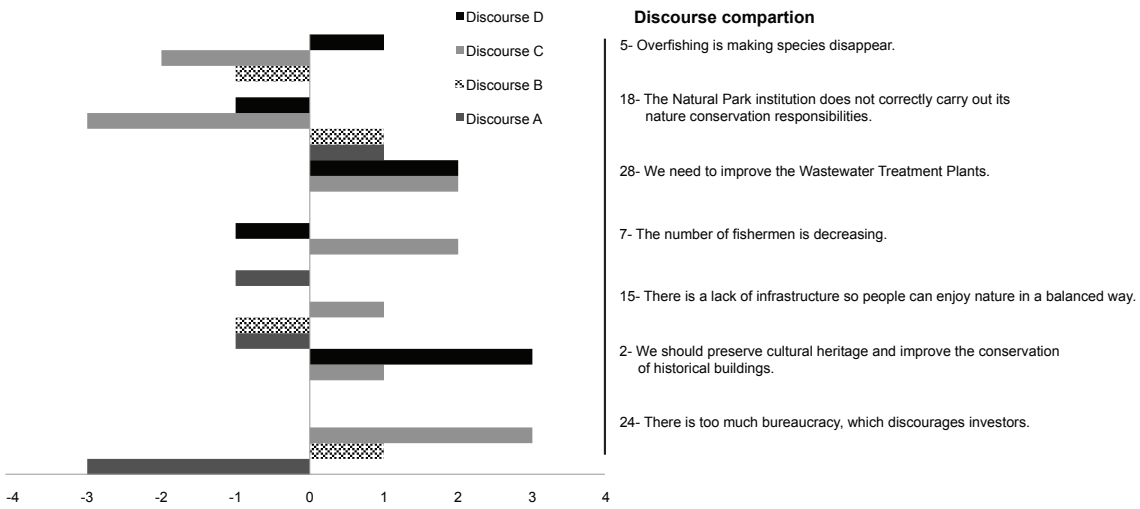


FIGURE 5

Agreement and disagreements using discourse D as reference.

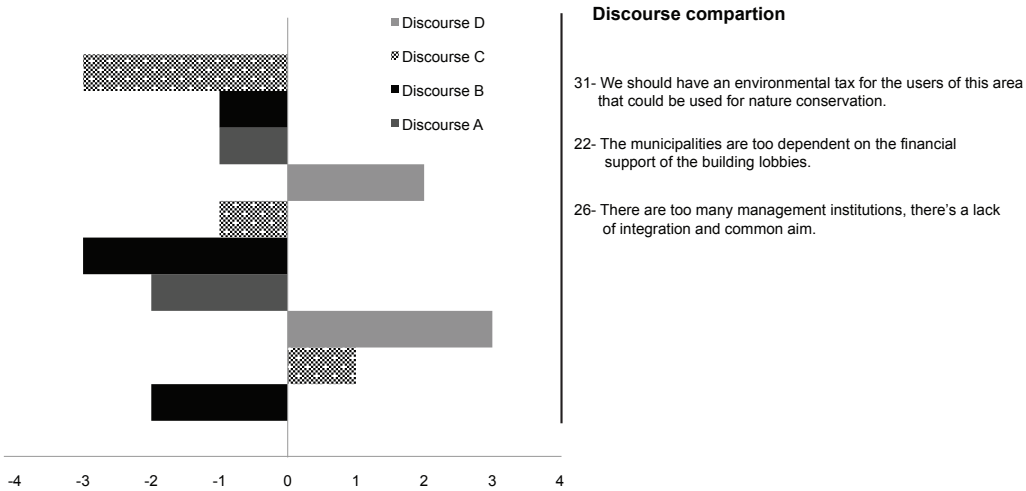
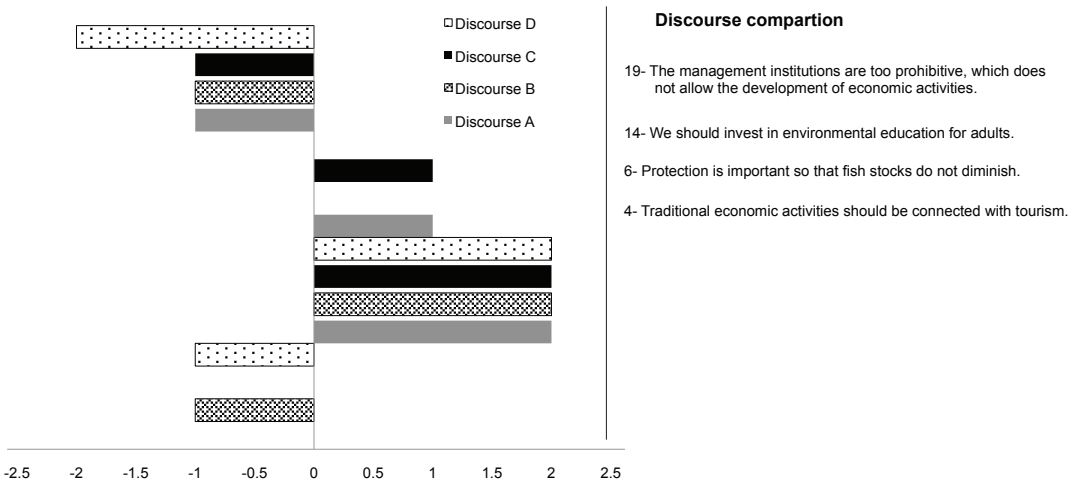


FIGURE 6

Statements that are consensual to all discourses. All listed statements are non-significant at P > 0,1.



Natural and cultural heritage have been identified by stakeholders and their importance highlighted by discourses B and C. POLIS-2008 defines several communication and dissemination strategies for the Ria Formosa's natural and cultural values. In addition, marketing strategies are going to be developed to increase tourist activities connected with goods and services from the Ria Formosa, which Q sort analysis also revealed as a positive move.

POLIS also includes investment in the demolition of built areas on the barrier island. The aim of this project is to combat erosion problems and risk situations and need to reestablish the dune system. However, as mentioned previously, houses on the barrier island are considered a minor issue for most of the discourses and can be a major area of tension between local society and management institutions, as it has been for many years. Bearing this in mind, residents who will be affected by these measures should be identified and an advance period of communication and negotiation should be established.

Investment in waste water treatment plants has also been pointed out in the analysis and is also included in POLIS-2008.

Protection of marine resources is commonly considered important and POLIS-2008 includes several investments that can promote it: coastal monitoring activities linked to geographic information systems and environmental quality control, among other strategies.

Various actions are planned to improve working conditions in the fisheries sector, which has also been an identified concern.

In addition, several investments are planned to increase infrastructure for enhancing contact with nature, a concern also identified by Q analysis.

POLIS appears to respond to several concerns identified by this stakeholder analysis, which bodes well for its acceptance within the Ria Formosa community. However, communication and information strategies should be developed in order to guarantee the success of the overall project, especially the parts that involve demolition actions.

IV.Conclusions

This study clearly shows the diverse perspectives for the future development of the Ria Formosa coastal zone. This leads to the conclusion that there is no one 'right' way of defining a future strategy for coastal management. The identification of four distinct discourses underlines the complexity of the concept.

Use of Q-methodology allowed the generation of statistically significant results with the use of only a small sample of participants and its participant-driven nature minimized research bias. Despite the distinct advantages of Q methodology, the initial stages of research design (carrying out interviews, generating and carefully selecting the statements) are very

intensive and time-consuming for the researcher. Consequently, the study suggests that it might not be possible to agree on one definitive method for stakeholder analysis. Instead, those needing to use such an assessment should not restrict themselves to following one of the identified views, but rather they should use a combination of criteria. We should recognize that different methods need to be used and that any measurements will only ever provide partial evaluations of the overall system. Perhaps it is more important to open political and participatory avenues to achieve effective strategies, coupled with legal and scientific measures for promoting a cleaner environment.

V. Acknowledgements

Thanks are due to the people that live and work along the Ria Formosa lagoon system and who openly shared information. This paper was greatly improved by the critical and insightful reviews of Margarida Castro, Tomaz Dentinho, Simon Connor and Alyne Delaney. This project was supported by the MarBEF (Marine Biodiversity and Ecosystem Functioning) project.

VI. References

Addams, H., Proops, J. (2000), Social Discourse and Environmental Policy: an Application of Q Methodology, Cheltenham Edward Elgar Editor

Andrade C. (1990), O Ambiente de Barreira da Ria Formosa, Departamento de Geologia da Universidade de Lisboa, PhD thesis, Universidade de Lisboa.

Boyle, K.J., Bishop, R.C. (1985), The total value of wildlife resources: conceptual and empirical issues, Invited paper, Association of Environmental and Resource Economists Workshop on Recreational Demand Modelling, Boulder, Colorado, 17–18 May

Brown, S.R. (1980), Political Subjectivity: Applications of Q-methodology in Political Science, New Haven and London, Yale University Press, pp. 5-6

Brown S.R. (1993), A primer on Q methodology, Operant Subjectivity: Journal of the International Society for the Scientific Study of Subjectivity, 16, pp. 91-138

Brown S.R. (2002), Q technique and questionnaires. Operant Subjectivity: Journal of the International Society for the Scientific Study of Subjectivity 25, pp. 117-126

Garcia, R. (2004), Sobre a Terra, Lisboa Público Edition

Guimarães M.H., Cunha A., Marques J., Nzinga R. (2010), Implications of clam farming and stakeholder's perception on the *Zostera noltii* cover distribution in Ria Formosa (southern Portugal), Ocean & Coast Management (submitted)

Michler T. (2003), Management of Marine Bio-Resources -A Comparative Study of Three European Coastal Areas, Master Thesis, Oldenburg, Alemanha: Universidade Carl Von Ossietzky

Praça, G. (2004), A performance do conhecimento local: o caso do viveirismo de bivalves na Ria Formosa, VIII Congresso Luso-Afro-Brasileiro, Coimbra 16 a 18 de Setembro

POPNRF (Plano de Ordenamento do Parque Natural da Ria Formosa), Resolução do Conselho de Ministros nº78/2009, Diário da República 1ª série – Nº 170 – 2 de Setembro 2009, 250 pp.

POLIS (2008), Sociedade para a Requalificação e Valorização da Ria Formosa SA.

Smith N.W. (2001), Current systems in psychology: history, theory, research, and applications. Wadsworth Edition

Stephenson, W. (1953), The Study of Behavior: Q-technique and its methodology, Chicago, University of Chicago Press

Van Den Belt, M., Videira, N., Antunes, P., Santos, R., Gamito, S. (2000). Modelação Participada na Ria Formosa, Edição Fundação do Mar. Lisboa, Portugal

Watts, S., Stenner, P. (2005), Doing Q methodology: theory, method and interpretation. Qualitative Research in Psychology 2 (1), pp. 67-91.

PERFORMING ARTS PARTICIPATION IN SMALL URBAN CENTRES: THE THEATRE OF VILA REAL

João Rebelo - DESG da Universidade de Trás-os-Montes e Alto Douro - Departamento de Economia, Sociologia e Gestão - jrebelo@utad.pt
Lívia Madureira - DESG da Universidade de Trás-os-Montes e Alto Douro - Departamento de Economia, Sociologia e Gestão - lmadurei@utad.pt
Artur Cristóvão - DESG da Universidade de Trás-os-Montes e Alto Douro - Departamento de Economia, Sociologia e Gestão - acristov@utad.pt
Leonida Correia - DESG da Universidade de Trás-os-Montes e Alto Douro - Departamento de Economia, Sociologia e Gestão - lcorreia@utad.pt

Resumo:

Tal como sucede na maioria dos países desenvolvidos, em Portugal, mesmo em pequenos centros urbanos, a oferta de artes performativas tem vindo a aumentar, devido à construção de novas estruturas culturais públicas. O elemento crucial para a sobrevivência e alcance da missão das instituições culturais, em especial das mais recentes, reside na captação e manutenção de audiências. O principal objectivo deste artigo é indagar da influência de variáveis relacionadas com o perfil social e económico na presença e frequência de artes do espectáculo, tomando como exemplo o Teatro de Vila Real. Para o efeito são estimados modelos microeconométricos de escolha discreta. Os resultados indicam que um aumento da audiência de artes performativas está, sobretudo, relacionado com a elevação do nível educacional e a oferta de um serviço de proximidade.

Palavras-chave: Cultura, artes de espectáculo, participação, microeconomia.
Códigos JEL: C25, D12, Z11

Abstract:

Like in most developed countries, in Portugal, even in small urban centres, the supply of performing arts has been growing, due to the construction of new public cultural facilities. However, the main factor determining the survival and sustainable success of cultural institutions, especially to the new entrants, is their ability to capture and keep audiences. The main aim of this paper is to explore the influence of a set of socio-economic variables in the awareness and attendance at performing arts, taking as example the Theatre of Vila Real. In order to achieve this aim, a micro-econometric model of discrete choice is used. The results indicate that the increase in audiences for the performing arts is primarily related to the public's educational level and to the proximity of the facilities.

Keywords: Culture, performing arts, participation, microeconomics.
JEL Codes: C25, D12, Z11

1. Introduction

In Portugal, like in other countries, in spite of the growing public support to performing arts, by both the state and local entities, there are still great disparities in its consumption according to different social groups and regions.

During the last 40 years, and as a consequence of the pioneering work by Baumol & Bowen (1966), the empirical evidence shows that the attendants for the performing arts have higher incomes, are better educated, with a high social status, and that both supply and demand for culture are more intense in urban areas with larger populations.

Based on the new theory of consumer choice, Stigler & Becker (1977) suggest that personal satisfaction resulting from the consuming of arts depends not only on the price, the income and taste, but also on factors such as the individual's previous artistic experience, knowledge of arts, education level and family background. The higher the experience and familiarity of the people with arts, the higher is their rate of satisfaction resulting from a certain level of arts' consumption.

Recent literature on performing arts attendance following an econometric approach (e.g. Gray, 2003; Borgonovi, 2004; Favaro & Frateschi 2007; Seaman[1], 2008) appears to confirm prior evidence, highlighting education, income and residence in urban and metropolitan areas as significant demand determinants.

In the Portuguese case, mainly as a result of recent high levels of public investment in theatres, cinemas and other cultural spaces, the supply of cultural products and services in many small towns and cities has been growing and widening, in contrast to the marked tendency in big urban centres – particularly in Lisbon and, to a lesser degree, in Oporto – for cultural infrastructures, facilities and operators to become more concentrated (Fortuna *et al.,* 1999). Thus new cultural infrastructures have appeared, at different moments, in many of the smaller urban centres of the country. One such example is the establishment of the Theatre of Vila Real (TVR), a small municipality with 50.000 inhabitants located in an Inland and low density region, Trás-os-Montes and Alto Douro, which is characterised by a development lag comparatively to Portuguese Coastal areas. The TVR had its official opening in March 2004, and occupies an area of 9.600 m^2. It is equipped with diversified spaces, ranging from auditoriums (big, small and open air), a games and play room *(ludoteca)*, a bar with live music performances, a bar-gallery, foyer, exhibition room, rehearsal room and storage. Performances in a wide range of the arts (theatre, music, dance and opera) take place in the auditoriums. The cultural events provided in the bar are mainly of musical nature.

The opening of the TVR has created opportunities for the city and region to develop a new centrality and capacity for attracting people. The TVR has become, in a short period of time, a public space for social meetings or, using Fortuna's words (1999), a "place for the public expression of social life". In a way, it can also become an important ingredient in the construction of the Vila Real's identity, of the collective self-esteem of its inhabitants and of the way they and their city present themselves externally.

Once cultural infrastructures have been created, the immediate issue is how to attract and maintain audiences with different social and economic profiles. For an institution that provides cultural products or services, either having a public or private organisational structure, the determining element in its survival will be the existence of a public, since it needs to generate revenues both from ticket sales to clients, and to obtain public or private sponsorship (Escaleira, 2001). Without audiences the organisation will be unable to fulfil its basic mission.

The attraction of new audiences, while maintaining the existing ones requires greater investments, as in the last decades, due to the exponential growth of information technology, there have been changes in people's lifestyles, tastes[2], attitudes, forms of cultural

[1] This paper includes a comprehensive revue of empirical studies on demand for performing arts. For Seaman (2008) during the last four decades, in spite of the contribution of sociologists, psychologists, marketing experts, as well economists, to the analysis of demand and participation for the performing arts, this remains an issue deserving further economic research.

[2] For instance, as arts education is now given less importance in the national educational system (basic, secondary and even university), there is some fear that the younger generation, as a consequence of the shifts both in demographic trends and cultural tastes, will be unable to fill the gap resulting from the decreasing number of adults who constitute both performers and audiences in the contemporary market for cultural products and services.

participation, and even in the methods by which tickets are purchased (Bernestein, 2007). These changes challenge cultural organizations to define a new vision of their business, giving a greater emphasis to the relationship with present and potential attendance in a way to provide customers' current and future needs and preferences. The potential range of the latter suggests that organisations should determine the products/services they intend to supply based on coherent plans and strategies for their artistic and public missions. Thus, they should conceive and execute marketing plans that imply, among other things, undertaking market research, clearly identifying target markets, building a readily identifiable brand, using new communication technologies, and offering services appropriate to each of the market segments.

Overall, in order to fulfil the essential conditions of the organisation's mission, the main aim has to be the presentation of high quality events, assuming that the ultimate objective of the artistic experience is the communication between artists and the audience. Without audiences there is no justification for the existence of either the arts or artists. Effective marketing is an absolute prerequisite for success and, to achieve a consistent and solid success, managers of cultural facilities have to continuously supervise their market environment (both supply and demand) and be aware of current and future market preferences.

For the new entrants and relatively inexperienced cultural institutions, such as the TVR case, it is particularly important to build a correct perception of the extent to which it has penetrated the market, i.e. to discover how well-known it is in its area of influence, by whom it is acknowledged and attended by and which physical facilities and products and services are most valued.

Having in mind the literature review and that the cultural attendance by the consumers is a sequential and learning process that starts by the awareness of the physical infrastructure and ends with the attendance at the performing arts events, this research analyses the influence of people's social and economic characteristics on the TVR awareness, presence, and attendance. Using a micro-econometric analysis approach, its main objective is to explain the differences in behaviour between the current and potential users of the TVR, as reflected in variables related with socio-economic profile, place of residence and experience in frequenting performing arts events.

The paper is organized as follows: section 2 contains the data and model; section 3 presents the results; and, finally, section 4 includes some final remarks.

2. Data and model

The data used in this study were collected in 2007 via 1,000 telephone[3] questionnaires for a study entitled "Theatre of Vila Real 2007 – The Views of the Region's Inhabitants" (Rebelo *et al*., 2007). The sample universe was constituted by people aged 16 or over, living in houses with home telephone connections and in the municipalities included within the previously defined geographical area of influence of the TVR. Those contacted totalled 1,000 individuals, selected using the share method, applied in two phases. Firstly, shares by municipalities were imposed, and afterwards, for each home, shares defined by gender and age were used to select the individuals asked to respond. The final shares were constituted based on the information collected on the last population census made by Portugal's National Institute for Statistics (INE, 2001), maintaining the proportion by municipality.

The 1,000 questionnaires were applied across the various municipalities according to each municipality's resident population in relation to the total population of the TVR's area of influence. Table 1 presents the distribution of the sample across the various municipalities, in percentage and absolute terms, as well as the respective maximum measurable sample error at the 95% confidence level (CL).

[3] The telephone interviews are much more advantageous for the administration of short and simple questionnaire: besides being much cheaper than personal interviews, they facilitate the collection of standardized answers (Lavrakas, 1998).

TABLE 1

Distribution of the sample across municipalities of TVR´s area

Counties	Resident population	Percentage in the sample	Sample observations	Max. error (%) 95% CL
Alijó	14320	5.9	59	12.8
Chaves	46667	18.0	180	7.3
Lamego	28081	11.6	116	9.1
Mesão Frio	4926	2.0	20	21.7
Mirandela	25819	10.6	106	9.5
Murça	6752	2.8	28	18.6
Peso da Régua	18832	7.8	78	11.1
Sabrosa	7032	2.9	29	18.2
Santa Marta de Penaguião	8569	3.5	35	16.5
Valpaços	19512	8.0	80	10.9
Vila Pouca de Aguiar	14998	6.2	62	12.5
Vila Real	49957	20.6	207	6.8
TOTAL	**245465**	**100**	**1000**	**3.1**

Note: Rebelo *et al.* (2007: 33).

The selection criterion used originated a total sample with a maximum statistical error of 3.1%, at 95% confidence level, which corresponds to an acceptable degree of precision for the analysis of the information concerning the resident population in the area of influence of the TVR.

In a second phase, the sample was formed by selecting the homes to be contacted in each of the municipalities. To do that, shares defined by gender and age were applied, according to the respective proportions of these variables in each of the sample municipalities in the Census of 2001 (INE, 2001). The choice of those to be surveyed in each sub-sample, by gender and age, was consistently made in a random fashion, for each of the municipalities. The selection of the houses to be interviewed was likewise made randomly.

Table 2 shows the distribution of those surveyed in the total sample, by gender (52% female and 48% male) and age groups. The respondents have an average age of 45.3 with a range between 16 (minimum) and 86 (maximum) years old, with a relative dispersion of 41% (coefficient of variation). The modal class is the one corresponding to 41-65 years, and the groups between 26 and 65 years old represent 60.4% of the sample.

The questionnaires provided dichotomist information on the variables “Awareness of the TVR”, “Presence at the TVR”, “Frequency of attendance at performing arts events (theatre, dance and music)” and “Participation in the Events of the Live Music Bar”, as well as on respondents’ social-economic profile, among others. Table 3 presents the statistical data on the variables considered in the econometric models.

TABLE 2

Distribution of the sample by gender and age group

	Number	%
Gender		
Female	520	52.0
Male	480	48.0
Total	**1000**	**100**
Age group (years)		
16 to 18	85	8.5
19 to 25	87	8.7
26 to 40	240	24.0
41 to 65	364	36.4
More than 65	224	22.4
Total	**1000**	**100**

Note: Rebelo *et al.* (2007: 34).

TABLE 3

Variables used in the econometric model

Variable		Description	Answers 1	
			Number	%
Y_1	Awareness	= 1 if has already heard about TVR; 0 if not	633	63.3
Y_2	Presence	= 1 if has visited TVR; 0 if not	254	25.4
Y_{3a}	Theatre	= 1 if has attended theatre at TVR; 0 if not	140	14
Y_{3b}	Dance	= 1 if has attended dance at TVR; 0 if not	77	7.7
Y_{3c}	Music	= 1 if has attended music concert at TVR; 0 if not	132	13.2
Y_{3d}	Live music bar	= 1 if has attended live music at TVR bar; 0 if not	92	9.2
Y_4	Frequency	= 1 if frequency of cultural events is positive; 0 if not	206	20.6
X_1	Gender	= 1 if is male; 0 if not	480	48
X_2	Children	= 1 has children <12 years old; 0 if not	288	28
X_3	Age	Years old (average of 45.3)		
X_4	Student	= 1 if is not student; 0 if student	888	88.8
X_{4a}	Self-employment	= 1 if is self-employed; 0 if not	146	14.6
X_5	Professional status	= 1 if holder of high ranking intellectual/scientific post; 0 if not	99	9.9
X_6	Educational level	= 1 if has primary education incomplete; 2 if has primary education completed; 3 if has secondary education completed; (…); 9 if is holder of Master's degree or PhD (average of 4)		
X_7	Internet access	= 1 if has access to internet; 0 if not	418	41.8
X_8	Attendance elsewhere	= 1 if attends such events elsewhere; 0 if not	275	27.5
X_9	Proximity	Distance in kilometres between Vila Real and the municipality where the respondent is resident (average of 47 km)		

Table 4 includes statistical information concerning to the 207 respondents living in the municipality of Vila Real. If compared with the total sample (Table 3), we observe that these respondents have a higher rate of awareness and attendance of the TVR. About 63.3% of the population aged 16 or over has already heard of the TVR, which is a significant number, taking into account the short period in which it has been functioning. Looking specifically at Vila Real, the proportion is overwhelming (96.6%), indicating that this cultural site has developed an undeniable visibility and importance to the town's inhabitants.

The proportion of people actually attending the TVR is much lower: only 40% of the people who are aware of the theatre's existence have actually visited it. For Vila Real residents this proportion reaches 73%. Ranking the attendance by type of event, in the total sample we have theatre (14%), music (13.2%), live music bar (9.2%) and dance (7.7%), with a total frequency of 20.6%. To those living in Vila Real, theatre and music have the same weight (47.3%) and are followed by live music bar (36.2%) and dance (29%), with a frequency of 65.7%.

Considering the explanatory variables, the main differences between the total sample and the residents in Vila Real are in the type of employment (self-employment), professional status (higher ranking), educational level (more educated), and internet access (higher level). The attendance level elsewhere is similar.

The maps 1 and 2 show the spatial distribution[4] of the awareness and attendance at the TVR. Predictably, Vila Real dominates. Nevertheless, there are both continuities and discontinuities in the distribution of awareness and attendance between different municipalities in the areas surrounding Vila Real. Basically, both variables (awareness and attendance) diminish as the distance from Vila Real increases, rather as if centrifugal forces were making awareness of and access to cultural infrastructure more difficult.

TABLE 4

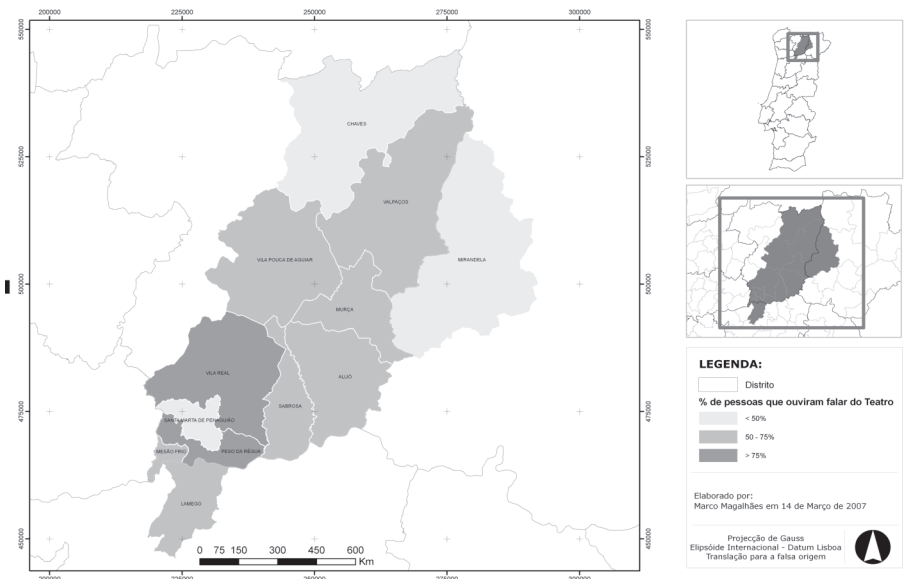
Statistical information of Vila Real (207 individuals)

Variable		Description	Answers1 (%)
Y_1	Awareness	= 1 if has already heard about TVR; 0 if not	96.6
Y_2	Presence	= 1 if has visited TVR; 0 if not	75.8
Y_{3a}	Theatre	= 1 if has attended theatre at TVR; 0 if not	47.3
Y_{3b}	Dance	= 1 if has attended dance at TVR; 0 if not	29
Y_{3c}	Music	= 1 if has attended music concert at TVR; 0 if not	47.3
Y_{3d}	Live Music Bar	= 1 if has attended live music at TVR bar; 0 if not	36.2
Y_4	Frequency	= 1 if frequency of cultural events is positive; 0 if not	65.7
X_1	Gender	= 1 if is male; 0 if not	47.3
X_2	Children	= 1 has children <12 years old; 0 if not	28.5
X_3	Age	Years old (average of 45.1)	
X_4	Student	= 1 if is not student; 0 if student	85.5
X_{4a}	Self-employment	= 1 if is self-employed; 0 if not	7.2
X_5	Professional status	= 1 if holder of high ranking intellectual/scientific post; 0 if not	17.9
X_6	Educational level	= 1 if has primary education incomplete; 2 if has primary education completed; 3 if has secondary education completed; (…); 9 if is holder of Master's degree or PhD (average of 5.5)	
X_7	Internet access	= 1 if has access to internet; 0 if not	58.4
X_8	Attendance elsewhere	= 1 if attends such events elsewhere; 0 if not	30.9
X_9	Proximity	Distance in kilometres between Vila Real and the municipality where the respondent is resident (0 for all respondents)	

[4] The distance between the municipality of residence and Vila Real ranges between a minimum of 0 km and a maximum of 80 km, with an average of 46.6 km and a coefficient of variation of 73.9%.

MAP 1

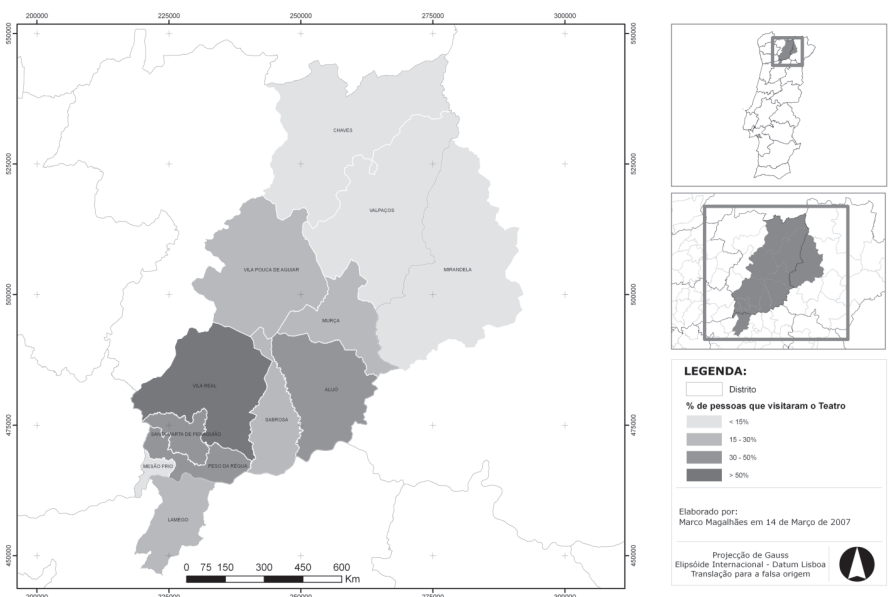
Spatial distribution of the TVR awareness



Note: Rebelo *et al*. (2007: 38).

MAP 2

Spatial distribution of the TVR presence



Note: Rebelo *et al*. (2007: 38).

Given that the main aim is to know if any of the explanatory variables (X) referred to in Table 3 influence individuals' awareness of the TVR, their having visited the TVR, or their having attended events at the TVR (the dependent variables, Y), the problem has to be solved using a binary choice model that employs categorical answers (i.e. Y = 1 or Y = 0); more specifically, the probit or logit models[5] (Greene, 2003):

$$\text{Prob } (Y = 1) = F(X, \beta) \quad (1)$$

$$\text{Prob } (Y = 0) = 1 - F(X, \beta) \quad (2)$$

The set of parameters β reflects the impact of changes in X on the probability of Y occurring; however, the marginal effect is not quantified in a direct way, as it is in the case of linear models (Greene, 2003).

In this paper, we present the estimation results obtained from using the probit model, in which:

$$\text{Prob } (Y = 1) = \Phi(\beta' X) \quad (3)$$

The $\Phi(.)$ is a commonly used notation for the standard normal distribution. A positive (negative) coefficient indicates that the probability change in the same (opposite) sense than the explanatory variable. If the coefficient in statistically non significant it means that changing the explanatory variable has no impact on the probability occurrence of the dependent variable.

3. Results

Table 5 shows the results of the estimations of the probit model for the different dependent variables. Each of the seven estimations[6] has overall significance

TABLE 5

Results of the Probit model estimations

	Awareness	Presence	Theatre	Dance	Music	Live music bar	Frequency
Constant	-0.27 (-1.07)	-1.15* (-4.22)	-1.31* (-4.28)	-2.11 (-5.63)	-1.12* (-3.48)	-0.84* (-2.29)	-0.83* (-2.91)
X_1 – Gender	0.16** (1.72)	0.06 (0.54)	-0.20 (-1.59)	0.09 (0.60)	0.05 (0.37)	-0.01 (-0.08)	-0.19 (-1.59)
X_2 – Children	0.07 (0.65)	0.20 (1.56)	-0.01 (-0.10)	0.05 (0.30)	-0.10 (-0.70)	-0.38* (-2.21)	0.09 (0.71)
X_3 – Age	0.00 (0.80)	0.00 (0.70)	0.00 (1.13)	0.00 (0.76)	-0.00 (-1.31)	-0.02* (-3.95)	-0.00 (-0.84)
X_4 – Student	0.11 (0.60)	-0.06 (-0.29)	-0.19 (-0.89)	0.24 (0.92)	0.19 (0.87)	0.49* (1.98)	0.00 (0.02)
X_{4a} – Self-employment	0.15 (1.21)	-0.20 (-1.36)	-0.11 (-0.66)	-1.20* (-2.76)	-0.51* (-2.18)	-0.15 (-0.60)	-0.23 (-1.43)
X_5 –Professional status	-0.26 (-1.08)	-0.09 (-0.47)	0.29 (1.53)	0.21 (0.95)	0.03 (0.16)	0.10 (0.44)	0.14 (0.71)
X_6 – Educational level	0.22* (6.80)	0.23* (6.77)	0.13* (3.58)	0.13* (2.75)	0.16* (3.92)	0.18* (3.48)	0.19* (5.21)
X_7 – Internet acess	0.11 (0.90)	0.36* (2.39)	0.38* (2.15)	0.25 (1.18)	0.18 (0.97)	0.04 (0.19)	0.34* (2.11)
X_8 – Attendance elsewhere	0.16 (1.42)	0.15 (1.25)	0.24** (1.83)	0.24 (1.59)	0.21 (1.51)	0.13 (0.83)	0.21** (1.63)
X_9 – Proximity	-0.02* (-9.35)	-0.04* (-13.62)	-0.03* (-10.12)	-0.03* (-7.32)	-0.04* (10.10)	-0.04* (-8.58)	-0.04* (-12.62)
Chi-squared (Signifi. level)	252.8 (0.00)	464.3 (0.00)	265.7 (0.00)	167.4 (0.00)	291.3 (0.00)	250.2 (0.00)	414.30 (0.00)

Note: Statistic t Student between parenthesis, excepting the significance level of Chi-squared statistic; * and ** indicate statistical significance of the parameter at 5% and 10% significance level, respectively.

[5] Although the two models provide different values for the regression coefficients, the signal and statistical significance of the parameter allow similar conclusions.

[6] Having in mind the potential consequences on the results (non-consistent regression estimators) originated by measure errors on the order variable "educational level", the same models were estimated assuming as dummy variables: primary education uncompleted, primary education completed, secondary education completed, higher education. The results (sign and significance of the regression parameters) and the conclusions were very similar to the models included in the text.

(the Chi-square has a high value), even though in each of the seven, the majority of the parameters, taken individually, is non-significant, according to the values of the t statistic.

According to the sign and significance of the respective parameters, we can infer that gender difference do not influence attendance at arts events, though male individuals have a higher awareness of the TVR's existence.

Having primary school-aged children does not seem to constrain people from attending performing arts events, with the exception of the live music in the TVR's bar, which is less attended by parents with younger children. Similar conclusion is obtained in relation to the variable "age", which has only statistical significance, with negative signal, in the model with dependent variable "live music bar", i.e., the older are the people the lower is the probability to attend the TVR´s live music bar.

When compared to other categories among the individuals surveyed, it appears that the only distinction attributable to students is with regard to their greater attendance at live music bar events, once to all other events the parameter is statistically non-significant. This result shows that the TVR has been unable to attract students to its other performing arts offerings, in spite of the large number of students living in the city, most likely attending the University of Trás-os-Montes and Alto Douro, whose main campus is situated in Vila Real.

Although the coefficient associated with the variable "self-employed worker" is negative with regard to all types of events, only dance and musical ones have a statistically significant coefficient; that is, the probability of this category of worker attending any performing arts events is lower than for other categories.

Having high-level intellectual/scientific employment do not affects attendance at theatrical events, with the corresponding coefficients of all events having no statistical significance.

As for education, there is no doubt that there exists a clear relationship between formal education and attendance at artistic events: the higher the former, the greater the latter.

Those individuals whose responses indicated that they had internet access were more likely to be present and to frequent all events at the TVR. Taken separately, these respondents showed evidence of greater attendance at theatre events.

Although the variable "attendance at events elsewhere" reflects, *a priori*, diversified and pre-existing cultural behaviour, in the case of the TVR this is the only variable that has a positive influence (with a coefficient that was significant at the 10% level) on attendance at theatrical events (in particular) and on attendance at the entire range of the TVR's cultural offerings.

The sign and significance of the coefficients relating to the variable "distance in kilometres between Vila Real and the municipality where respondent is resident" clearly indicate that the farther the cultural supply is, the weaker the participation, confirming that the supply of cultural activities represents, undoubtedly, a proximity service[7].

4. Final remarks

Who is aware of the TVR and attends its events? This was the empirical question with which this research started. The survey results are clear: in the defined area of influence, constituted by the municipality of Vila Real and 11 other municipalities located around it, there is no doubt that as one moves progressively further away from Vila Real, fewer people know of the existence and attend the TVR.

Taking into account the econometric results, with regard to the social-economic profiles, the conclusions do not vary significantly from those obtained in other studies of cultural goods and services (e.g., Borgonovi, 2004), especially those relating to live performing arts events. More specifically, when we try to evaluate the impact of key social-economic traits on the decision to attend the cultural activities promoted by the TVR, we find that the main determining variables are their academic level and the distance between their place of residence and the TVR, with the remaining variables having impact in none or only in some of the events. That is, the rise in the audiences of performing arts events is strongly influenced by the academic level and by the supplying of a proximity service.

[7] Similar result is obtained if the quantitative variable "distance" is replaced by a dummy variable that assumes the value 1 if the respondent is resident in Vila Real and 0 if not.

Based on the analysis developed in the paper, it is possible to infer some guidelines that can help to consolidate the TVR's marketing efforts and to fully achieve its mission and become a cultural facility with spillover effects and a relevant importance for regional economic development. Among these guidelines we would emphasise: (1) the importance of policies aiming to promote greater knowledge of the TVR outside Vila Real, with a view not only to gaining greater regional – i.e. not only local – visibility, but also consolidating established audiences; (2) the necessity of developing a strategy of consolidating the TVR's public and the attraction of new attendees, with particular focus on students and young people, but without forgetting all the age groups of the target population; and (3) the importance of establishing a networked and cooperative effort linking cultural and educational institutions in the immediate vicinity of the TVR and beyond, i.e. by creating scale and scope economies. In summary, a strong marketing strategy, more and better network efforts and cooperation, and an intensive focus on educational initiatives seem to constitute the three central pillars of any future cultural programme.

In line with the major lines of thought underpinning current EU efforts to establish a dynamic and competitive knowledge-based economy, future analysis of the socio-economic effects of the TVR must focus on the existing and potential synergies between culture, knowledge and economic development, and the potential that the corresponding facilities and institutions have to promote more innovative and creative services and activities, capable of generating spillover effects. This view is emphasised in the strategic plan for Portugal's Northern Region to the year 2015, in which "culture has a well-established and significant role in the production of territorial identities and the generating of social interaction, in the production of new logics of innovation, and in the promotion of change and competitiveness" (CCDRN, 2006: 44). The linkage between cultural activities and local development is certainly an area deserving future attention and further research.

References

Baumol, W. and E. G. Bowen (1966). *Performing Arts: The Economic Dilemma*. Cambridge, MA: Twentieth Century Fund.

Bernestein, J. S. (2007). *Arts, Marketing Insights. The Dinamycs of Building and Retaining Performance Arts Audiences.* San Francisco: John Wiley & Sons, Inc.

Borgonovi, Francesca (2004). "Performing arts attendance: an economic approach". *Applied Economics*, 36, pp. 1871-18885.

CCDRN (2006). *Norte 2015, Competitividade e Desenvolvimento: Visão Estratégica.* Porto: Autor.

Escaleira, J. J. P. (2001). *No Palco, entre o Mercado e o Estado – Reflexões sobre a Economia das Artes do Espectáculo, numa Viagem pela Economia Industrial, na Companhia de Políticas Públicas, Aplicação ao Caso Português. Tese de Doutoramento em Economia (não publicada).* Porto: Faculdade de Economia da Universidade do Porto.

Favaro, D. and C. Frateschi (2007). A Discrete Choice Model of Consumption of Cultural Goods: The Case of Music. *Journal of Cultural Economics*, 31: 205-234.

Fortuna, C. (1999). Introdução ao painel "Os Novos Espaços Públicos: Identidades e Práticas Culturais". *Revista Crítica de Ciências Sociais*, Nº 54, pp. 139-148.

Fortuna, C., C. Ferreira and P. Abreu (1999). "Espaço Público Urbano e Cultura em Portugal". *Revista Crítica de Ciências Sociais*, Nºs 52-53, pp. 85-118.

Gray, Charles M. (2003). Participation. *A Handbook of Cultural Economics*, edited by Ruth Towse, Edward Elgar, Cheltenham, UK: 356-365.

Greene, William (2003). *Econometric Analysis*. Fifth Edition, New-Jersey: Prentice Hall – Pearson Education.

INE (2001). *Censos 2001: Resultados definitivos, Norte: XIV Recenseamento Geral da População; IV Recenseamento Geral da Habitação.* Lisboa: Instituto Nacional de Estatística.

Lavrakas, P. (1998). Methods for Sampling and Interviewing in Telephone Surveys. *In* Bickman, Leonard e Debra J. Rog (Eds.), *Handbook of Applied Social Research Methods*. London & New Deli: Sage Publications.

Rebelo, J., A. Cristóvão and L. Madureira (2007). *Teatro de Vila Real – Visão dos Residentes da Região*. Vila Real: Teatro de Vila Real.

Seaman, Bruce A. (2008). Empirical Studies of Demand for the Performing Arts. *Handbook of the Economics of Art and Culture*, edited by Victor A. Ginsburgh and David Throsby, Elsevier, North Holland: 415-472.

Stigler, George J. and Gary S. Becker (1977). "De Gustibus Non Est Dispuntandum". *American Economic Review*, 67 (2): 76-90.

O PROCESSO DE AVALIAÇÃO AMBIENTAL ESTRATÉGICA: O CASO DA REDE RODOVIÁRIA NA REGIÃO DO CENTRO INTERIOR DE PORTUGAL

Jorge Gonçalves - IST-CESUR - E-mail: jorgeg@civil.ist.utl.pt
Ana Roxo - Atkins Portugal - E-mail: aroxo@wsatkins.pt
Paula Rodrigues - EP-Estradas de Portugal - E-mail: paula.rodrigues@estradasdeportugal.pt
Maria João Oliveira - EP-Estradas de Portugal - E-mail: maria.oliveira@estradasdeportugal.pt

Resumo:

A necessidade de informar, numa perspectiva estratégica e integrada, a tomada de decisão relativa à opção da configuração da rede de itinerários complementares da Região Centro Interior foi reconhecida pela EP - Estradas de Portugal antes da transposição da Directiva 2001/42/CE, do Parlamento Europeu e do Conselho, de 27 de Junho, para o Direito Interno, ao lançar, no final de 2005, o concurso público para o "Estudo de Avaliação Estratégica para o Desenvolvimento da Rede Rodoviária Nacional na Região do Centro Interior (IC6, IC7 e IC37)".

Este estudo de sustentabilidade territorial ganhou novos contornos, com a instauração de um contexto legal para a Avaliação Ambiental Estratégica, decorrente da publicação do Decreto-Lei n.º 232/2007, de 15 de Junho, a que deveriam, portanto, sujeitar-se os cenários julgados pertinentes para a (re)definição da rede de Itinerários Complementares.

O processo de "Avaliação Ambiental Estratégica do Plano Rodoviário Nacional na Região do Centro Interior" centrou-se, assim, na elaboração de uma proposta de desenvolvimento da rede de Itinerários Complementares (IC6, IC7 e IC37) na zona da Serra da Estrela, no quadro mais vasto das acessibilidades regionais, considerando as dimensões sociais, ambientais e económicas. Enquadrado pelo DL n.º 232/2007, de 15 de Junho, ficou criado o contexto formal de oportunidade para a tomada de decisão informada sobre a eventual alteração ao Plano Rodoviário Nacional (PRN 2000).

Palavras-chave: Planeamento de acessibilidades, Desenvolvimento regional, Avaliação estratégica, Indicadores de impacto, Sustentabilidade territorial

Códigos JEL: R42, R48

Abstract:

The need to support the decision making concerning the choice of the *Centro Interior* secondary road's network, through a strategic and comprehensive approach, had been recognized by EP – *Estradas de Portugal* even before the transposition of Directive 2001/42/EC to the National Law. In fact, EP launched, late 2005, the public tender for the "Study for Strategic Assessment of the National Road Network in the Region of *Centro Interior* (IC6, IC7and IC37)".

This sustainability study gained new contours with the establishment of the legal framework for the Strategic Environment Assessment, following the publication of Decree-Law No. 232/2007, on June, the 15th which should therefore be subject to the scenarios considered relevant to the (re) definition of the complementary roads network. The "Strategic Environmental Assessment of the Region of *Centro Interior* National Road Plan" aimed to achieve the best proposal for the development of the complementary roads' network (IC6, IC7 and IC37) in *Serra da Estrela* region, having in mind the broader framework of regional accessibilities, and taking into consideration the social, environmental and economic components. Formally framed by Decree No 232/2007, this turned to be a strong opportunity to support a well-informed decision making on the possible amendment of the National Road Plan (NRP 2000).

Keywords: Accessibility planning, Regional development, Strategic Assessment, Impact indicators, Territorial sustainability

JEL Codes: R42, R48

1. O planeamento das infra-estruturas de transporte e o desenvolvimento regional e local

O traçado das infra-estruturas de transporte é, antes de mais, um problema que importa ao desenvolvimento nacional, regional e urbano e só depois deve surgir como um problema financeiro ou de engenharia. Esta constatação tem tido uma tradução nem sempre imediata e clara nas políticas territoriais e de desenvolvimento, evidenciando particulares dificuldades na transição da escala nacional para a regional. Por outras palavras, estando definidas, num patamar nacional, as ligações estratégicas em matéria de infra-estruturas de transporte entre destinos entendidos como nós relevantes foi, durante muito tempo, negligenciada a relevância dos efeitos do seu traçado ao nível intra-regional.

Em Portugal, o reconhecimento da importância de uma rede nacional de estradas com desenho estratégico data de 1889, criando as Estradas Reais (de âmbito nacional), as Estradas Distritais (de âmbito regional) e as Estradas Municipais (de âmbito local). Em 1910, por via da implantação da república, a antiga designação de "Estrada Real" foi substituída pela de "Estrada Nacional". O Plano de 1933 segmentou as estradas nacionais em 1ª e 2ª classe e o Plano Rodoviário Nacional de 1945 haveria de ser o responsável pelas actuais estradas nacionais, agora divididas em três categorias, constituindo as duas primeiras a rede fundamental. Dentro das estradas de 1ª classe, os números de 1 a 18 estavam reservados aos Itinerários Principais, correspondendo às estradas que ligavam as capitais de distrito entre si e a todas as estradas com origem em Lisboa e Porto.

A grande alteração chegou já muito após a revolução de 1974, com a aprovação do Plano Rodoviário Nacional de 1985 (Decreto-Lei 380/85, de 26 de Setembro). Na perspectiva da adesão de Portugal à Comunidade Económica Europeia, em 1986, aquele Plano repensou profundamente o sistema de infra-estruturas viárias passando a considerar a Rede Fundamental, constituída por Itinerários Principais (IP) e a Rede Complementar, constituída por Itinerários Complementares (IC) e outras estradas. Ficaram claras, também, as expectativas depositadas numa rede viária mais qualificada: "(...)Impõe-se, pois, a revisão do plano rodoviário nacional a fim de, na perspectiva do desenvolvimento orgânico do País, se alcançarem os objectivos primordiais, como o correcto funcionamento do sistema de transportes rodoviários, o desenvolvimento de potencialidades regionais, a redução do custo global daqueles transportes, o aumento da segurança da circulação, a satisfação do tráfego internacional e a adequação da gestão financeira e administrativa da rede (...)" (do preâmbulo).

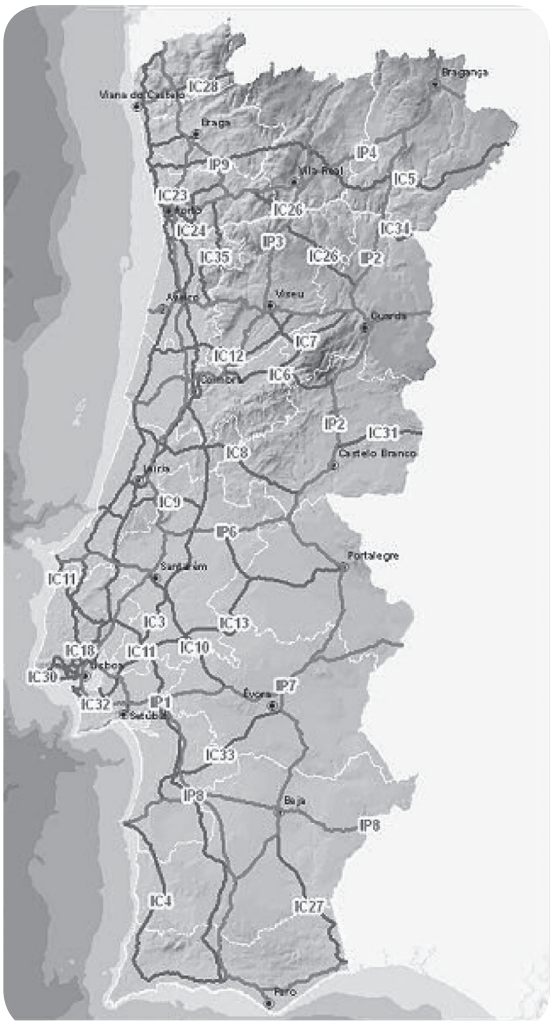
Este PRN85 foi alvo de uma ligeira reformulação no Decreto-Lei 222/98, de 17 de Julho, que publicou um novo Plano Rodoviário Nacional (PRN2000). Criou as Estradas Regionais, criadas a partir da reclassificação de parte das antigas Estradas Nacionais.

Na Europa, o grande impulsionador deste debate foi a acção desencadeada pelos investimentos comunitários no sentido de esbater os efeitos do contínuo alargamento da União Europeia (UE) sobre as assimetrias regionais no que respeita às oportunidades de desenvolvimento. Com efeito, as redes trans-europeias e os apoios financeiros ao abrigo dos fundos de coesão dirigidos para o esbatimento das desigualdades no seio da UE, introduziram, por um lado, maior racionalidade e coerência nos investimentos à escala europeia e, por outro, permitiu a densificação e qualificação das redes regionais. Os efeitos desta política comunitária no desenvolvimento económico nem sempre foram evidentes (Vickerman *et al.,* 1999), mas a discussão já vem de longe no âmbito comunitário (Keeble *et al.,* 1982), no contexto nacional (Linneker, 1996; Démurger, 2001) e, ainda, na dimensão regional (Rietveld, 1989).

Porém, este não tem sido um tema que se reduz quer à esfera das infra-estruturas rodoviárias, verificando idêntico grau de pertinência com a ferrovia clássica ou de alta velocidade (Gutierez *et al*., 1996), quer a preocupações exclusivamente europeias (Lakshmanan, 2001). É neste quadro que se avança, por iniciativa da Estradas de Portugal, EP, para uma reflexão estratégica em torno dos investimentos previstos no âmbito do Plano Rodoviário Nacional. Com efeito, o "Estudo de Avaliação Estratégica para o Desenvolvimento da Rede Rodoviária Nacional na Região do Centro Interior (IC6, IC7 e IC37)" que

FIGURA 1

Plano Rodoviário Nacional 2000



Fonte: http://www.estradasdeportugal.pt (visualizado em 17 de Maio de 2009)

esteve na origem do processo de Avaliação Ambiental Estratégica que aqui se descreve, propunha-se definir o cenário mais favorável para o desenvolvimento da rede rodoviária na zona da Serra da Estrela – região Centro de Portugal - tendo em conta a sustentabilidade do território e, portanto, atendendo a critérios, não só de natureza rodoviária (tráfego, desempenho da rede, rentabilidade financeira, etc.) mas também social, ambiental e de desenvolvimento económico.

Os termos de referência, que suscitaram o desenvolvimento da presente metodologia, sublinhavam desde logo a necessidade de proceder a uma análise integrada e de natureza estratégica de uma realidade marcada pela existência de uma imponente barreira natural composta pela Serra da Estrela, dificultando a sua transposição e impondo também, por isso, restrições ao desenvolvimento socioterritorial visíveis nas condicionadas relações funcionais entre as principais polaridades urbanas. De facto, "(...) *reconhece-se que a Serra da Estrela e área envolvente continuam a assistir ao fenómeno da desertificação populacional, com consequente degradação da base demográfica e das condições de urbanidade, bem como à persistência de um sistema urbano fragmentado (por um lado, o eixo consolidado de Castelo Branco/Fundão/Covilhã/Guarda e, por outro, a recente afirmação do eixo "Beira Serra" Gouveia/Seia/Oliveira do Hospital).*

Poderá afirmar-se, assim, que a definição da problemática em causa, em ordem à análise crítica do PRN 2000 na zona da Serra da Estrela, se encontra sintetizada no seguinte diagnóstico de partida:

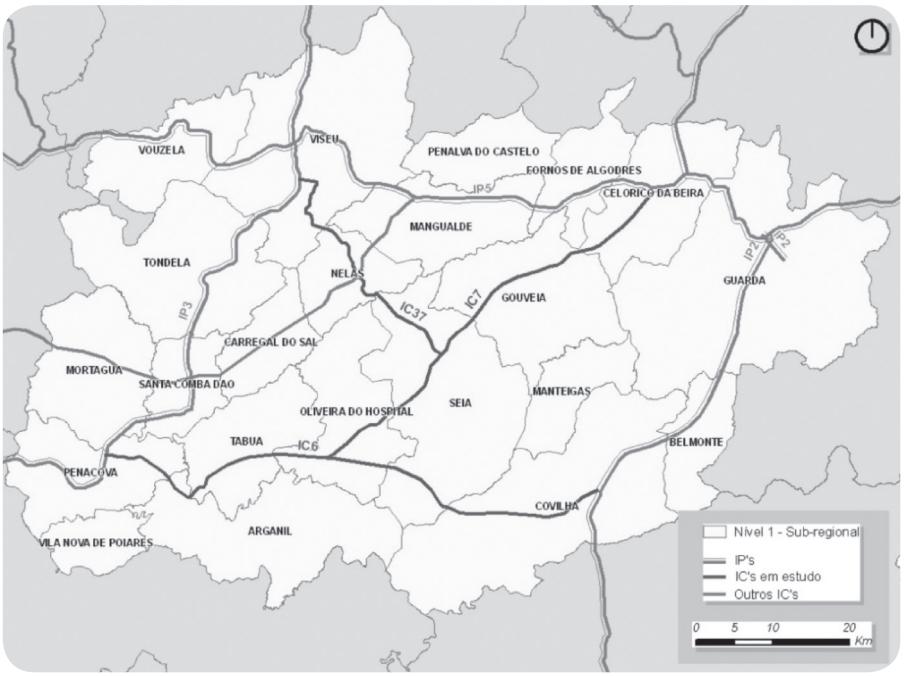
- *Serra da Estrela como barreira natural de difícil transposição (orografia; sensibilidade ecológica);*
- *baixo Grau de Execução do PRN na zona (IC6, IC7, IC37, IC12);*
- *fragilidade da base demográfica e sistema urbano fragmentado;*
- *emergência de transformações territoriais e do papel das cidades médias;*
- *novo contexto relativo a perspectivas e compromissos de desenvolvimento, em parte associado à consolidação do sistema de gestão territorial e ao processo de formalização de Planos e Programas de âmbito supramunicipal*." (*in* Termos de Referência, p. 8).

Considerando a natureza e objectivos da investigação em causa, de carácter sobretudo estratégico e associado a dinâmicas sociais, económicas e funcionais que não são circunscritas a um território, dificilmente se determinariam com segurança os seus limites físicos. Contudo, para que em termos práticos fosse possível proceder a uma análise do suporte territorial, houve que proceder a uma configuração da área de estudo que se ilustra na figura seguinte e que abrangeu 22 concelhos (cf. Figura 2).

O desenvolvimento dos trabalhos veio confirmar em absoluto os pressupostos enunciados nos documentos de concurso através de uma análise integrada e prospectiva da realidade que permitiu construir um leque muito alargado de indicadores que suportam estas afirmações. Iniciado por uma caracterização e diagnóstico da situação de partida e aprofundado, em seguida, por um extenso processo de avaliação de cenários, foi possível, complementarmente, introduzir novas temáticas e ampliar os contornos que determinaram o enquadramento do estudo.Os antecedentes do processo no âmbito do "Estudo de Avaliação Estratégica para o Desenvolvimento da Rede Rodoviária Nacional na Região do Centro Interior (IC6, IC7 e IC37)" forneceram os elementos de base para a compreensão do território, respectivas dinâmicas de evolução e a inserção da área de estudo num contexto mais global. Assim, em coerência com o trabalho desenvolvido, a EP – Estradas de Portugal elaborou o Relatório dos Factores Críticos para a Decisão, o qual estabeleceu o âmbito da AAE e delimitou os cenários finais a considerar para efeitos

FIGURA 2

Âmbito Territorial de Avaliação Sub-Regional



da avaliação a levar a cabo. Com este relatório procedeu-se à consulta institucional de um conjunto significativo de entidades da Administração Pública consideradas como Entidades com Responsabilidade Ambiental Específica (ERAE), cujas observações informaram a evolução dos trabalhos.

Na sua sequência foram, então, formalizados o Relatório do Plano, o Relatório Ambiental e o respectivo Resumo Não Técnico, que tiveram em conta três cenários de rede rodoviária para a Região do Centro Interior, tendo sido também submetidos ao procedimento de consulta (ERAE e pública), nos termos da legislação em vigor. Da apreciação da fase de consulta, quer às ERAE quer ao público em geral, surge o Relatório da Consulta, que resume e apresenta os resultados obtidos e sintetizados nesse período. O Relatório Final sistematiza e pondera, grosso modo, os contributos do trabalho técnico, da Consulta Pública e da Consulta de Entidades com Responsabilidades Ambientais Específicas, apontando para o Cenário Preferencial. O processo de Avaliação Ambiental Estratégica culmina com a opção relativamente à necessidade ou não de alteração do PRN, em função do cenário adoptado, e emissão da Declaração Ambiental.

No Quadro 1 sistematizam-se as diferentes fases do processo, conteúdos e produtos resultantes.

2. Avaliação de base estratégica

2.1 Abordagem metodológica

Por definição, uma avaliação estratégica visa fornecer informações que permitam integrar, num sistema compreensivo e de forma preventiva, o tratamento de diversas componentes no processo de planeamento. Constitui-se, fundamentalmente, como um instrumento de apoio à tomada de decisão técnico-política, criando as bases que fundamentem as opções de planeamento e programação, assegurando a sua coerência interna e permitindo, em complemento, prever os instrumentos que garantam a minimização dos eventuais efeitos negativos e/ou a potenciação dos seus resultados positivos. Centra-se numa comparação de carácter relativo entre os diferentes cenários, tendo como pano de fundo um determinado quadro de referência e uma realidade de partida, seus constrangimentos e potencialidades.

Em termos metodológicos, envolve um julgamento relativo à possibilidade de ocorrência de um determinado efeito e à previsão do seu significado, benéfico ou prejudicial, sobre o meio receptor e suas dinâmicas tendenciais, considerando o comportamento de cada cenário face aos Factores Críticos atrás definidos. As previsões decorrentes desta avaliação podem não ter um carácter quantitativo, sendo as abordagens de carácter qualitativo consideradas válidas e apropriadas. Baseia-se numa análise pericial integrada ou seja, assenta no juízo técnico, por parte de peritos, cobrindo todas as áreas de análise julgadas pertinentes e para as quais exista informação disponível, pressupondo a discussão alargada ao conjunto de especialistas envolvidos de forma a abranger todo o universo de sensibilidades.

No início dos trabalhos deram-se passos com significado relevante para o processo de cenarização. Logo nos primeiros momentos abordou-se o enquadramento estratégico dos cenários a

QUADRO 1

Etapas do Processo

Fases da AAE	Actividades	Produtos
Fase 1 – Factores Críticos para Decisão (FCD)	Definição dos Factores Críticos para a Decisão (FCD)	Relatório de Factores Críticos para a Decisão
	Consulta a Entidades com Responsabilidade Ambiental Específica - ERAE: esta consulta integrou os documentos técnicos produzidos previamente no âmbito do "Estudo de Avaliação Estratégica para o Desenvolvimento da Rede Rodoviária Nacional, na Região do Centro Interior (IC6, IC7 e IC37)"	Relatório de Factores Críticos para a Decisão ANEXO I – Clausulas Técnicas do Caderno de Encargos do EAE da Rede Rodoviária Nacional, na Região do Centro Interior ANEXO II – Relatório de Definição de Âmbito ANEXO III – Relatório de Análise e Diagnóstico
Fase 2 – Análise e Avaliação	Elaboração do Relatório Ambiental (pondera os contributos da Consulta às Entidades na fase de FCD)	Relatório Ambiental
	Consulta a Entidades com Responsabilidade Ambiental Específica e Consulta Pública	Relatório do Plano Relatório Ambiental Resumo Não Técnico
	Apreciação dos pareceres recebidos e elaboração do Relatório da Consulta	Relatório da Consulta
	Elaboração da Proposta de Cenário Preferencial e do Relatório Final	Relatório Final
Fase 3 – Declaração Ambiental	Elaboração da Declaração Ambiental	

desenvolver através da definição dos **Domínios Estratégicos** e do enunciado de uma primeira aproximação às **Questões-Chave**. A conclusão da Caracterização e Diagnóstico, complementarmente, permitiu consolidar as componentes centrais da avaliação bem como alguns princípios gerais a considerar. Na fase de desenvolvimento e avaliação dos cenários, tratou-se, então, de aprofundar essas pistas e dar resposta aos objectivos enunciados, facto que implicou a adopção de um percurso que atravessou várias actividades metodológicas de natureza muito específica.

A cenarização desenvolveu-se em duas etapas distintas. Em termos genéricos, qualquer destas etapas foi suportada por uma matriz base de avaliação integrada, sendo que a primeira incorporou uma abordagem mais extensiva (mais cenários e mais critérios) e a segunda, já integrada no processo de AAE, foi estruturada para os três cenários finais seleccionados e desagregada por **Factores Críticos para a Decisão (FCD)**. Qualquer delas obriga, contudo, aos passos metodológicos descritos no Quadro 2.

Com base nessa primeira etapa de cenarização, foi possível circunscrever e delimitar os três cenários a sujeitar à Avaliação Ambiental Estratégica, a saber:

A – Cenário de Base (PRN 2000);

B – Cenário Extremado (Túneis);

C – Cenário Compósito.

A avaliação levada a cabo para a selecção da rede de itinerários foi suportada por uma metodologia que assumiu, desde as primeiras etapas de trabalho, a vantagem de incorporar no decurso do processo, de forma consistente, os contributos de diferentes

QUADRO 2

Metodologia de cenarização

Definição dos cenários	• Considerando o cenário base ou de referência e as alternativas que, por via de antecedentes já estabelecidos, se constituem como referência de análise e/ou aquelas que decorrem do conhecimento adquirido do território e problemáticas em jogo.
Estruturação da grelha de parâmetros de avaliação	• Assumem-se como valores e princípios globais que balizam a apreciação em curso e resultam do aprofundamento das aproximações preliminares (Domínios Estratégicos, Questões-Chave, FCD).
Selecção dos critérios de avaliação	• Em referência às Questões-Chave e aos FCD, bem como a estratégias globais (nacionais e internacionais) de desenvolvimento sustentável, tendo em conta a natureza do projecto (no caso, programação de itinerários complementares), escala de abordagem em causa e informação pertinente e disponível
Análise dos efeitos	• Operacionalização da informação recolhida e tratada com vista à apreciação do comportamento dos cenários a avaliar para cada um dos critérios, identificando o seu tipo e nível de resposta
Ordenação dos cenários	• Através da ponderação integrada dos vários critérios considerados e posicionamento relativo dos cenários no quadro das opções em jogo

momentos e tipos de participação efectivados, procurando auscultar as sensibilidades e expectativas regionais e locais, por sua vez informadas por orientações de política superior.

Assim, na sistematização do diagnóstico, na construção dos cenários e na recomendação por um cenário preferencial, a avaliação procurou integrar as manifestações que, às diferentes escalas de avaliação, foi possível captar. Logo nas primeiras etapas do estudo, ainda antes da formalização do processo de AAE, desenvolveram-se esforços no sentido de ouvir os principais actores da Região. Realizaram-se entrevistas a cerca de 30 entidades que se pronunciaram acerca de expectativas, necessidades, leitura das dinâmicas territoriais e prioridades (cf. Quadro 3).

FIGURA 3

Cenários em Estudo

QUADRO 3

Entidades auscultadas

Institucionais			Associativos		
Administração Central	**Entidades Regionais**	**Entidades Municipais**	**Ambientais**	**Empresariais**	**Sectoriais**
ICN	CCDR Centro	Associação de Municípios do Planalto Beirão	Quercus de Coimbra e Viseu	CEC - Conselho Empresarial do Centro	Região de Turismo da Serra da Estrela
Direcção de Estradas de Castelo Branco, Coimbra, Guarda, Viseu	Parque natural da Serra da Estrela	Associação de Municípios da Cova da Beira	Geota	NERCAB - Associação Empresarial do Região de Castelo Branco	ADTRC -Associação para o Desenvolvimento do Turismo na Região do Centro
	Paisagem Protegida da Serra do Açor	Associação de Municípios da Serra do Açor		AIRV - Associação Empresarial da Região de Viseu	ACICS - Associação Comercial e Industrial do Concelho de Seia
		Câmara Municipal de Arganil, Penacova, Seia, Gouveia, Mangualde, Covilhã, Oliveira do Hospital, Tábua, Viseu, Nelas, Guarda, Celorico da Beira		NERGA - Associação Empresarial da Região da Guarda	
				BEIRA SERRA - Associação para o Desenvolvimento Rural Integrado	

O resultado desta auscultação integrou a configuração dos diferentes cenários a observar. Num segundo momento, logo que foi possível fazer uma triagem das alternativas em jogo, apresentaram-se os cenários que iriam ser sujeitos ao processo de Avaliação Ambiental Estratégica, suscitando uma intensa participação por parte de muitos desses actores.

2.2. Matriz de Avaliação

Na base da análise empreendida esteve o preenchimento de uma matriz de classificação dos efeitos associados às diferentes alternativas considerando os Factores Críticos para a Decisão que condicionavam a opção. Apresentam-se seguidamente os critérios adoptados no tratamento de cada um dos Factores Críticos.

A avaliação de cada FCD foi traduzida sob a forma de ficha, incluindo vários campos, na qual se descrevem os critérios seleccionados para a avaliação de cada um deles bem como os efeitos previsíveis de cada cenário sobre a situação actual. Na parte destinada à avaliação dos impactes diferencia-se o Nível, Escala Temporal, Sentido e Tipo de Efeito em causa para esse Factor Crítico. Esta classificação envolveu a predição de impactes, através da identificação das potenciais alterações da situação actual e tendencial, e uma avaliação que traduziu a significância do impacte, numa escala qualitativa (de sete pontos de variação - de muito positivo, neutro, a muito negativo, com representação simbólica de +, 0 e -).

Destacou-se a componente da Rentabilidade Financeira uma vez que as premissas metodológicas e os objectivos da avaliação integrada pluri-critério e da análise custo-benefício conduzem a leituras que se julgou conveniente não sobrepor (cf. Quadro 4).

QUADRO 4

Critérios por FCD

Factores Críticos para a Decisão (FCD)	Critérios
Qualidade Ambiental	Potencial para a degradação da qualidade do ar Potencial para a degradação da qualidade da água Potencial afectação do conforto acústico
Alterações Climáticas	Emissões de GEE
Ocupação do Solo e Paisagem Rural	Alteração Morfológica do Relevo Interferência com Áreas de Vinha da Região do Dão Interferência com Usos do Solo Produtivos (agrícolas e florestais)
Recursos e Riscos	Interferência com Áreas Sensíveis Afectação de Recursos Hídricos Áreas Críticas relativamente a Incêndios Florestais
Conectividade da Rede Rodoviária	Tempo de Viagem (minutos) Distância das Sedes de Concelho aos IC´s
Utilização da Rede Rodoviária	Tráfego Previsto (Vk) Cobertura Demográfica
Complementaridade Modal	Articulação Intermodal das Infra-Estruturas de Transporte
Segurança da Rede	Sinistralidade
Consolidação do Sistema Urbano	Distância/Tempo a Cidades Médias Número de Ligações Internas Deslocações Pendulares entre Centros Urbanos do Nível 1
Emprego e Coesão Social	Acessibilidade a Órgãos Desconcentrados da Administração Central Acessibilidade a Equipamentos de Saúde Distância/Tempo a Bacias de Emprego
Dinâmica da Economia Regional	Valorização dos Recursos Turísticos (naturais e culturais) Valor Acrescentado Bruto / Emprego Depósitos Bancários e Sociedades
Rentabilidade Financeira	Custos Benefícios Taxa Interna de Rentabilidade (TIR)

QUADRO 5

Resultados da avaliação por cenário

DOMÍNIOS ESTRATÉGICOS DE AVALIAÇÃO	FACTORES CRÍTICOS	CENÁRIOS		
		Cenário A	Cenário B	Cenário C
Qualidade Ambiental e Recursos	Qualidade Ambiental	-	--	-
	Alterações Climáticas	-	--	-
	Ocupação do Solo e Paisagem Rural	--	--	-
	Recursos e Riscos	--	---	--
Acessibilidades	Conectividade da Rede Rodoviária	++	+++	++
	Utilização da Rede Rodoviária	+++	+++	+++
	Complementaridade Modal	++	+++	++
	Segurança da Rede	++	+	++
Desenvolvimento Regional e Territorial	Consolidação do Sistema Urbano	++	+++	++
	Emprego e Coesão Social	++	+++	++
	Dinâmica da Economia Regional	++	+++	+++
Análise Económica	Rentabilidade Financeira	+++	---	+++

2.3. Consultas

Aquando do arranque do processo formal de AAE, houve que obedecer ao estipulado no seu enquadramento jurídico. Assim, foi solicitado parecer sobre o Relatório dos **Factores Críticos para a Decisão,** procedendo-se à consulta institucional de um conjunto de entidades da administração pública consideradas como ERAE nos termos dos artºs nº 3 e 5 do DL nº 232/2007, de 15 de Junho (APA – Agência Portuguesa do Ambiente; CCDR Centro – Comissão de Coordenação e Desenvolvimento Regional do Centro; ICNB – Instituto para a Conservação da Natureza e Biodiversidade; INAG – Instituto da Água; ARS Centro – Administração Regional de Saúde; Municípios: Celorico da Beira, Covilhã, Fornos de Algodres, Gouveia, Guarda, Mangualde, Manteigas, Viseu, Nelas, Oliveira do Hospital, Seia e Tábua). Do conjunto das 18 entidades consideradas, apenas 4 não se pronunciaram por motivos diversos. Participaram a maioria dos municípios (10), o Instituto Nacional da Água (INAG), o Instituto da Conservação da Natureza e da Biodiversidade (ICNB), a Comissão de Coordenação e Desenvolvimento Regional do Centro (CCDR - Centro) e a Agência Portuguesa do Ambiente (APA).

Finalmente, aquando da conclusão do **Relatório Ambiental**, e de novo ao abrigo do estipulado no DL nº 232/2007, de 15 de Junho, um amplo processo de consulta foi desencadeado em paralelo com uma nova etapa de audiência das ERAE´s. O tratamento da informação recolhida no âmbito da Consulta Pública considerou 5 grupos de classificação, diferenciados segundo a proveniência da participação: "Administração Local" (câmaras municipais não consideradas ERAE, juntas e assembleias de freguesia), "Particulares", "Associações Empresariais e Sociais", "Associações de Defesa do Património e Ambiente" e "Outros". Nos gráficos seguintes ilustram-se alguns aspectos relevantes da fase de Consulta.

FIGURA 4

Origem das participações

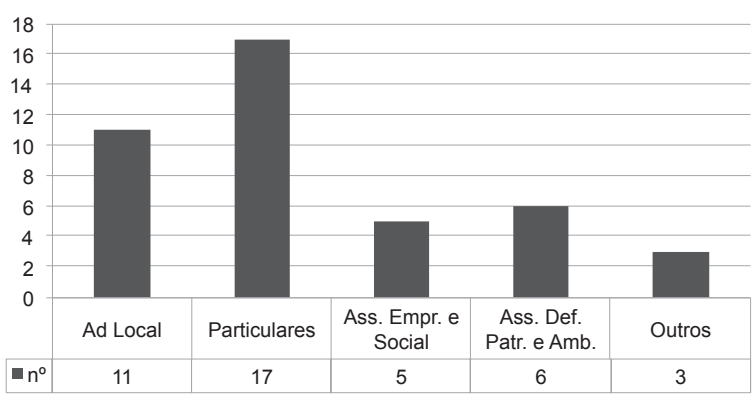
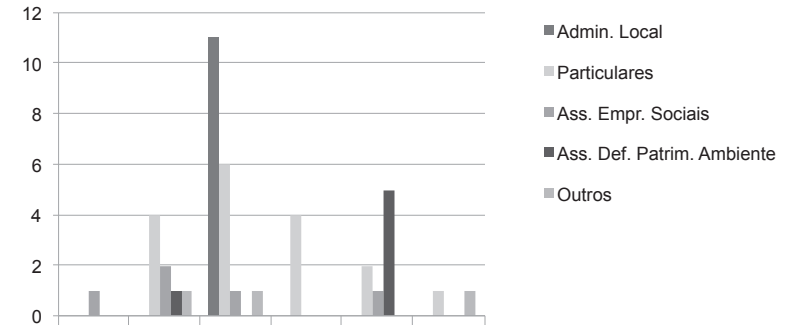


FIGURA 5

Cenário preferencial por entidade de participação



	A	B	C	NI	NF	O
Admin. Local	0	0	11	0	0	0
Particulares	0	4	6	4	2	1
Ass. Empr. Sociais	1	2	1	0	1	0
Ass. Def. Patrim. Ambiente	0	1	0	0	5	0
Outros	0	1	1	0	0	1

Legenda: A – cenário A; B – cenário B; C – cenário C; NI – não indica; NF – nada fazer; O – outro

Sistematizando, os traços fundamentais que marcaram este processo indicam que:

- As ERAE mobilizaram-se de forma generalizada, produzindo pareceres com contributos significativos para o enriquecimento do processo;
- A participação das outras entidades e particulares foi significativa em volume e cobertura geográfica, diversificada e construtiva nos conteúdos apresentados;
- As participações recebidas no seu conjunto não questionam a abordagem técnica concebida pela equipa ou quaisquer das conclusões obtidas. No entanto, as quatro ERAE da Administração Central levantam questões que, por não se ajustarem ao âmbito estratégico da avaliação, merecem ser respondidas e analisadas em fases subsequentes;
- Algumas participações, principalmente com origem na Consulta Pública, fazem propostas de alteração/melhoria de troços, a ponderar em sede de Estudo Prévio;
- Os resultados da consulta deixaram claro o sentido da escolha relativamente à identificação do Cenário Preferencial.

3. Conclusões

O processo de Avaliação Ambiental Estratégica (AAE) da Rede Rodoviária da Região do Centro Interior (IC6, IC7, IC37) teve uma génese atípica e um carácter pioneiro no domínio do planeamento de infra-estruturas rodoviárias em Portugal, constituindo-se como um dos primeiros processos de AAE formal. Com a assunção da Declaração Ambiental (DA), fecha-se um procedimento de avaliação que permitiu não só o ensaiar de metodologias de avaliação estratégica, mas, sobretudo, um exercício de governança territorial na procura de um cenário de rede para a zona em causa que tivesse em conta critérios de sustentabilidade territorial.

A sua génese atípica decorre, em primeiro lugar, do facto desta mesma AAE só ser inteligível a partir dos pressupostos e dos objectivos de um estudo de avaliação estratégica lançado pela EP antes da transposição para Portugal da Directiva Comunitária que impõe a sujeição a avaliação ambiental dos planos e programas com efeitos no ambiente. No limite, este estudo de avaliação estratégica significava o reconhecimento da EP de que uma análise crítica do PRN, numa zona

territorialmente fragilizada e onde a rede de itinerários complementares apresentava um taxa de execução baixa, não era compatível com a figura de "estudo de viabilidade" ou de "estudo prévio", importando definir uma estratégia metodológica capaz de, por um lado, integrar na avaliação diferentes dimensões de análise, reposicionando o sistema rodoviário na sua interacção com os sistemas ambiental, económico e de ordenamento e desenvolvimento do território e, por outro lado, convocar os vários actores locais e institucionais para o debate que, decerto, se geraria.

Na fase em que o Estudo se encontrava quando surgiu o contexto e a oportunidade para o seu enquadramento no processo de AAE já se dispunha de documentos que demonstram o respeito por aquelas premissas, beneficiando a AAE do carácter pioneiro do Estudo ao ter acolhido o seu objectivo central e o seu referencial metodológico. Neste ponto específico valerá a pena referir que o Estudo, e também a AAE subsequente, com todas as vicissitudes inerentes, representam elementos de singularidade na cultura organizacional da EP – Estradas de Portugal. Do ponto de vista processual, a AAE trouxe de muito positivo a evidência da necessidade de "compromisso" das entidades institucionais em matérias particularmente controversas e legitimou a consulta pública como um requisito obrigatório – aspectos fulcrais de uma sociedade que, reconhecidamente, possui um deficit de participação e cidadania.

Neste caso dir-se-á que o objecto em causa – a Serra da Estrela, a rede de acessibilidades e o modelo de desenvolvimento e organização do território – seria, à partida, especialmente atreito a posicionamentos muito confinados à esfera de actuação de cada entidade e a uma mobilização local expressiva. Contudo, o Cenário escolhido acabou por apresentar um nível de consensualização confortável. Tal não significa, contudo, que se tenham utilizado todos os recursos do sistema de participação, reconhecendo-se que o agenciamento e a vinculação de interesses convergentes ganha maior eficácia quando, em momentos determinados, decisores, especialistas e público interessado partilham plataformas de debate. A valorização, apropriação e integração no processo de planeamento destes procedimentos, variam, pois, em função de diferentes contextos culturais, sociais e organizacionais.

Não deixa, no entanto, de merecer reflexão o modo como devem ser inscritas, em processos desta natureza, modalidades de participação resultantes de uma mobilização da sociedade civil organizada com base numa lógica quantitativa. As motivações sectoriais, corporativas ou territoriais têm sempre o seu lugar nos complexos processos de desenvolvimento, havendo uma responsabilidade intrínseca das equipas técnicas em mediar a sua expressão (valores, expectativas, desejos), material que se procurou absorver com as entrevistas, consulta pública, análises documentais, observações locais, etc.

Finalmente, reportando ao trabalho de cenarização e de avaliação dos impactes estratégicos dos cenários, afigura-se pertinente realçar os seguintes aspectos:

- Embora para efeitos da avaliação ambiental de planos e programas, exigida pelo Decreto-Lei nº 232/2007, de 15 de Junho, a definição dos Factores Críticos para a Decisão (FCD) – elemento estruturante de toda a avaliação - pudesse ter-se cingido a critérios de natureza "ambiental", desde o início do processo, mais propriamente desde o Estudo inicial, postularam-se, como princípios analíticos, uma "análise estratégica", enquanto abordagem global e prospectiva sobre o desenvolvimento do território e uma "análise integrada", enquanto apreciação crítica das inter-relações entre diferentes componentes e dimensões de análise e uma "análise de sustentabilidade global" cobrindo dimensões ambientais, sociais, económicas e financeiras;
- A definição dos cenários a sujeitar a AAE não constituiu um momento "fechado" e único do processo de avaliação, tendo implicado a cenarização prévia de um conjunto razoável de cenários, que permitiu seleccionar 3 cenários com propostas diferenciadoras, um dos quais resultado da optimização do comportamento dos restantes: A - Cenário de Base (PRN 2000), B – Cenário Extremado (Túneis), C - Cenário Compósito.

4. Conclusões

Bruno Soares, R. (2008), **Avaliação Estratégica do Impacte Ambiental de Políticas de Ordenamento**, Dissertação de mestrado (policopiado), Instituto Superior Técnico, Lisboa.

Démurger, Sylvie (2001), *"Infrastructure Development and Economic Growth:An Explanation for Regional Disparities in China?"* **Journal of Comparative Economics,** 29, 95–117.

Gutierez, J., González, R., Gómez, G. (1996*), "The European high-speed train network. Predicted effects on accessibility patterns"*, **Journal of Transport Geography**, Vol. 4, No. 4, pp. 227-238.

Keeble, David, Owens, Peter L., Thompson, Chris(1982), *"Regional accessibility and economic potential in the European community"*, **Regional Studies**,16:6, pp.419-432.

Lakshmanan, T.R.; Subramanian, U.; Anderson, W.P.; Léutier, F. (2001) **Integration of Transport and Trade Facilitation,** The World Bank, Washington.

Linneker, Brian (1996), *"Road transport infrastructure and regional economic development.The regional development effects of the M25 London orbital motorway",* **Journal of Transport Geography**, vol. 4-2. pp. 77-92.

Partidário, Maria do Rosário (2007), **Guia de Boas Práticas para Avaliação Ambiental Estratégica: orientações metodológicas**, APA, Amadora.

Rietveld, Piet (1989), *"Infrastructure and regional development. A survey of multiregional economic models",* **Annals of Regional Science**, 23, pp.255-274 **.**

Stephanedes, Y. J. (1990), *"Distributional effects of highway investment on local and regional development",* **Transportation and Economic Development- Proceedings of a Conference, Williamsburg, Virginia, November 5-8, 1989**, pp. 156-164.

Vickerman, Roger; Spiekermann, K., Wegener, M. (1999), *"Accessibility and Economic Development in Europe"*, **Regional Studies**, Volume 33-1, pp. 1 – 15.

A EFICIÊNCIA DO RAMO DA EDUCAÇÃO PRÉ-ESCOLAR NO NORTE DE PORTUGAL – UMA ANÁLISE DA ÚLTIMA DÉCADA[1]

Paulo Reis Mourão - Universidade do Minho - E-mail: paulom@eeg.uminho.pt
Daniela Gaspar - Universidade do Minho - E-mail: danikiko@sapo.pt

Resumo:

Este trabalho debruça-se sobre o sector da educação pré-escolar em Portugal, numa perspectiva inovadora e alcançando resultados pioneiros. Avalia as diferenças nos ramos privado e público deste sector. Através de uma análise dos padrões de eficiência dos municípios do norte de Portugal, conclui que existe uma grande heterogeneidade de desempenhos dos locais, havendo uma tendência para que o pré-escolar público seja mais eficiente do que o pré-escolar privado assim como é menos ineficiente o sector quando se avalia o rácio do número de crianças e o número de educadores do que quando se avalia o rácio do número de crianças e o número de estabelecimentos de ensino.

Palavras-chave: Eficiência Económica; Norte de Portugal

Códigos JEL: R19; R53; I20

Abstract:

This work focuses on the preschool education in Portugal. It uses a novel perspective and it achieves original results. This work evaluates the differences between the private sector and the public sector of the Portuguese preschool education. This evaluation was carried out in the municipalities of the North of Portugal for the last ten years. This research concludes that there is a substantial heterogeneity of the efficiency levels in these municipalities. However, on average, the public sector is more efficient than the private sector of the preschool education in the North of Portugal and, also on average, there is less inefficiency when the output is measured by the ratio between the number of children and the number of teachers against the alternative measure composed by the ratio between the number of children and the number of schools.

Keywords: Preschool education sector; Economic Efficiency; North of Portugal

JEL Codes: R19; R53; I20

[1] Os autores agradecem a 2 revisores anónimos da Revista Portuguesa de Economia Regional as sugestões deixadas assim como as sugestões dos participantes na sessão onde o artigo foi debatido enquanto comunicação ao XIII Encontro Nacional de Ciências em Educação, decorrido em Castelo Branco (24 a 26 de Setembro de 2009). Qualquer limitação remanescente é da responsabilidade dos autores.

1. Introdução

A criança começa a ser educada desde o momento do seu nascimento no seio familiar. Fora de casa a educação pré-escolar será a etapa seguinte da educação básica no processo de educação ao longo da vida, sendo sempre complementada com a acção educativa da família.

A frequência da educação pré-escolar é facultativa, no reconhecimento de que cabe, primeiramente à família a educação dos filhos, mas compete ao Estado contribuir activamente para a universalização da oferta da educação pré-escolar. (Lei Quadro da Educação Pré-Escolar, Lei nº 5/97, Capítulo II, artigo 3º)

Para assegurar este nível de ensino, em Portugal, existem duas redes de educação pré-escolar: a rede pública e a rede privada. Existe ainda a oferta educativa por parte das Instituições Particulares de Solidariedade Social que, na qualidade de rede semi-privada comparticipada pelo Estado, foram consideradas, neste trabalho, como pertencendo à rede privada.

Ambas as redes estão interligadas constituindo, desta forma, uma rede nacional de educação pré-escolar, com o objectivo de a fazer chegar cada vez mais a um maior número de crianças.

No entanto, a necessidade premente de uma reorganização do sector em face dos desafios demográficos e das pressões da hodiernidade, implica a presença de instrumentos que informem os decisores do actual estado da educação pré-escolar em Portugal.

Para responder a essa necessidade, surge o presente trabalho que se debruça sobre as especificidades da rede privada e da rede pública do pré-escolar português.

O objectivo final deste trabalho é, assim, a avaliação da eficiência técnica em cada um dos ramos em que se divide o sector da educação pré-escolar em Portugal, usando uma amostra dos concelhos do Norte de Portugal.

Neste sentido, a Secção 2 deste trabalho debruça-se sobre uma apresentação dos modelos de eficiência económica que foram seguidos para conduzir esta investigação. A Secção 3 detalha um trabalho estatístico no sentido de avaliar os padrões de eficiência ao nível do pré-escolar, identificando as situações mais prementes de necessidades de implementação de medidas de reforço de eficiência assim como sinaliza estes valores (originais na Literatura) por município. A Secção 4 conclui.

2. Noção seguida de 'eficiência económica' e modelos estimados

O conceito de "eficiência económica" é um conceito complexo, dada a sua longa história na Ciência Económica. No presente trabalho, que pretende analisar o nível de eficiência económica na rede do pré-escolar nos concelhos do Norte de Portugal, vai seguir-se um conceito de eficiência técnica (Iregui *et al*, 2007) pelo qual se designa por eficiência a capacidade de obtenção do máximo rendimento através de um vector de factores produtivos e de um dado nível de tecnologia[2].

Neste caso, pretende-se avaliar de que modo os diferentes factores intervenientes no processo educativo ao nível do pré-escolar, nas NUTS 3 do Norte de Portugal, estão a gerar níveis diferenciados de resultados finais, aferidos por duas realidades (rede pública e rede privada) observadas por dois indicadores convencionais de rendimento escolar: o número de alunos por docente e o número de alunos por estabelecimento de ensino.

A medição da eficiência no sector da educação (e por dedução) nos vários ramos do sector da educação (à semelhança do ramo pré-primário) é uma matéria complexa (Hanushek, 1986) na medida em que nesse sector se transformam factores produtivos directos e indirectos de difícil mensurabilidade em produtos finais (qualidade do ensino manifestada pelo aluno, na dimensão do indivíduo, ou, por exemplo, taxa de frequência e assiduidade, numa dimensão do grupo ou da sociedade). Ultrapassando as posições agnósticas também criticadas por Hanushek (1986), neste trabalho avançou-se para a medição dos indicadores de rendimento escolar que McCarty e Yaisawrang (1993) também usam, na medida em que a avaliação da eficiência no domínio do indivíduo obriga a etapas associadas ao uso de portefólios e que ficam desde já como um desafio derivado deste trabalho.

[2] É possível encontrar-se na literatura uma outra noção de 'eficiência económica', vocacionada para a afectação de recursos. Segundo esta noção, define-se 'eficiência' como a capacidade em combinar factores produtivos em produtos finais numa proporção óptima em face dos preços vigentes (Iregui et al, 2007).

Ilustrando este conceito de eficiência através de um Modelo de Fronteira, temos a Figura 1.

Na Figura 1, compreende-se que com os recursos UU e RR (por exemplo, Taxa de Natalidade e Densidade demográfica), atingir-se-ia uma dada produção eficiente sugerida pela área envolvida pela curva F (um dado valor óptimo de alunos por docente). No entanto, opções ineficientes geram pontos interiores a essa área. Por exemplo, optando por *u* unidades de UU combinadas com *R* unidades de RR, a produção alcançada seria dada pela área resultante da soma da parte branca (sugerida pela letra i) com a parte verde (sugerida pela letra g) - a medida respectiva de eficiência identificar-se-ia com a proporção da área branca mais a área verde sobre a área total envolvida por F (isto é [i+g]/[i+g+f+h]). Optando por outra combinação ineficiente, por exemplo, *U* e *r*, então a produção alcançada seria correspondente à soma da parte branca (sugerida pela letra i) com a zona vermelha (sugerida pela letra h) - e a medida de eficiência seria equivalente à proporção da parte branca mais a parte vermelha sobre a área total envolvida por F (isto é, [i+h]/[i+g+f+h]), projectando um valor menor que o óptimo de aluno por docente.

Uma linearização da função de produção ao nosso modelo de análise de eficiência subjacente recorre à equação 1 (Battese e Coelli, 1995):

$$y = \alpha + \beta' x + \theta z + v - u \qquad \text{(Eq.1)}$$

Pela Eq. 1, sugere-se que o resultado *y* depende de um vector *x* de factores produtivos e de um termo de erro composto. Este termo de erro divide-se em *v* e em *u*. *v* é uma variável aleatória, com uma distribuição normal dos seus valores e com média de zero, que capta todas as situações influentes que escapam à modelização seguida. *u* é uma variável aferidora do padrão de ineficiência (Iregui *et al,* 2007).

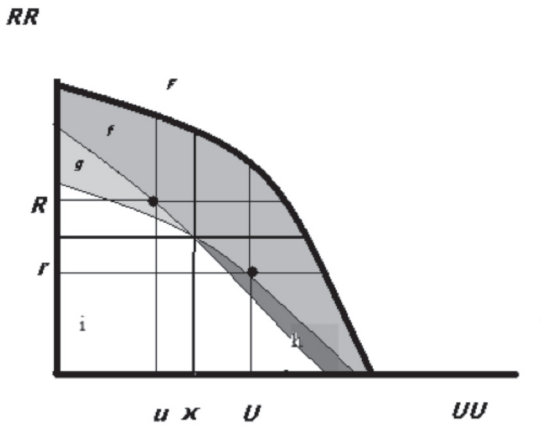
Battese e Coelli (1995) provaram que incorporando os *z* factores contextuais na caracterização da distribuição de *u* geram-se medidas de ineficiência mais robustas do que quando estes *z* factores intervêm directamente na função-produção como regressores exógenos.

Nesta fase, convém salientar que *y* não é uma medida da quantidade do produto (neste caso, do produto educativo, como recordado por Hanushek, 1986, ou Iregui *et al*, 2007) mas *y* é antes uma sugestão do rendimento da oferta educativa.

O modelo estatístico a ser estimado assume uma Função Cobb-Douglas (Eq. 2)[3]. Esta função vai ser estimada com 672 observações (relativas a 96 concelhos *i* observados por 7 anos *t*, entre 2000 a 2006). A função será estimada por máxima verosimilhança[4] (Battese e Coelli, 1995).

FIGURA 1

Medição da eficiência económica através de uma Fronteira de Possibilidades de Produção



[3] O nível de eficiência económica (se considerando a produtividade dos factores) pode medir-se pelos rendimentos à escala (soma das elasticidades dos factores).

[4] Poder-se-ia aplicar estimações próprias de dados em painel para a Equação 2. Neste caso, a estimação foi por máxima verosimilhança, de acordo com Battese e Coelli, 1995. Outros métodos aplicáveis são elencados em Bauer (1990) e Greene (1993).

$$\ln Y_{it} = \beta_0 + \sum_{k=1}^{k} \beta_k \ln X_{k,it} + v_{it} - u_{it} \qquad \text{(Eq.2)}$$

u_{it} segue a distribuição normal modificada abaixo indicada (sendo δ_0 e δ_j termos a serem estimados para cada unidade *i* em cada período temporal *t* e considerando os *M* factores contextuais):

$$u_{it} \sim N\left[\delta_0 + \sum_{j=1}^{M} \delta_j z_{j,it} \sigma_{uit}{}^2\right]$$

e

$$v_{it} \sim N\left(0, \sigma_{vit}^2\right)$$

O termo *u* é assumido como independentemente distribuído (mas não identicamente) enquanto truncagem não negativa da distribuição normal modificada (Battese e Coelli, 1995). Através da parametrização de Battese e Corra (1977), ultrapassa-se o problema da correlação entre *u* e *z* ou de multicolinearidade das variáveis em *z* assim como se obtém a estimação de δ_0 e δ_j.

O nível de eficiência para cada unidade *i* em cada período temporal *t (EFit)* é dado por

$$EF_{it} = \frac{E(Y_{it}^* \mid X_{it}, u_{it})}{E(Y_{it}^* \mid X_{it}, u_{it} = 0)}$$

Em que *EFit* identifica a distância estimada entre o output real e o output potencial (considerando que não existem os desvios u_{it}).

Assim, Y_{it} vai assumir dois valores já apresentados: o número médio de crianças por educador ou, então, o número de crianças por estabelecimento do concelho *i* em *t*.

Estes indicadores apresentam algumas vantagens imediatas, relativas eminentemente a quais os casos municipais de maior ou de menor eficiência na oferta educativa do pré-escolar. Como facilmente se constata na literatura, este estudo é pioneiro ainda na capacidade comparativa de avaliar a eficiência económica para a dimensão pública e para a dimensão privada desta oferta educativa além de avaliar os municípios do Norte de Portugal numa dimensão nunca antes estudada.

Uma leitura simplista e primária destas medidas de rendimento poderia induzir um erro interpretativo – que os municípios com um maior nível de intensidade dos indicadores (por exemplo, os municípios com valores maiores de alunos por docente) seriam os municípios mais eficientes. A metodologia aqui seguida vai, aliás, contrariar esse enviesamento interpretativo. Vai ser possível, pelo contrário, verificar quais os municípios que com o mesmo conjunto de estímulos recebidos pelos factores produtivos e pelas condições contextuais apresentam uma resposta mais eficiente (isto é, um melhor aproveitamento desses recursos factoriais). E esse aproveitamento não é coincidente, acriticamente ou aprioristicamente, com valores superiores da produção final.

Na Eq. 2, $X_{k,t}$ identifica a gama de *inputs* que intervêm directamente no número de alunos a frequentar o ensino pré-primário (Hanushek, 1986; Iregui *et al*, 2007):

- Densidade populacional,
- Taxa de natalidade,
- e Taxa de fecundidade.

$Z_{j,it}$ assume o vector de variáveis sócio-económicas que condiciona o contexto tecnológico de produção. É extenso o conjunto de variáveis que reflectem o nível de desenvolvimento económico do local, o seu nível de assistência médica e o de padrão cultural; no entanto por disponibilidade centrámo-nos naquelas que a literatura tem analisado para a realidade observada[5] (Mourão, 2004; 2008):

- Taxa de mortalidade,
- Taxa de nupcialidade,
- Taxa de divórcio,
- Índice de Envelhecimento,
- Volume de Vendas por Empregado,
- Levantamentos por terminal bancário electrónico (vulgo, *multibanco*),
- Despesas do município *per capita*,

[5] Obviamente, o sistema de desenvolvimento económico recebe as contribuições de um extenso número de dimensões (por exemplo, Duttagupta e Mlachila, 2008). Já muito mais limitado é o conjunto de variáveis associadas e disponíveis. Algumas variáveis que poderiam ser significativas no modelo são o PIB real per capita ou o nível de mensalidade paga às instituições acolhedoras. No entanto, apesar do esforço visível na colecta de dados ter sido melhorado nos últimos anos (mesmo em termos oficiais), não permitiu a disponibilidade actual dessas variáveis potencialmente relevantes.

- Taxa de Mortalidade Infantil,
- Número de Médicos por mil habitantes,
- Número de Farmácias no concelho,
- e Utilizadores por biblioteca.

A Tabela 1 apresenta as estatísticas descritivas das variáveis envolvidas neste estudo (medidas de rendimento, *inputs* e variáveis condicionantes)[6].

A Tabela 1 comprova que os rácios alunos/docente e alunos/estabelecimento são, em média, mais elevados no segmento privado do que no público. No entanto, regista-se ainda uma maior dispersão de valores face ao valor central (um maior desvio-padrão) no sector privado.

A próxima sub-secção detalhará os resultados em termos de eficiência económica.

3. Resultados

3.1 Resultados das Funções-Produção

A Tabela 2 apresenta os resultados da estimação da Eq. 2, através do *software* de análise de eficiência *FRONTIER* V. 4.1, e usando as variáveis logaritmizadas.

Desde logo, estes dados mostram que os sub-ramos da educação pré-primária têm factores diferenciados como seria de esperar dada a natureza distinta dos dois mercados (Coulson, 2009).

Observando as estimações para cada função-produção, constata-se que existe uma certa rigidez no modelo relativo ao número de alunos por estabelecimento de ensino, em especial no ensino privado, na medida em que este indicador só reage significativamente a uma variável (neste caso, só reage ao número de médicos por mil habitantes,

TABELA 1

Estatísticas descritivas

variable		obs	mean	Std. Dev.	Min	Max
Alunos/docente	(publico)	672	7.584538	2.07884	1	20.08554
Alunos/docente	(privado)	672	11.32624	6.395216	1	20.08554
Alunos/Estabelecimento	(publico)	672	19.41314	45.84026	1	1096.633
Alunos/Estabelecimento	(privado)	672	57.39131	189.3228	1	2980.958
Densidade Populacional		672	231.7828	412.9044	7.389056	2980.958
Taxa de Natalidade		672	6.429879	1.888223	2.718282	7.389056
Taxa de Mortalidade		672	6.602761	2.09126	2.718282	20.08554
Taxa de Nupcialidade		672	3.410456	1.718814	1	7.389056
Taxa de Divórcio		672	1.041743	0.375442	0.13534	2.718282
Taxa de Fecundidade		672	17.75913	8.139532	1	54.59815
fndice de Envelhecimento		672	78.29309	45.06376	1	148.4132
volume de vendas por empregado		672	38.8419	19.52687	2.718282	54.59815
Levantamentos por terminal		672	37.49038	54.65481	1	403.4288
Despesas Municipais per capita		672	11.22053	29.73848	0.135335	148.4132
Taxa de Mortalidade Infantil		672	3.562195	2.58058	1	20.08554
Medicos por mil habitantes		672	1.273904	0.8829	0.13534	7.389056
Farmácias por concelho		672	0.931023	0.6609	0.13534	2.718282
utilizadores por biblioteca		672	2544.832	4086.147	1	22026.46

Nota: INE, Anuários Estatísticos da Região Norte (anos compreendidos entre 2000 e 2006)

[6] Estatísticas acessórias, como a matriz de correlação de Spearman, dado que estamos perante Time Series Cross Section data, serão apresentadas se solicitadas aos autores.

TABELA 2

Estimação das Funções-Produção por Máxima Verosimilhança

Variáveis	Alunos/docente (Público)	Alunos/docente (Privado)	Alunos/Estabelecimento (Público)	Alunos/Estabelecimento (Privado)
Intercepção	3,071 -0,358	4,174 -0,907	4,188 -0,881	5,468 -1,467
Densidade Populacional	0,083*** -0,012	-6,361*** -0,039	0,127*** -0,04	0,016 -0,08
Taxa de Natalidade	-0,017 -0,065	-0,234 -0,196	0,006 -0,181	0,041 -0,272
Taxa de Mortalidade	-0,006 -0,066	-0,652*** -0,193	-0,352* -0,185	-0,475 -0,315
Taxa de Nupcialidade	0,024 -0,037	0,033 -0,116	-0,029 -0,109	0,102 -0,174
Taxa de Divórcio	-0,036** -0,017	-0,033 -0,058	-0,007 -0,053	-0,056 -0,079
Taxa de Fecundidade	-0,002 -0,008	-0,011 -0,027	-0,021 -0,024	0,03 -0,034
Índice de Envelhecimento	-0,127 -0,054	0,099 -0,111	-0,036 -0,1	-0,116 -0,147
Volume de Vendas por empregado	-0,095*** -0,028	-0,095 -0,092	-0,134 -0,094	-0,013 -0,17
Levantamentos por terminal	0,039* -0,02	0,205*** -0,054	0,017 -0,05	0,051 -0,075
Despesas Municipais *per capita*	-0,060*** -0,011	-0,103 -0,036	-0,056 -0,035	-0,025 -0,062
Taxa de Mortalidade Infantil	-0,022* -0,012	-0,06 -0,04	0,062 -0,038	0,054 -0,058
Médicos por mil habitantes	0,041** -0,015	0,147*** -0,049	0,135*** -0,049	0,288*** -0,09
Farmácias por município	0,015 -0,011	0,01 -0,037	0,004 -0,033	-0,023 -0,05
Utilizadores por biblioteca	0,008*** -0,003	0,034*** -0,011	-0,006 -0,01	-0,002 -0,014
$\delta^2 = \sigma^2_{uit} + \sigma^2_{vit}$	0,062*** -0,004	1,060*** -0,165	0,402*** -0,033	1,827*** -0,218
$\gamma = \sqrt{\frac{\sigma^2_{uit}}{\delta^2}}$	0,600*** -0,054	0,940*** -0,112	0,198*** -0,067	0,670*** -0,042
Valor de máxima verosimilhança (log)	218,65	-97,32	-601,79	-1005,6
Número de observações na estimaçãos	672	672	672	672

Nota: Erros estimados entre parêntesis. Destacados a amarelo os coeficientes significativos a menos de 10% de significância [Significância estatística: 10%(*); 5%(**); 1%(***)].

variável indiciadora do padrão de assistência a questões de saúde da população). Assim, espera-se que um aumento em 1% do número de médicos por mil habitantes conduza a um aumento de 0,29% do rácio municipal entre o número de alunos a frequentar o ensino pré-escolar privado e o número de estabelecimentos privados de ensino pré-escolar.

Relativamente ao número de alunos por estabelecimento de ensino público, existe um leque mais amplo de factores intervenientes além do número de médicos por mil habitantes, nomeadamente a densidade populacional (geradora de uma maior oferta potencial de crianças em idade

pré-escolar) e a taxa de mortalidade no geral (que, se reduzida, possibilita valores mais elevados de alunos por estabelecimento de ensino).

Quando avaliamos o número de alunos por docente do pré-escolar, constatamos que existe uma maior diversidade de factores intervenientes face ao número de alunos por estabelecimento do mesmo segmento de ensino. Assim, verificou-se que existe um aumento dos valores associados a esta variável (independentemente da variável ser relativa a serviços públicos ou a serviços privados) por valores superiores do número de médicos por mil habitantes, do número de utilizadores das bibliotecas municipais e do valor dos levantamentos por terminal bancário electrónico. Esta leitura salienta, assim, que municípios com um maior padrão de desenvolvimento sócio-económico são espaços caracterizados pela existência de um maior número de crianças por educador de infância.

No entanto, a densidade populacional proporciona efeitos contrários na variável relativa ao número de crianças por educador, em função da qualidade pública ou da qualidade privada dos prestadores de serviços. Assim, se um aumento de 1% desta variável leva a um aumento de 0,08% do número de crianças por educador de infância em unidades do sector público, já o mesmo aumento de 1% conduz a uma redução de 6,34% do rácio em questão no sector privado.

A razão subjacente a esta disparidade de comportamento encontra-se no efeito diferenciado que o aumento da densidade populacional gera na dimensão considerada no denominador do rácio do número de crianças por educador de infância. Assim, quando a densidade populacional aumenta existe uma tendência para aumentar o número global de crianças a recorrer ao pré-escolar (efeito sobre o numerador do rácio). Mas quando a densidade populacional aumenta existe uma tendência mais acentuada para o aparecimento de mais profissionais do ensino básico a laborar no pré-escolar que, dadas as contingências do sector público (número fixo de educadores atribuídos a cada estabelecimento e oferta limitada a crianças com mais de 36 meses, como observado no Anexo descritivo) gera um maior fluxo destes profissionais para o sector privado. Como resultado, ainda que o numerador possa crescer, o aumento no denominador do sector privado é mais acentuado, levando a uma diminuição do rácio em observação.

Existe a necessidade de uma leitura próxima quando temos de interpretar os coeficientes negativos que foram estimados. Por exemplo, quando observamos que um aumento da taxa de divórcio ou do volume de vendas por empregado conduz a uma redução do número de crianças por educador no segmento público, os motivos principais deste efeito prendem-se ao padrão urbano mais acentuado nos municípios onde a taxa de divórcio ou o volume de vendas por empregado é superior, espaços onde a presença da concorrência do segmento privado conduz a menores valores do rácio de crianças por educador no público.

É especialmente curiosa a existência de coeficientes negativos alcançados para a variável da despesa municipal per capita, quer considerando o modelo explicativo do número de crianças por educador em serviço público quer considerando o número de crianças por educador em serviço privado. A explicação mais consistente sugere que os municípios com maior despesa pública per capita são municípios com uma maior capacidade de atractividade de profissionais do pré-escolar, levando a uma menor concentração do rácio relativo ao número de alunos por profissional qualificado.

Os coeficientes estimados relativos aos factores *gamma* (γ) e *delta* (δ) traduzem medidas ligadas directamente à variância do erro estimado para cada modelo.

Um factor *gamma* traduz a participação estimada do termo de ineficiência na variância do erro composto. Assim, um *gamma* mais elevado está associado a uma variabilidade mais acentuada das medidas de ineficiência relativas aos casos estudados (neste caso, valores municipais). Concretizando com valores na Tabela 2, sugere-se que existe uma maior variabilidade de desempenhos municipais no sector privado do que no sector público (independentemente do indicador ser relativo ao rácio de crianças por educador ou relativo ao rácio de crianças por estabelecimento de ensino pré-escolar) ou então que existe uma maior variabilidade de desempenhos dos rácios relativos ao número de crianças por educador do que dos rácios relativos ao número de crianças por estabelecimento.

A variância do termo de erro encontra-se sugerida pela estimação dos valores associados a δ^2.

3.2 Padrões de eficiência estimados

A Tabela 3 sintetiza os resultados alcançados, em termos de eficiência económica, no segmento da educação pré-escolar, com as observações municipais do Norte de Portugal. Como sugerido previamente, estas estimações foram alcançadas por máxima verosimilhança e recorrendo ao programa *Frontier 4.1*.

TABELA 3

Níveis de Eficiência do pré-primário em Portugal, NUTS3 do Norte do país e respectivos municípios (2000-2006)

Eficiência Estimada	(a) Alunos/docente (Público)	(b) Alunos/docente (Privado)	(c) Alunos/Estabelecimento (Público)	(d) Alunos/Estabelecimento (Privado)	(e) (a)-(b)	(f) (c)-(d)	(g) (a)-(c)	(h) (b)-(d)
Portugal	65,48%	43,30%	70,90%	30,56%	22,18%	40,34%	-5,42%	12,74%
Região Norte	93,52%	67,01%	89,86%	67,36%	26,51%	22,50%	3,66%	-0,35%
	(9%)	(19%)	(8%)	(19%)	(20%)	(19%)	(10%)	(16%)
Minho-Lima	92,20%	77,60%	91,65%	77,73%	14,61%	13,92%	0,55%	-0,13%
	(7,05%)	(10,80%)	(9,45%)	(15,42%)	(10,85%)	(11,67%)	(10,35%)	(20,70%)
Arcos de Valdevez	96,55%	91,53%	88,74%	67,45%	5,02%	21,29%	7,81%	24,08%
Caminha	94,95%	81,64%	88,25%	61,02%	13,32%	27,23%	6,70%	20,62%
Melgaço	87,18%	62,08%	85,40%	75,00%	25,10%	10,40%	1,78%	-12,92%
Monção	83,09%	94,55%	84,24%	74,06%	-11,46%	10,18%	-1,15%	20,49%
Paredes de Coura	73,82%	66,32%	75,35%	55,97%	7,50%	19,38%	-1,53%	10,35%
Ponte da Barca	97,92%	75,92%	77,02%	76,17%	22,00%	0,85%	20,90%	-0,25%
Ponte de Lima	90,05%	81,79%	89,96%	87,26%	8,26%	2,71%	0,09%	-5,46%
Valença	91,68%	81,96%	85,39%	45,90%	9,72%	39,49%	6,30%	36,06%
Viana do Castelo	89,80%	77,48%	88,71%	71,91%	12,32%	16,80%	1,09%	5,56%
Vila Nova de Cerveira	89,16%	92,95%	59,34%	36,35%	-3,79%	22,99%	29,82%	56,61%
Cávado	94,14%	72,51%	88,76%	81,15%	21,62%	7,61%	5,38%	-8,64%
	(3,89%)	(11,15%)	-7,34%	(12,12%)	(13,78%)	(13,83%)	(6,77%)	(15,60%)
Amares	90,80%	88,03%	75,45%	40,71%	2,77%	34,74%	15,35%	47,32%
Barcelos	94,53%	75,68%	83,24%	65,76%	18,85%	17,48%	11,29%	9,92%
Braga	90,96%	74,23%	86,30%	64,21%	16,73%	22,09%	4,66%	10,03%
Esposende	90,65%	62,04%	90,02%	58,05%	28,61%	31,97%	0,64%	3,99%
Terras de Bouro	97,83%	66,51%	81,21%	42,76%	31,31%	38,45%	16,62%	23,75%
Vila Verde	86,42%	89,72%	69,85%	68,73%	-3,30%	1,12%	16,56%	20,99%
Ave	88,14%	77,06%	87,71%	71,12%	11,08%	16,59%	0,43%	5,95%
	(5,23%)	(9,52%)	(10,63%)	(12,69%)	(12,61%)	(13,05%)	(8,92%)	(13,31%)
Fafe	84,82%	72,23%	75,82%	61,23%	12,59%	14,60%	9,00%	11,01%
Guimarães	81,07%	75,12%	82,33%	65,36%	5,95%	16,97%	-1,25%	9,77%
Póvoa de Lanhoso	92,91%	72,54%	80,19%	61,90%	20,37%	18,29%	12,72%	10,64%
Santo Tirso	91,06%	82,95%	86,30%	68,07%	8,11%	18,22%	4,76%	14,88%
Trofa	93,45%	71,60%	83,83%	60,46%	21,85%	23,36%	9,63%	11,14%
Vieira do Minho	95,67%	61,64%	87,68%	36,78%	34,03%	50,90%	7,99%	24,86%
Vila Nova de Famalicão	91,97%	84,11%	86,94%	76,38%	7,86%	10,56%	5,03%	7,74%
Vizela	84,52%	92,43%	55,37%	45,03%	-7,91%	10,34%	29,15%	47,40%
Grande Porto	87,80%	67,82%	90,53%	64,78%	19,98%	25,75%	-2,73%	3,04%
	(7,33%)	(1,97%)	(5,73%)	(6,40%)	(8,44%)	(9,47%)	(8,02%)	(6,29%)
Espinho	94,14%	64,70%	85,90%	38,40%	29,44%	47,50%	8,24%	26,30%
Gondomar	87,33%	71,35%	83,72%	40,32%	15,98%	43,40%	3,61%	31,03%
Maia	84,58%	68,99%	79,83%	35,84%	15,59%	43,99%	4,75%	33,15%
Matosinhos	77,13%	69,20%	78,63%	34,51%	7,93%	44,12%	-1,50%	34,69%
Porto	75,98%	71,30%	80,83%	49,78%	4,68%	31,05%	-4,85%	21,52%
Póvoa de Varzim	77,49%	69,39%	70,46%	47,93%	8,10%	22,53%	7,03%	21,46%
Valongo	81,22%	68,18%	80,92%	53,10%	13,03%	27,82%	0,30%	15,08%
Vila do Conde	96,26%	68,92%	78,00%	44,98%	27,34%	33,02%	18,26%	23,94%
Vila Nova de Gaia	86,37%	69,99%	68,35%	43,43%	16,37%	24,92%	18,02%	26,56%
Tâmega	88,57%	68,61%	90,29%	72,18%	19,96%	18,11%	-1,72%	-3,57%
	(4,76%)	(11,20%)	(8,26%)	(12,31%)	(10,61%)	(12,66%)	(8,35%)	(17,83%)
Amarante	93,10%	85,95%	86,00%	63,71%	7,14%	22,29%	7,09%	22,24%
Baião	89,00%	80,92%	70,47%	57,38%	8,08%	13,09%	18,53%	23,54%
Cabeceiras de Basto	93,77%	66,10%	85,60%	70,67%	27,66%	14,92%	8,17%	-4,57%
Castelo de Paiva	79,39%	61,25%	75,61%	71,60%	18,14%	4,01%	3,78%	-10,35%
Celorico de Basto	89,88%	87,95%	87,26%	38,07%	1,93%	49,19%	2,62%	49,88%
Cinfães	91,55%	66,52%	78,13%	38,70%	25,03%	39,43%	13,42%	27,82%
Felgueiras	80,35%	71,33%	78,79%	60,26%	9,02%	18,53%	1,56%	11,07%
Lousada	78,49%	66,26%	78,05%	65,20%	12,22%	12,85%	0,43%	1,06%
Marco de Canaveses	85,79%	70,01%	90,59%	59,09%	15,78%	31,50%	-4,80%	10,92%
Mondim de Basto	90,64%	89,16%	82,42%	66,82%	1,48%	15,60%	8,22%	22,33%
Paços de Ferreira	87,99%	73,44%	83,55%	51,51%	14,55%	32,04%	4,45%	21,93%
Paredes	85,33%	69,26%	82,77%	62,29%	16,06%	20,48%	2,55%	6,98%
Penafiel	90,10%	56,07%	87,04%	60,06%	34,04%	26,98%	3,06%	-3,99%
Resende	87,62%	90,12%	86,16%	41,99%	-2,50%	44,17%	1,45%	48,13%
Ribeira de Pena	86,78%	60,21%	57,70%	34,14%	26,57%	23,56%	29,08%	26,07%

Nota: Entre parêntesis, desvio-padrão da distribuição municipal das medidas de eficiência

TABELA 3 (CONT.)

Níveis de Eficiência do pré-primário em Portugal, NUTS3 do Norte do país e respectivos municípios (2000-2006)

Eficiência Estimada	(a) Alunos/docente (Público)	(b) Alunos/docente (Privado)	(c) Alunos/Estabelecimento (Público)	(d) Alunos/Estabelecimento (Privado)	(e) (a)-(b)	(f) (c)-(d)	(g) (a)-(c)	(h) (b)-(d)
Entre Douro e Vouga	94,46%	64,01%	89,84%	78,43%	30,45%	11,42%	4,62%	-14,41%
	(4,58%)	(7,54%)	(8,72%)	(18,44%)	(8,02%)	(12,28%)	(6,67%)	(11,55%)
Arouca	96,90%	70,67%	85,02%	63,11%	26,23%	21,91%	11,88%	7,55%
Oliveira de Azeméis	91,23%	65,67%	75,11%	54,41%	25,55%	20,70%	16,12%	11,26%
Santa Maria da Feira	95,22%	62,69%	88,64%	57,56%	32,54%	31,07%	6,59%	5,12%
São João da Madeira	87,94%	76,23%	85,70%	78,37%	11,71%	7,34%	2,24%	-2,14%
Vale de Cambra	86,20%	56,48%	67,80%	27,64%	29,72%	40,15%	18,40%	28,84%
Douro	81,83%	70,95%	88,17%	69,21%	10,88%	18,96%	-6,34%	1,74%
	(9,69%)	(30,86%)	(6,77%)	(26,15%)	(34,81%)	(27,55%)	(9,62%)	(13,88%)
Alijó	80,58%	71,87%	82,32%	64,52%	8,71%	17,80%	-1,75%	7,35%
Armamar	79,14%	91,12%	83,74%	72,01%	-11,98%	11,73%	-4,60%	19,11%
Carrazeda de Ansiães	63,40%	68,72%	75,16%	74,17%	-5,32%	0,99%	-11,76%	-5,45%
Freixo de Espada à Cinta	80,77%	62,48%	78,60%	40,84%	18,29%	37,76%	2,17%	21,63%
Lamego	75,94%	65,52%	79,65%	26,83%	10,42%	52,83%	-3,71%	38,70%
Mesão Frio	93,12%	4,08%	79,61%	1,67%	89,04%	77,94%	13,52%	2,41%
Moimenta da Beira	87,55%	92,16%	89,62%	72,17%	-4,62%	17,45%	-2,07%	19,99%
Penedono	69,88%	87,88%	76,30%	57,47%	-18,00%	18,83%	-6,42%	30,41%
Peso da Régua	85,46%	78,83%	85,72%	76,42%	6,63%	9,30%	-0,26%	2,41%
Sabrosa	63,28%	74,73%	79,79%	37,40%	-11,44%	42,40%	-16,51%	37,33%
Santa Marta de Penaguião	97,31%	66,56%	78,87%	31,06%	30,75%	47,82%	18,44%	35,51%
São João da Pesqueira	90,33%	4,08%	90,16%	2,14%	86,25%	88,02%	0,17%	1,95%
Sernancelhe	71,21%	71,60%	75,89%	42,13%	-0,38%	33,77%	-4,68%	29,47%
Tabuaço	81,26%	6,28%	86,27%	4,99%	74,97%	81,28%	-5,02%	1,29%
Tarouca	70,89%	4,07%	72,55%	1,82%	66,82%	70,74%	-1,67%	2,25%
Torre de Moncorvo	74,37%	58,52%	85,63%	44,65%	15,84%	40,97%	-11,26%	13,87%
Vila Flor	74,13%	73,58%	76,34%	60,09%	0,56%	16,24%	-2,20%	13,48%
Vila Nova de Foz Côa	69,49%	87,10%	67,25%	67,47%	-17,60%	-0,22%	2,24%	19,63%
Vila Real	86,67%	72,94%	65,06%	44,65%	13,73%	20,41%	21,61%	28,29%
Alto Trás-os-Montes	77,76%	70,99%	89,59%	82,18%	6,77%	7,41%	-11,84%	-11,19%
	(11,73%)	(22,21%)	(9,08%)	(20,78%)	(23,13%)	(24,11%)	(7,50%)	(17,94%)
Alfândega da Fé	66,06%	37,63%	80,81%	63,03%	28,44%	17,78%	-14,75%	-25,40%
Boticas	68,71%	73,26%	66,51%	61,48%	-4,54%	5,03%	2,20%	11,77%
Bragança	72,66%	74,12%	86,86%	64,81%	-1,46%	22,04%	-14,20%	9,30%
Chaves	76,01%	74,54%	75,57%	53,52%	1,47%	22,05%	0,44%	21,02%
Macedo de Cavaleiros	67,45%	68,48%	80,86%	79,27%	-1,02%	1,60%	-13,41%	-10,79%
Miranda do Douro	89,20%	73,52%	93,27%	61,30%	15,68%	31,97%	-4,07%	12,22%
Mirandela	70,71%	61,38%	75,83%	76,59%	9,33%	-0,76%	-5,12%	-15,21%
Mogadouro	97,40%	90,36%	88,18%	83,15%	7,04%	5,03%	9,22%	7,21%
Montalegre	92,06%	91,00%	91,58%	62,18%	1,06%	29,40%	0,48%	28,82%
Murça	55,58%	69,36%	66,52%	72,71%	-13,79%	-6,19%	-10,94%	-3,34%
Valpaços	73,36%	79,80%	70,53%	71,15%	-6,44%	-0,62%	2,83%	8,65%
Vila Pouca de Aguiar	86,56%	77,61%	84,48%	34,30%	8,95%	50,18%	2,08%	43,31%
Vimioso	85,89%	4,38%	86,84%	3,12%	81,51%	83,72%	-0,95%	1,26%
Vinhais	72,83%	65,90%	70,59%	46,91%	6,93%	23,68%	2,24%	18,99%
Média amostral	84,60%	69,65%	80,94%	55,50%	14,95%	25,44%	3,66%	14,15%

Nota: Entre parêntesis, desvio-padrão da distribuição municipal das medidas de eficiência

Não será excessivo recordar que quando discutimos "eficiência económica" não estamos a observar os *outputs* por si só mas antes a capacidade de resposta de cada município aos estímulos recebidos dos factores intervenientes. Assim, é bem possível que um município ostente um valor superior para um dado indicador (por exemplo, para o rácio de crianças por educador no sector público) e, no entanto, tenha um valor inferior em termos de eficiência quando comparado com um outro município que é caracterizado por valores inferiores desse indicador. Esta situação acontece porque o município com o valor superior em termos de eficiência respondeu com um valor superior no rácio em questão perante estímulos de mesma ordem que também foram introduzidos nos outros municípios.

Por exemplo, a Tabela 2 mostrou que a densidade populacional é um factor interveniente na obtenção de maiores rácios de criança por educador no sector público. Aí, estimou-se que, em média, um aumento em 1% da densidade populacional leva a um aumento de 0,083% no rácio em citação. No entanto, se um dado município responder com um aumento de 0,100% no rácio das crianças por educador em

função do aumento de 1% da densidade populacional, então esse município evidencia uma maior eficiência. Estas conclusões podem ser generalizadas para a combinação dos vários factores, sem perda de sentido.

Realizando uma leitura sobre os resultados expostos, verifica-se que a NUTS 2 Norte tende a ser menos ineficiente do que a NUTS 1 (Portugal). O nível de eficiência na NUTS 2 Norte é sempre superior ao respectivo nível para Portugal, independentemente do indicador usado para a produção.

Por exemplo, a NUTS 2 Norte revela um padrão de eficiência de 93,52% no indicador do rácio de crianças por educador no sector público enquanto, para o mesmo indicador, a NUTS 1 revela um padrão de 65,48%.

Outra observação é relativa à comparação entre o sector público e o sector privado, usando o rácio de crianças por educador. Na generalidade dos casos, o sector público é mais eficiente que o privado. Isto indicia que o sector público tem uma capacidade superior de resposta aos factores que intervêm no rácio em questão do que o sector privado perante os próprios factores.

Em termos de comparação entre os rácios do número de crianças por educador e do número de crianças por estabelecimento, verifica-se que, em média, os primeiros rácios são superiores aos segundos, independentemente de estarmos a tratar do sector público ou do sector privado. Por exemplo, a média amostral do padrão de eficiência obtida na avaliação dos modelos descritivos do número de alunos por educador no sector público é de 84,6%. Por sua vez, a média do padrão de eficiência percebida no modelo do número de alunos por estabelecimento público é de 80, 94% (os respectivos valores no sector privado são 69,65% contra 55,50%). Estes valores devem ter uma leitura consistente com a definição seguida de eficiência – evidenciam que existe um maior aproveitamento médio dos estímulos oriundos dos factores estatisticamente significativos (evidenciados na Tabela 2) por parte do número de alunos por docente do que por parte do número de alunos por estabelecimento de ensino. No entanto, reportando-nos novamente à Tabela 2, verificamos que a variabilidade de desempenhos municipais (indiciada pelo factor *gamma*) é superior nos rácios de alunos por educador do que nos rácios de alunos por estabelecimento. Combinando esta evidência, fica sugerida uma realidade que concentra valores de desempenho muito elevados nalguns concelhos quando se consideram os rácios de alunos por educador em detrimento de outros concelhos, com valores mais modestos, o que produz uma média mais elevada mas também uma maior variabilidade.

Na Tabela 3, aparecem ainda, entre parêntesis, os desvios-padrão para cada NUTS 3 considerando o desempenho municipal nos diferentes modelos. Constata-se que nas NUTS onde os padrões de eficiência são mais elevados existe uma menor dispersão dos valores. Aprofundando esta relação, verifica-se que as NUTS que apresentam níveis de desenvolvimento sócio-económico mais baixo segundo vários autores, como Cónim (2002) ou Mourão (2005) são aquelas que apresentam níveis de eficiência mais baixos. Estes casos são os relativos às NUTS Tâmega, Douro e Alto Trás-os-Montes. Mourão (2006) demonstrou que estas NUTS são caracterizadas por uma acentuada centralidade de alguns dos municípios, o que pode ser apontado como uma razão para a elevada disparidade de padrões de eficiência dos municípios incluídos.

Adicionalmente, a Tabela 3 apresenta quatro colunas que facilitam a leitura comparativa dos resultados (as quatro últimas colunas). Na coluna *(e)* compara-se a vantagem de eficiência, por município, no modelo explicativo do rácio de alunos por educador no serviço público com o rácio de alunos por educador no serviço privado. Na coluna *(f)* compara-se a respectiva vantagem nos modelos explicativos de alunos por estabelecimento. Na coluna *(g)* observa-se a vantagem do nível de eficiência municipal perceptível pelo modelo do rácio de alunos por educador em serviço público face ao nível de eficiência municipal perceptível pelo modelo do rácio de alunos por estabelecimento público. Na coluna *(h)* está evidenciada a vantagem destas dimensões reportadas ao sector privado.

Estas variáveis (colunas *e* a *h*) podem assumir valores positivos e negativos. Os valores positivos indiciam que existe uma resposta maior do que o expectável por parte dos municípios aos estímulos derivados das dimensões intervenientes no sector público sobre o sector privado (colunas *e* e *f*) ou nas

funções do número de alunos por educador sobre o número de alunos por estabelecimento (colunas *g* e *h*). Os valores negativos têm uma leitura simétrica, indicando que nas colunas *e* e *f*, por exemplo, a resposta aos estímulos é maior no sector privado do que no público.

Utilizando o exemplo do concelho de "Arcos de Valdevez", constata-se que os valores das colunas *e* a *h* são, respectivamente, 5,02%, 21,29%, 7,81% e 24,08%. Estes valores mostram que no concelho em questão o nível de eficiência é maior no sector público do que no sector privado (5,02% na vantagem do número de alunos por educador, e 21,29% na vantagem do número de alunos por estabelecimento) assim como revelam que a relação do número de alunos por educador é mais eficiente do que a relação do número de alunos por estabelecimento (7,81% para o sub-sector público e 24,08% para o sub-sector privado). Estes valores expressam que existe espaço, neste município, para medidas que melhorem a eficiência no mercado privado do pré-escolar, promovendo acções que tenham como consequência um número mais elevado de alunos por educador no sector privado assim como, por outra via, que incentivem a frequência de um número mais elevado de alunos por estabelecimento[7].

Os restantes concelhos têm uma leitura semelhante possibilitada por estes resultados inovadores na literatura científica.

3.3 Discussão dos Resultados

Estes resultados colocam, desde já, um sério aviso às intenções de políticas no sector do pré-escolar. Na medida em que se verificam valores inferiores de eficiência no sector privado, qualquer medida de reorganização da oferta educativa ao nível do pré-escolar deve ter por sentido final um aumento da eficiência conjunta nos sub-sectores, quer seja no privado quer seja no público. Se, por exemplo, se limita a oferta privada quando os valores respectivos são de significativa ineficiência, o resultado final será um pequeno aumento da eficiência no sub-sector público e uma acentuação dessa ineficiência no sector privado (não se verificando, pois, *melhoramentos de Pareto* descritos por exemplo em Barbosa, 1997). Medidas de reorganização do sector só serão bem concebidas se não existir ineficiência no aproveitamento dos estímulos (situação própria dos pontos de eficiência que compõem a *fronteira de possibilidades de produção* da Figura 1). Caso contrário, deslocando recursos utilizados numa produção que ainda não atingiu o seu óptimo para outra produção também ineficiente, poder-se-á obter um resultado final menos eficiente do que o alcançado antes da reorganização.

Por outro lado, estes resultados permitem sinalizar os espaços onde a necessidade de medidas que melhorem a eficiência é mais forte e em que dimensões o foco de acção deve ser colocado. Por exemplo, municípios sinalizados com valores negativos na coluna (e) da Tabela 3 são municípios que devem estimular, de sobremaneira, a rede pública; se houver valores negativos, por exemplo, na coluna (g), então o estímulo deve contemplar adicionalmente medidas que estimulem a eficiência relacionada com o número de crianças por educador no sector público. No entanto, a grande diversidade dos valores de eficiência expressa a realidade de um sector muito heterogéneo onde falta uma regulação efectivamente incisiva que leva a uma homogeneização no sector, tendo em vista maiores níveis de eficiência.

Em síntese, este trabalho pretende contribuir com uma análise crítica e quantitativa de avaliação dos padrões de eficiência da rede regional do pré-escolar, sendo, além de um esforço pioneiro na literatura, um instrumento útil tanto para decisores públicos quer para investidores privados.

[7] Mais uma vez se alerta que seguimos noções de eficiência técnica em que avaliamos o output enquanto intensidade de frequência no ensino pré-escolar e não enquanto medidas de qualidade do ensino ministrado. Observe-se ainda que, apesar de na Tabela 1, se ter verificado que, em média, o número de alunos por educador no segmento privado é superior ao do segmento público, isso não indicia que num concelho (por exemplo, o caso destacado a título ilustrativo de Arcos de Valdevez) não exista ineficiência no segmento privado, que se traduz num aproveitamento deste rácio aquém do potencial dadas as condições do município.

4. Conclusão

Tal como nos diz Piaget, a finalidade da educação é criar seres humanos capazes de cada vez mais fazerem coisas novas. Com o decorrer dos tempos, cada vez mais a formação das crianças se inicia mais cedo, ou seja, no pré-escolar.

Assim, em Portugal existem duas redes de educação pré-escolar: a rede pública e a rede privada que foram aqui analisadas em termos de eficiência económica.

Foi realizado um esforço empírico pioneiro na Literatura, no sentido de se avaliar a eficiência técnica do sector da educação pré-primária em Portugal nos concelhos do Norte de Portugal.

A leitura dos resultados, derivada desse esforço empírico, salienta que existe uma grande heterogeneidade de valores, indiciando desde logo a existência de práticas muito diversificadas no sector, espelhando a necessidade de uma regulação mais incisiva no sentido de promover melhores práticas em todos os locais.

Como valores de referência, verificou-se que existe menor ineficiência no ramo público que no ramo privado e menor ineficiência na função auscultada pelo número de crianças sobre o número de educadores. Estes resultados mostram que no geral devem ser empreendidas medidas indutoras de maior eficiência generalizada, em especial numa utilização mais intensiva das instituições. Este esforço foi ainda estendido aos concelhos nortenhos de Portugal, facilitando a sinalização da situação de cada caso.

Referências Bibliográficas

Barbosa, A. (1997), *Economia Pública*, McGraw-Hill, Lisboa

Battese, G. e G. Corra (1977), "Estimation of a Production Frontier Model: with application to the pastoral zone of eastern Australia", *Australian Journal of Agricultural Economics*, 21, 169-179.

Battese, G. e T. Coelli (1995), "A model for technical inefficiency effects in a stochastic frontier production function for panel data", *Empirical Economics*, 20, 325-332.

Bauer, P. (1990), "Recent developments in the econometric estimation of frontiers", *Journal of Econometrics*, 46, 39-56

Cónim, C. (2002); "População e Desenvolvimento Humano: Uma Perspectiva de Quantificação. 1970-1999"; *Estudos sobre a Economia*; Departamento de Prospectiva e Planeamento; Lisboa

Coulson, A. (2009); "Comparing Public, Private and Market Schools: the International evidence"; *Journal of School Choice*; 3; 31-54

Duttagupta, R. e M. Mlachila (2008); "What is really good for long term growth? Lessons from a binary classification tree (BCT) approach"; IMF Working Paper WP/08/263

Formosinho, J. (1997); "Comentário à Lei 5/97", *Legislação*, Lisboa, Gabinete para a Expansão e Desenvolvimento da Educação Pré-Escolar, Novembro, 1997

Greene, W. (1993), "The econometric approach to efficiency analysis", in Fried, H., Lovell, C. e S. Schidt, *The Measurement of Productive Efficiency*. New York: Oxford University Press

Hanushek, E. (1986), "The economics of schooling: Production and efficiency in public schools", *Journal of Economic Literature*, 24, 1141-1177.

INE, Instituto Nacional de Estatísticas (vv anos), *Anuários Estatísticos da Região Norte*, Lisboa

Iregui, A., Melo, L. e J. Ramos (2007), "Análisis de eficiencia de la educación en Colombia"; *Revista de Economia del Rosario*; vol. 10, 1, 21-42.

McCarty, T.A. e Yaisawaring, S. (1993),"Technical efficiency in New Jersey school districts" in Fried, H., Lovell, C. e S. Schidt, *The Measurement of Productive Efficiency*. New York: Oxford University Press

Mourão, P. (2004), "As disparidades regionais em Portugal: uma sugestão a partir de índices sintéticos"; *Revista Rede*s (Universidade de Santa Cruz do Sul); vol. 9; nº 3; September-December; 11-33

Mourão, P. (2005); "A importância do desenvolvimento regional na localização de equipas de futebol profissionais"; *Revista Portuguesa de Economia Regional*; vol. 8; 31-45

Mourão, P. (2006); "Tendências de concentração regional no interior português – o caso de Trás-os-Montes e Alto Douro"; *Regional and Sectorial Economic Studies*; vol. 6; nº1;

Mourão, P. (2008), "Local development and competitive soccer teams location"; *Investigaciones Regionales*; vol. 12; pp. 135-146

Vasconcelos, T. (2000), "Educação de Infância em Portugal: perspectivas de desenvolvimento num quadro de posmodernidade", *Revista Iberoamericana de Educácion*, nº 22.

Legislação da República Portuguesa para consulta

Circular nº 17/DSDC/DEPEB/2007 – Enquadram a organização das Orientações Curriculares

Decreto-Lei nº 147/97 de 11 de Junho - Estabelece o ordenamento jurídico do desenvolvimento e expansão da rede nacional de educação pré-escolar e define o respectivo sistema de organização e financiamento.

Despacho Conjunto nº 268/97 de 25 de Agosto - Define os requisitos pedagógicos e técnicos para a instalação e funcionamento de estabelecimentos de educação pré-escolar. Normas de instalações.

Despacho conjunto nº 300/97 - Define as normas que regulam a comparticipação dos pais e encarregados de educação no custo das componentes não educativas dos estabelecimentos de educação pré-escolar

Despacho n.3º/SEAE/2002, de 28 de Junho.

Despacho nº 12591/2006, de 16 de Junho - Considera a importância do desenvolvimento de actividades de animação e de apoio às famílias na educação pré-escolar

Despacho nº 5220/97 de 10 de Julho – Aprovação das Orientações Curriculares

Lei nº 5/97 de 10 de Fevereiro – Lei Quadro da Educação Pré-Escolar – Consagra o ordenamento jurídico da educação pré-escolar, na sequência da Lei de Bases do Sistema Educativo.

Anexo Descritivo

Caracterização da Rede Pública e da Rede Privada no sector da Educação Pré-Escolar em Portugal

Em Portugal existe uma rede nacional de educação pré-escolar constituída pela: a rede pública e a rede privada. O seu objectivo é o de nacionalizar esta educação e faze-la chegar cada vez mais a um maior número de crianças.

A.1.– Rede Pública

A rede pública da educação pré-escolar compreende todos os estabelecimentos de educação infantil, dependentes do Ministério da Educação.

Nestes estabelecimentos existe: a componente lectiva e a componente sócio-educativa[8]. A componente educativa é da responsabilidade do Ministério da Educação, e é assegurada por um docente especializado – Educador (a) de Infância, que segue as orientações imanadas pelo Ministério da Educação[9]. A componente sócio-educativa[10] é da responsabilidade dos agrupamentos/instituições em articulação com as Autarquias. O ministério da Educação assume a responsabilidade do carácter educativo, ficando a supervisão pedagógica e o acompanhamento da execução das actividades de animação e de apoio à família a cargo do educador responsável pelo grupo.

A componente lectiva é gratuita para todas as crianças. Os almoços e o prolongamento do horário são pagos ou não pelos pais de acordo com a sua situação económica devidamente comprovada e em conformidade com o escalão a que pertencem[11]. As autarquias disponibilizam os espaços físicos, contratam o pessoal auxiliar de educação e suportam as despesas de manutenção dos edifícios (água, luz, telefones, aquecimento). Estas medidas visam estimular e desenvolver o alargamento da rede nacional de educação pré-escolar pública, promovendo uma política de igualdade e de oportunidades de acesso a todas as crianças a esta educação.

A educação pré-escolar pública é ministrada nos Jardins de Infância construídos para este fim e existem em maior número nas zonas urbanas ou nas suas proximidades.

A componente lectiva é de 5 horas, com um intervalo de 1.30h ou 2.00h para almoço. Este pode ser servido na instituição, desde que requerido pelos pais/familiares.

A componente sócio-educativa aparece sempre que os pais/encarregados de educação por questões de necessidade a requisitem. O seu horário será fixado no início do ano em reunião de pais e salvaguardando os interesses e bem-estar dos alunos, tentando responder às necessidades das maiorias das famílias. É desenvolvida por monitores e/ou auxiliares de acção educativa, mas coordenada pelo Educador(a). As suas mensalidades são calculadas de acordo conta o rendimento *per capita* familiar[12].

A faixa etária das crianças está compreendida entre os 3 e os 5/6 anos de idade, ou seja, a idade de ingresso no ensino básico (Lei nº 5/97, artigo 3º). O critério de acesso a este rede é a idade das crianças, tendo sempre prioridade as crianças mais velhas, ou seja, as crianças de 5 anos e assim sucessivamente[13].

Geralmente os grupos são heterogéneos em sexo e em idade, constituindo as denominadas salas mistas, mas, podem existir salas homogéneas em idade.

De acordo com a Lei em vigor[14], cada sala de educação pré-escolar deverá ter em média 2m² por criança, o que equivale a uma média de 20 a 25 crianças. Mas existem excepções relativamente às zonas de pouca densidade populacional infantil (aldeias de Trás-os-Montes e Alto Douro, das Beiras e do Alto e Baixo Alentejo).

---

8 Lei-Quadro da Educação Pré-Escolar (Lei nº 5/97).

9 Lei nº 5/97, capítulo VI, artigo 18.

10 Lei-Quadro da educação pré-escolar em articulação com o Decreto-lei nº 147/97 (11 de Junho)

11 (Lei nº 5/97, capítulo V, artigo 16)

12 Despacho Conjunto nº 300/97 de 9 de Setembro de 1977, 2º série, artigo 3º.

13 Despacho n. 3º/SEAE/2002, de 28 de Junho.

14 Despacho Conjunto nº 268/97 de 25 de Agosto.

Em relação ao método usado, cabe ao Ministério da Educação assegurar a qualidade do ensino ministrada na educação pré-escolar. Assim, o Estado define as Orientações Gerais da Educação Pré-Escolar, cabendo-lhe os aspectos pedagógicos e técnicos e competindo-lhe: definir as regras para o enquadramento da actividade dos estabelecimentos de educação pré-escolar; definir os objectivos e linhas de orientação curricular; definir os requisitos habilitacionais do pessoal que presta serviço nos estabelecimentos de educação pré-escolar; assegurar a formação pessoal; apoiar as actividades de animação pedagógica; definir regras de avaliação de qualidade dos serviços; realizar actividades de fiscalização e inspecção[15].

Actualmente, muitos jardins de infância já fornecem o almoço às crianças, desde que este seja previamente requisitado pelos seus familiares. O pagamento das refeições é feito nas autarquias ou nos próprios jardins (Associação de Pais) e de acordo com o rendimento *per capita* familiar[16]. Existem crianças que não pagam nenhuma mensalidade (famílias abrangidas pelo rendimento mínimo e crianças de risco)

Algumas autarquias asseguram o transporte das crianças sempre que necessário e com aviso prévio do educador(a) de infância.

A.2. – Educação Pré-Escolar Privada

A rede privada é a outra rede de educação pré-escolar. Engloba as Instituições de ensino particular e cooperativo e as instituições particulares de solidariedade social[17].

Nas IPSS a componente educativa, a componente de apoio à família e as refeições são pagas pelos pais e estão incluídas na mensalidade, que é calculada em função da declaração de IRS dos pais/encarregados de educação e de acordo com o Despacho Conjunto nº 300/97, 2ª série, de 9 de Setembro e com a Circular nº 3 de 2 de Maio de 1997. As crianças que se encontram em famílias/instituições de acolhimento, são consideradas crianças de risco e, por isso, não pagam mensalidade.

Nos estabelecimentos de ensino particular e cooperativo, o Estado, através do Ministério da Educação, estabelece com as entidades tutelares contratos de desenvolvimento para a educação pré-escolar.

A componente lectiva destas Instituições está a cargo e é ministrada por um Educador(a) de infância. A componente de apoio à família é exercida pelas Auxiliares de Acção Educativa e Coordenada pelo Educador.

Esta educação é leccionada em IPSS, em instituições privadas construídas para esse fim ou em edifícios adaptados com as características necessárias para o trabalho a desenvolver com crianças de tenra idade.

O horário de funcionamento desta rede varia de Instituição para Instituição, dentro e fora da mesma região. A maior parte delas estão abertas desde as 7.00h/7.30h às 18.30h/19.00h. Contudo, existem Instituições que têm um horário de funcionamento mais alargado, visto este poder ser alargado de acordo com as necessidades dos pais.

Nestes estabelecimentos as crianças têm acesso a uma ou duas actividades extra-curriculares incluídas na mensalidade.

Esta rede é formada por duas valências: jardim de infância e creche, de acordo com as idades das crianças, assim no caso do jardim de infância o nível etário das crianças varia entre os 3 e os 5/6 anos de idade e no caso das creches entre os 4/5 meses e os 36 meses de idade no caso das creches.

O número de crianças por sala depende dos espaços físicos da mesma[18]. Se a turma tiver a lotação máxima, e uma criança for proveniente de uma Instituição de apoio a menores, referenciada pela Segurança Social, ou oriunda de situação de risco alternativa o número poderá ser alargado.

A rede privada é a única que valoriza as necessidades das crianças com idades compreendidas entre os 3 ou os 4 meses e os 36 meses de idade. A mensalidade da creche é suportada pelos pais.

[15] Lei nº 5/97, capítulo III, artigo 8.

[16] Despacho Conjunto nº 300/97 de 9 de Setembro, II série, artigo 3º.

[17] Decreto-Lei nº 147/97 de 11 de Junho

[18] Despacho Conjunto nº 268/97 de 25 de Agosto

A metodologia usada na rede privada tem em conta o Regulamento interno da Instituição e o Projecto Institucional. Apesar de não serem supervisionadas pelo Estado, têm de cumprir as Leis, Decretos-Lei, Portarias, Normas, Despachos-Normativos emanados pelo Ministério da Educação. O recurso dos profissionais de educação às Orientações Curriculares também é muito frequente.

A componente lectiva é pensada de acordo com o grupo de crianças e muitas vezes é planeada com as mesmas. Porém, existem actividades que são decididas em reunião de conselho pedagógico de acordo com os interesses e ideais da administração[19].

Duas das principais refeições diárias (almoço e lanche) estão incluídas na mensalidade que é suportada pelos pais. Quando as crianças não almoçarem na Instituição esta quantia poderá ser descontada na mensalidade total.

Algumas Instituições já possuem transporte próprio o que facilita e torna mais fácil o transporte das crianças[20].

[19] Nesta rede também se tem em conta o que está estipulado na Circular nº 17/DSDC/DEPEB/2007.

[20] Este tem de estar de acordo com a legislação em vigor e adaptado de acordo com as normas estabelecidas pela União Europeia para transporte de crianças com menos de 10 anos de idade.

THE PORTUGUESE MANUFACTURING INDUSTRY (1996-2004): WHICH CAPACITY FOR STRUCTURAL CHANGES? [1]

Natércia Godinho Mira - Universidade de Évora - E-mail: nmira@uevora.pt

Resumo:

As decisões de investimento das empresas, quer em investimento físico ou tangível, quer em intangíveis ou capital humano, constituem importantes determinantes do padrão estrutural. Neste contexto, o nosso objectivo consiste em avaliar a habilidade desenvolvida pelas empresas da indústria transformadora Portuguesa, para promover as necessárias alterações no padrão de especialização. Como os investimentos intangíveis são, por natureza, de difícil medição e avaliação, utilizámos taxonomias WIFO aplicadas à indústria transformadora, as quais nos permitem reduzir essa intangibilidade em análises quantitativas. Sem grandes alterações durante o período analisado, os resultados apontam para uma especialização em indústrias intensivas em trabalho e reduzidas competências, o que, sendo revelador de uma reduzida capacidade de adaptação, pode afectar o processo competitivo no seio de um mercado alargado.

Palavras-chave: adaptabilidade, competitividade, decisões de investimento, alteração estrutural, padrão de especialização.

Códigos JEL: L60

Abstract:

The investment decisions of firms in relation to both, physical or intangible investments and to human capital are important determinants of any structural pattern. In this context, our objective is to evaluate the ability developed by firms' Portuguese manufacturing, to make the necessary changes on the specialisation pattern. Because intangible investments are, by nature, difficult to measure and evaluate, we use WIFO taxonomies applied to the manufacturing industry. These taxonomies allow to makes at least some of the intangibles a bit more tangible for quantitative analysis. The results point towards a specialisation in labour-intensive and low-skill manufacturing with no great changes during the period, revealing all the while a reduced capacity to adapt, which could affect the competitive process within an enlarged market.

Keywords: adaptability, competitiveness, investment decisions, structural change, specialisation pattern.

JEL Codes: L60

[1] My thanks to the Publicity and Clients Department of INE for their promptness in providing all the statistical information requested, under auspices of the INE/MCES (National Institute for Statistics/Ministry for Science and Higher Education) Protocol.

1. Introduction

Since Portugal joined the European Economic Community in 1986 and went on to participate in monetary union, as a result of the ratification by Parliament of the Treaty on European Union (EU) in 1992, until the planned establishment of Economic and Monetary Union on 1 January 1999, complete integration within the present European Union has been considered a priority. This integration, as well as Portugal's participation in relation to the euro, was recognised as essential. However, at the same time, it was seen as a challenge because of the competition that would be felt both at the global and at the EU level, and also because of the implications this would have for the competition among firms in the internal market. This challenge became far greater, as the pressure of the process of economic restructuring was increasingly felt, considering the difficulties firms generally came to experience. While new firms were set up and entered the market, there were others which, as they were basically inefficient, were forced out of the market, because they could not deal with the greater competition, whether in the broader sphere or in the domestic market itself.

The question of the firms' competitiveness and of the Portuguese economy in general, is seen as fundamental to the whole process of integration, since it is an economy that is very open to the outside and, as such, is very exposed to international competition. Only by being competitive does an economy have the capacity to, on the one hand, maintain its position in those markets where it does business and, on the other, win new markets. The key aspect of this competitiveness is the adaptability of economies (European Commission, 1999), which is essentially the ability to pursue new opportunities through the accumulation and reuse of resources, as well as through an aptitude to exploit already-existing competitive strengths. This adaptability, fundamental not only to the growth of a country but also to the reduction of the vulnerability of its economy through the development of its capacity to resist unforeseen external economic shocks, is equally important for firms, so that the capacity to adapt is seen as a key element in entrepreneurial competitiveness.

Twenty years after joining and after approximately fourteen consecutive years of financial support from the EU had elapsed, Portugal, in 2004, had one of the lowest levels of productivity among the 15 EU members. In terms of average percentage of the EU 15, for the year productivity was 62.6 and the per capita GDP in PPP[2] was 67.4 (Banco de Portugal, Annual Report, 2004). The use made of structural funds channelled into manufacturing, with the objective of promoting investment and contributing to an increase in levels of productivity in such a way as to guarantee competitiveness among firms within the Single Market, did not appear by then to have ensured that the necessary modifications had been achieved.

In the face of empirical evidence in the mid-1990s indicating that there was a need for a profound restructuring at the industrial level, the objective of this paper is to evaluate the ability developed by manufacturing firms during the period under analysis (1996-2004), to alter the structure of Portuguese industry while it was adapting to new competitive forces[3]. In which way, the firms' investment decisions were as a stimulating force to make the necessary changes in the specialisation pattern of manufacturing industry? Taking the Portuguese manufacturing industry as the basis for this study, it clearly being the dominant industrial sector[4] and the one where transactional goods were concentrated on an international scale, our objective is to evaluate the adaptability of the Portuguese economy to the more aggressive competitive conditions.

This paper is structured as follows. In section 2 a brief overview of theoretical framework around the concepts to be used is given. In section 3, an attempt is made to evaluate the extent of the structural changes that occurred during the period under analysis, since the greater or lesser degree of ability to adapt to the new competitive constraints depends on the pattern of specialisation and on the rhythm of the changes occurring in the structure of the manufacturing industry. In section 4, first of all we analyse the firms' physical investment decisions at the sectoral level, while a potential stimulating force for some of the structural changes, as determinants

[2] Purchasing power parity.

[3] After 2004, these underwent yet further change due to the fact that the EU had expanded, with 10 new countries joining that year.

[4] This refers to industry in its broadest sense which, as well as the Manufacturing Industry, includes mining, electricity, gas, water and construction.

of the capacity for accumulation and the adaptability of the economy. Then, intangible and human capital investments are also taken into consideration, and using the WIFO industrial taxonomies we seek to analyse the specialisation pattern of Portuguese manufacturing industry, with reference either to other studies that apply the same methodology, or that has analysed the evolution of Portuguese manufacturing. Finally, in section 5, some conclusions are drawn from the empirical work carried out.

2. Sctrutural Change, Adaptability and Competitiveness

Depending on the accumulation of human and physical capital, above all the economic growth depends on efficiency with which they are used. So, productivity growth given by the ability to obtain more output from given inputs of labour and capital, depends on the quality of those factors as well as the way of their combination on production – more or less efficiently.

Because productivity growth is determined by a variety of factors, it is difficult to attribute the poor performance of productivity growth to any particular factor. But, in a certain way there is consensus that in certain Member States of the European Union and in the United States too, the information and communication technologies (ICT) and innovation have been determinants in the acceleration of productivity growth (European Commission, 2002).

An essential insight of classical development economics was that economic growth depends on changes in the structure of production, with the industrialization being the driver of technical change and the reallocation of labour from low to high-productivity activities having a positive effect on overall productivity increase (United Nations, 2006).

Despite the several uses of the concepts of structure and structural change in economics, the most common use of structure has to do with the relative importance of sectors in the economy, either in terms of production or factor use, being the industrialization the central process of structural change (Syrquin, 1988).

Discussing the role of what they called “leading sectors”, Freeman and Soete (1997) identified the term “structural change” to the Schumpeterian term of “creative destruction”. In Schumpeter’s theory, the introduction of innovations lead to a process of “creative destruction” with the emergence and growth of new sectors, and the decline of the old technologies. So, creative destruction and structural change have the same meaning, i.e., changes measured by variations in the shares of sectors in output or employment. Freeman and Soete (1997) show how since the First Industrial Revolution both technological change and creative destruction had mainly taking place within the manufacturing sector.

Either Kaldor (1966), considering the manufacturing sector as a driving force for economic growth, or Cornwall (1976) referring the importance of technological changes on manufacturing sectors to productivity improvement in a whole of sectors, concluded that manufacturing is the prime sector leading to economic growth.

The manufacturing industry is the most exposed sector to international competition, because manufactured goods are more tradable than other goods or services. Besides is a sector more intensive in Research and Development (R&D). Therefore, the evolution in manufacturing is a good indicator for capturing the capacity of the economy to react and adjust to globalization challenges.

According to Abramovitz (1986), the notion of adaptability supposes the existence of an interaction between the social capability and the technological opportunity. The level of education and firms, commercial, and financial organizations and other institutional arrangements, are important constrains in its choice and adaptation of technology. “The combination of technological gap and social capability defines a country’s potentiality for productivity advance by way of catch-up” (Abramovitz, 1986, p: 389). So, technological catch-up is much more than replacing an outdated technological set up with a more modern one, implying continuous transformations on technological, economic and institutional structures[5].

[5] In a seminal paper about convergence, Abramovitz (1986) pointed out for the first time the link between structural change and convergence.

While early growth models emphasized the role of capital accumulation without recognize the role of innovation and diffusion of technology in global economic growth, modern growth theories suggest the innovation as a crucial determinant of growth. Technological change and innovations are essential sources of structural change.

Despite several doubts persistence about the relative importance for overall economic and productivity growth, on the one hand of the contribution of productivity growth within the ICT sector and, on the other, of the spillovers from the ICT sector to other industries, an important characteristic of the US economy and some EU Member States that registered a good economic performance, is the intensive use of information and communication technologies (ICT) (European Commission, 2001). ICT is considered a core element of the knowledge society and an important complement to R&D activities.

According to the European Commission (2002), "a key determinant of Europe's recent under–performance in productivity growth is insufficient innovative activity as well as under–investment in, and weak diffusion of, information and communication technologies (ICT)" (European Commission, 2002: p.4).

Although productivity growth in developed countries mainly relies on technological innovation, there is no doubt that changes in the structure of production towards activities with higher levels of productivity, is a crucial determinant of economic growth, where the human capital is crucial[6]. Technology diffusion can only be efficient if the level of human resources is high enough. The human capital contributes to productivity, both at the level of individual workers and at the macroeconomic level, in an intimate relationship between skills and productivity. Only with a labour force of high quality, new technologies, innovation and research and development can be readily exploited.

3. Structural Changes in The Manufacturing Industry

Being the dominant industrial sector, manufacturing it is made up of fairly heterogeneous sub-sectors, with the particularity of having evolved in a differentiated way during the 20th century. In an analysis carried out on nine sub-sectors and with a breakdown to 2 digits of the CAE-Rev 1, Aguiar and Martins (2004) identified a progressive diversification in the Portuguese manufacturing industry up to the 1960s. With the Food, drink and tobacco, Textiles, clothing and footwear and Wood and cork sectors clearly dominant in the first decades of the century, they suffered a reduction in importance, whether in terms of production or of labour force, when the Paper, publishing and printing, Non-metallic minerals, Metallic products, machinery and transport materials sectors came to be of greater importance in manufacturing.

For the period between 1970 and 1996, with the same sub-sectors and similar breakdown, Lança (2000) concluded that the evolution of Portuguese manufacturing was characterized by a great structural immobility, with an accentuated international specialisation on the cluster textil/ leather. With the increasing foreign investment on the automobile industry, at the end of the period the situation changed, with the Metallic products in 1996 being the first sector in terms of exports (37% of total manufacturing), against a significant reduction on the Food, drink and tobacco sector (thirteen percentage points since 1970).

The analysis undertaken by the European Commission in relation to specialisation in European manufacturing between 1986 and 1998 at two levels of breakdown (sector and industry) in fourteen countries, indicates for Portugal, a decrease in specialisation (in terms of production and exports), which is contrary to what was the general trend in the remaining countries (European Commission, 1999). During this period, the greatly reduced specialisation reflected reductions in sectors such as textiles, food production and wood production, with the manufacture of Machinery and equipment and Electrical machinery, together with Vehicle manufacturing, taking their place.

In a breakdown to 3 digits of the CAE for the period 1996 to 2004, we have sought to evaluate how the 101 industries evolved and whether the trend towards a decreasing specialisation identified by the European Commission report was maintained. In terms of the production, export and employment variables, two indicators were used in our analysis,

[6] For details about the relationship between human capital and productivity growth, see for example, Mankiw et al (1992), Barro and Sala-i-Martin (1995) and Vandenbussche et al. (2006) .

namely the Herfindahl Index and the Concentration Ratio. Both indices were used according to the suggestion made by the European Commission (European Commission, 1999) for an analysis of the degree of manufacturing specialisation in determined industries. There are others specialisation indicators, each one with advantages and disadvantages and highlighting different aspects. Not all of them are easy to calculate or interpret, and someone not very intuitive quantitatively. The generalised use of Herfindahl Index and Concentration Ratio in studies about specialisation dictates our choice. Comparing with the Herfindahl Index and others indicators, Concentration Ratio has the advantage of to be most intuitive. This is the reason why it is considered a good complement in all studies of specialisation allowing by simple comparison in two different years, to assess how evolve the degree of specialisation.

Thus, manufacturing is "highly specialised" in production, if a reduced number of sectors or industries (consonant with the breakdown) is responsible for a significant part of production. All changes that occur in specialisation level are a reflexion of how resources are reused within manufacturing industry.

The Herfindahl Index is defined as the sum of the square of the shares of all sectors/industries in the whole manufacturing industry. This makes it very susceptible to influence by the market share of the largest sector or industry. In spite of this disadvantage it is easy to calculate. Its formula is given as:

$$H = \sum (s_i)^2 ,$$

where *i* represents each sector or industry appertaining to manufacturing, and s_i relates to the sector share *i* (or industry) within the total manufacturing industry. The greater the value of *H*, the greater is the degree of specialisation. Over time, increases in the Herfindahl Index are indicative of a greater degree of industrial specialisation and, consequently, of an increase in concentration in a limited number of sectors/industries. On the other hand, decreases in the index point to reductions in specialisation and concentration, which signifiers a greater dispersal of production over a greater number of sectors/industries.

All of the statistical information used was provided by the Instituto Nacional de Estatística - INE (National Institute for Statistics) from the database of the Inquérito às Empresas Harmonizado - IEH (Harmonised Survey of Enterprises). The data were properly weighted by INE in a breakdown of the manufacturing industry into 3 digits of the Classificação das Actividades Económicas - CAE (Classification of Economic Activities) for the period 1996 to 2004.

Relative to the behaviour of this index (based on industries share) and in respect of variable production, it can be seen from Figure 1 that the trend was towards the maintenance of the index in relation to the first year of the period, with no significant fluctuations during the nine years studied. The specialisation of production, relatively stable and with an *H* in the order of 0.025, indicates a high degree of inter-industrial dispersal of production and a reduced mobility. The trend of the index relative to the specialisation of exports and the specialisation of employment was different, with more marked fluctuations and a decreasing trend in the former, in particular from 1999. By then, a reduction in specialisation and in the concentration of exports begins to be seen and thus a dispersal of exports among a greater number of industries. In the case of the index relating to specialisation in employment, the slightly decreasing trend up to the middle of the period is reversed, representing from that point an increase in the degree of specialisation and concentration of employment in a smaller number of industries. Exports and employment, from 2001, revealed diverging trends.

Despite some fluctuations in the index of specialisation of exports and of employment and relative stability in the index of specialisation of production, we can see that, for most of the period, this last index reached values of almost half of the other two, representing a lower concentration in respect of production.

The other indicator, Concentration Ratio (CR_n), provided by the part of the *n* largest industries/sectors in the total manufacturing industry (in production, exports and employment), was used as a secondary indicator. As a Concentration Ratio disadvantage,

is that it only uses information about the largest industries/sectors; besides there is no good guide about the dimension of *n* that should be considered. Its formula is given as:

$$CR_n = \sum_{i=1}^{n} s_i \ ,$$

where *i* represents each sector or industry appertaining to manufacturing, and s_i relates to the sector share *i* (or industry) within the total manufacturing industry.

Such as for the Herfindahl Index, the CR_5 was calculated for each of the variables, based on industries share (Figure 2). During the three years analysed, 1996, 2000 and 2004, the ratio revealed itself to be relatively stable whether for production or for employment. However, the ratio relative to production was far lower, with 25.7% in 1996 and 24.05% in 2004, while for employment the ratio for these years was around 35% to 36%. In relation to the stability of the ratio relative to production, there is also a corresponding relative stability with respect to the five industries which continued as the five largest during the period. They are: Manufacture of petroleum products (CAE 232), Manufacture of other clothing and fashion accessories (CAE 182), Manufacture of motor vehicle (CAE 341), Manufacture of footwear (CAE 193), and Manufacture of other food products (CAE 158). The fluctuations that occurred during the period are slight, indicating an inter-industrial mobility which was reduced in terms of variable production. The industry that falls into fifth place, CAE 193 – the Footwear industry, maintaining a certain degree of regularity until about 2002, became part of the group of the following five in 2003, with 2.9% of the manufactured product in 2004, while in 1996 it had 4%, accentuating the loss of importance in the industrial structure of an industry that had always been considered "traditional" in Portuguese manufacturing[7].

With a greater fluctuation in exports, the five largest industries held on to about 41% of total manufacturing exports in 1996, a concentration which was significantly reduced in 2004, when the CR_5 was 29.94%. In spite of this reduction, which confirms the decreasing specialisation seen in the previous decade, the composition of the group of the five largest industries underwent no major changes: Motor vehicle manufacture (CAE 341) – always on the top during the period[8] (essentiality due to the high foreign investment), Manufacture of other clothing and fashion accessories (CAE 182), the Footwear industry (CAE 193), the Manufacture of pulp, paper and cardboard (CAE 211) and the Manufacture of other work in wood and of work in straw and plaiting materials; the Cork industry (CAE 205). The final year of the period was an exception, with the last of these industries giving place to the Manufacture of electronic components (CAE 321), with 5.3% of the total of manufactured exports although in 1996 this percentage was only 3.2%, with an evident substitution by exports incorporating a higher level of technology.

In addition to the stability of the ratio relative to employment, should be emphasize that the five premier industries were practically the same throughout the period, each of them with relatively stable shares and only one or two changes in their position relative to each other, confirming in this group a reduced inter-industrial mobility in terms of employment.

As important as the structural changes, is the speed of those changes. So, the indicators of the speed of change of production, of exports and of employment were calculated (European Commission, 1999; Aiginger 2000; Aiginger 2001), based on the absolute differences between the shares of the first and of the last years, which were added for all of the industries (3 digits).

$$\text{Speed of Change} = \sum_i \left| s_{i,t} - s_{i,t-n} \right| ,$$

where $s_{i,t}$ and $s_{i,t-n}$ represent the shares in the last year of the period and in the first year, respectively.

Aiginger (2000) drew attention to some of the problems to be taken into consideration when the index is applied, given the difficulty of the measurement of the speed of change through one simple indicator. The fact that the speed of change of shares distinguishes

[7] According to Lança (2000), this industry was part of the main specialisation pole of the Portuguese manufacturing industry, the cluster textil/leather, which was responsible in 1996, for 31% of the exports, 21% of the value added and 32% of the industrial employment.

[8] This confirms the continuity of the good performance in terms of exports of the automobile industry (particularly the motor vehicle sector) founded by Lança (2000).

only one aspect of structural modifications, whose origin could even be varied when adaptability is a complex process with many facets, is among the identified problems.

Varying between a minimum of 0 (in case of maximum similarity between the shares) and a maximum of 200 (when the similarity is minimal), on its own, the structural change expressed by the speed of change indicator is not an objective, though it does represent the capacity for change of an economy or industry, reflecting levels of competitiveness.

The index produces values very different for each of the variables: 26.07 for production, 42.78 for exports, and 20.03 for employment. In the last case, this comprises a fairly moderate structural change and represents some rigidity, which could affect growth.

Aiginger (2001) calculated the speed of change for the manufacturing of 14 EU countries for the period 1985 to 1998. In a breakdown to 3 digits, the results for Portugal point to changes in the order of 49.57 in the case of value added (this was the variable that was used and not production), 44.48 in the case of exports and 40.46 for the speed of change in relation to employment. The correspondent values of the speed of change in the 14 EU countries were 19.27 for value added, 21.33 for exports and 17.48 for employment. Portugal was one of the countries with the fastest structural changes during the period under analysis, ranking, for any of the variables, between first and third of the fourteen countries analysed. Comparing with our results, we can say that there was a significant reduction on structural changes since the middle of 1990's (only results of exports and employment can be comparable).

Calculating the speed of change at sector level and for production, exports and employment with a breakdown to 2 digits of CAE, the sectors considered "winners" and "losers" in terms of their respective shares were identified (Tables 1, 2 and 3).

For every variable, sectors intensive in R&D[9] and with high level labour skills[10] were found among the winners and losers to the same degree as were labour-intensive sectors with low skills in terms of human resources used. Having as its basis those sectors which, from the beginning to the end of the period, registered major changes in respect of shares of production and exports, from 1996 to 2004, we can say that at the first glance, there is no clear trend pointing to huge structural changes, in the sense of a greater weight being given to sectors intensive in R&D and with a greater use of more highly qualified human resources. However, we must refer a positive aspect: there is a slight trend to a decrease in shares (for all variables) of low-technology sectors, such as Food and drinks industries, Tobacco industry, Manufacture of textiles, Clothing industry, preparation, dyeing and manufacture of articles made from fur and Cutting and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear.

4. The Importance of Investment as an Impulse for Change

4.1 The physical investment and the adaptability and capacity for accumulation

As is recognised by neoclassical models (Solow 1957, Barro 1998), gross fixed capital formation and tangible productive investment are determinants in the capacity for accumulation of an economy and, consequently, of its development. In this way, and based on neoclassical theory, we acknowledge the relevance that the variable of physical investment has in the economy in general and in Portuguese manufacturing industry in particular, as a moving force for its development. This is because, apart from contributing to improvements in work productivity itself, it is also through tangible investment that access is provided to new technologies incorporated in the equipment that is acquired.

In relation to this point, the analysis made of the behaviour of Portuguese manufacturing during the period 1996 to 2004 has to do with the way in which the firms' decisions of physical investment evolve at the industry level, while being a potential stimulating

[9] To classify the sectors according their intensity in R&D, we use the OECD Classification which divides the manufacturing industry into high-technology, medium-high-technology, medium-low-technology and low-technology groups. This classification is based on analysis of R&D expenditure and output of 12 OECD countries according to ISIC Rev. 3 (NACE Rev. 1 in Europe). For details see Hatzichronoglou (1997).

[10] Landesmann et al. (2007), in a study about skills and industrial competitiveness, identified industry groups by average skill intensity, classifying in the high-skill intensive, industries such as machinery, electrical and optical equipment and transport equipment, and in the low-skill intensive, industries such as textiles, wood, other manufacturing and recycling.

force for some of the structural changes. Although not corresponding exactly to the value of firms' investment, the variable used, Increase in Material Fixed Assets, is the one which can identify it most closely and which could be obtained from the accounts' details, to become part of the questionnaires undertaken within the ambit of IEH. It corresponds to the total variation of the fixed material assets occurring during the exercise – acquisitions less disinvestments. It includes the work that the enterprise carried out for itself and which is destined for capital assets and corresponds in terms of the variables examined by IEH, to the algebraic sum of three aspects: Increases in Material Fixed Assets, Divestitures, Transfers and Discounts.

For the whole period and at 1996 prices[11], the calculation was made of rates of growth of the variable Increase in Material Fixed Assets, which we will from now on designate Investment. Because of an "unusual" negative value of that variable in 1996 in the industry (CAE 265) motivated by a great value of property transfers, which distort our analysis by the influence on the rates of growth of manufacturing, we take the option of neutralize the effect of that CAE in the total investment and, of course, we excluded its value in the growth rate of manufacturing[12]. For all period, the importance of the investment of that industry in total manufacturing is not very high and relatively stable (around 1 or 2%).

It was concluded that there is some irregularity in this type of expenditure, either in relation to the length of the period under analysis or between the various industries. Despite this, the choice was made to divide the period under analysis into two sub-periods. This was due to the fact that, on average, in the first four years of the period (1996-2000), the number of sectors with negative growth rates in investment was lower, with an average annual growth rate for this period of 6.75% for manufacturing as a whole, while for the following four years (2000-2004) this rate was negative (-15.9%) (see Table 4). As a rule, no clearly defined trends exist in investment' decisions, whether in global terms throughout the period or even at the level of the various industries. This agrees with the findings of the European Commission in relation to the decade 1985 – 1995 by recognizing the volatility of the variable investment, and according to which, because the factors explaining the pattern of investment in European manufacturing are varied, rates of investment were registered which varied as much between the various industries in a given country as between countries (for a given industry). Since this is to do with changes of a technological nature and the reaction to demand, it is an aspect that is also influenced by macroeconomic policies and by the regulatory structure of each country (European Commission 1999).

In spite of the investment irregularity, two sub-periods of analysis were defined and the average annual growth rate was calculated. Throughout all period, the average annual growth in manufacturing was of -4.58%, 36 industries registered negative growth and 75 had higher rates of growth than that of manufacturing as a whole. Taken as a whole, the first sub-period shows an average annual growth higher than the second, which is in fact negative. The average annual growth in manufacturing during this first sub-period was 6.75%, 26 industries having negative growth rates and 62 growing more than manufacturing as a whole. In the second sub-period, a reduction in investment was verified in around 42% of the industries although 77 of the 100 analysed had registered rates of growth of investment higher than that of manufacturing as a whole, which in this period grew by -15.90%.

During the period, the year showing the worst performance in investment was 2002, with the rate of growth in manufacturing at -24.93%; it was the year in which 66 of the 100 industries saw their investment expenditure reduced, compared to the previous year. This deceleration of business investment could be quite naturally related to the slowdown in economic activity which was confirmed for this year, as well as to the heightened levels of firms' debt, which occasioned

[11] Because of the unavailability of a price index at industry level, the variable was deflated by a price index constructed with annual growth prices for Portuguese economy (Banco de Portugal, Annual Reports).

[12] CAE 265 refers to the Cement, lime and plaster industry. In 1996, it was an industry with 46 firms, three of them of a great dimension. For such negative value, a probable explanation could be the restructure of one of those firms, with the consequent distribution of its inheritance, without registration on 1996 of the acquisitions counterparts.

a reduction in the credit that was sought (Banco de Portugal, Annual Report, 2004).

There are many industries in which, although they have overall positive values in the conjunction of the three variables (Increase in Material Fixed Assets, Divestitures, Transfers and Discounts), frequent fluctuations from one year to the next end up bringing in negative rates of growth, a situation which is much more frequent in the second sub-period than in the first. In global terms, comparing both sub-periods, we can talk about a reduction in investment performance.

As our objective is to group industries on the basis of rates of growth in investment, the following criteria for classification were adopted:

Rate of Variation in Investment	Growth/Reduction
Over 100%	Strong growth
Between 50 and 100%	Very high growth
Between 25 and 50%	High growth
Between 10 and 25%	Moderate growth
Between 0 and 10%	Reduced growth
Negative up to -10%	Slight reduction
Between -10 and - 25%	Moderate reduction
Between -25 and - 50%	Strong reduction
Lower than - 50%	Very strong reduction

The different investment performances in the two sub-periods led us to consider an ordination of industries according to the average rates of growth of investment during the first (1996-2000). From among them, we selected and took as our basis for comparison those which registered rates of growth of investment higher than 25%. In total there were 35 industries, whose behaviour during the second sub-period was analysed. This led to a regrouping on the basis of the dynamics of their investment during the period 2000 to 2004 and the formation of three groups with distinct patterns of behaviour with regard to investment (Table 5):

- Group I - those varying between strong growth and high growth;

- Group II - those varying between moderate growth and reduced growth;

- Group III - industries where there was a reduction in investment, moving from a slight reduction to a very strong reduction.

We can verify distinct dynamics of investment in the two sub-periods, with all those industries which in the first were assumed to be strong investors displaying in the second diverse behaviour, moving from the maintenance of their position (Group I and some cases from Group II) to situations of a drastic reduction in investment (Group III), where some industries moved from a situation of strong growth to one of very strong reduction. This is the case of industries of Manufacture of electric motors, generators and transformers (CAE 311) and of Manufacture of aircraft and space vehicles (CAE 353), where the reduction was highest. This clearly means a reduction of expenditure in investment in an industry investing strongly in R&D and with high levels of skills in the workforce.

Out of the total of the 35 industries used as the basis for comparison, only 14 maintained rates of high growth in the second sub-period and, as such, were included in Group I. In general, we could say that the irregularity of investment decisions in each industry throughout the period did not allow us to establish any relationship between the physical investment realised and the structural changes which occurred. However, we must highlight a particular industry, namely, the Manufacture of electronic components (CAE 321) whose behaviour in terms of exports we have emphasize in the structural analysis. Increasing their exports during the period, this industry was one out of the 35 industries with a great performance in terms of investment expenditures in the first sub-period. Besides, belonging to the group I, it has registered a very high growth in the last sub-period. This good performance could be understands as a stake on industries driven by technology, with an evident substitution by exports incorporating a higher level of technology, denoting a capacity to adapt, even if insufficient.

4.2 The investment in intangibles factors of production and the specialisation pattern

The industries' decisions that they will invest in what is frequently called physical (tangible) investment or in intangible and in human capital investments strongly condition and determine the structural pattern and consequently the competitiveness of an economy. The use made of existing technology, as well as of current labour skills in the methods of production utilised, determine its structural pattern, reflecting the strengths and weaknesses underlying them and affecting work productivity and levels of competitiveness.

For this reason, investment in intangible assets in their varied components is taken as fundamental in order to guarantee that the firms' competitiveness is based on their capacity to innovate at the level of products or of processes, with the utilisation of new technologies and new methods and forms of management and organisation. Among them are included, for example, investment in R&D, design, patents and know-how, in marketing, in human resource training, in entrepreneurial organisation, etc. Young (1998) presented a list of possible intangible investments, designating "six core components" divided into: those connected with computers; production and technology; human resources; organisation of the enterprise; an external component: marketing and sales; and a final group related to specific intangibles of determined industries.

According to Hunter et al (2005), from an economic perspective, intangible investments constitute any expenditure which, because it cannot be included as a physical investment, is destined to generate benefits in the long term. Whether in terms of accounting or on the part of economists and managers, there is some uniformity in terms of the identification of intangible investments in non-monetary assets, with no physical manifestation. Nevertheless, the problem is essentially located in the way that these are evaluated. All of them are intangibles, difficult to measure and evaluate. The same authors draw attention to the need for classification and measurement of this type of asset, not only to understand the level of return on investment already made but also so that future investments can be planned and forecasts made.

To what extent this type of investment influences competitive performance at the level of industries and conditions respective structures, has been a question that for a number of years has preoccupied the European Commission.

Recognising the importance of intangible factors of production, the objective of making empirical analyses that take them into consideration viable, has led to an approach towards intangibles, on the one hand centred on the distinction between tangible and intangible factors of production, and on the other based on the skills of human resources (Peneder, 1999). Using as its information base statistics from the manufacturing industry in the Unites States of America[13], the author used cluster statistical techniques with the objective of revealing typical patterns of factors through the classification of observations based on their relative similarities in respect of a multi-dimensional conjunction of variables. The central idea was that of segmenting the data in a way that creates maximum homogeneity within each group and with the maximum distance between groups. This approach gave rise to two new typologies of industry, known as WIFO I and II[14]. Both classifications (presented in Annexes identified as WIFO taxonomies) correspond to Eurostat's revisited NACE system (Statistical Classification of Economic Activities in the European Community) at the three-digit level. There is a direct correspondence between the CAE Rev.2 and the NACE Rev.1.1 until the four digit level.

Considering the importance of intangibles assets, as well as its difficulty of being measurable which is a great barrier for empirical analysis, the European Commission (European Commission, 1999), found in those taxonomies a very useful tool, and use them to analyse the structural pattern of European manufacturing industry. Later we'll made reference to the results founded for Portugal in that report.

[13] At the European Union level, no data exist with identical breakdown in relation to all the variables used.

[14] WIFO – Austrian Institute of Economic Research.

We used those typologies or taxonomies, WIFO I and II, in determining the specialisation pattern of Portuguese manufacturing industry.

The first taxonomy of the industrial structure (WIFO I), it is based on the comparative exogenous advantages dependent on the localisation and, as such, a function of the relative endowments of capital and labour factors (tangible investment) and on the specific endogenous advantages created by the firms, resulting from intangible investments in marketing or in innovation. Its application brought about the grouping of industries into five distinct, mutually exclusive blocks, each of them reflecting typical combinations of productive factors:

- I - Labour-intensive industries;
- II - Capital-intensive industries;
- III - Industries driven by marketing and publicity (publicity-intensive);
- IV - Industries driven by technology (R&D intensive);
- V - Residual industries – The choice of this name is by our owned, and is to do with the fact that, in contrast to the other groups, it is a grouping of industries which are not defined by any productive factor in particular.

Based on taxonomy WIFO I and with a breakdown into 3 digits of CAE, the shares of production, export and employment of the 101 industries which comprise Portuguese manufacturing are in Table 6. Sector 37 – Recycling, encompassing industries 371 and 372, forms part of class D of CAE (manufacturing industries); these did not, however, form part of either of the two taxonomies. We opted to include them in the Group of Residual Industries in the case of taxonomy I and in the Group of low-level skills in the case of taxonomy II.

Although there were few significant alterations in respect of the evolution of any of the groups throughout the period, it is worth highlighting the reduced shares of production and employment with respect to Group IV, the R&D intensive industries (11.06% and 4.83 %, respectively, in 2004), which expresses the lower importance in manufacturing of industries driven by technology, the group where innovation and investment in R&D are important. In terms of export share, the importance of this group is clearly higher (around 20.65% in the same year), denoting a better performance of manufacturing in respect of the composition of its exports. This is so, despite the fact that labour-intensive industries continued to be those which, throughout the whole period, represented the greatest values in terms of exports and employment. Clearly, the data point to a specialisation of manufacturing production in labour-intensive industries (Group I), together with Groups II, III and V, to the detriment of industries that are R&D intensive.

The second taxonomy (WIFO II), it captures another aspect, that of the qualifications and training of human resources, in discriminating between industries according to the use they make of different labour skills. According to this taxonomy, the industries were placed into four distinct groups:

- I - High level of skills;
- II - Medium level of skills (white collar);
- III - Medium level of skills (blue collar);
- IV - Low level of skills.

The application of this second taxonomy, whose results are found in Table 7, allows us to conclude that for every variable, Portuguese manufacturing is clearly deficient in high-level skills, being, on the contrary, specialised in industries which utilise resources with lower qualifications. In terms of production, its pattern of specialisation has not undergone large changes, the only fact registered being that the greatest variation occurred in industries with the lowest levels of skills, which is verified from 1996 to 2000. To be registered as a positive point, there was an increase in the share relative to industries with medium-level skills (white collar). This trend is also verified in relation to export share, with exports in 2004 involving the same type of skills, being around seven percentage points above its value in 1996. Of note is the fact that a reduction in the relative share was verified in the group of industries utilising low-level skills, which, although not very significant, indicates a positive evolution in industrial structure, that is, greater utilisation of more highly qualified human resources.

In 1997 as a result of the WIFO taxonomies application among 14 EU countries, and in contrast with the others, Portugal had among resources used and in terms of Value Added, the lowest share in industries with high levels of competence (5.79%) and the highest share in industries with low levels of competence (52.52%) (European Commission,

1999). The correspondent shares in the EU-15 were 30.43% and 16.75%. There are great differences in the industrial structure across those countries in terms of both tangible versus intangible inputs and skill intensities. This denotes completely different structural patterns, which reflect differences in the use made of technology and in the use of different labour skills.

Zielinska-Glebocka (2005) analyses the specialisation pattern of Polish manufacturing in the period 1993 to 2000, employing those taxonomies. Based on WIFO I, she found that Poland still remains more specialised in labour-intensive, capital intensive and some residual (called of mainstream) industries, and less specialised in R&D industries. With the WIFO II, Polish data show a country more specialised in low-skill and blue collar industries and less specialised in high-skill industries.

Relative to the aspect of the qualifications of human resources (one of the principal non-material resources), one of the indicators pointed out as relevant in this domain is concerned with the percentage of workers with a higher education diploma. In Portuguese manufacturing in the period 1996 to 1999, this percentage was only 13%, equivalent to a little more than a half of the European average (Marques, 2002). These figures, although relating to a decade ago, express very well what has to be done from the point of view of training and qualifications for the manpower that is used on which, to a large degree, the levels of productivity and competitiveness of manufacturing depend.

Measuring growth and the speed of structural change of manufacturing for fourteen EU countries between 1985 and 1998, Aiginger (2001), concluded that Portugal and Ireland share high growth and rapid structural change according to all indicators. Portugal, successful in catching up, with rapid growth and speed of change was classified near the top of the ranking.

In an analysis of the performance in the nineties of the three southern peripheral countries, Spain, Portugal and Greece, Aiginger (2003) concluded that those countries (since 1970) grew faster than the EU, with Portugal reducing its gap per capita at purchasing power parity from 50% to 31%. However, with a low tertiary education, the least educated work force and a research considerably below the EU average, for Portugal were prospected the major difficulties with toughest competition from EU enlargement to take place in 2004.

In a study about the convergence and structural change of the cohesion countries Godinho and Mamede (2004), concluded that: i) in all countries, the standards of living convergence vis-à-vis the EU average were associated with changes in the productive structure; ii) although the good performance of the Portuguese manufacturing industry between 1985 and 1994, when compared with the others cohesion countries, their productivity remains on a lower level; iii) in terms of convergence, the relative success of the Portuguese manufacturing industry has to do with a positive evolution on the subsector of low-tech industries (comprising about 59% of the manufacturing employment), the main sector in all cohesion countries. According our own data, the positive evolution was maintained, because in 1996, low-tech industries[15] accounted for 65% of total manufacturing employment.

In their study, Godinho and Mamede (2004), made use of a similar period of the paper of Aiginger (2001), which, as we saw, presented for Portugal the fastest structural changes of the fourteen countries analysed.

As for the application of these two taxonomies, the following should be noted. As happens in any classification with this range, care has to be taken in any interpretations that are made, in so far as 101 industries were grouped together into five or four different groups (depending on the taxonomy used), since there were naturally within each group industries with a high level of heterogeneity.

5. Conclusions

The empirical analysis undertaken to evaluate the ability developed by manufacturing firms during the period between 1996 and 2004, through the necessary changes to modify the structure of Portuguese manufacturing industry, allows us to draw certain conclusions.

In first place, and from the analysis which was made based on indicators of specialisation, we can conclude that the most significant changes are in respect of exports, with a greater speed of structural change, although with a reduction

[15] According to the OECD Classification mentioned on footnote 9.

in specialisation and concentration and, thus, a dispersal of exports between a greater number of industries. This trend, demonstrated by the Herfindahl Index, was corroborated by a significant reduction of the respective $CR_{5,}$ thus pointing to a continuing decrease in specialisation, a factor which had already manifested itself in the previous decade. Throughout the period and having as its base those sectors which registered the greatest changes in respect of share of production, exports and employment, and so considered "winners" or "losers", there is no clear trend pointing to a huge structural changes, in the sense of a greater weight being given to sectors intensive in R&D and with a greater use of human resources holding a higher level of qualifications.

In relation to the analysis made about the capacity for accumulation and adaptation through the realisation of expenditure on physical investment, we were no able to conclude much more than the existence of a great irregularity in this type of expenditure and a better performance in the first half of the period under analysis, with no clear direct relation with the structural changes which occurred. As an exception, we have highlighted a particular industry included in the high-technology group, namely, the Manufacture of electronic components (CAE 321) by its great performance in terms of both export capacity and investment expenditures. Moreover, we must emphasize the behaviour of the Motor vehicle manufacture (CAE 341), belonging to the medium-high-technology group – always on the top of the five largest industries in terms of exports. Mainly supported by foreign investment, this could be understands as a stake on industries driven by technology, denoting a better performance of manufacturing in respect of the composition of its exports, even if slight.

In respect of the investment in intangibles factors of production and their effects on the structural pattern, the application of WIFO I and II taxonomies led us to conclude that, on the one hand there continues to be a strong stake in labour-intensive industries to the detriment of industries in R&D, reflecting the less important role in Portuguese manufacturing of industries driven by technology. On the other hand, despite a slight improvement in respect of the use of more qualified human resources, Portuguese manufacturing continues to be somewhat deficient in high level skills, remaining, on the contrary, specialised in industries which use resources with lower levels of qualifications. As far as we are concerned, this constitutes a serious obstacle to the development of the industrial sector and strongly conditions the competitive process in an enlarged market, in which, from the point of view of skills, we are presently confronted in a UE-27 with much better qualified partners. Learning and skills development should be priorities whose importance mustn't be forgotten, considering that we have to compete with partners, someone of them that for sure have completely different structural patterns.

In our opinion, the adaptation of Portuguese manufacturing to strong international competition, which has been felt for some time, has been greatly conditioned, not only by displacement in terms of time but also by displacement in terms of the intensity of R&D[16]. The structure of manufacturing in more developed countries, which have rapidly evolved in the direction of there being ever greater incorporation of activities involving a high level of technology, in particular in the realm of ICT (information and communication technologies), requires on the part of Portuguese manufacturing a capacity for adaptation, where innovation has to be a constant concern. This goes beyond the physical investments that have already been made and should be extended to the role of intangible investments, with precise objectives for ever-increasing skills and capacities and an efficient use of ICT. ICT are a key element of the emerging information and knowledge society and an important complement of all R&D activities, playing a crucial role in the modernisation of any economy and in the promotion of innovation, without forget that technology diffusion can only be efficient if the level of human resources is high enough. As we saw, modern

[16] In Lança (2000), chapter 4 about a technological view of the Portuguese manufacturing, was stressed the modest effort of their firms in R&D, innovation and other technological expenses, which constitute an obstacle to their competitive performance. According to the same author (p.2), besides a reduced immaterial investment particularly in R&D, there are other two main structural fragilities in the Portuguese manufacturing industry, namely, the low level of education and qualification of the human resources and a deficient management of a lot of their firms. All of them constitute a serious obstacle to a transition for a more competitive economy based on innovation and quality.

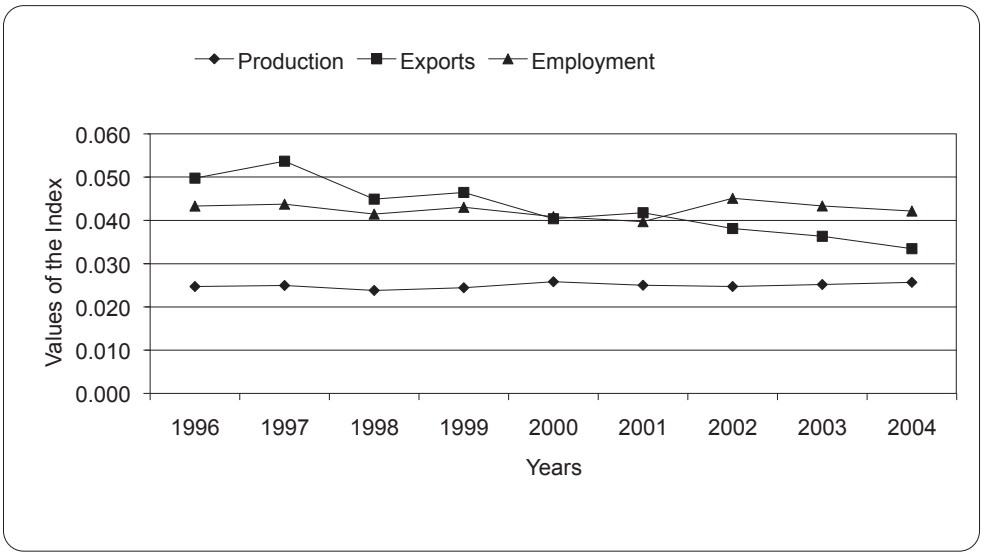
growth theories suggest the innovation is a crucial determinant of growth, with technological change and innovations being essential sources of structural change.

The existing industrial structure, characterised by a low intensity of R&D and human resources and where lower levels of qualifications predominate, denotes a completely different structural pattern when comparing with other countries our competitors, which reflect differences in the use made of technology and at the level of different labour skills, showing that much still has to be done, so that Portuguese firms could compete, under the same conditions, with their European congeners.

6. Annexes

FIGURE 1

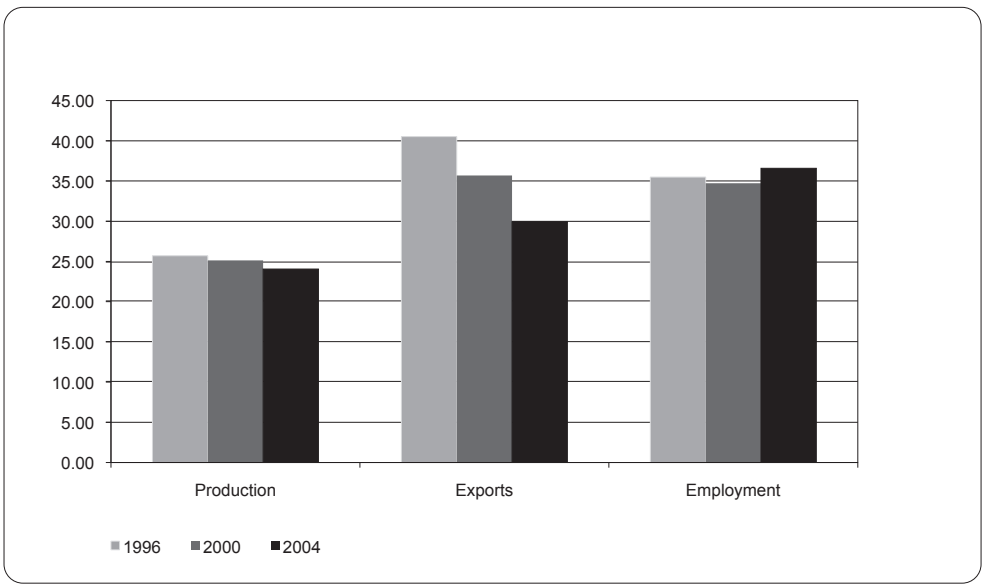
Herfindahl Index (H)



Source: Own processing of data from INE.

FIGURE 2

Market share of the five largest industries (CR5)



Source: Own processing of data from INE.

TABLE 1

Speed of change in production in the Manufacturing Industry (1996-2004)

	CAE – Rev.2 (2 digits)	1996 (%)	2004 (%)	Speed of Change
Sectors with greatest growth in the share of production	Manufacture of equipment and of radio, television and communication appliances	2.97	4.74	1.77
	Manufacture of coke, refined petroleum products and treatment of nuclear fuel	7.31	9.04	1.73
	Manufacture of metallic products, except machines and equipment	5.09	6.32	1.23
	Manufacture of rubber articles and plastic materials	2.23	3.30	1.07
	Base metals industries	2.02	2.82	0.80
Sectors with greatest decrease in the share of production	Tobacco industry	1.29	0.60	0.69
	Food and drinks industries	16.35	15.46	0.89
	Cutting and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	4.69	3.24	1.45
	Manufacture of motor vehicles, trailers and semi-trailers	7.25	5.77	1.48
	Manufacture of textiles	7.94	5.77	2.17

Source: Own processing of data from INE.

TABLE 2

Speed of change in exports in the Manufacturing Industry (1996-2004)

	CAE – Rev.2 (2 digits)	1996 (%)	2004 (%)	Speed of Change
Sectors with greatest growth in the share of exports	Manufacture of equipment and of radio, television and communication appliances	6.04	10.26	4.22
	Manufacture of rubber articles and plastic materials	1.77	4.27	2.50
	Manufacture of metallic products, except machines and equipment	2.45	4.30	1.85
	Manufacture of furniture, other manufacturing industries, non-specified	1.57	3.24	1.67
	Manufacture of electrical equipment and machinery, non-specified	4.35	5.59	1.24
Sectors with greatest decrease in the share of exports	Manufacture of other transport material	2.52	1.46	1.06
	Clothing industry, preparation, dyeing and manufacture of articles made from fur	10.02	7.11	2.91
	Manufacture of textiles	11.01	7.25	3.76
	Cutting and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	8.42	4.47	3.95
	Manufacture of motor vehicles, trailers and semi-trailers	16.59	12.10	4.49

Source: Own processing of data from INE.

TABLE 3

Speed of change in employment in the Manufacturing Industry (1996-2004)

	CAE – Rev.2 (2 digits)	1996 (%)	2004 (%)	Speed of Change
Sectors with greatest growth in the share of employment	Manufacture of metallic products, except machines and equipment	8.05	9.66	1.61
	Manufacture of furniture, other manufacturing industries, non-specified	6.50	7.51	1.01
	Manufacture of rubber articles and plastic materials	1.92	2.90	0.98
	Manufacture of other mineral, non-metallic products	6.70	7.09	0.39
	Food and drinks industries	11.51	11.90	0.39
Sectors with greatest decrease in the share of employment	Manufacture of equipment and of radio, television and communication appliances	1.69	1.45	0.24
	Manufacture of other transport material	1.68	1.17	0.51
	Clothing industry, preparation, dyeing and manufacture of articles made from fur	15.58	14.67	0.91
	Cutting and dressing of leather; manufacture of luggage, handbags, saddlery, harness and footwear	7.99	6.60	1.39
	Manufacture of textiles	11.84	9.55	2.29

Source: Own processing of data from INE.

TABLE 4

Investment trends for the manufacturing industry during the period 1996 to 2004

	1996-2000	2000-2004	2001-2002	1996-2004
Average annual growth in the manufacturing industry (%)	6.75	-15.90	-24.93	-4.58
Nº. of industries with reduction in the growth rate of investment	26	42	66	36
Nº. of industries with growth rates higher than the manufacturing industry in general	62	77	56	75

Source: Own calculations based on data from INE.

TABLE 5

Industries with rates of growth of investment higher than 25% for the period 1996-2000: ordering based on growth during the following sub-period

	CAE - Portuguese Classification of Economic Activities - Rev. 2	Average annual growth 1996-2000 (%)	Average annual growth 2000-2004 (%)
Group I	247 – Manufacture of synthetic or artificial fibres	239.78	Strong growth (487.55)
	263 – Manufacture of tiles, floor tiles, mosaics and ceramic plaques	73.08	Strong growth (359.19)
	268 – Manufacture of other mineral, non-metallic products	284.55	Strong growth (353.08)
	283 – Manufacture of steam generators	157.85	Strong growth (216.45)
	246 – Manufacture of other chemical products	39.97	Strong growth (210.64)
	291 – Man. mach. equip. for prod. and use of mechanical energy	167.73	Strong growth (199.29)
	312 – Manuf. of distrib. and control material for electrical installations	37.86	Strong growth (167.06)
	355 – Manufacture of other transport material, non-specific	54.09	Strong growth (133.36)
	282 – Manufacture of tanks and containers for central heating	72.97	Strong growth (103.64)
	221 – Publishing	125.70	Very high growth (80.94)
	365 – Manufacture of games and toys	351.97	Very high growth (69.47)
	321 – Manufacture of electronic components	251.31	Very high growth (68.87)
	371 – Recycling of scrap iron and metallic waste	2 079.02	Very high growth (67.05)
	341 – Manufacture of motor vehicles	73.77	High growth (43.30)
Group II	156 – Processing of cereals and pulses; manuf. of starches, flours, etc.	267.01	Moderate growth (18.57)
	372 – Recycling of non-metallic waste	32.96	Moderate growth (14.78)
	251 – Manufacture of rubber goods	32.96	Moderate growth (11.37)
	157 – Manufacture of animal feed	28.02	Reduced growth (9.50)
	154 – Production of oils and vegetable and animal fats	155.36	Reduced growth (5.07)
	266 – Manuf.of concrete, plaster, cement and granolithic conc. products	25.48	Reduced growth (1.38)
Group III	300 – Manuf.of office machinery and automatic information equipment	77.86	Slight reduction (-0.36)
	211 – Manufacture of pulp, paper and cardboard (except corrugated)	65.52	Slight reduction (-0.39)
	285 – Treating and coating of metals; general mechanical activities	73.30	Slight reduction (-6.95)
	223 – Reproduction of recording supports	42.95	Slight reduction (-9.47)
	244 – Manufacture of pharmaceutical products	48.23	Slight reduction (-9.76)
	175 – Other textile industries	180.34	Slight reduction (-11.83)
	352 – Manufacture and repair of railway rolling stock	63.27	Moderate reduction (-21.65)
	241 – Manufacture of base chemical products	151.82	Very strong reduction (-51.48)
	275 – Founding of ferrous and non-ferrous metals	41.24	Very strong reduction (-59.06)
	191 – Cutting and dressing of leather	33.91	Very strong reduction (-72.42)
	313 – Manufacture of wires and insulated cable	31.80	Very strong reduction (-83.23)
	202 – Manuf. of veneers, plywood, panels, fibres and other panels	66.54	Very strong reduction (-118.74)
	171 – Preparation and spinning of textile fibres	65.05	Very strong reduction (-242.49)
	311 – Manufacture of electric motors, generators and transformers	138.59	Very strong reduction (-517.46)
	353 – Manufacture of aircraft and space vehicles	98.35	Very strong reduction (-2067.37)

Source: Own calculations based on data from INE.

TABLE 6

Share of Production, Exports and Employment in Total Manufacturing: Application of the Industrial Taxonomy WIFO I (by tangible and intangible factors)

Grouping of Industries	1996	2000	2004
	Share (%)		
Group I – Labour-intensive industries			
Production	24.82	24.47	24.30
Exports	27.84	27.11	26.84
Employment	43.42	43.63	44.64
Group II – Capital-intensive industries			
Production	18.11	20.50	20.86
Exports	16.94	19.17	20.26
Employment	6.18	5.67	5.12
Group III – Publicity-intensive industries			
Production	28.85	24.83	25.06
Exports	16.71	13.94	13.09
Employment	26.38	25.11	25.52
Group IV – R&D-intensive industries			
Production	10.66	11.51	11.06
Exports	21.45	21.56	20.65
Employment	4.90	5.10	4.83
Group V – Residual industries			
Production	17.56	18.70	18.72
Exports	17.05	18.21	19.16
Employment	19.13	20.47	19.85

Source: Own processing of data from INE.

TABLE 7

Share of Production, Exports and Employment in Total Manufacturing: Application of the Industrial Taxonomy WIFO II (by qualifications of human resources)

Grouping of industries	1996	2000	2004
	Share (%)		
Group I – High-level skills			
Production	5.87	5.74	5.68
Exports	5.68	5.80	5.99
Employment	6.19	5.98	6.08
Group II – Medium-level skills (white collar)			
Production	25.59	28.83	29.65
Exports	25.27	29.66	32.62
Employment	13.11	14.00	13.52
Group III – Medium-level skills (blue collar)			
Production	19.77	20.74	20.31
Exports	25.56	24.37	24.65
Employment	21.80	23.51	24.91
Group IV – Low-level skills			
Production	48.76	44.69	44.36
Exports	43.48	40.17	36.73
Employment	58.90	56.51	55.49

Source: Own processing of data from INE.

WIFO TAXONOMY I

industries (CAE Rev. 2) clustered by input combinations

Residual industries	Industries driven by marketing and publicity
1730 Finishing of textiles	1510 Meat products
1770 Knitted and crocheted articles	1520 Fish and fish products
1750 Other textiles	1530 Fruits and vegetables
1760 Knitted and crocheted fabrics	1540 Vegetable and animal oils and fats
2120 Articles of paper and paperboard	1550 Dairy products; ice cream
2430 Paints, coatings, printing ink	1560 Grain mill products and starches
2510 Rubber products	1570 Prepared animal feeds
2520 Plastic products	1580 Other food products
2610 Glass and glass products	1590 Beverages
2660 Articles of concret, plaster and cement	1600 Tobacco products
2680 Other non-metallic mineral products	1910 Tanning and dressing of leather
2720 Tubes	1920 Luggage, handbags, saddlery and harness
2870 Other fabricated metal products	1930 Footwear
2910 Machinery for production, use of mech. power	2210 Publishing
2920 Other general purpose machinery	2220 Printing
2930 Agricultural and forestry machinery	2230 Reproduction of recorded media
2950 Other special purpose machinery	2450 Detergents, cleaning and polishing, perfumes
2960 Weapons and ammunition	2820 Tanks, reservoirs, central heating radiators and boilers
2970 Domestic appliances n. e. c.	2860 Cutlery, tools and general hardware
3110 Electric motors, generators and transformers	3350 Watches and clocks
3130 Isolated wire and cable	3630 Musical instruments
3140 Accumulators, primary cells and primary batteries	3640 Sports goods
3150 Lighting equipment and electric lamps	3650 Games and toys
3540 Motorcycles and bicycles	3660 Miscellaneous manufacturing n. e. c.
3550 Other transport equipment n. e. c.	
3700 Recycling (*)	**Capital intensive industries**
	1710 Textile fibres
Labour intensive industries	2110 Pulp, paper and paperboard
1720 Textile weaving	2310 Coke oven products
1740 Made-up textile articles	2320 Refined petroleum products
1810 Leather clothes	2410 Basic chemicals
1820 Other wearing apparel and accessories	2470 Man-made fibres
1830 Dressing and dyeing of fur; articles of fur	2630 Ceramic tiles and flags
2010 Sawmilling, planing and impregnation of wood	2650 Cement, lime and plaster
2020 Panels and boards of wood	2710 Basic iron and steel, ferro-alloys (ECSC)
2030 Builders' carpentry and joinery	2730 Other first processing of iron and steel
2040 Wooden containers	2740 Basic precious and non-ferrous metals
2050 Other products of wood; articles of cork, etc.	3430 Parts and accessories for motor vehicles
2620 Ceramic goods	
2640 Bricks, tiles and construction products	**Industries driven by technology (R&D intensive)**
2670 Cutting, shaping, finishing of stone	2420 Pesticides, other agro-chemical products
2810 Structural metal products	2440 Pharmaceuticals
2830 Steam generators	2460 Other chemical products
2840 Forging, pressing, stamping and roll forming of metal	3000 Office machinery and computers
2750 Casting of metals	3120 Electricity distribution and control apparatus
2850 Treatment and coating of metals	3210 Electronic valves and tubes, other electronic comp.
2940 Machine-tools	3220 TV, and radio transmitters, apparatus for line telephony
3160 Electrical equipment n. e. c.	3230 TV, radio and recording apparatus
3420 Bodies for motor vehicles, trailers	3310 Medical equipment
3510 Ships and boats	3320 Instruments for measuring, checking, testing, navigating
3520 Railway locomotives and rolling stock	3330 Industrial process control equipment
3610 Furniture	3340 Optical instruments and photographic equipment
3620 Jewellery and related articles	3410 Motor vehicles
	3530 Aircraft and spacecraft

Source: Adapted from European Commission, 1999. (*) This inclusion is of our own responsibility.

WIFO TAXONOMY II

industries (CAE Rev. 2) clustered by qualifications of human resources

High skills
2440 Pharmaceuticals
2910 Machinery for production, use of mech. power
2920 Other general purpose machinery
2930 Agricultural and forestry machinery
2940 Machine-tools
2950 Other special purpose machinery
2960 Weapons and ammunition
3000 Office machinery and computers
3510 Ships and boats
3530 Aircraft and spacecraft
Medium/white collar skills
2110 Pulp, paper and paperboard
2120 Articles of paper and paperboard
2210 Publishing
2220 Printing
2230 Reproduction of recorded media
2310 Coke oven products
2320 Refined petroleum products
2410 Basic chemicals
2420 Pesticides, other agro-chemical products
2430 Paints, coatings, printing ink
2450 Detergents, cleaning and polishing, perfumes
2460 Other chemical products
2470 Man-made fibres
2970 Domestic appliances n. e. c.
3110 Electric motors, generators and transformers
3120 Electricity distribution and control apparatus
3130 Isolated wire and cable
3140 Accumulators, primary cells and primary batteries
3150 Lighting equipment and electric lamps
3160 Electrical equipment n. e. c.
3210 Electronic valves and tubes, other electronic comp.
3220 TV, and radio transmitters, apparatus for line telephony
3230 TV, radio and recording apparatus
3310 Medical equipment
3320 Instruments for measuring, checking, testing, navigating
3330 Industrial process control equipment
3340 Optical instruments and photographic equipment
3350 Watches and clocks
Medium/blue collar skills
2010 Sawmilling, planing and impregnation of wood
2020 Panels and boards of wood
2030 Builders' carpentry and joinery
2040 Wooden containers
2050 Other products of wood; articles of cork, etc.
2810 Structural metal products
2820 Tanks, reservoirs, central heating radiators and boilers
2830 Steam generators
2840 Forging, pressing, stamping and roll forming of metal
2850 Treatment and coating of metals
2860 Cutlery, tools and general hardware

2870 Other fabricated metal products
3410 Motor vehicles
3420 Bodies for motor vehicles, trailers
3430 Parts and accessories for motor vehicles
3520 Railway locomotives and rolling stock
3540 Motorcycles and bicycles
3550 Other transport equipment n. e. c.
3610 Furniture
Low skills
1510 Meat products
1520 Fish and fish products
1530 Fruits and vegetables
1540 Vegetable and animal oils and fats
1550 Dairy products; ice cream
1560 Grain mill products and starches
1570 Prepared animal feeds
1580 Other food products
1590 Beverages
1600 Tobacco products
1710 Textile fibres
1720 Textile weaving
1730 Finishing of textiles
1740 Made-up textile articles
1750 Other textiles
1760 Knitted and crocheted fabrics
1770 Knitted and crocheted articles
1810 Leather clothes
1820 Other wearing apparel and accessories
1830 Dressing and dyeing of fur; articles of fur
1910 Tanning and dressing of leather
1920 Luggage, handbags, saddlery and harness
1930 Footwear
2510 Rubber products
2520 Plastic products
2610 Glass and glass products
2620 Ceramic goods
2630 Ceramic tiles and flags
2640 Bricks, tiles and construction products
2650 Cement, lime and plaster
2660 Articles of concret, plaster and cement
2670 Cutting, shaping, finishing of stone
2680 Other non-metallic mineral products
2710 Basic iron and steel, ferro-alloys (ECSC)
2720 Tubes
2730 Other first processing of iron and steel
2740 Basic precious and non-ferrous metals
2750 Casting of metals
3620 Jewellery and related articles
3630 Musical instruments
3640 Sports goods
3650 Games and toys
3660 Miscellaneous manufacturing n. e. c.
3700 Recycling (*)

Source: Adapted from European Commission, 1999. (*) This inclusion is of our own responsibility.

References

Abramovitz , M. (1986). "Catching Up, Forging Ahead, and Falling Behind", *Journal of Economic History*, Vol. XLVI, Nº.2, Junho, p: 385-406.

Aguiar, A., and Martins, M. (2004). "O Crescimento da Produtividade da Indústria Portuguesa no Século XX". *Documento de Trabalho nº. 145, CEMPRE* – Centros de Estudos Macroeconómicos e Previsão da Faculdade de Economia da Universidade do Porto.

Aiginger, K. (2000). "Speed of Change". European Commission. *DG Enterprise Working Paper*, Brussels.

Aiginger, K. (2001). "Speed of Change and growth of manufacturing". *WIFO, Enterprise DG Working Paper*. Chapter 4 of the Study: Structural Change and Economic Growth, in Peneder, M.; (Coordinator), Aiginger, K., Hutschenreiter, G., Marterbauer, M., Wien, 2001.

Aiginger, K. (2003). "Catching-up in Europe: The Experiences of Portugal, Spain and Greece in the Nineties", *WIFO Working Papers*, nº. 212, 2003.

Banco de Portugal, Annual Reports: http://www.bportugal.pt/publish/relatorio/antigos/rel_p.htm.

Barro, R. (1998). "Notes on Growth Accounting". *NBER Working Paper Séries*, Nº 6654, Cambridge, Mass.

Barro, R.J. and X. Sala-i-Martin (1995), "Economic Growth", MacGraw-Hill.

Cornwall, J. (1976). "Diffusion. Convergence and Kaldor's Law", *Economic Journal*, 86, p:307-314.

European Commission (1999). *The Competitiveness of European Industry*, 1999 Report, Brussels.

European Commission (2001). *European Competitiveness Report*, Brussels.

European Commission (2002). "Productivity: the Key to Competitiveness of European Economies and Enterprises", Communication from the Commission to the Council and the European Parliament (COM, 2002, 262 final), Brussels.

European Commission (2003). *European Competitiveness Report*, Brussels.

Freeman and Soete (1997). "The Economics of Industrial Innovation". 3rd Edition, London and Washington, Printer.

Godinho, M. and Mamede, R. (2004). "Convergência e mudança estrutural no âmbito dos «países de coesão»", *Análise Social*, vol. XXXVIII (169), p: 1069-1090.

Hatzichronoglou, T. (1997). "Revision of the High-Technology Sector and Product Classification", *OECD Science, Technology and Industry Working Papers*, 1997/2, OECD Publishing.

Hunter, L. C., Webster, E. and Wyatt, A. (2005). "Measuring Intangible Investment". *Melbourn Institute Working Paper Series*. Working Paper nº. 05/05.

Kaldor, N. (1966). "Causes of the Slow Rate of Growth of the United Kingdom". Cambridge, Cambridge University Press.

Lança, I. (2000). "Especialização internacional e competitividade em Portugal", Celta Editora, Oeiras.

Landesmann, M.A., R. Stehrer, and S. Leitner (2007). "Skill problems in European industrial sectors, part II: Skills and industrial competitiveness", Study prepared for DG Enterprise and Industry.

Mankiw, G., D. Romer and N. Weil (1992). "A contribution to the empirics of economic growth", *Quarterly Journal of Economics*, 107(2), 407-437.

Marques, A. (2002). "Crescimento, Produtividade e Competitividade". *Discussion Paper nº. 11, CEUNEUROP*, Coimbra.

Peneder, M. (1999). "Intangible Investment and Human Ressources". The new WIFO taxonomy of manufacturing industries. *WIFO Working Papers*, nº. 114.

Solow, R. M. (1957). "Technical Change and the aggregate production function". *Review of Economics and Statistics*, vol. 39, August.

Syrquin, M. (1988). "Patterns of Structural Change". In Handbook of Development Economics, Volume I, Edited by H. Chenery and T.N. Srinivasan, Elsevier Science Publishers, B. V., p.203.273.

United Nations (2006). "World Economic and Social Survey: Trends and Policy ins the World Economy", Chapter II, Structural change and Economic Growth, p. 29-51, Department of Economic and Social Affairs, United Nations publication.

Vandenbussche, J., P. Aghion and C. Meghir (2006). "Growth, distance to frontier and composition of human Capital", *Journal of Economic Growth*, 11(3), 97-127.

Young, A. (1998) "Toward an Interim Statistical Framework: Selecting the Core Components of Intangible Investment". OECD-Workshop on Measuring Intangible Investment. OECD document on Internet.

Zielinska-Glebocka, A. (2005). "Adaptability of Polish Manufacturing in the Face of EU Accession". *South Eastern Europe Journal of Economics* 1, 97-120.

NORMAS PARA OS ARTIGOS A SUBMETER À REVISTA PORTUGUESA DE ESTUDOS REGIONAIS

A. NORMAS RESPEITANTES À ACEITAÇÃO E AVALIAÇÃO DOS ARTIGOS

1. Só serão aceites para avaliação artigos que nunca tenham sido publicados em nenhum suporte (outra revista ou livro, incluindo livros de Actas). A única excepção admissível é ter sido divulgada uma versão anterior do artigo submetido em séries do tipo "working papers" (electrónicas ou em papel).

2. Ao enviar uma proposta de artigo para a Revista, os autores devem renunciar explicitamente a submetê-la para publicação a qualquer outra revista ou livro até à conclusão do processo de avaliação. Para o efeito deverão sempre enviar, juntamente com o artigo que submetem, uma declaração assinada neste sentido. No caso de recusa do artigo pela Direcção Editorial, os autores ficarão livres para o publicar noutra parte.

3. Os artigos submetidos à Direcção Editorial para publicação serão sempre avaliados (anonimamente) por dois especialistas na área convidados para o efeito pela Direcção Editorial. Os dois avaliadores farão os comentários que entenderem ao artigo e classificá-lo-ão de acordo com critérios definidos pela Direcção Editorial. Os critérios de avaliação procurarão reflectir a originalidade, a consistência, a legibilidade e a correcção formal do artigo. No prazo máximo de 10 semanas após a submissão do artigo, os seus autores serão contactados pela Direcção Editorial do resultado da avaliação feita. O processo de avaliação tem três desenlaces possíveis:

   (1) o artigo é admitido para publicação tal como está (ou com meras alterações de pormenor) e é inserido no plano editorial da revista. Neste caso, a data previsível de publicação será de imediato comunicada aos autores.

   (2) o artigo é considerado aceitável mas sob condição de serem efectuadas alterações significativas na sua forma ou nos seus conteúdos. Neste caso, os autores disporão de um máximo de 6 semanas para, se quiserem, procederem aos ajustamentos propostos e para voltarem a submeter o artigo, iniciando-se, após a recepção da versão corrigida, um novo processo de avaliação.

   (3) o artigo é recusado.

   As decisões que a Direcção Editorial tomar com base nos pareceres recolhidos são soberanas e inapeláveis para qualquer outro órgão.

4. Assim que esteja feito o trabalho de formatação gráfica prévio à publicação do artigo na revista, serão enviadas ao autor as respectivas provas tipográficas para revisão. As eventuais correcções que este quiser fazer terão de ser devolvidas à Direcção Editorial no prazo máximo de 5 dias úteis a contar da data da sua recepção.

5. Ao autor ou a cada um dos co-autores de cada artigo aceite será oferecido um exemplar do número da Revista em que o artigo foi publicado e cinco separatas do artigo.

6. Os originais, depois de formatados de acordo com as presentes normas, não poderão exceder as 30 páginas, incluindo a página de título, a página de resumo, as notas, os quadros, gráficos e mapas e as referências bibliográficas. Serão liminarmente recusados todos os artigos que ultrapassem este limite.

7. As propostas de artigo deverão ser enviadas, pelo correio, para o Secretariado Técnico da Revista: APDR - Apartado 3060, 3001-401 COIMBRA - PORTUGAL. Para informações ou para a comunicação posterior os contactos do Secretariado Técnico são os seguintes: telefone: 239 820 938, fax: 239 820 750, e-mail: rper@ine.pt.

B. NORMAS RESPEITANTES À ESTRUTURA DOS ARTIGOS

8. Os autores deverão enviar o artigo completo (conforme os pontos seguintes) em disquette, CD-Rom ou por e-mail para o endereço que consta no ponto 7.

9. Os textos deverão ser processados em *Microsoft Word for Windows* (versão 97 ou posterior). O texto deverá ser integralmente a preto e branco.

10. Na publicação os gráficos, mapas, diagramas, etc. serão designados por "figuras" e as tabelas por "quadros". Admite-se, nas figuras e nos quadros, a utilização de escalas de uma segunda cor (ex: laranja).

11. As eventuais figuras e quadros deverão ser disponibilizados de duas formas distintas: por um lado devem ser colocados no texto, com o aspecto pretendido pelos autores. Para além disso, deverão ser disponibilizados em ficheiros separados: os quadros, tabelas e gráficos serão entregues em *Microsoft Excel for Windows*, versão 97 ou posterior (no caso dos gráficos deverá ser enviado tanto o gráfico final como toda a série de dados que lhe está na origem, de preferência no mesmo ficheiro e um por *worksheet*); para os mapas deverá usar-se um formato vectorial em *Corel Draw* (versão 9 ou posterior)

12. As expressões matemáticas deverão ser tão simples quanto possível. Serão apresentadas numa linha (entre duas marcas de parágrafo) e numeradas sequencialmente na margem direita com numeração entre parêntesis curvos. A aplicação para a construção das expressões deverá ser ou o *Equation Editor* (*Microsoft*) ou o *MathType*.

13. Salvo casos excepcionais, que exigem justificação adequada a submeter à Direcção Editorial, o número máximo de co-autores das propostas de artigo é três.

14. O texto deve ser processado em página A4, com utilização do tipo de letra *Times New Roman* 12, a um espaço e meio, com um espaço após parágrafo de 6 pt. As margens superior, inferior, esquerda e direita devem ter 2,5 cm.

15. A primeira página conterá exclusivamente o título do artigo, bem como o nome, morada, telefone, fax e e-mail do autor, com indicação das funções exercidas e da instituição a que pertence. No caso de vários autores deverá aí indicar-se qual o contacto para toda a correspondência da Revista.
16. A segunda página conterá unicamente o título

e dois resumos do artigo, um em português e outro inglês, com um máximo de 800 caracteres cada, seguidos de um parágrafo com indicação, em português e inglês, de palavras-chave até ao limite de 8 em cada língua. Os dois resumos são obrigatórios.

17. Na terceira página começará o texto do artigo, sendo as suas eventuais secções ou capítulos numerados sequencialmente utilizando apenas algarismos (não deverão utilizar-se nem letras nem numeração romana).

18. Cada uma das figuras e quadros deverá conter uma indicação clara da fonte e ser, tanto quanto possível, compreensível sem ser necessário recorrer ao texto. Todos deverão ter um título e, se aplicável, uma legenda descritiva.

19. A forma final das figuras e quadros será da responsabilidade da Direcção Editorial que procederá, sempre que necessário, aos ajustamentos necessários.

C. NORMAS RESPEITANTES ÀS REFERÊNCIAS BIBLIOGRÁFICAS

20. A "Bibliografia" a apresentar no final de cada artigo deverá conter exclusivamente as citações e referências bibliográficas efectivamente feitas no texto.

21. Salvo em circunstâncias excepcionais, que deverão ser aduzidas pelos autores e sujeitas a decisão da Direcção Editorial, o número máximo permitido de referências bibliográficas é 25.

22. Para garantir o anonimato dos artigos, o número máximo de citações de obras do autor do artigo (ou de cada um dos seus co-autores) é três e não são permitidas expressões que possam denunciar a autoria tais como, por exemplo, "conforme afirmámos em trabalhos anteriores (cfr. Beterraba (1998: 3))".

23. Os autores citados ao longo do texto serão indicados pelo apelido seguido, entre parêntesis curvos, do ano da publicação, de ":" e da(s) página(s) em que se encontra a citação. Por exemplo: ao citar-se "Batata (1973: 390-93)": está-se a referir a obra escrita em 1973 pelo autor "Batata", nas páginas 390 a 393. Deverá usar-se "Batata (1973: 390-93)" e não "Batata (1973: 390-93)". No caso de uma mera referenciação do autor bastará indicar "Batata (1973)".

24. No caso de o mesmo autor ter mais de um trabalho do mesmo ano citado no artigo, indicar-se-á a ordem da citação, por exemplo: Nabo (1983a: 240) e Nabo (1983b: 232).

25. As referências bibliográficas serão listadas por ordem alfabética dos apelidos dos respectivos autores no fim do manuscrito. O nome será seguido do ano da obra entre parêntesis, e da descrição conforme com a seguinte regra geral:

MONOGRAFIAS:

Cenoura, Hermenegildo (1997a), *A Teoria dos Legumes*, Alcarraques, Editora da Horta

COLECTÂNEAS:

Galega, Couve (1992), "Herbicidas e estrumes" in Feijão, Brunilde (coord), *Teoria e Prática Hortícola*, Mem Martins, Quintal Editora, pp. 222-244

ARTIGOS DE REVISTA:

Nabiça, Brites (1999), "Leguminosas Gostosas" in *Revista Agrícola*, Vol. 32, nº 3, pp. 234-275

26. A forma final das referências bibliográficas será da responsabilidade da Direcção Editorial que procederá, sempre que necessário, aos ajustamentos necessários.

NORMS FOR THE SUBMISSION OF PAPERS TO THE PORTUGUESE REVIEW OF REGIONAL STUDIES

A. NORMS FOR THE SUBMISSION AND ASSESSMENT OF PAPERS

1. 1. Only papers that have never been published (in another Review or book, including conference Proceedings) can be considered. The only exception is where a previous version of the paper submitted has been published in a series of “working papers” (electronic or paper format).

2. When a paper is submitted to RPER, the authors must explicitly state that it will not be submitted for publication in any other review or book until the reviewing process is completed. For this purpose, a signed declaration must de sent along with the paper. If the paper is rejected by the Editorial Board, the authors are free to publish it anywhere else.

3. Papers submitted for publication will always be reviwed (anonymously) by two specialists in the area, invited by the Editorial Board. The two referees will offer their comments and classify it in accordance with the criteria defined by the Editorial Board. The reviewing criteria include originality, consistency, legibility and the paper’s formal correction. The authors will be informed by the Editorial Board of the results of the evaluation within 10 weeks of its receipt. The assessment has three possible outcomes:

   (1) the paper is accepted for publication just as it is (or with minor changes) and it is included in the editorial plan for the Review. In this case, the authors are immediately informed of the expected publication date.

   (2) The paper is considered acceptable provided that major changes are made to its form and/or contents. In this case, authors will have a maximum of six weeks to make such changes and to submit the paper again. Once the revised version is received, a new assessment process starts.

   (3) The paper is refused.

   Decisions taken by the Editorial Board based on the opinions received are final and cannot beappealed.

4. Once the paper has been formatted for publishing, it will be sent to the author for graphics checking and revision. Any corrections the author might want to make must be sent to the Editorial Board within five days.

5. Each author and co-author of accepted papers will be offered a number of the published Review

6. Articles cannot exceed 30 pages after being formatted according the present norms, including the title page, the summary page, notes, tables, graphics and maps and references. Papers that exceed this limit will immediately be refused.

7. Papers must be sent, by e-mail to rper@apdr.pt or by normal mail to the Executive Secretariat of RPER at APDR – Apartado 3060, 3001-401 COIMBRA – PORTUGAL. For further information or future contact: telephone: + 351 239 836 068, fax: + 351 239 820 750, e-mail: rper@apdr.pt.

B. NORMS FOR STRUCTURING PAPERS

8. The authors must send a complete version of the paper on a CD-Rom by mail, or in the original Microsoft Word file by e-mail, to the contacts specified in point 7 of Norms (A).

9. The texts must be processed in Microsoft Word for Windows (97 or later version). All written text must be black.

10. Graphics, maps, diagrams, etc. shall be refereed to as “Figures” and tables shall be refereed to as “Tables”.

11. Figures and Tables must be delivered in two different forms: inserted in the text, according to the author’s choice, and in a separate file. Tables and graphics must be delivered in Microsoft Excel for Windows 97or later. Graphics must be sent in both the final form and accompanied by the original data, preferably in the same file (each graphic in a different worksheet). Maps must be sent in a vector format, like Corel Draw or Windows Metafile Applications.

12. Mathematical expressions must be as simple as possible. They will be presented on one line (between two paragraph marks) and numbered sequentially at the right margin, with numeration inside round brackets. Equation Editor (Microsoft) or Math Type are the accepted Applications for original format files.

13. The paper may have no more than three co-authors. Exceptions may be accepted when a reasonable explanation is presented to Editorial Board.

14. Text must be processed in A4 format, Times New Roman font, size 12, line space 1.5 and 6 pt space between paragraphs. The upper, lower, left and right margins must be 2.5 cm.

15. The first page shall contain only the paper’s title, the author’s name, address, phone and fax numbers and e-mail, and the affiliation of the author. In the case of several authors, please indicate the contact person for correspondence.

16. Second page shall only contain the heading and two summaries of the paper, one in Portuguese and the other in English, no more than 800 characters each, followed by a line, in Portuguese and English respectively, with the key-words to a limit of 8 for each language. The two summaries are required only when the paper’s language is Portuguese.

17. Text starts on the third page. Sections or chapters are numbered sequentially using Arabic numbers only (letters or Roman numeration must not be used).

18. Figures and Tables must contain a clear source reference. These shall be as clear as possible without the reading of the text being strictly necessary. Each must have a title and, if applicable, a legend.

19. The final format of Figures and Tables will be of the responsibility of the Editorial Board, who will allow some adjustments, whenever necessary.

C. NORMS FOR REFERENCES

20. The references listed at the end of each paper shall only contain citations and references actually mentioned in the text.

21. The maximum number of references allowed is 25. Exceptions to this rule are rare and only occur for extremely good reasons.

22. To ensure the anonymity of papers, each author's self references are limited to three and no expressions that might betray the authorship are allowed (for example, "as we affirmed in previous works (cfr. Beetroot (1998: 3)").

23. Authors cited in the text must be indicated by his/her surname followed, within round brackets, by year of publication, by ":" and by the relevant page number(s). For example, the citation "Potato (1973: 390-93)", refers to the work written in 1973 by the author Potato, on pages 390 to 393. If the author is merely mentioned, indication of "Potato (1973)" is sufficient.

24. In case an author has more than one work from the same year cited in the paper, citation must be ordered. For example: Turnip (1983a: 240) and Turnip (1983b: 232).

25. References must be listed alphabetically by authors' surnames, at the end of the manuscript. The name will be followed by year of publication inside round brackets and the description, thus:

MONOGRAPHS:

Carrot, Howard (1997a), The Vegetables Theory, Capers, Horticulture Editor

COLLECTION:

Green, Borecole (1992), "Weed Killers and Manure" in Been, Mary (coord.), Farming - Theories and Practices, Greenland, Onion Publishing Company, pp. 222-244

REVIEW PAPERS:

Tomato, Bridget (1999), Tasty Broccoli in Farmer Review, Vol. 32, no. 3, pp. 234-275

26. The final format of the references will be the responsibility of the Editorial Board, who will allow adjustments whenever necessary.