

The construction of a Portuguese seaport system in the Early Modern Age – an exploratory approach. The HISPORTOS project.

AMÉLIA POLÓNIA

1. HISPORTOS – a brief presentation

This paper provides a brief presentation of the HISPORTOS Project – *A contribution to the history of NW Portuguese seaports in the Early Modern Age*¹. The project has been funded by the Portuguese Foundation for Science and Technology, starting in October 2001, and was concluded in December 2005. We aim to present some reflections on specific issues of the research programme: theoretical guidelines, sources, methodology, as well as a number of scientific results arising from the data collected.

Different historiographical schools throughout Europe have developed significant research on seaport history and dynamics, whereas there have not been a sufficient number of in-depth studies on the part of Portuguese historians to allow for the possibility of comparative studies with other European cases.

Furthermore, in the last few decades, Early Modern European historiography has largely focused on the analysis of port systems and seaport networks, paying particular attention to the overseas traffic system. This perspective is based on a theoretical conception of the existence of international seaport hierarchies and tends accordingly to be centred on a macro analysis. This type of approach underrates or even disregards the study of the internal dynamics and specific profiles of each seaport. On the contrary, the Hisportos project elected the micro level and the local and regional scales as its methodological starting point to study the seaports in NW Portugal, aiming to discuss the existence or not of seaport models. But models cannot be developed out of context, stripped of specific local realities, without resorting to the perception of possible diachronic evolutions in which, besides the general cyclical events and the policies of the central authority, local circumstances and specific conditions and features of each seaport interfere.

The theoretical premise of our research was, then, that a **micro-analysis** provides a crucial opportunity to review the levels of research and the thematic topics involved in seaport studies, facilitating the search for answers to questions that the macro approach is unable to give.² Even though the geography of maritime scales insists on the international dimension of the European market, we must not forget the regional and interregional dimensions. This period, particularly from the 16th century, saw the consolidation of transport networks involving the coastline and the interior, some making use of the waterways as routes for shipping goods and supplying regional sub-areas. The study of port zones is thus crucial to our understanding of the economic dynamics of far more extensive regions.

¹ POCTI/HAR736417/2000

² POLÓNIA, Amélia; AMORIM, Inês - *Hisportos – Contribuição para o estudo dos portos do Noroeste português. Apresentação de um projecto de investigação*. Simpósio “Microhistória em Hispanoamérica: Metodologias, Temas e Linhas de Investigação. As migalhas e a pluralidade”. 13th AHILA International Congress (Ponta Delgada, 3 to 8 September 2002).

So it is important to examine other types of networks and complementarities, on a smaller scale, and not simply that of the connections between the major ports. The historical protagonism of these great maritime centres has often relied on local inter-port networks. In fact, from the point of view of logistics, shipbuilding, transport capacity, and the availability of navigation technicians, a cosmopolitan port necessarily relied on other ports and on areas where agriculture and crafts were the predominant occupations, without which their dynamism would have been impossible to sustain. This is verifiable in the case of Lisbon during the period of overseas expansion. It is hence important to study these local and regional interactions to better understand local situations, on the one hand, and international and intercontinental connections, on the other. It is also important to see a port in its complexity as a whole: human, social, urban, technical, administrative, and economic. All these issues led us to work with the concept of **seaport system**.

The suggestion mentioned in Guimera³ and others seemed attractive: it is a concept that should help us to define the essence of ports. As an object, a port is difficult to analyse. It exists as the result of complex relations. Relations between distinct elements of various types: economic, cultural, social, political and geographical. The intensity and level of interrelated causes and effects, of sub-relations and major relations, are never determined in a unilateral way. The very essence of ports may be determined by one commodity or by many commodities, regardless of their value, by long-haul trade ships or by coastal traffic, by fishermen or by passengers, by shipbuilding or by transportation logistics... The nature of the object is comprehensible through the most important elements that make up the system, but also through the features of these elements and the relationship between them. Decisive for the results of the study is the definition of the system. It may be defined at the level of a single seaport universe, or even at a regional dimension. **If at the outset port functions are elected as a reference**, then all ports in a region, regardless of their importance, can be taken as elements of a system⁴.

Our standpoint was not to assess the overwhelming importance of some ports over others. What interested us here was to re-exam the role of small ports (defined in terms of concentration and distribution of goods, vessels, services, capital) and place them in a system. In fact, we have ignored their comparative rank and have appraised them for their intrinsic value, on their own terms. We were particularly interested in examining whether these ports became economically and socially essential (in the national, regional or even local, context), or whether they were built in response to circumstantial political opportunities and schemes.

These were the epistemological lines and scientific options that guided the Hisportos project. Its aim was thus to study the ports of NW Portugal in the early modern age (16th to 18th centuries). The

³ GUIMERA, Agustín; ROMERO, Dolores (ed.) - *Puertos y sistemas portuários (siglos XVI-XX)*, Madrid, Ministerio de Fomento, 1996

⁴ OSSWALD, Helena – “The Hisportos case – Scientific options and research programme. A possible approach to NW Portuguese seaport studies” in *European Seaport System in comparative approach. International workshop* (Porto, 21-22 October 2005). In the press.

choice of the area, **Northwest Portugal** (see map), was validated based on geographical criteria – the characteristics of the coastline and port accessibility – and on historical bases. In fact, in NW Portugal the geography of the rivers and that of the morphological aspects of the coastline shaped a potential propensity for ports, boosting communication along the coast and intense activity at the river mouths. However, the dimension and type of NW Portuguese ports vary between very small harbours and small and medium ports.

It is also common knowledge that those ports played a specific and highly relevant role in the trading networks of the early modern age. It has been clearly established that they interacted closely with the North and South of Spain and Northern Europe, as well as with an extended insular, African and South American Atlantic. These essentially commercial dynamics should not cease to produce implications for port infrastructures and for strategies of leadership and political and economic protagonism that need to be studied, case by case.....

Some studies had, at the time the project began, already been conducted on these seaports. In particular, Vila do Conde, Porto and Aveiro had already been object of academic studies, namely in the form of PhD theses⁵. Their approach was, however, mostly directed at economic, demographic, urban and even social dynamics, without questioning or providing answers to some essential issues:

- in what way did geomorphological conditions interfere with the potentialities of each seaport;
- in what way did the crown, the local authorities and politics interfere with the construction of specific seaports and sea towns;
- in what way were the technological advances in Europe implemented in Northwest Portugal, through the mobility of engineers;
- how did the construction and reconstruction of seaport infrastructures take place: the projects, their accomplishment and implementation; knowledge, available technology; materials used and their origin; initiatives and investment; technicians.
- how did the different seaports in these historical and geographical spaces work together and in what way were they part of a larger system – regional, national, European and intercontinental.

Based on these points of view, our team developed a research project in which the following aspects were central to the **research plan** carried out:

1. The geomorphological features and their interaction with historical dynamics;
2. The installation and subsequent changes in seaport infrastructures;
3. The interaction between these port areas and the *hinterland* and *vorland*;
4. The application of technological innovations, associated with hydraulic engineering;

⁵ POLÓNIA, Amélia – *Vila do Conde – um porto nortenho na expansão ultramarina quinhentista*, Porto, 1999, 2 vols. [PhD]; *Expansão e Descobrimentos numa perspectiva local. O porto de Vila do Conde no século XVI*, Lisboa, INCM, In printo; AMORIM, Inês – *Aveiro e sua Provedoria no séc. XVIII (1690-1814) – estudo económico de um espaço histórico*, Coimbra, Comissão de Coordenação da Região Centro, 1997; BARROS, Amândio - *Porto: a construção de um espaço marítimo nos alvores da Época Moderna*, Porto, 2004, 2 vols. [PhD].

5. The production of scientific knowledge on the territory (cartography, topography, hydrologic plans, ...)

These aims led to the constitution of a multidisciplinary team that included historians, archaeologists, geographers, cartographers, engineers and architects. The team's purpose comprised in developing a research methodology and data gathering that would enable the area under study to be considered from a pluridisciplinary viewpoint.

Besides the historical dynamics, we concentrated on studying the consolidation of port precincts and port infrastructures, their integration in the urban setting, as well as the technical and financial constraints of these dynamics, assuming an active interaction between these variables. The methodology we proposed to follow consisted in taking each port separately and subjecting them to investigation using the same inquiry grid, so as to compile databases that would guide the questioning of the documentation and systematisation in a manner consistent with the information available.

In light of these assumptions, the analytical perspective was to re-ask a number of **questions**, and to examine:

1. whether geomorphological conditions influenced specific interventions in the ports, in terms of infrastructure, or the historical dynamics of seaports;
2. whether the global historical contexts revealed to be decisive in the construction of ports, and whether their influence could likewise be detected in the various ports studied;
3. whether, over a long period of time (16th to 18th centuries), and in light of contextual restrictions and related technological factors, common lines can be found in the building of technical, military, urban and economic infrastructures in the various ports of northwest Portugal;
4. whether this construction, especially of infrastructures, arose from a concerted policy emanating from the central authority, or whether other institutional entities, to be identified, were the protagonists;
5. whether, from a multi-secular perspective, there were any developments in this institutional policy in terms of construction and intervention in port infrastructures and urban planning;
6. whether international contexts interfered in the domestic decisions of each country, setting a synchronic European pace, or whether it was the opposite, that is, the tendencies identified at a national level were specific or even contradictory amongst themselves.

The specific methodological grid devised aimed to answer the points proposed in **Annex 1**:

To sum up, what we aimed to underline was that the infrastructural construction of ports cannot be exempt from areas of questioning that considerably transcend the technological aspects. They involve issues related to geomorphological variables and historical evolution, in which the micro approach can be essential, even when research covers a long period of time and a vast territorial area.

Strict answers to the questions raised by this analytical structure were not found in the historiographical output, which actually contained considerable gaps with respect to the history of ports in the periods prior to the 18th-19th centuries. We were confronted with three main kinds of work on this topic: that produced by local researchers, more monographic in nature and inclined to be descriptive and greatly bound to documental contents; that concerned with a particular plan from a particular engineer, generally without checking the geomorphological conditions and historical dynamics that motivated them; and those arising from academic research work. These ultimately aimed to tackle economic and social issues, although they still required a geomorphological and climatic contextualization, as well as having to reference buildings and infrastructural improvements, taken as reflecting or influencing historical dynamics.

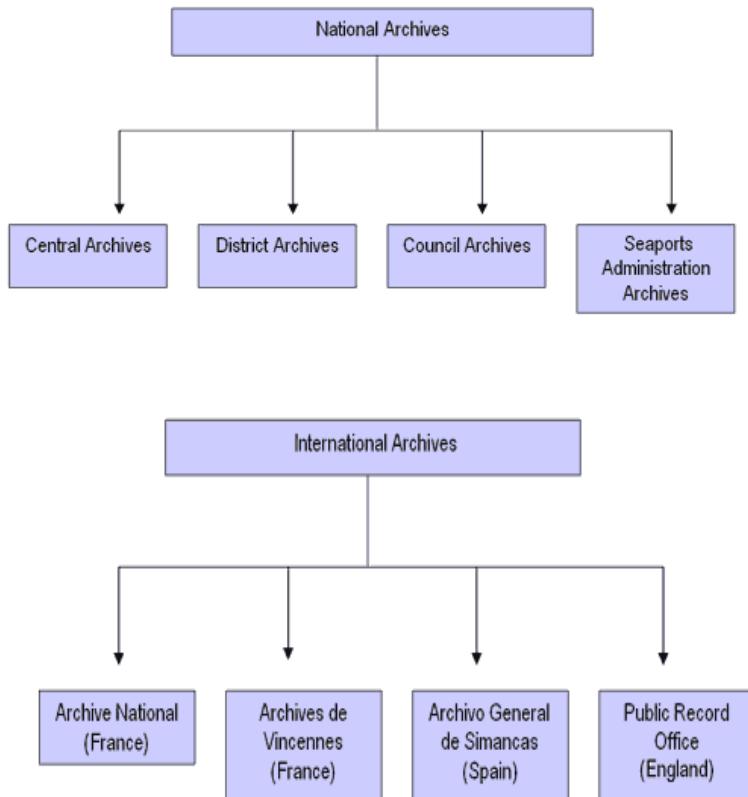
From an historical point of view, moreover, works summarizing royal policies and the jurisdiction of central authority in relation to seaports, did not add much. They only explained which institutions were subsequently in charge of the public works carried out on these areas, but not really the tendencies and implications of their policies.

At the same time, although other disciplines have also focused on port precincts, making the coastal rim one of the most favoured areas for geomorphological analysis, this approach is usually taken either on the basis of a long-term perspective, going back to the major geo-climatic eras and their impact on the design of the coastline (warm period, ice age), or concentrating on an environmentalist reading, focusing on the study of the occurrence of contemporary ecological assaults on the planet and how they have redefined coastlines. Architecture and urbanism also favour urban seafronts, reflecting policies that aim to restore riverside and coastal zones, but apart from that, leave in the most complete silence all the earlier contexts and factors that shaped the development of these areas.

We believed, then, that the major challenge presented by the project was in bringing together a scientific team with diverse, yet complementary, academic backgrounds, and in seeking to implement a multidisciplinary research framework, in which historical materials (maps, projects, written documents) from the early modern period could be subject to diverse and specialized scientific interpretations, able to decode information that a mere historical analysis could not ascertain.

So as to comply with the research goals proposed, the team followed a **research programme** in the last four years, whose main steps were:

1. Research of cartographic and documental corpora in private, local and central archives, in Portugal and abroad



2. Bibliographic research in order to create a significant database on seaport history.
3. The holding of scientific meetings, whose main goals were the definition of concepts and methodological grids.
4. The promotion of debates and work sessions to discuss database modelling so as to bolster data gathering and improve the potentialities of information research.
5. The presentation of essays on cartographic reconstitutions of seaport spaces from a diachronic and comparative perspective, aiming to project and reconstitute geomorphological, infrastructural and urban phenomena.
6. Group participations in national and international meetings in order to present and submit our research programme to discussion and feedback⁶.
7. Also foreseen were contacts with international research teams that develop similar research projects, namely CEHOU (Centro de Estudos Históricos de Obras Públicas e Urbanismo) and CRHMA (Centre de Recherche sur l'Histoire des Mondes Atlantiques), as well as contacts with the International Maritime Economic History Association.

In order to pursue some of these goals, databases were created and are now available at www.hisportos.com, whose structure aims to intersect the main research fields proposed:

⁶ We underline the workshop held in Porto, in October 2005, under the comprehensive issue: *European seaport systems in the Early Modern Age. A comparative approach*, with the presence of all members of the project, as well as some European seaport researchers, such as Gordon Jackson, from Glasgow; Juan Torrejon Chaves, from Cadiz, Cátia Antunes and Louis Sicking, from Leiden. [Proceedings in the press]

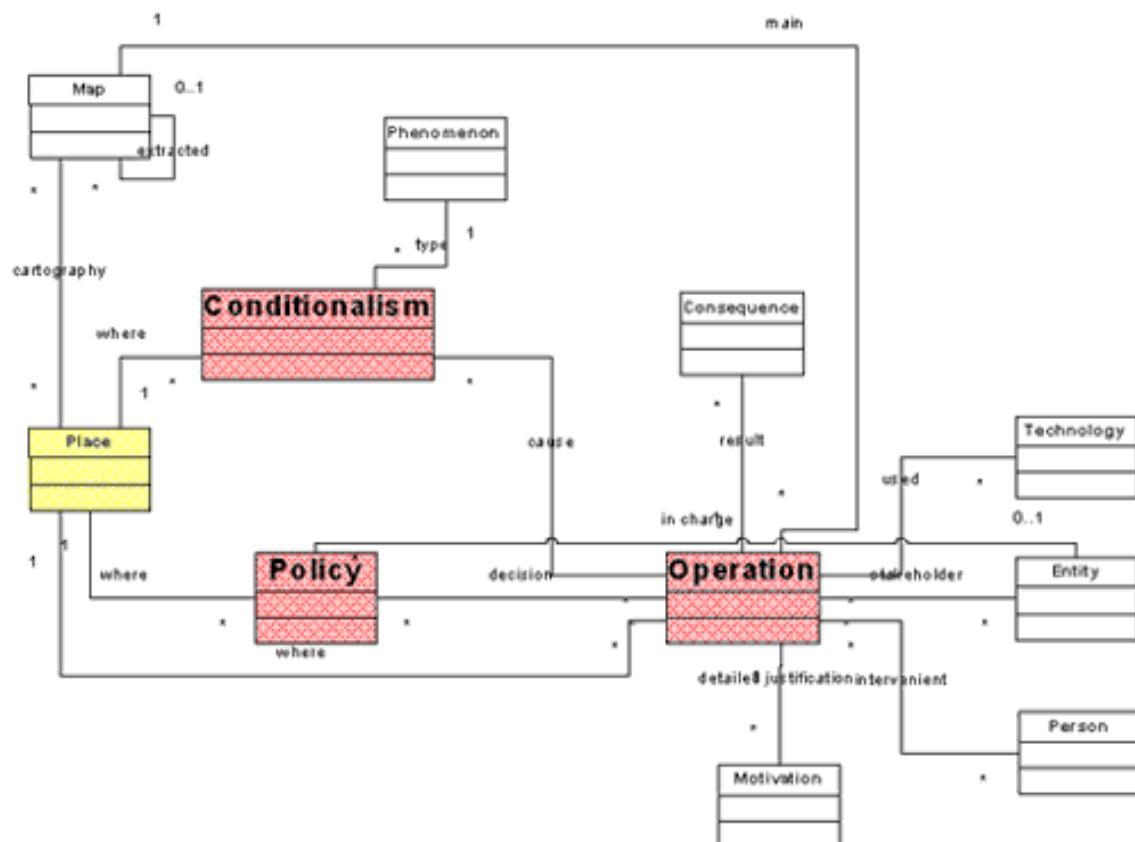
1. Geomorphological settings (CONDITIONALISM)
2. Local and central policies regarding seaport intervention (POLICY)
3. Infrastructural seaports building (OPERATION),

having as secondary levels

1. GEOMORPHOLOGICAL PHENOMENA
2. TECHNOLOGIES
3. PERSONS and ENTITIES.

The database was built based on the assumption that all data are presumed to be linked in every field according to criteria of interconnectivity, as shown in the following diagram:

DATABASE STRUCTURE⁷



⁷ DAVID, Gabriel – “HISPORTOS databases – “Informatics options, virtualities and limits” in *European seaport systems in the Early Modern Age. A comparative approach. International Workshop (Porto, 21-22 October 2005]*. In the press.

2. HISPORTOS – Some research results

Considering this framework as a background, we will now make some queries to the database according to some of our main questions, from a mostly historical point of view, assuming our inability to question the data from a geomorphological or technical perspective.

One of the main relevant topics is to find out whether the historical contexts proved to be decisive in the construction of ports, assuming that their influence could likewise be detected in the various ports studied depending on their dimension, geomorphological configuration and specific diachronic protagonism.

The data distribution of the overall number of seaport interventions in the long term (14th to 18th centuries) according to the dimension of seaports should prove useful as an approach to this issue:

Table 1 - Seaport infrastructural interventions – a diachronic distribution

Seaport	Seaport Dimension ⁸	14 th -15 th Centuries	%	16 th Century	%	17 th Century	%	18 th Century	%	Total	%
Caminha	Small	2		0		5		5		12	100
Viana Castelo	Medium	3		8		6		7		24	100
Vila do Conde	Small	1		16		17		3		37	100
Porto	Major	2		18		27		50		97	100
Aveiro	Medium	0		1		10		57		68	100
Total		8	3.8	43	20.2	65	30.5	122	57.3	213	100

Source: Hisportos databases. www.hisportos.com

We now cross these results with some variables related to seaport construction policies, in order to explain the previous scenario in light of specific questions:

1. Did the construction of infrastructures arise from a policy emanating from the central authority, or were other institutional or third party entities, to be identified, the main protagonists?
2. Were there, from a multi-secular perspective, any developments in the institutional policy in terms of construction and intervention in port infrastructures and urban planning?

Data distribution of the funding of works, whether by central or local entities, should provide a useful approach to these issues:

⁸ According to a scale only applicable to NW Portuguese seaports. The criteria applied favoured demographic indexes, harbour commodities; regional and long-haul trade traffic, shipbuilding, transportation logistics, and financial power.

Table 3. Funding and financing approval – diachronic distribution

Entities	Diachronic Distribution	Seaports	No.	Total	%
Central power	14 th -15 th Centuries	Viana do castelo	1	1	
	16 th Century	Vila do Conde Porto	3 1	4	
	17 th Century	Viana do castelo Vila do Conde Porto	2 7 6	15	
	18 th Century	Porto Aveiro	5 3	8	
Sub-Total				27	
Local power	14 th -15 th Centuries	Caminha Viana do castelo	1 1	2	
	16 th Century	Viana do castelo Porto	2 2	4	
	17 th Century	Caminha Vila do Conde Porto	1 5 5	11	
	18 th Century	Viana do castelo Porto Aveiro	1 1 1	3	
Sub-Total				20	40
Third parties	14 th -15 th Centuries	Caminha Viana do castelo Vila do Conde	1 1 1	3	100
	16 th Century			0	
	17 th Century			0	
	18 th Century			0	
Sub-Total				3	6
Total				50	100

Source: Hisportos databases. www.hisportos.com

Some key ideas can be underlined from the analytical framework of the tables above:

1. The number, as well as the complexity, of the technical interventions rise in the 17th and 18th centuries. The occurrences registered in times prior to 16th century are notoriously low, even when considering the lack of documental sources for this period.
2. The number of works funded by the central power increases notoriously in 17th and 18th centuries in comparison with local power initiatives, even though, against the backdrop of war throughout the 17th century, both seem to be significant⁹. The funding of works by third parties is not entirely understandable except in the context of the 14th and 15th centuries, attending to the increasing complexity of the interventions, even when the involvement of third parties (seamen; tradesmen;

⁹ The significant number of local authority interventions in Vila do Conde can only be explained because of its manorial jurisdiction, which transferred certain attributes to the lordship authority, represented by local agents, which were accomplished in other sea towns by the crown.

technicians, ...) in the projects is evident in the following centuries, and obvious in the 18th century, when the pressure they brought to bear was essential in implementing the intervention projects.

3. The 18th century investments by the crown seem to be exclusive to the bigger ports: Porto and Aveiro.

Understanding some contextual constraints may be useful in a comprehensive interpretation of the tendencies presented in the tables above:

1. The construction of seaports and harbours should be explained according to political, military and economic contexts. Whereas the number of interventions in the 16th century, namely in Vila do Conde and Porto, mostly directed at the navigation viability of harbour entrances and the construction of quays and docks, are connected with the importance and prominence of the trade movement in these ports, in direct connection with overseas trade and navigation, due to Portugal's maritime expansion, those that took place in the 17th century, mostly directed at the building and maintenance of fortifications and other defence structures, are above all associated with the Restoration War (1640-1656) between Portugal and Spain.

The interventions conducted in the 18th century must be understood in a distinct context and according to new variables. Even though the economic dynamics undoubtedly still count, now strategic planning, in terms of central power policies, has to be increasingly considered.

2. The number of interventions reflects a reality expressed by other indicators, be they demographic or economic, and points to the breakdown of small ports, such as Vila do Conde and Caminha, or even Viana do Castelo, at a national and international level, during the 17th century, but most especially in the 18th century. This reality is connected not only with their internal dynamics, but with a funding policy which selects the main seaports and seems to exclude smaller communities and small economic agents, which dominated in those peripheral spaces, from their economic strategies. The economic policy of the Marquis de Pombal (1750-1777), which favours the Porto and Lisbon merchant communities, launching trade, fishing and agricultural monopolies (like the case of the Brazilian trade Companies; the Algarve Fisheries Company, and the Port wine viticulture and trade Company (Companhia da Agricultura e Vinhos do Alto Douro), is one of the key measures responsible for this tendency, which reflects on seaport logistics maintenance and construction, or at least, on a significant part of it.

Since these structures depend on central power funding, as we have seen, their maintenance, even when justified at a regional level, was not supported by the requisite infrastructural investments. This tendency leads to changes in the interregional port system in NW Portugal, questioning the traditional logistic complementarities between smaller and bigger ports, and diminishing the relevance of small

seaport towns in relation to their hinterlands, through a variety of infrastructural conditions necessary to support maritime traffic, guaranteed by bigger vessels and adequate warehouses and custom houses.

It presumes the transformation of relatively important seaports, even on a small or medium scale, into "unimportant Ports", in the sense proposed by Gordon Jackson: "Those with a poor or backward hinterland and few external connections; with a small or no share of national imports and exports and, contrary to expectations, a small share of coastal trade, which was also dominated by major ports; with exceptions they owned and built few ships; they had inadequate facilities for larger ships; few warehouses; no comprehensive mercantile community or direct foreign linkages; few industries and small populations; in sum, they had no opportunity for self generated trade"¹⁰.

The conjunctural evolution of the infrastructural investments we analysed in the long term (16th to 18th centuries) seems to determine the irreversible loss of protagonism and economic capability of the smaller ports of NW Portugal, with benefit to Porto, which had, nevertheless, serious accessibility problems, largely determined by its geomorphological constraints.

3. If the implementation of infrastructural interventions in Porto can be understood in a context of economic growth, the case of Aveiro is quite distinct, and explains another dimension of seaport construction. In fact, Porto dominated the national and international Port wine trade in the 18th century. The Douro River and the entrance to the Douro harbour figure as pivotal factors at a regional and international level, in order to facilitate the connection with regional and international markets. The development of its port logistics and the concern with the viability of its maritime access are, in this context, understandable and justified.

But Aveiro suffered, at this time, the decline of the salt trade, its traditional trade basis and no other product appears to substitute it, in a setting in which the seaport presented serious geomorphological problems. The port was sliding to the South, very far from the town of Aveiro. The urgency of rebuilding the seaport was a persistent claim defended by the local authorities and economic agents. Between 1759 (when the port was first closed) and 1808 (the date of the definite settlement of the port), a long list of military engineers (Portuguese, German, French and Italian) passed through Aveiro. Even though actual interventions only began in 1802, with the construction of a dike that conducted and constrained the waters so as to open the port, the multiple interventions by the central power are reflected in the numerous technical operations, paid by the crown, or with its approval, during the 18th century, a period when the customs and other trade and economic revenues could not support the cost of the maintenance of the open harbour. Nevertheless, the works and the engineering planning persisted, in association with other proposals that aimed to promote the Aveiro port, despite all the geomorphological and economic restrictions.

¹⁰ Jackson 2001, Gordon Jackson – *The Significance of Unimportant Ports*. "International Journal of Maritime History", December 2001, vol. XIII, n° 2, p. 6

In fact, dating from the late 18th and early 19th centuries, there is an interesting collection of papers that discussed the standing and the growth of the port, and defended fiscal advantages, aiming to promote Aveiro as a “free port”, with an administrative and political *status* justified by a propagandistic dissertation about the theoretical and visionary promise to extend trade benefits¹¹. This model is thus a construction, based on political and economic theories, rather than a promising local or even regional context. The port of Aveiro, during the 18th and 19th centuries, seems in fact to be constructed based on theoretical assumptions and technical experiences rather than on its national or international relevance or even on its local or regional dynamism.

This seems to comprise one of the three models of seaport construction and growth in NW Portugal during the Early Modern Age, where the others two are:

- the small ports of Caminha and Vila do Conde and the one of Viana do Castelo, all of which were destined to become “unimportant ports”, despite their internal and hinterland importance during the 16th century (Vila do Conde and Caminha, associated with overseas trade and navigation), and the 17th century (Viana do Castelo, associated with the Brazilian sugar trade, even though in connection with Lisbon’s merchant community¹²);
- the pivotal seaport of Porto, with a sustainable economic growth, based on the promising Port wine trade and the export trade of Brazilian products, that brought with them the navigability of the Douro River and significant investments in the Porto harbour, even though the geomorphological constraints of the harbour entrance seemed to dissuade significant investments, and imposed the transference of the harbour, in the 19th century, to Leixões. What was at stake was the centrality of the town, dependent, in the long term, on the protagonism of its harbour, and the navigability of the Douro River.

The definition of these models, prospected through the evaluation of seaport construction and maintenance investments, also raised some other questions, that only a second phase for the Hisportos project could answer, those related to town planning dynamics: the evaluation of urbanization rates intersected with harbour structures and economic indicators; the construction of an urban profile involving or excluding the harbour, the seafronts or the riverfronts; the construction of an architectural image intersected with wealth rates, financing capital and external patterns suggested by the seaport network connections. But also those related to economic and demographic rates of growth or decline.

Another level of questioning may, nevertheless, be answered by the current Hisportos databases: the one related to technological dynamics, including the evaluation of the presence of foreign engineers, responsible for the application of foreign models of harbour construction and new technological models;

¹¹ AMORIM, Inês - Portuguese “free” Ports at the turn of the 18th Century – a Strategy to Promote “Unimportant” Ports, in *Proceedings of the 4th International Congress on Maritime History* (Corfu-Greece, 23-27 June 2004), Corfu, International Maritime Economic Association/ Ionian University, (2005). [CD-Rom]

¹² COSTA, Maria Leonor Freire, *O transporte no Atlântico. As frotas do açúcar (1580-1663)*, 2 vols.. Lisboa, 2000 [PhD]

the influence of foreign models in domestic decision-making; the synchronism (or not) with European technical knowledge, namely of hydraulic engineering.

An overview of the universe of engineers involved, over this time period, in seaport construction in NW Portugal can provide a useful insight into this relevant issue.

Table 4. Diachronic and geographical distribution of engineers involved in seaport construction (16th-18th centuries)

Engineers nationality	Diachronic distribution	Seaports	Nº	
Portuguese	16 th . Century		0	0
	17 th . Century	Porto	1	1
	18 th . Century	Caminha Viana Castelo Vila do Conde Porto Aveiro	2 2 1 7 5	17
French	16 th . Century		0	0
	17 th . Century	Caminha Viana Castelo Vila do Conde Porto	1 1 1 1	4
	18 th . Century	Viana Castelo Vila do Conde Porto Aveiro	2 1 2 5	10
Italien	16 th . Century	Vila do Conde	1	1
	17 th . Century		0	0
	18 th . Century	Porto Aveiro	2 1	3
British	16 th . Century		0	0
	17 th . Century		0	
	18 th . Century	Aveiro	1	1
German	16 th . Century		0	
	17 th . Century		0	
	18 th . Century	Aveiro	1	1
Total			38	38

Source: Hisportos databases: <http://www.hisportos.com>

This table highlights some key ideas:

1. The identification of Portuguese engineers is almost absent from the records until the 18th century. Their number only appears with significance in the 19th century. The effective lack of technicians, the resource constraints and/or the late recognition of the technical and professional status of Portuguese agents emerge as a potential explanation.
2. On the contrary, there are numerous foreign engineers working in Portugal: Italians, French, British, and German, mostly recorded in 18th century and in Porto and Aveiro, even though their presence can also be seen in Viana do Castelo, or even in Vila do Conde. Names such as the Filipe Térçio, Charles Lassart, Miguel Lescol, Filipe Neri, Giovanni Iseppi, Carlos Mardel, José Aufdiener, Guilherme de Valleré, Louis d'Allincourt, Reinaldo Oudinot, José Champalimaud de Nussance, François Hacinte Polchet, Martinho

José Pirré, Adam Wentzel Hestek, or Guilherme Edsen, appear from the 16th to the 18th centuries. But it is in the 19th century that they will be dominant, mostly in Porto, where the Scottish and British engineers are prevalent.

3. If we cross the results obtained until the 18th century with the initiatives of seaport construction in which central power played the major role, we can also establish a fundamental connection between central policies sustaining seaport technical interventions and the presence of foreign engineers, mostly during the 18th century – a century marked by the spread of the ideals of the Enlightenment, the emergence of enlightened despotism as a political regime, and the period of the government of the Marquis de Pombal, in Portugal, a minister who was foreign-minded, sensitive to other European approaches on technical knowledge in all sectors, ranging from public works, urbanism, trade and finance to industry.

4. If we follow another approach, which is also available in the Hisportos databases, and took now into account biographical considerations, we would find that a considerable number of the technicians recorded are military engineers, drawn to Portugal by the challenges of the Restoration War (1640-1654); the Spanish Succession War (1703-1715) and the French Revolutionary Wars (1793-1801). This fact brought to Portugal a significant amount of technical and scientific contributions.

In fact, in the period between the 17th and 19th centuries, military engineers produced, to a large extent, scientific knowledge, together with technological knowledge, associated with the conception, construction or maintenance of infrastructures, whether those related with defence facilities or harbour ones. This fact made them an essential element in the territorial planning and organization of several European states. The seaport spaces frequently assimilated several of these dimensions of technological knowledge, in terms of both defence infrastructures (bulwarks, fortifications), and harbour structures (quays, dikes, wharves, levees, thick walls, sea beacons, lighthouses, ...).

A study of their projects reveals, in fact, technological models resulting from an active dynamic of transference of knowledge. This circulation of technicians and technology in maritime spaces appears as an agent in the “globalisation” of scientific knowledge and technology all over Europe. The same occurs with cartographic representations, whose authors are, in a significant number, and mostly in the 18th century, foreign technicians, mostly engineers, who use them as a work tool.

The 18th century is also marked by the increasing importance of cartographical production, which gained technical precision and craftsmanship. The multiplication of cartographical representations of seaport precincts and coastline profiles, intersected with planned operations on seaports, whose number is, as we have underlined, more significant in this period, can also be corroborated by our database, by the number of maps and plans countable for each seaport territory.

The numbers and proportional rates presented in the table also underline the distinct behavioural pattern throughout the entire period under consideration. If the 16th and 17th centuries express a comparable interest for all the seaports, the 18th century affirms a preferential, if not almost exclusive preference for two of these seaports: Aveiro and Porto, the same ones that drew the attention of the crown and motivated several engineering projects and several harbour interventions

Table 5. Cartographical representations – diachronic and geographical distribution

Diachronic distribution	Seaports	Nº	%
16 th . Century	Caminha Viana Castelo Vila do Conde Porto Aveiro	0 1 2 1 0	
Sub-Total		4	5.3
17 th . Century	Caminha Viana Castelo Vila do Conde Porto Aveiro	5 5 5 5 5	
Sub-Total		25	32.9
18 th . Century	Caminha Viana Castelo Vila do Conde Porto Aveiro	7 5 5 14 16	
Sub-Total		47	61.8
Total		76	100

Source: Hisportos databases: www.hisportos.com

The study of these cartographic representations from a comparative perspective makes the reconstitution of seaport infrastructures and geomorphological dynamics possible from a diachronic perspective, through the application of a technique of geo-referenced and computer assisted cartography. This is one of the most productive ways to reveal the evolution of seaport spaces from a long-term perspective. An experiment has been conducted, in which we tried to reconstitute the Aveiro harbour entrance over the time period considered (17th-19th centuries). The results subsequently obtained (Map 2) exemplify the potential of the Hisportos project.

It was our hope that these straightforward exercises could highlight the historiographical potentialities of the Hisportos project, whose capacity to provide answers does not end in the efforts that has been presented in this paper. Just like the documental sources, the Hisportos databases can be as productive and inexhaustible as the scientific issues established by the researcher, taking, obviously into consideration the main goals and scientific guidelines that led to the research project.

Annex 1
INQUIRY GRID IN SEAPORT STUDIES

1. The geomorphological aspects of each port

1.1. The geomorphological constraints and potentialities of the coastal zone

2. The territorial backdrop

2.1. Topographical setting

2.2. Factors influencing changes to the coastal rim

3. Construction of port infrastructures

3.1. Building or improving quays, wharves, etc.

3.2. Building breakwaters, groins, jetties, banks, dikes, ...

3.3. Constructing sea marks (channel markers, stakes, lighthouses, sails, buoys, flags)

3.4. Improving accesses (harbour entrances and depths)

3.5. Improving and constructing defence and communication facilities (forts, bridges, channels, etc.)

3.6. Establishment of administrative and fiscal controls (authorities, legislation, technical staff, specialized buildings)

3.7. Construction and specialization of facilities: warehouses, arsenals, shipyards.

4. Royal and local polices relating to ports

5. Assessment of use of technological innovation

5.1. The technical and cultural sphere (agents and institutions for scientific and technical development)

5.2. The technological options in building each port in relation to advances in hydraulic engineering

5.3. The route between the production of scientific knowledge (hydrology, topography, cartography) on the territory and the options of those in charge of the ports

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