



UNIVERSIDADE D  
COIMBRA

Luís Manuel Pinheiro Machado da Luz

CONTRIBUTIONS TO THE STUDY OF  
TRANSPORT IN INSULAR REGIONS

Ph.D. Thesis in Doctoral Program in Transport Systems supervised by  
Professor António Pais Antunes and Professor Vítor Caldeirinha presented to  
the Department of Civil Engineering of the Faculty of Sciences and  
Technology of the University of Coimbra.

December 2022



UNIVERSIDADE D  
**COIMBRA**

Luís Manuel Pinheiro Machado da Luz

**CONTRIBUTIONS TO THE STUDY OF  
TRANSPORT IN INSULAR REGIONS**

Ph.D. Thesis in Doctoral Program in Transport Systems supervised by  
Professor António Pais Antunes and Professor Vítor Caldeirinha presented to  
the Department of Civil Engineering of the Faculty of Sciences and  
Technology of the University of Coimbra.

December 2022



## Acknowledgements

It has been a long journey since 2013, when I made the decision to pursue this Ph.D. It has been a journey that challenged me constantly, testing my resilience and stubbornness, especially while working on a full-time job. During this time, the world changed a lot and so have I. For twice, I suspended my studies, but, as people say, third time's a charm. That's what I kept saying while I returned to study and writing the final version of the thesis.

But no journey is made alone and there are several people I would like to thank at the end of mine. First, I am grateful to Professor Pais Antunes for his incentive, guidance, support, and above all, patience, since the early beginning. His permanent guidance was essential and without which this thesis could never be completed. I'm truly recognized for his belief and encouragement to complete this thesis. I'm also thankful to Professor Vítor Caldeirinha for his contribution to proceed and complete this thesis. I mostly admire his objectivity and the way he transmitted confidence, never refusing to answer my doubts and always challenging my ideas.

Additionally, I would like to thank all those who answered the surveys that were included in two of the chapters of the thesis, and to those that provided additional contacts, in particular to André Moura, Cruise Manager at Portos dos Açores, for a handful of contacts of cruise specialists in the Macaronesia region, as well as to Eduardo Cabrita, General Cruise Manager of Mediterranean Shipping Company (MSC) in Portugal, and Nikos Mertzanidis, Director at CLIA Europe, for their priceless help in providing the contacts for the interviews with several senior cruise operator managers. I'm also thankful to Tomás Serebrisky, of the Inter-American Development Bank, for the data provided on a series of ports of the Caribbean, that I could not obtain elsewhere or any other way. I'm also thankful to José Carlos Bernardes and André Mendonça Pacheco for reading and commenting some of my English draft versions at some stages in the process.

In the personal domain, I would like to thank my family and friends. First, I would like to say some words to my son Vasco: Please excuse me for not being present as I wished during your

growth, for not playing with you long enough. I hope my example of dedication and persistence enriched you. Suddenly, you are now a person of legal age and starting a master's degree, which is a great pride for me. I became a truly ruffled father. Thank you, Vasco.

And my last words go to my wife São, the most amazing person I could ever met. Along all these years, you have been my utmost valuable support. Your love, passion, and understanding, have given me the strength and courage to embrace and persist on this long journey. I can now put this thesis at the shelf and keep it there for a while..., and to give you all the time and attention.

# Contents

<i>Abstract</i> .....	<i>ix</i>
<i>Resumo</i> .....	<i>xi</i>
<i>Introduction</i> .....	<i>2</i>
<b>1.1 Background</b> .....	<b>2</b>
<b>1.2 Research objectives</b> .....	<b>5</b>
<b>1.3 Outline</b> .....	<b>7</b>
<b>1.4 Publications</b> .....	<b>9</b>
<i>The nexus between port governance and performance</i> .....	<i>11</i>
<b>2.1 Introduction</b> .....	<b>11</b>
<b>2.2 Theoretical contribution</b> .....	<b>14</b>
2.2.1 Port governance models and performance .....	16
2.2.2 Main model types .....	19
2.2.3 Expected results .....	21
<b>2.3 Research method</b> .....	<b>22</b>
2.3.1. Conceptual model and hypotheses .....	22
2.3.2 Factors and variables .....	23
2.3.3 Data collection, sample and measurement .....	23
2.3.4 Statistical methodology .....	24
<b>2.4 Analysis and results</b> .....	<b>25</b>
<b>2.5 Discussion</b> .....	<b>26</b>
<b>2.6 Conclusions and contributions</b> .....	<b>29</b>
<i>Port governance in insular contexts: The cases of Caribbean and Macaronesian islands</i> .....	<i>31</i>
<b>3.1 Introduction</b> .....	<b>31</b>
<b>3.2 Theoretical background</b> .....	<b>35</b>
3.2.1 Port stakeholders and port governance .....	35
3.2.2 A brief synopsis of the Advocacy Coalition Framework .....	38
<b>3.3 Insular ports systems of the Caribbean and the Macaronesia regions</b> .....	<b>41</b>
3.3.1 Overview .....	41
3.3.2 The Caribbean.....	42
3.3.3 Macaronesia.....	46
<b>3.4 Port subsystem beliefs and application of the ACF</b> .....	<b>48</b>
3.4.1 The structure of beliefs of port stakeholders.....	48
3.4.2 Stochastic analysis .....	50
<b>3.5 Discussion</b> .....	<b>55</b>
<b>3.6 Conclusions</b> .....	<b>58</b>
<i>Equity and efficiency in regular maritime transport: The case of Azores as an outermost European archipelago</i> .....	<i>61</i>
<b>4.1 Introduction</b> .....	<b>61</b>

<b>4.2 Background.....</b>	<b>64</b>
4.2.1 Liner shipping and the diversity of cabotage regimes .....	64
4.2.2 Maritime insular cabotage in Europe and public intervention .....	66
4.2.3 Other insular cabotage regimes and public intervention.....	69
4.2.4 Evaluation of transport policies .....	70
<b>4.3 The Azores maritime freight system.....</b>	<b>71</b>
4.3.1 The guarantee of regularity, continuity, and quality of service .....	71
4.3.2 Weekly connections, with biweekly calls in all islands .....	72
4.3.3 A transit time for cargoes not exceeding seven days .....	74
4.3.4 Equal freight prices to all islands.....	75
4.3.5 Equity and efficiency impacts in the Azores maritime freight system .....	76
<b>4.4 Universal Service Obligations as an alternative to the present system .....</b>	<b>80</b>
4.4.1 Definition and implementation of USO .....	80
4.4.2 Application of a USO framework for the Azores maritime freight system .....	84
4.4.3 Complementary topics .....	88
4.4.5 Evaluation of the present PSOs and the alternative USO regimes.....	89
<b>4.5 Conclusions .....</b>	<b>90</b>
<i>Impacts of Cruise Tourism: A Study Focusing on the Macaronesia Region .....</i>	<i>93</i>
<b>5.1 Introduction.....</b>	<b>93</b>
<b>5.2 Cruise Industry and Ports.....</b>	<b>95</b>
5.2.1 Cruise industry.....	95
5.2.2 Itineraries and positioning of ports .....	96
<b>5.3 Economic Impacts of Cruises .....</b>	<b>99</b>
5.3.1 Cruise lines, ports and destinations.....	99
5.3.2 Types and measurement of expenditures .....	100
5.3.3 Spending in a cruise visit.....	101
<b>5.4 Cruise Tourism in Macaronesia .....</b>	<b>103</b>
5.4.1 Overview .....	103
5.4.2 Cape Verde .....	107
5.4.3 Azores.....	109
5.4.4 Madeira.....	111
5.4.5 Canary Islands .....	114
<b>5.5 Conclusions .....</b>	<b>119</b>
<i>Cruise destination characteristics and performance: Application of a concept model to North Atlantic islands of Macaronesia .....</i>	<i>122</i>
<b>6.1 Introduction.....</b>	<b>122</b>
<b>6.2 Literature review.....</b>	<b>125</b>
<b>6.3 Cruise Tourism in Macaronesia .....</b>	<b>131</b>
<b>6.4 Conceptual model.....</b>	<b>134</b>
6.4.1 Conceptual model .....	134
6.4.2 Application to the Macaronesia region .....	136
<b>6.5 Results and analysis .....</b>	<b>138</b>
6.5.1 Results for Macaronesian port and destination characteristics .....	138
6.5.2 Model validity and model results.....	141
6.5.3 Model confirmation .....	146

<b>6.6 Conclusions .....</b>	<b>149</b>
<i>Conclusion.....</i>	<i>153</i>
<i>References .....</i>	<i>158</i>
<i>Appendix 1.....</i>	<i>178</i>
<i>Appendix 2.....</i>	<i>180</i>
<i>Appendix 3.....</i>	<i>183</i>
<i>Appendix 4.....</i>	<i>184</i>



## List of Figures

Figure 2.1 – Conceptual model.....	22
Figure 2.2 – Result of the structural model .....	27
Figure 3.1 The Caribbean (Panel A) and the Macaronesia (Panel B) regions .....	41
Figure 3.2 Regression line between TEU and equipment level (year 2008) .....	53
Figure 3.3 Regression line between TEU and equipment level (year 2008, smaller ports).....	54
Figure 4.1 Lorenz curves for container ships’ calls and supply TEUs .....	77
Figure 4.2 Potential approaches to calculate the cost of the USO .....	82
Figure 5.1 The Macaronesia region.....	94
Figure 5.2 Total number of passengers carried by cruise ships .....	96
Figure 5.3 The cruise Global Value Chain approach.....	100
Figure 5.4 Average expenditure of passengers and crew members in Caribbean ports (USD).....	102
Figure 5.5 Cruise tourists and stayover tourists in Madeira in 2019 .....	106
Figure 6.1 Conceptual model .....	135
Figure 6.2 Port characteristics of all ports of each archipelago .....	139
Figure 6.3 Port characteristics of the main ports of each archipelago .....	139
Figure 6.4 Onshore characteristics of each archipelago .....	140
Figure 6.5 Results of the confirmatory model .....	142

## List of Tables

Table 2.1 – Classification of the main models of port governance .....	20
Table 2.2 – Constructs and variables .....	25
Table 2.3 – Typology of the respondents' company .....	26
Table 2.4 – Respondents' port.....	26
Table 2.5 – Liberal model and optimum model for Portuguese experts .....	29
Table 3.1 Characterisation of several island ports of the Caribbean .....	44
Table 3.2 Characterisation of several island ports of the Macaronesia .....	47
Table 3.3 Stakeholders' perspectives to port governance.....	49
Table 3.4 Summary of the ports in the sample .....	51
Table 3.5 Descriptive statistics, averages by subregion (2008-2012).....	52
Table 3.6 Summary of linear regression.....	52
Table 3.7 Variation of throughput (TEU).....	54
Table 4.1 Maritime transport services in the Azores – calls, supply, and capacity (TEUs) (*).....	73
Table 4.2 Demand for maritime transport (full TEU) .....	73
Table 4.3 Supply TEUs, demand TEUs and Vessel's capacity utilization .....	78
Table 4.4 Distribution of time by ships' operations .....	79
Table 4.5 Summary of the most relevant characteristics of the financing mechanisms .....	83
Table 4.6 The Azores maritime freight system framework under a Universal Service policy .....	85
Table 5.1 Stayover tourists and cruise tourists in Macaronesia (2011-2019).....	104
Table 5.2 Cruise passengers in the main ports of Macaronesia (2011-2019).....	104
Table 5.3 Seasonality of cruise passengers in Macaronesia and Europe .....	107
Table 5.4 Cruise passengers' expenditure in several seasons.....	116
Table 5.5 Comparison between Canary Islands and other cruise destinations .....	117
Table 6.1 Characterization of the archipelagos of Macaronesia in the cruise industry .....	133
Table 6.2 Factors, variables, and references.....	138
Table 6.3 Variables' statistics.....	141
Table 6.4 Results of the confirmatory model and comparison of groups of ports .....	144
Table 6.5 Means of the survey and interviews for site and situation-related attributes .....	147

## Abstract

A well-functioning transport system is crucial for modern societies and, especially for islands, normally subject to geographic constraints and facing a high dependency from maritime transport for cargoes. Yet, many countries remain unprepared to enhance the potential of port and shipping policies. In the case of islands, most of the times they lack the basic infrastructure and superstructure endowments, conditioning their potential for development and imposing high level of freight prices on the economy. In addition, ports have a relevant role in the cruise tourism industry, contributing to the development of local areas as cruise destinations. For islands, often conditioned on the set of relevant economic activities, cruise tourism complements the more conventional tourism activities, working often as a way of publicising the tourism destination for a future visit of cruise passengers as shore tourists.

In this thesis we focus on three distinct areas of the blue economy, i.e., port, shipping, and cruise tourism industries. The thesis, which essentially consists of a collection of scientific papers, aims to reduce the existing gap in knowledge that islands face in these three areas, devoting particular attention to two different perspectives: one is geography, in which site and situation factors are critical; and the other is the economic and social perspective, where efficiency and equity concerns are inevitable.

In this regard, the port industry is studied on chapters 2 and 3. In chapter 2, a more general perspective is used, to get the big picture about the port industry, especially in terms of port governance. Based on a thoroughly literature research and a survey to port managers and specialists, it was possible to identify several key mechanisms that contribute directly to the development of the most effective port performance. Chapter 3 is focused on the role of the stakeholders in the definition of port communities in island ports of both the Caribbean and Macaronesia regions and the way the port authorities may contribute to the development of effective solutions, based on principles established in the Advocacy Coalition Framework.

In chapter 4 we focus on the shipping industry, studying the case of the Azores where equity and efficiency topics are particularly noteworthy, given the dispersion of the islands and the reduced dimension of local markets. We used the Universal Service concept to illustrate how equity and efficiency topics could be simultaneously covered, providing an improvement in terms of public policy.

Chapters 5 and 6 are oriented to the cruise tourism industry and especially to the case of Macaronesia, as an increasingly relevant market in global terms. In Chapter 5 we characterize the current situation of the cruise industry, discuss the individual strategies that have been pursued by the different archipelagos, and provide insights into the challenges that both ports and destinations must overcome to ensure their long-term sustainable growth. Chapter 6 is focused on the identification of the most relevant factors that work as drivers for the best impact in the performance of both the port and the cruise destination, based on an extensive literature research and a survey to cruise specialists and managers covering all four archipelagos of the Macaronesia.

We believe that our approaches are relevant and constitute a significant contribution to the literature on these topics, despite the complexity, dynamic and various perspectives that the case studies presented here comprise. In addition, we tried to present vivid and dynamic approaches in illustrating the case studies debated in the various chapters. Those approaches may be applied with minor adjustments in other cases, mainly those exposed in chapters 2, 3 and 6, as well as in chapter 4, although in a more limited way.

**Keywords:** Port industry, Shipping industry, Cruise tourism industry, Islands.

## Resumo

Um sistema de transportes funcional é crucial em qualquer sociedade moderna e especialmente para as ilhas, sujeitas a constrangimentos ditados pela geografia e confrontados com um elevado grau de dependência face ao transporte marítimo para o transporte de mercadorias. No entanto, muitos países permanecem incapazes de aproveitar o potencial das políticas portuária e marítima. No caso das ilhas, estas carecem, na maioria das vezes, de infraestruturas e equipamentos, condicionando o seu potencial de desenvolvimento e impondo elevados níveis de preços de transporte no sistema económico. Adicionalmente, os portos têm um papel relevante na indústria do turismo de cruzeiros, contribuindo para o desenvolvimento de áreas locais como destinos de cruzeiros. Para as ilhas, muitas vezes condicionadas no seu conjunto de atividades económicas, o turismo de cruzeiros complementa as atividades turísticas mais convencionais, funcionando muitas vezes como forma de divulgação do destino turístico para os passageiros de cruzeiros numa futura visita enquanto turistas.

A presente tese aborda três áreas distintas da economia azul, ou seja, as indústrias portuária, marítima e de turismo de cruzeiros. A tese, que consiste numa série de artigos científicos, pretende reduzir a lacuna existente no grau de conhecimento que as ilhas registam nestas três áreas, dedicando particular atenção a duas perspetivas: uma é a geografia, em que os fatores de localização e de situação apresentam-se como críticos; e a outra é a perspetiva económica e social, onde as preocupações de eficiência e equidade são inevitáveis.

Neste sentido, a indústria portuária é alvo de estudo nos capítulos 2 e 3. No capítulo 2 é apresentada uma perspetiva mais geral, por forma a obter o quadro geral acerca da indústria portuária, especialmente em termos de governação. Com base numa pesquisa bibliográfica e num inquérito dirigido a administradores portuários e especialistas, foi possível identificar diversos mecanismos que contribuem diretamente para o desenvolvimento eficaz do desempenho portuário. O capítulo 3 foca-se no papel dos *stakeholders* na definição de comunidades portuárias em portos insulares das regiões das Caraíbas e Macaronésia e na forma

como as autoridades portuárias podem contribuir para o desenvolvimento de soluções eficazes, com base nos princípios estabelecidos na teoria *Advocay Coalition Framework*.

No capítulo 4 aborda a indústria do *shipping*, estudando o caso dos Açores, em que os conceitos de equidade e eficiência são particularmente relevantes, dada a dispersão das ilhas e a reduzida dimensão dos mercados locais. Recorremos ao conceito do Serviço Universal para ilustrar como os conceitos de equidade e eficiência podem ser simultaneamente cobertos, proporcionando um incremento em termos de política pública.

Os capítulos 5 e 6 estão orientados para a indústria de turismo de cruzeiros e especialmente para o caso da Macaronésia, um mercado com um significativo crescimento. No capítulo 5 caracterizamos situação atual da indústria, discutimos as estratégias de cada um dos arquipélagos, e fornecemos pistas quanto aos desafios que os portos e os destinos de cruzeiro terão de ultrapassar por forma a assegurar o seu desenvolvimento sustentável a longo prazo. O capítulo 6 foca-se na identificação dos fatores mais relevantes que funcionam como indutores para o melhor desempenho tanto do porto como do destino de cruzeiros, com base numa pesquisa bibliográfica e num inquérito dirigido a administradores e especialistas da área nos vários arquipélagos da Macaronésia.

Acreditamos que as abordagens desenvolvidas são relevantes e constituem um contributo muito significativo para a literatura destas áreas, não obstante a complexidade, dinâmica e diversas perspectivas que os casos apresentados envolvem. Adicionalmente, tentámos apresentar uma abordagem dinâmica na ilustração dos casos debatidos ao longo dos vários capítulos. Tais abordagens poderão ser aplicadas com apenas alguns ajustamentos noutras realidades, sobretudo as expostas nos capítulos 2, 3 e 6, bem como ainda no capítulo 4, embora em menor grau.

**Keywords:** Indústria portuária, Indústria de *shipping*, Indústria de turismo de cruzeiros, Ilhas.

**CONTRIBUTION TO THE STUDY OF TRANSPORT IN  
INSULAR REGIONS**

# Chapter 1

## Introduction

### 1.1 Background

A substantial number of questions related to asymmetric economic development is justified, according to the economic theory, by the advantages inherent to a central location. In opposition, the more peripheric regions present several unfavourable characteristics that inhibit their development. In this sense, geography is a critical element with impact on the level of development of societies, associated to costs of transactions across space and economies of scale in production (KRUGMAN, 1992). Whether such a situation occurs solely because of geographic remoteness and distance is, however, a moot point, as reported by FYNES and ENNIS (1997).

Among the multiple forms how disadvantages of the peripheric regions are expressed, transport costs constitute the most evident direct cost of the distance to the markets. Studies on the subject are relatively clear about the impact of distance on the formation of transport costs, as well as regarding the way how these costs influence economic performance. For example, GALLUP, SACKS, and MELLINGER (1999), based on the *AK* model (known also as a Harrod-Domar model), considered a hypothetical differential of 5% on transport costs between two different economies. This differential on transport costs has an impact on the growth rate of these two economies, being the growth rate in the low-transport-cost economy 49% higher than the high-transport-cost economy. Several other authors emphasized the importance of the quality of transport infrastructures in the reduction of transport costs. Examples include COMBES and LAFOURCADE (2005), LIMÃO and VENABLES (2001), MARTINEZ-ZARZOSO and SUAREZ-BURGUET (2005), MICCO and PÉREZ (2001), UNCTAD (2014) or VENABLES and LIMÃO (1999).



In the case of the islands – especially when small and remote –, geography is often a particularly strong constraint, since they depend heavily on the air and maritime transport modes for their accessibility and connectivity, with consequences in higher transport costs. Examples in the literature include, among several others, BORGATTI (2007), CEPAL (1997), CUBAS, GRICEÑO-GARMENDIA, and BOFINGER (2015), DESA (1996), EURISLES (1999), KUWAMORY (2006), UNCTAD (2014), or WILMSMEIER and HOFFMANN (2008). The work carried out within the scope of the United Nations on Sustainable Development (DESA, 1996) presents data about 28 insular countries referring a penalty due to sea freights of more than 45%. However, excluding Singapore from the set of insular countries, since it is one of the most important ports in the world in terms of container handling, leads to an even more difficult reality, being sea freights 123% higher for insular countries. These calculations confirm unequivocally the existence of significantly burdensome transport costs for insular countries.

The case of the Caribbean, characterized by a multiplicity of rather dispersed islands with reduced traffic volumes on multiple routes and dominated by transport operators facing maritime diseconomies of scale and oligopolistic structures, is paradigmatic, being subject to high maritime costs, as reported, among others, by CEPAL (1997), CUBAS *et al.* (2015), or WILMSMEIER and HOFFMANN (2008).

For European Union, the European Islands System of Links and Exchanges (EURISLES) concludes that average island freight prices at least double those practiced in exchanges between the capitals of the Member States. The Azores archipelago registered the higher transport costs among all North Atlantic islands, with freight prices 41% higher than those in Madeira and 112% higher than those in the Canaries according to data from EURISLES (1999).

Regarding connectivity and accessibility, small islands face inferior levels when compared to other regions or countries, both regarding the air and maritime modes (ARVIS and SHEPHERD, 2011, BRICEÑO-GARMENDIA *et al.*, 2015, UNCTAD, 2022a).

Besides the freight prices practiced by the shipping industry, port tariffs have also a significant direct impact on freights costs. According to FINK, MATTOO, and NEAGU (2002), the

liberalization of port services would provide a decrease of 35% in the price of regular liner services. For MICCO and PÉREZ (2001), a port less efficient can correspond to a 60% further distance to the market. Similar conclusions were obtained by CLARK, DOLLAR, and MICCO (2004). WILMSMEIER, HOFFMANN, and SANCHEZ (2006) found that the effect of doubling port efficiency in a pair of ports has the same impact on international transport costs as halving the distance between them.

The role of local governments and port authorities is considered as particularly relevant by WILMSMEIER *et al.* (2006), since port policies, in opposition to shipping policies, are directly managed by them through some level of intervention and/or regulation, as also stressed by SANCHEZ *et al.* (2003). However, as stated by STOPHER and STANLEY (2014), there are limitations on the capacity of governments to solve transport problems, for reasons such as the inherent complexity of those problems, inefficiencies in some governmental approaches, and resource constraints. For the islands, frequently lacking coherent and coordinated maritime transport policies, as well as port infrastructure and superstructure endowments, in addition to outdated port governance models, the role of public entities and governments is vital in the provision of solutions to overcome socially inadequate market solutions.

Cruise tourism is another dimension of the maritime industry, with a particular importance for the islands, often limited on their set of relevant economic activities. According to LESTER and WEEDEN (2004), the islands are the paradise condition, nurtured by operator and travel agents. The importance of cruise tourism derives from its multiple impacts in the destinations, as shown in a chart presented by GUI and RUSSO (2011) to illustrate the broad number of interactions involving a cruise visit. The impacts of cruise tourism can be evaluated by its direct, indirect, and induced effects, being measured in terms of monetary impacts. There are also non-monetary impacts, including both positive and negative effects. Positive effects include the promotion of the island as tourism destination and the possibility of a future visit by cruise passengers as shore tourists, while negative effects are especially concentrated on environmental and crowding-out grounds. Nonetheless, as highlighted by TEYE and PARIS (2011), while there

can be positive benefits of cruise tourism, often development decisions in the area are based on an illusion and on limited data supporting the expected impacts. Thus, the intervention of port authorities, governments agencies, and local stakeholders is relevant for the classification of the destination and the establishment of the most effective solutions to capitalize the economic impact of cruise tourism.

Our work covers these three industries (ports, liner shipping and cruise tourism) that integrate the blue economy, in the component of commerce and trade in and around the oceans, according to the definition of the WORLD BANK (2017).

## 1.2 Research objectives

The main objective of the present thesis is to contribute to knowledge in these three areas of the blue economy (port, shipping, and cruise tourism industries), focusing on the specific problems that islands face and providing a comprehensive strategic framework with a coherent articulation between the technical and institutional systems, based on conceptual tools and innovative approaches.

Until now these topics have been insufficiently studied both in the academia and in the business world. The lack of oriented benchmarking in all these fields, on one side, and the need of a deeper knowledge about possible alternatives for the islands, on the other, may provide positive consequences for the islands. To the best of our knowledge, the literature covering each one of these three industries focusing on islands is still scarce, incomplete and disperse, being critical to reduce the knowledge gap that often limits the capabilities of government agencies as well as local stakeholders to deal with the multiplicity of constraints they face, namely in terms of accessibility and connectivity, high freights, job creation and economic growth.

Following this perspective, chapters 2 and 3 are dedicated to port industry topics, with a particular focus on port governance and port performance. Given the complexity of the port industry, with a wide number of stakeholders and a particularly important role for governments and government agencies in the formation of port policies, resulting in a diversity of port

governance models implemented all over the world, with different results in performance, these two chapters focus on two complementary objectives. On chapter 2 the specific objectives are: (1) the identification and analysis of the most relevant port governance mechanisms; (2) the identification and analysis of the most relevant port performance indicators, and (3) the influence of port governance model mechanisms on port performance. Chapter 3 is focused on the Caribbean and Macaronesian island port systems, presenting the following specific objectives: (1) to determine the most frequent policy coalition solutions in port communities; (2) to identify the results obtained by the different policy coalitions.

As well as ports, shipping is a fundamental topic for islands. The recognition that the economic vitality of a region depends on a well-functioning transport network. Chapter 4 is dedicated to the regular maritime cabotage freight system covering the Azores, a Portuguese archipelago located in the North Atlantic Ocean where shipping freight prices are very high. The problem can be traced as a typical liberalisation problem in network industries with an equity-efficiency trade-off. The specific objectives of this chapter are: (1) to evaluate the present situation of the regular maritime freight services to/from and between the Azores islands, both in terms of efficiency and equity; (2) to analyse the possibility of application of the concept of universal service obligations in this market; (3) to formalise the market structure and the role of the government in the process.

Another area directly involved with the port industry and the blue economy, with potential impacts in local communities, is cruise tourism. Based on the consolidated position obtained in the last decades by the Caribbean region on this industry, in chapters 5 and 6 we focus on the cruise industry in the context of the region of Macaronesia, which contemplates the archipelagos of the Azores, Madeira, Canary Islands and Cape Verde.

In Chapter 5 the specific objectives are: (1) the characterization of the current situation in the cruise industry, both in global terms and in the case of the various archipelagos of Macaronesia; (2) the identification of both the exogenous and internal drivers that influence the different

archipelagos; (3) the identification of the individual strategies being pursued by the different archipelagos.

Chapter 6 is oriented to the following specific objectives: (1) the identification and analysis of the most relevant port and destinations cruise drivers; (2) the identification and analysis of the most relevant port and destination cruise performance indicators; (3) the influence of port and destination cruise drivers on port and destination performance.

As already mentioned in Section 1.1, citing STOPHER and STANLEY (2014), transformational approaches are needed if fundamental issues are to be resolved better. The margin of intervention of small islands in the maritime transport world may be relatively small, being limited to only some topics, particularly in the port industry, according to SANCHEZ *et al.* (2003) and WILMSMEIER *et al.* (2006). However, we claim that small islands can mitigate some of their constraints, through consistent and oriented approaches based on scientific knowledge.

### 1.3 Outline

The present thesis is divided in seven chapters, being chapters 1 and 7, respectively, devoted to the thesis introduction and conclusion. The five main chapters, chapters 2 to 6, are all written in the format of scientific papers. Two of them have already been published on influential scientific journals covering transport topics, while others are expected to be submitted in the following months.

Due to the structure of the thesis, with a set of chapters written in the format of scientific articles, the document can be read sequentially, chapter by chapter, or each chapter independently. Also derived from the structure of the thesis, all chapters have their own introduction, developments, and conclusions. Consequently, some repetitions throughout the document are inevitable. However, this thesis forms a consistent document and is not only a collection of dispersed papers. Each chapter addresses a specific topic.

Chapters 2 and 3 are devoted to the port industry with a particular focus in port governance, while chapter 4 is dedicated to the liner shipping, specifically to cabotage restrictions imposed under European Regulation to the Azores archipelago. Chapters 5 and 6 are both dedicated to cruise tourism industry in the Macaronesia region.

In chapter 2, a general perspective about port governance models is presented. Since the publication of the first edition of the Port Reform Toolkit by the World Bank, a considerable discussion was observed in port governance models. As mentioned by BROOKS and CULLINANE (2006a,b), the appropriate role of port authorities, and how government might establish the governance environment in which ports operate, is a discussion topic that continues today. Our contribution to the literature involves the presentation of a conceptual model that establishes the connection between port governance mechanisms and port performance indicators. Through this conceptual model one can define the most adequate port mechanisms for public managers to choose when deciding the characteristics of the port governance model that they should change to ensure better performance.

Chapter 3 is dedicated to the insular regions of the Caribbean and Macaronesia, describing the port systems in both regions, and presenting a framework approach (Advocacy Coalition Framework - ACF) to characterise the port communities and the involvement of port stakeholders. Given the complexity of the port industry and the different roles of the stakeholders involved in this industry, the principles established in the ACF are particularly adequate to frame the difficulties that islands face regarding the most adequate port model.

Chapter 4 is devoted to liner shipping connections, focusing on the case of the Azores, a particularly penalized outermost region of the European Union. The current cabotage legislation is composed by a substantial set of equity constraints, with negative consequences in terms of both equity and efficiency. We present an alternative model, based on the concept of Universal Service, a particularly appropriate tool for network industries under liberalisation processes, specifying some key topics to take in consideration in the implementation phase, namely the role of the regulator and of the government in the structure of the allocation of funds.

Chapters 5 and 6 explore the cruise tourism industry, with a focus on the Macaronesia region, which have been increasing its relevance in the international market, with a market share surpassing 3%, greater than other important seasonal destinations like Alaska or the North Sea.

In chapter 5 we present a more descriptive analysis about cruise tourism impacts, with the presentation of a broad perspective concerning the structure of the cruise industry and their main characteristics, followed by an analysis of the characteristics and stages of development of the Macaronesian archipelagos of the Azores, Madeira, Canary Islands and Cape Verde, followed by an analysis of the strategies that the different archipelagos have been pursuing.

Taking in consideration the distinct phases of development observed on the Macaronesian archipelagos, in chapter 6 we developed a more conceptual analysis, presenting the most important port and destinations drivers, the most relevant performance indicators, and establishing the connection between the port and destinations drivers and the performance indicators. This approach can be relevant for local stakeholders and government agencies when deciding about the prioritisation of their investments in this area.

A final remark should be mentioned about the various chapters of the thesis. Chapters 2 and 6 both present a broader and wider perspective that can be applied to more general contexts, while chapters 3 to 5 present a more focused perspective, oriented specifically to insular insights. On chapter 3 we direct our attention to both the Caribbean and the Macaronesia region, chapter 5 focuses on the Macaronesia region, and the Azores archipelago is analysed in chapter 4.

Finally, chapter 7 summarizes the work done within the scope of this thesis, presenting, also, some of its limitations and suggestions for future investigation.

## 1.4 Publications

As mentioned above, this thesis is organized based on scientific papers. It is therefore important to mention the publications that are expected to result from the research made during the doctoral program.

Some of the papers have been submitted to international journals and have been accepted for publication, while others will be submitted soon. The paper entitled “The nexus between port governance and performance” (corresponding to chapter 2 of the thesis) was submitted and accepted for publication in *Maritime Policy and Management*. The paper entitled “Cruise characteristics and performance: Application of a concept model to North Atlantic islands of Macaronesia” (corresponding to chapter 6 of the thesis) was submitted and accepted for publication in *Research in Transportation Business and Management*.

It should be mentioned that the content of chapter 4 is related to a study published in 2013 in *Revista Portuguesa de Estudos Regionais*. An article based on this chapter is expected to be submitted to a top journal covering maritime and/or public policies topics in the next months.

Beside the publications, the dissemination of the research developed during the doctoral program has been made in national and international events between 2014 and 2021:

- The 20<sup>th</sup> APDR Congress: Renaissance of the Regions of Southern Europe, 10-11 July 2014, Évora, Portugal;
- The 21<sup>st</sup> APDR Congress, joint with 55<sup>th</sup> ERSAs Congress: World Renaissance: Changing roles for people and places, 25-28 August 2015, Lisbon, Portugal;
- The 14<sup>th</sup> NECTAR International Conference: Transport in a networked society, May 31-June 2, 2017, Madrid, Spain;
- The MEDCRUISE 1<sup>st</sup> webinar, “The impact of COVID-19 on cruise, ferry and cargo ports”, a MedCruise and MEDports joint initiative, 23 February 2021, Online; and
- The 1<sup>st</sup> Conference of Macaronesia – Transport, 8-9 April 2021, an online event promoted by the Government of the Azores, with the presence of speakers from all the archipelagos of Macaronesia.

It should be referred that my presence in these two last events took place while I was serving as CEO of Portos dos Açores, S.A.



## Chapter 2

### The nexus between port governance and performance

#### 2.1 Introduction

The diversity of port governance models in the world, on different continents, and sometimes within the same country, with historical and political origins and diverse performances, has aroused the interest of researchers. The increasing importance of maritime transport in the global and local economies and the trends in the port industry towards terminal concessions have led to a redefinition of the port authority's role. The port authority has assumed an increasing entrepreneur role, with greater autonomy—devolution—and enlargement of the focus to the logistics chain and hinterland connectivity—regionalization (BROOKS and PALLIS, 2008, 2012; BROOKS, CULLINANE, and PALLIS, 2017; JIA *et al.*, 2017; WANG, CHEN, and HUANG, 2018). The concept of governance involves a full set of relationships between a company's management, its board, its shareholders and other stakeholders. It provides the structure through which the objectives of the company are set, and the means of attaining those objectives and monitoring performance are determined (OECD, 1999). Port literature has made important advances in recent years, such as BROOKS and CULLINANE (2006b), BROOKS and PALLIS (2008), VERHOEVEN (2010), BROOKS and PALLIS (2012), BROOKS, CULLINANE, and PALLIS (2017) and PILCHER and TSENG (2017). Governance models' classification, as well as the description of the reform mechanisms of these models, was advanced by some authors (BALTAZAR and BROOKS, 2001; BROOKS and CULLINANE, 2006b; BROOKS and PALLIS, 2008; VAN DER LUGT, DE LANGEN, and HAGDORN, 2015).

However, there is no comprehensive literature on port governance models' decision impacts on performance, since it is a recent, complex and geographically diversified topic.

WORLD BANK (2007) port governance models, for example, did not address the relationship between governance and performance. More recently, BROOKS, CULLINANE, and PALLIS (2017) developed an important advance in the case analysis of diverse countries around the world, focusing on the changes in national port policies with respect to devolution, regulatory reform and newly imposed governance models over the past decade. Previously, BALTAZAR and BROOKS (2006) presented a theoretical approach of the concepts associated to the reform process of the port governance model, including governance, environment, the port model and performance decisions. This model was later developed by BROOKS and PALLIS (2008) and BROOKS and PALLIS (2012). However, it would be important to cross the model with the multinational analysis of BROOKS, CULLINANE and PALLIS (2017) to understand the adherence to this diversity in ports and detail the classification and structure of the different decision options on port governance and their effect on performance.

Port governance is divided into (a) port governance and (b) port authority governance. In the first case, port governance covers the way services and terminals are managed and their relationship with the port (WORLD BANK, 2007); in the second case, it refers to port authority's internal governance and its relationship with the government and external agencies (BROOKS and CULLINANE, 2006b; VERHOEVEN, 2014). The port authority is a body with statutory responsibilities that manages a port's water and land-site domain, regardless its ownership and respective nature (DE MONIE, 2004). The literature highlights the importance of competition in each port services segments (DE LANGEN and PALLIS, 2006). It also shows a greater integration of ports and private terminal operators in the production and supply chains and with the geographical extension of ports action (NOTTEBOOM and RODRIGUE, 2005; RODRIGUE and NOTTEBOOM, 2010). This study is based on contingency theory (BALTAZAR and BROOKS, 2006) to support the port governance model.

The purpose is to understand the port governance model and the relation with the port performance, focusing in three different objectives: first, to analyse the port governance

mechanisms; second, to analyse the port performance factors; and third, to understand the influence of the governance model mechanisms on port performance.

A factor analysis was used to determine its main components, and a methodology with a structural equation model analysed a sample of 105 valid answers of a survey sent to specialists and managers of port user's companies that operate in the main Portuguese ports.

Portuguese ports are included in the Latin model of governance, based on centralized control and state influence. This model of port governance confronts the liberal model. It has been a contradictory process, with advances and retreats. The government backed by more conservative and liberal political forces advocated greater autonomy, especially during the recent IMF and Troika intervention. The more socialist government advocated greater centralization and the limitation of this autonomy, formally supported by central departments. Also, it is verified that different stakeholders defend the creation of a national holding of ports; other stakeholders advocate the merger of regional ports; and still others, the full autonomy of the ports. Also increased private participation in port management, with larger investments and longer concession periods versus larger state investments and shorter concessions differentiate governance models. However, there seems to be common trends in the different currents of thought and policies towards the adoption of the liberal model, conducive to port regionalization and autonomy, relevant to the research (CALDEIRINHA, FELÍCIO, and DA CUNHA, 2017).

The paper is structured as follows. After the introduction, a theoretical framework is presented, based on contributions to the topic. Section 2.3 focuses on the integration of the research method with the conceptual model and hypotheses, factors and variables, data collection, sample, and statistical methodology. In Section 2.4 we present the analysis and results, a discussion of the results is presented in Section 2.5, followed by the conclusions and contributions.

## 2.2 Theoretical contribution

The port governance model evolution, including tendencies like devolution and regionalization policies, has been increasing the port authority's autonomy and responsibility, giving them a wider role beyond the port itself (VERHOEVEN, 2014; VAN DER LUGT, DE LANGEN, and HAGDORN, 2015). The port governance model characteristics should ensure efficiency and effectiveness as drivers to the satisfaction of customers and port users, with reduced costs and high-quality services (BROOKS, SCHELLINCK, and PALLIS, 2011; ONUT, TUZKAYA, and TORUN, 2011; FELÍCIO, CALDEIRINHA, and DIONÍSIO, 2015).

The literature has pointed to the need to reform governance models to ensure better port performance, especially regarding: (a) the creation of conditions for economic development (TONGZON, 2002; CHEON, 2007), (b) ensure efficiency through customer satisfaction and differentiated supply chain needs (BROOKS, SCHELLINCK, and PALLIS, 2011) and (c) promote efficient and productive port activity growth (CHEON, DOWALL, and SONG, 2010). BALTAZAR and BROOKS (2006) resorted to the contingency theory to support the port governance model. Open systems organizations require governance adjustments to meet the balance needs and to adapt to the external environment. Nevertheless, the single solution for governance model does not exist, because it depends on the local goals and environment type. Different governance models are needed in different environments (LAMBERT, 2009).

National laws and specific port legislation have direct influence on the decision process about the port governance model mechanisms in each country and its evolution (CALDEIRINHA, FELÍCIO, and DA CUNHA, 2017; RODRIGUE, 2017). Portuguese legislation of 2006 on corporate governance strengthened supervision and control of port governance (ROQUE, 2015). National policy has an influence on ports and on the decisions regarding the port governance model, as mentioned by PALLIS and VAGGELAS (2017). In the case of Italy, national policy has a special influence on the model of regionalized port authorities that is being developed, contrary to tendencies of greater local autonomy and devolution (PAROLA *et al.*, 2017). In the

case of the Netherlands and Belgium, despite different national laws for each country, the common municipal political model implies local and autonomous governance systems (VAN DE VOORDE and VERHOEVEN, 2017; DE LANGEN and VAN DER LUGT, 2017; VAN DER LUGT, DE LANGEN, and HAGDORN, 2015). Port policy has thus a special impact on policy choices and decisions in all countries. In Netherlands, the port-oriented business policy, with environmental concerns, has led to the development of a model of port authority as a port development company (PDC), which prospects and invests in new business niches (DE LANGEN and VAN DE LUGT, 2017; VAN DER LUGT, DE LANGEN, and HAGDORN, 2015).

Global technical and economic changes have been determining the characteristics and decisions about the port governance model, as is the case of China, where the deceleration of economic growth and the recent strategy of the new silk route (OBOR—One Belt, One Road) using large ships has determined a model of cooperation between port authorities in a context of flexible management geared towards large investments, quality of service and global expansion (NOTTEBOOM and YANG, 2017). Local economic conditions also influence the port governance model, as has already been the case in Portugal and Greece port governance model mechanisms (CALDEIRINHA, FELÍCIO, and DA CUNHA, 2017).

Cities and regions contexts determine port governance, as in the case of Belgium and the Netherlands, or the case of the new governance model in Italy. In Spain, the autonomous regions have a strong influence on the management model of each port, but this is also conditioned by instruments created by Madrid to control the management in a centralized way through the government agency Puertos del Estado (LAXE, SÁNCHEZ, and GARCIA-ALONSO, 2016).

Private actors in ports also determine port governance model choices. The French ports have strong local proximity with the port users and in the Turkish ports, private companies own land inside ports jurisdiction areas conditioning their management (DEBRIE, LACOSTE, and MAGNAN, 2017; ESMER and DURU, 2017). In British and Australian ports, private

companies influence the private-based governance model of ports (MONIOS, 2017; CHEN, PATEMAN, and SAKALAYEN, 2017).

The size of the market also plays a role in the port governance model, such as island ports like Cyprus, where issues of local demand dimension involve port authorities oriented towards international transshipment opportunities in Limassol (PANAYIDES, LAMBERTIDES, and ANDREOU, 2017). The size of the port determines the governance model, as can be seen in Canada and France, where ports are divided into different governance models, more national or local, according to their respective size (BROOKS, 2017; DEBRIE, LACOSTE, and MAGNAN, 2017). MCCALLA (2008a) focused his analysis on site and situation geographical factors in the case of Kingston (Jamaica), highlighting the importance of the port's relative location in the transshipment activity.

### 2.2.1 Port governance models and performance

Decisions about the port governance model can be made by several stakeholders under the influence of external environmental factors.

The complexity and diversity of models does not allow us to analyse the totality of the characteristics of each one. But it is possible to find variables that allow to differentiate tendencies in port reform processes and the application of classic models in diverse regions of the world.

For example, in Europe governance models are subdivided into the Hanseatic, with local governance, Latin type, with a more central governance, and Anglo-Saxon, with independent governance private type (SUYKENS and VAN DE VOORDE, 1998), but in the rest of the world there are many other models and subtypes. And even these models mix decisions of different types depending on the country in concrete and the moment of time. There are also different governance practices between small and large ports.

One of the main variables of port governance is associated to the type of port authority, its main functions and relationship with port operators. In this case, ports are traditionally divided into

(a) service port, (b) tool port (c) landlord port and (d) full privatized port (WORLD BANK, 2007). Most ports have adopted landlord strategies, although some ports in the Caribbean, especially in smaller islands, and the Macaronesia (the archipelagos of Azores or Cape Verde, for example) or South Africa have adopted the service port model (HAVENGA, SIMPSON, and GOEDHALS-GERBER, 2017; CUBAS, BRICEÑO-GARMENDIA, and BOFINGER, 2015). The tool port model still prevails in some particular cases like in the case of some of the Azores' islands, or the port of Aveiro, in Portugal. However, in many countries there is a mix of these models, as in the case of Brazil, where some private terminals have recently been created under the supervision of the Federal authorities (GALVÃO, ROBLES, and GUERISE, 2017). In South Korea, the Central Government operates ports directly, but is looking for the introduction of a more entrepreneurial mindset (SONG and LEE, 2017). Most countries do not intend to privatize port authorities, adopting a landlord model with private operators with concessions of 30 years or more (DE LANGEN and VAN DER LUGT, 2017; VAN DER LUGT, DE LANGEN, and HAGDORN, 2015).

In turn, there are port authorities fully privatized as in New Zealand port (BANDARA and NGUYEN 2015; TULL and REVELEY 2001) or by grant of a concession by government, such as Piraeus or new autonomous port authorities, such as the ones of the ports of Turkey and China (NOTTEBOOM and YANG, 2017; ESMER and DURU, 2017). There are port authorities that depends on local cities or regional, national or federal central decisions. In Brazil, the power was recently concentrated in a national authority, ANTAQ (GALVÃO, ROBLES, and GUERISE, 2017). Government plays an important role in defining and achieving strategic and socio-economic policy objectives, underlying its ownership of the port authority (DE LANGEN and VAN DE LUGT, 2017; VAN DER LUGT, DE LANGEN, and HAGDORN, 2015).

The port authorities focus varies considerably. It may be concentrated in its core port business, it may be in local relations, with port community and the municipality, or it may be on a more regional level within the logistics platforms and supply chains in the hinterland

(regionalization), which is considered a new phase of port's life (NOTTEBOOM and RODRIGUE, 2005). According to VILLA (2017), Mexican ports are now looking to widen their focus on hinterland logistics. RODRIGUE and NOTTEBOOM (2010) report that the regionalization phase brings the perspective of port development to a higher geographical scale, which is beyond the port perimeter.

The relations between nearby ports and its port authorities are discussed and includes integration or cooperation strategies, such as China (NOTTEBOOM and YANG, 2017) and cooptation or competition, as in the case of the Belgian or Dutch ports. Many regional ports integrate small ports and there is a discussion about possible integration of large ports located in the same region, with the government requiring greater cooperation between port authorities. Management coordination between ports, while maintaining their respective autonomy, is another possible perspective (NOTTEBOOM and RODRIGUE, 2005). KNATZ (2017) refers to the case of cooperation between US ports in logistics chain to combat the threat of the Panama Canal. NOTTEBOOM (2009) report that cooperation between competing ports (typically in proximity) is often seen to avoid inter-port destructive competition. Port Authorities strive to minimize competitive environment using flexible governance framework within ports.

The organization of ports varies from country to country, varying from more centralized models of a single national port authority, such as South Africa, Cyprus or Taiwan, where four authorities were concentrated in a single national (TSENG and PILCHER 2017; HAVENGA, SIMPSON, and GOEDHALS-GERBER, 2017) to regional or multi-port authorities, as is being developed in Italy and as is the case of West Australian ports. Some local authorities are differentiated by size of port, between small and large ports, as is the case in Canada. However, sometimes there are several models within the same country (HAVENGA, SIMPSON, and GOEDHALS-GERBER, 2017; BROOKS, 2017; PAROLA *et al.*, 2017; PANAYIDES, LAMBERTIDES, and ANDREOU, 2017).

The port authority functions may be distinguished from (a) conservative operator, (b) simple land manager and facilitator, and (c) PDCs new activities (VAN DER LUGT, DE LANGEN,



and HAGDORN, 2015). The conservative port authority focuses on managing and implementing actions passively and mechanistically. The ‘facilitating’ port authority assumes itself as mediator and partner between economic and social interests, seeking to become involved in strategic regional partnerships. The ‘business’ port authority combines features of facilitator with the attitude of an investor, service provider and consultant (VERHOEVEN 2010; VERHOEVEN and VANOUTRIVE, 2012).

The intra-port competition regulation is an important characteristic of the port governance model and can be more oriented to (a) liberalization of port services; (b) limitation of port service providers; or (c) to monopoly on port services (WORLD BANK, 2007).

The port managers’ selection process is an important factor and can influence port performance. The managers can be appointed by national politicians, local politicians, recurring to a technical tender or appointed by the port community (MARE, 2014). When port managers, or other port positions, are chosen on friendship basis or political closeness, good results cannot be expected and over staffing can influence performance.

It is possible to distinguish the type of Management Control exercised over the port authority: (a) internal control, (b) financial and investment control, government control, (c) management KPIs, monitored monthly or quarterly by government, and (d) Total control and decision dependence of the central government or another entity (ROQUE, 2015). DE LANGEN and VAN DER LUGT (2017) mention that governments create control mechanisms that reduce ports independence, but they should instead create autonomous bodies of supervision.

### 2.2.2 Main model types

Taking the variables found in the literature, it was possible to identify several main governance models divided between the Private, Liberal, Controlled and Centralist models (Table 2.1).

The private model (based on the Anglo-Saxon model) consists of private port authority and private operator with autonomy and minimal contractual control by the government. The core of the activity is focused on port operations and its influence can be extended to the railroad or to

logistics areas in the hinterland. This model is based on competition between ports and on liberalizing of services. The managers are selected by merit. Sometimes under this model, a fee is due to the government in return for the port concession or for buying the land (BROOKS and CULLINANE, 2006b).

Table 2 1 – Classification of the main models of port governance

Main port governance models characteristics	Private	Liberal	Controlled	Centralist
PA type	Full private port	Landlord	Landlord	Tool/Service port
PA power	Private power	Devolution/ Autonomy	Controlled devolution	Centralist
PA focus	Core	Regional/ International	Regional	Core
PA's relations	Competition	Cooperation	Cooperation	Integration
PA geo-organization	Each port PA	Each port PA	PA regional fusion	One PA
PA functions	Land manager	Development	Facilitator	Operator
PA competition model	Liberalization	Liberalization	Limitation	Monopoly
PA managers selection	Technical	Mix	Political	Political
PA management/Legal structure control type	Minimal	Internal control	Finance and invest	Total control
PA nature	Full private	Government company	Government company	Government department
PA financing	Pay to government	Balanced accounts	Government add	Public money

Source: adapted from BALTAZAR and Brooks (2006), BROOKS and Cullinane (2006a), BANDARA, NGUYEN, and CHEN (2013).

The liberal and local model (based on the Hanseatic model) consists of a public port business authority and private concessionaires or leasers, with considerable autonomy (devolution) and control of KPIs and internal financial by a company supervisory body. It is focused on regionalization and international relations and in the international hinterland and foreland. Competition and cooperation with other neighbouring and distant ports is a driving force. It is a development port company, liberalizing services as much as possible. Management is ensured by technicians selected by merit, but also by political choice. It is required that these port authorities have the balanced budgets (BROOKS and CULLINANE, 2006b).

The Controlled model (based on Latin model) relies on a public capital port authority and fully private concessionaire terminal operators of public service, with some autonomy (controlled devolution) and financial and investments strategy controlled by the government. The focus is on regionalization, widening its influence in the near hinterland. Cooperation with other neighbouring national ports is stimulated by the government. It aims to be a business facilitator, limiting the number of service providers as much as possible to ensure scale and control. It is

managed by technicians selected by political choice. It often receives government aids for certain major public investments (BROOKS and CULLINANE, 2006b).

The centralized model relies on a port authority that works as government agency that controls all or some ports of the country, with tight financial, economic, operational and investment or strategy control. The ports under this regime are focused on the core of the port operation, with an integrated view of the neighbouring ports and sometimes of the railroad. It is a port activity operator, with a monopoly status. It is managed by technicians selected by political choice and depends on the government budget, although it can have its own limited budget (HAVENGA, SIMPSON, and GOEDHALS-GERBER, 2017).

### 2.2.3 Expected results

Port government decisions are related to maximization of impact on performance, as BROOKS and PALLIS (2008) mention, and the performance of the economy. But we must be careful to be rigorous in the measure of this impact as referrer by PILCHER and TSENG (2017). The main variables used by the authors in the evaluation of the results of the port governance model reforms include port throughput, measured by the total movement of goods or the number of containers or TEU (20 equivalent unit) moved by the port (WORLD BANK, 2007).

Other objectives include the containment or reduction of costs and prices charged by ports to final customers, by increasing competition and operational efficiency among operators. In the case of the port of Gothenburg, the port terminal concession process involved strikes, throughput reduction and customer dissatisfaction, as well as rising prices, which was contrary to the objectives of the port reform, allegedly due to lack of competition (BERGQVIST and CULLINANE, 2017). Also, in Australia, port reforms have led to unexpected results with rising costs and port prices, as well as reduced investment due to lack of competition and lack of public interest advocacy, due to port privatization, contrary to expectations with the reform (CHEN, PATEMAN, and SAKALAYEN, 2017; BANDARA, NGUYEN, and CHEN, 2013). In Italy, the political instability, and its effects on a port governance without adequate autonomy

and stability, is cited as the cause of reduced investment. Privatization of ports in the United Kingdom is also seen as a cause of lack of investment in infrastructure and equipment and low productivity (MONIOS, 2017). Recently, Chile has increased its productivity with a port privatization policy (WILMSMEIER and SANCHEZ, 2017).

Positive or balanced financial results are common goals in many countries when deciding on governance models. The effectiveness, the customer satisfaction and supply chains are important objectives, but little considered in port governance decisions (VIEIRA *et al.*, 2014).

## 2.3 Research method

### 2.3.1. Conceptual model and hypotheses

The purpose is to understand the port governance model and the relation with port performance. The research model evaluates port governance model mechanisms and its relationship with the port performance factors (Figure 2.1).

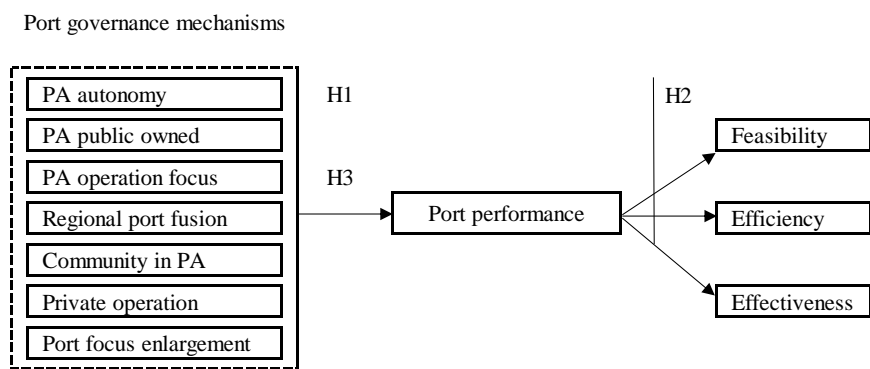


Figure 2.1 – Conceptual model

The hypotheses proposed are those following:

H1—Mechanisms that characterize the port governance model are PA autonomy, PA public owned, PA operation focus, regional port fusion, community in PA management, private operation, and port focus enlargement.

H2—Mechanisms that characterize the port performance are feasibility, efficiency and effectiveness.

H3—Port governance mechanisms influence port performance.

### 2.3.2 Factors and variables

Port governance model mechanisms consists of the main constructs and variables that characterizes the differences between world port governance models, identified in literature review and resulted from factor analysis to survey variables (Table 2.2). Port governance model mechanisms consists of the PA autonomy that includes clear strategy, strategy accepted by all port, no conservative PA, entrepreneur PA, PA internal control, cooperation focus, business PA, PA balanced accounts, autonomous PA; PA public owned that includes Government company, public owned, Government PA and Government control of port; PA operations focus that includes PA operator, operation focus, and Government approved prices; Regional port fusion that includes neighbourhood PA joint management, port fusion, and national PA; Community in PA management that includes Region in PA management, port community in PA management, PA depends from Region, and small ports city management; Private operation that includes operation by private companies and concession of operations; and port focus enlargement that includes PA pays dividends to Government, main role of PA in logistics chain, and PA internationalization. Port performance factors consists of feasibility, efficiency and effectiveness as direct observed variables.

### 2.3.3 Data collection, sample and measurement

The main evolution characteristics and contradictions of the governance model of Portuguese ports, linked to two different political periods, were showed by CALDEIRINHA, FELÍCIO, and DA CUNHA (2017) and referred in literature review. It was considered important to understand now which is the most suitable model for good port performance in the future would be, independent from political choices and evaluate if follows the global tendency for liberal model.

Qualitative data was collected based on a survey sent to the main Portugal port users. A question was addressed to each of the 44 variables based on literature, concerning the port governance model characteristics (40 variables) and port performance measures (4 variables), using a 7-point Likert scale (Appendix 1). The questionnaire was submitted online in November 2017 to 955 managers from companies operating in the five main Portuguese ports, with 105 valid answers.

After the data collection, a factor analysis was performed to operationalize the model, and a set of eight main factors with Cronbach's Alpha greater than 0.6, corresponding to 31 variables was selected (Table 2.2). One of the factors is port performance with three variables. The remaining seven factors are related to the characteristics of governance models and include 28 variables of the 44 initial variables, 13 were rejected due to lack of model statistical significance, although the hierarchy of classification by the respondents is important (Appendix 1).

The sample characterization expresses the typology of the respondent's company and the port that he knows best (Tables 2.3 and 2.4).

#### 2.3.4 Statistical methodology

The factor analysis methodology allowed the definition of the main components of the model. SPSS25/AMOS25 software was used to perform the calculations. It was also used the integrated methodology of structural equations modelling to evaluate the general research model and the latent/observed explanatory and explained variables.

The measurement model allowed to evaluate the goodness-of-fit of the model adjustment and of the latent variables, based on the observed variables. That was followed by the development of the structural model with the various causal relations between the variables, measuring of the adjustment coefficients. This methodology allowed to evaluate the general adjustment of the model among the variables.

Table 2.2 – Constructs and variables

Construct	Variable	SEM $\beta$	Alpha Cronbach	Authors
Port performance	Feasibility	0.51	0.825	BERGQVIST and CULLINANE (2017); MONIOS (2017); WILMSMEIER and SANCHEZ (2017); BROOKS, SCHELLINCK and PALLIS (2011); WORLD BANK (2007); BROOKS and PALLIS (2008); VIEIRA <i>et al.</i> (2014); SANZ-BLAS, CARVAJAL-TRUJILLO and BUZOVA (2017)
	Efficiency	0.75		
	Effectiveness	0.88		
PA Autonomy and entrepreneurship	Clear strategy	0.66	0.804	VAN de VOORDE and VERHOEVEN (2017); DE LANGEN and VAN DER LUGT (2017); VAN DER LUGT, DE LANGEN and HAGDORN (2015); VERHOEVEN (2010); VERHOEVEN and VANOUTRIVE (2012); VAN DER LUGT, DE LANGEN and HAGDORN (2015)
	Strategy accepted by all port	0.55		
	No conservative PA	0.49		
	Entrepreneur PA	0.73		
	PA internal control	0.53		
PA public owned	Cooperation focus	0.61	0.677	ROQUE (2015); VAN DE VOORDE and VERHOEVEN (2017); DE LANGEN and VAN DER LUGT (2017)
	Business PA	0.66		
	PA balanced accounts	0.47		
	Autonomous PA	0.59		
	Government company	0.50		
PA operation focus	Public owned	0.77	0.634	WORLD BANK (2007); HAVENGA, SIMPSON and GOEDHALS-GERBER (2017); DE LANGEN and VAN DER LUGT (2017)
	Government PA	0.78		
	Government control	0.75		
Regional port fusion	PA operator	0.55	0.691	HAVENGA, SIMPSON and GOEDHALS-GERBER (2017); BROOKS (2017); PAROLA <i>et al.</i> (2017); PANAYIDES, LAMBERTIDES and ANDREOU (2017); TSENG and PILCHER (2017)
	Operation focus	0.46		
	Government approves prices	0.58		
	Neighbourhood PA joint management	0.68		
Community in PA management	Port fusion	0.68	0.671	HAVENGA, SIMPSON and GOEDHALS-GERBER (2017); PANAYIDES, LAMBERTIDES and ANDREOU (2017); TSENG and PILCHER (2017)
	National PA	0.52		
	Region in PA management	0.64		
Private operation	Port community in PA management	0.56	0.645	HAVENGA, SIMPSON and GOEDHALS-GERBER (2017); PANAYIDES, LAMBERTIDES and ANDREOU (2017); TSENG and PILCHER (2017)
	PA depends from region	0.58		
	Small ports city management	0.47		
Port focus enlargement	Operation by private companies	0.59	0.654	WORLD BANK (2007); HAVENGA, SIMPSON and GOEDHALS-GERBER (2017); DE LANGEN and VAN DER LUGT (2017); YU <i>et al.</i> (2017)
	Concession of operation	0.57		
	PA pay dividends to Government	0.67		
	Main role of PA in logistics chain	0.47		
	PA internationalization	0.70		NOTTEBOOM and RODRIGUE (2005); WANG, CHEN and HUANG (2018)

## 2.4 Analysis and results

After the development of the structural model, the necessary internal adjustments were made to achieve a high level of goodness-of-fit. Thus, the general internal consistency of the model was verified, as well as the convergence validity of latent variables and the model unidimensionality using the Cronbach's alpha coefficient as defined by HAIR *et al.* (1998). Significant results were obtained confirming the goodness-of-fit of the model ( $\chi^2$ : 1300.2/ $\chi^2$ /df: 3.01/RMSEA: 0.098 < 0.1).

Table 2.3 – Typology of the respondents' company

	Frequency	Percent
Ship agent	8	7.6
Ship owner	5	4.8
Port authority	37	35.2
Shipper	4	3.8
Logistics company	1	1.0
Terminal operator	13	12.4
Freight forwarder	3	2.9
Other	34	32.4
Total	105	100.0

Table 2.4 – Respondents' port

Ports	Frequency	Percent
Aveiro	3	2.9
Leixões	14	13.3
Lisboa	23	21.9
Setúbal	37	35.2
Sines	28	26.7
Total	105	100.0

The model result (Figure 2.2) explains port performance ( $R^2= 0.42$ ), including feasibility ( $R^2= 0.26$ ), efficiency ( $R^2= 0.56$ ) and effectiveness ( $R^2= 0.77$ ). The governance model main characteristics that explain port performance are Private operation ( $\beta= 0.95$ ), PA Autonomy ( $\beta= 0.24$ ), PA public owned ( $\beta= 0.22$ ) and Region and Port Community in PA management ( $\beta= 0.18$ ). Factors with a negative impact on port performance are Regional Port Fusion ( $\beta= -0.15$ ), Enlargement of Port Focus ( $\beta= -0.15$ ) and PA operation focus ( $\beta= -0.07$ ).

## 2.5 Discussion

The observed variables mean, resulting from the survey and used in constructs, assume values higher than 3,5 points (7-Likert scale), confirming its importance. The factor results confirm the main constructs used in model. These results confirm H1.



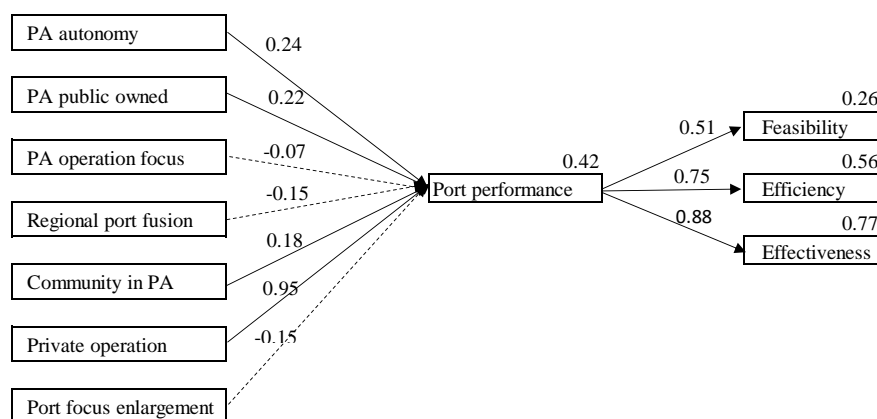


Figure2.2 – Result of the structural model

The results show that port efficiency based on investment and productivity, with effect on prices, is ideally an important characteristic for port specialists, as referred by BERGQVIST and CULLINANE (2017) and CHEN, PATEMAN, and SAKALAYEN (2017). It is proved that the ports' profitability/feasibility, with positive or balanced results, is an important performance, and that effectiveness variable and customers/supply chains satisfaction are important performance indicators considered by the experts, as reported by VIEIRA *et al.* (2014). In consequence, these results confirm H2.

In this survey, port experts consider it is important for port performance to adopt the landlord port model, with the concession of port operations to private companies and the reduction of the port authority's direct port operation. There are evident in results to reject that the full privatized port model has positive results in the performance, preferring a public owned port authority (Appendix 1). This classification was adopted by WORLD BANK (2007). This confirms the tendency at most of world's ports, with the adoption of landlord model (DE LANGEN and VAN DER LUGT, 2017; VAN DER LUGT, DE LANGEN, and HAGDORN, 2015). They do not consider that the government should operate the port directly but consider that publicly owned port authorities should increase the characteristics of an entrepreneurial mindset, as referred to by SONG and LEE (2017). The results point out that the government plays an important role in defining and achieving port policy goals, since it owns the port authority,

although more control must be carried out by internal bodies as advocated by DE LANGEN and VAN DER LUGT (2017). The results also point out that the port authorities should not focus only on their core business, but must give more attention to local customers, logistics chains and to their region/city, that should participate on the port's management (minimized regionalization), corroborating only partially what NOTTEBOOM and RODRIGUE (2005) or VILLA (2017) have referred. The results highlight the need of closer relations between nearby port authorities, a topic that is discussed in literature with integration and cooperation strategies (NOTTEBOOM and YANG, 2017). The results point out to a negative effect on performance of the integration/fusion of large ports located in the same region, preferring the cooperation between ports as referred by KNATZ (2017) or NOTTEBOOM (2009), including co-opetition between ports in proximity. The results reveal the existence of performance advantages for ports whose port authorities have a clear and consensual strategies and that are more entrepreneurial and operate as PDCs, as defended by VAN DER LUGT, DE LANGEN, and HAGDORN (2015), rejecting the conservative port authority that is mainly focused on managing the port only as landlord. Although the model did not include variables about selection of port managers, the means reached by the respective variables point to the preference for merit-based selection process as an important factor that can influence port performance, as mentioned. In conclusion, these results confirm H3.

It can be also observed that the optimum port governance model for Portuguese experts approaches the characteristics of the liberal governance model, as described in the literature review (Table 2.5). Portuguese government should take this result in consideration in the new port political plans and avoid measures that collide with this long-term tendency, but this results also express the global tendency about ideal port governance model and may be extended to other geographies, with appropriate adaptations.

Table 2.5 – Liberal model and optimum model for Portuguese experts

Port type	Liberal	Optimum model for Portuguese experts
PA type	Landlord	Landlord and concession to private
PA power	Devolution	Devolution with more autonomy to port
PA focus	Regional	Focus on regionalization without operation of rail and logistics
PA's relations	Cooperation	Cooperation without integration of ports
PA geo-organization	PA autonomy	PA autonomy of each port without fusion
PA functions	Development	Entrepreneurship and development company
PA competition model	Liberalization	Liberalization with external regulator
PA managers selection	Mix	Technical and merit
PA management control	Internal control	Internal control
PA nature	Government company	Government company
PA financing	Own receipts	Own receipts and balance accounting

The port governance model with performance impact is characterized by being a landlord model, with the operation being granted to private companies and an entrepreneurial port authority, autonomous from the government or from other ports. The port should be owned by the government, being the management board controlled by an internal body with participation of the region or city and the involvement of the Port Community. The results suggest that the merger of ports and the focus on operation by the port authority have negative impact in performance, and the port authority should be concerned on the region and logistics issues but avoiding becoming a full logistics operator.

On the other hand, the characteristics of port governance models with the highest score (Appendix 1) include the concession of the operation to private hands, the autonomy of each port in relation to the government or other ports. Additionally, the port authority should have capacity to negotiate prices, and to cooperate, having balanced accounts, and managers appointed by merit, clear strategies accepted by the port community, and an entrepreneurial and facilitator port authority, with internal supervision and control.

## 2.6 Conclusions and contributions

The research confirms existence of port governance model mechanisms and its relationship with higher levels of performance, feasibility, profit, efficiency and effectiveness, and consequently economic impact, aiming port authorities and port operators to increase their results. The

mechanisms that characterize the port governance model are: PA autonomy, PA public owned, PA operation focus, regional port fusion, community in PA management, private operation, port focus enlargement. The mechanisms that characterize the port performance are: feasibility, efficiency and effectiveness. Port governance model mechanisms influence port performance.

The main governance characteristic is private port operations, through concessions, although land ownership and port management should be kept public and not privatized. The port authority should abandon definitively port operations, and make an approach to the logistics chain, but avoiding a direct participation in the land transport or logistics areas management.

Another important characteristic is the port authority's business mindset and its autonomy from the government, with freedom to take business actions and create new businesses that are necessary for the port development, as a true PDC. The port authority control should be through an internal organization of the port itself and not by government supervision, either by the port's ministry or by the finance ministry. The model explains port performance, including profitability, efficiency and effectiveness.

Another important conclusion is the approximation of the of port governance with the liberal model, described by the authors based on the Hanseatic model, which reveals the importance of the success of this model in Northern Europe, as well as worldwide.

The main contribution of this paper to the literature is providing a set of factors that public managers may decide when changing the characteristics of the port governance models to ensure their performance

The conclusions should consider the sample's number of observations limitations and the geographical limitations, so it would be interesting to extend the study to other countries and continents, with different port governance models to confirm these results Another important issue will be the inclusion of environmental effect and local factors that may affect the model.

## Chapter 3

# Port governance in insular contexts: The cases of Caribbean and Macaronesian islands

### 3.1 Introduction

In recent decades, maritime transport has undergone significant transformations with a continuous growth of ship size and the emergence of the container as increasingly important transportation equipment. In the 1990s, the container started to seriously affect global trade patterns and manufacturing strategies, with direct consequences in the port industry (HARALAMBIDES, 2007; DUCRUET and NOTTEBOOM, 2012). In such a new context, many governments entered a period of port reforms, changing applicable governance structures with powerful private players struggling to gain control over port-oriented logistics networks (VERHOEVEN, 2010). Gradually, governments have moved to extract themselves from the business of port operations, focusing their efforts on the monitoring and oversight responsibilities associated with the concept that the role of government is to provide a safe and secure environment for citizens and a level playing field for commercial activities (BROOKS and CULLINANE, 2006a).

The landlord model has gradually come to dominate the port industry worldwide, with port authorities operating public-private interfaces, synchronising the interest and action of all public institutions (central governments, municipalities, etc.) with the behaviour and the strategic interest of private operators (VAN DER LUGT, DE LANGEN, and HAGDORN, 2017). The Port Reform Toolkit (WORLD BANK, 2007) was an important tool in this evolution process in port governance, especially for developing countries, designed to flatten the learning curve for institutional renewal. In general, those processes were supported by the new public management philosophy, that emphasizes market principles and the ‘one best way’ approach about how the

public sector should be governed (BROOKS and PALLIS, 2012). However, in the last two decades, the contingency theory gained more relevance, suggesting that there is not one best way to manage, but an appropriate way to manage for a given context. The contingency theory does not refute the validity of making absolute recommendations with respect to some variables that affect a given organizational situation, but suggests that, for a given situation, there will likely be sets of contingency variables whose characteristics should match if organizational performance is to be maximized (BALTAZAR and BROOKS, 2006).

In the case of the islands, ports are truly a strategic asset due to the extreme dependency on maritime transport that islands face (SANCHEZ and WILMSMEIER, 2009; TOVAR, HERNÁNDEZ, and RODRÍGUEZ-DÉNIZ, 2015). In general, one can consider two contrasting situations prevails, with some island ports with an intermediate location in the main global trade routes while others are associated to isolated small islands, without significant hinterlands and outside the range of major shipping routes (PINNOCK and AJAGUNNA, 2012; SANCHEZ, 2017). These differences have an immediate consequence in terms of port development. UNCTAD (2014) consider that port characteristics, namely the need of dredging for accommodation of larger and larger ships, the inexistence of ship-to-shore container cranes, given that ever fewer new vessels are today built with their own gear, the long waiting times for ships, and lengthy customs clearance procedures, are among a set of five determinants for the higher transport costs that islands face<sup>1</sup>. Some of these ports have adopted the landlord port model and managed to consolidate their relevance in the shipping and port industry. Examples include the cases of Singapore, Taiwan, Kingston (Jamaica) or Freeport (Bahamas). Others are still operating under the service port model, with outdated infrastructure and several difficulties in the catch-up process, like most ports in Eastern Caribbean or in the Pacific Ocean, facing huge freight prices and low levels of connectivity.

---

<sup>1</sup> The other determinants for high transport costs, according to UNCTAD (2014), include economies of scale, trade imbalances, distance, and competition.

Based on the contingency theory, BALTAZAR and BROOKS (2006) developed the Matching Framework, which configures port performance as a function of the match between the port operator's task environment, strategies, and structures. This model is the reference for most part of subsequent port governance models contained in the literature. Among the models, one should highlight that of BROOKS and CULLINANE (2006c) and of BROOKS and PALLIS (2008). In the first, the authors include the relationships between firms and government to illustrate that both types of stakeholders do not function in isolation, being the performance (or outcomes) of the government Matching Framework part of the environment of firms, while the outcomes of firms integrate the environment of the government. The integration of both types of stakeholders is particularly important in the formation of a port cluster. In the second model, an iterative dynamic of several steps for the evolution of port governance is included in the Matching Framework, reflecting the complexity of those processes, since their evolution take frequently more than a decade to consolidate.

Both concepts, i.e., the diversity of stakeholders and the iteration processes, are key elements in port governance. For DE LANGEN (2006) a distinction needs to be made between port authority governance and port governance. The governance of the port authority is closely linked with corporate governance issues, while port governance, on the other hand, is more related to cluster governance since a port consists of a variety of actors, with a diversity of interests and suffering a multiplicity of influences. Although, according to CLARK *et al.* (2004), there are some variables that no government can change, port efficiency is, for WILMSMEIER *et al.* (2006) within the scope of national policies, being directly manageable by governments through some level of intervention and/or regulation, with potential impact on level of freight prices. Thus, port governance is a priority topic for islands, frequently subject to higher handling charges and shipping costs, policy interference as well as confused and misaligned goals among the port players (CUBAS *et al.*, 2015; PINNOCK and AJAGUNNA, 2012).

The quest to identify the most appropriate allocation of responsibilities and governance for island ports, is a theme practically absent from the literature. Exceptions include mostly the Caribbean region, focusing the authors on the need of a catching-up process (CUBAS *et al.*, 2015; PINNOCK and AJAGUNNA, 2012). In general, the literature has focused on the efficiency analysis, through data envelopment analysis (DEA) or stochastic frontier analysis (SFA) of the major container ports of the world (for example, BRAY, CAGGIANI, and OTTOMANELLI., 2015; CULLINANE and WANG, 2006; CULLINANE *et al.*, 2006; TONGZON, 2001), or of national port systems (for example, BARROS, FELÍCIO, and FERNANDES, 2012; COTO-MILLAN, BANOS-PINO, and RODRIGUEZ-ALVAREZ, 2000; MARTINEZ-BUDRÍA *et al.*, 1999; MONTEIRO, 2018; NGUYEN *et al.*, 2016). Only some authors have included in their datasets some island ports (for example, BROWN, 2018; CDB, 2016; CUBAS *et al.*, 2015; SARRIERA *et al.*, 2013 and SEREBRISKY *et al.*, 2016), mostly Caribbean ports, stressing the relative inefficiency of several of those ports. Some cases, namely CDB (2016), CUBAS *et al.* (2015), PMAC (2020) or PINNOCK and AJAGUNNA (2012) contained suggestions and proposals for the future development of the most fragile ports of the Caribbean. However, the complexity of the port industry and the multitude of stakeholders involved, on one side, and, on the other, the extreme dependency of maritime transport that islands face, turns these processes of change in island ports highly politicized and involving several risks.

The Advocacy Coalition Framework (ACF), a cornerstone conceptual mechanism to analyse the dynamics in this context, as well as the role of political processes in the formation or catch-up dynamics of adequate and effective island port systems, seems, in our perspective, especially adequate to this analysis involving the smaller island ports, extremely reluctant to change their governance models, mostly based on service port models. In fact, the ACF is one of the most prominent theoretical frameworks in coalition politics and public policy, being focused on the study of change within policy processes. Using this framework, we intend to discuss how can island ports of the Caribbean and Macaronesia regions, improve their port governance models



and what may be the role of the different stakeholders involved in the port industry. To the best of our knowledge, such an analysis is still missing in the literature, and may constitute an important source of information for the development of future port policies in insular contexts.

The paper is structured as follows. After the introduction, a brief theoretical background is presented in Section 2, followed, in Section 3 by the characterisation of the Caribbean and Macaronesian island port systems, based on qualitative and quantitative data. Section 4 is devoted to the application of the ACF conceptual approach on the ports of the Caribbean and Macaronesia as well as a brief analysis of port efficiency. In Section 5 we discuss why some processes of policy change has occurred while in other cases didn't occur, followed, in the final section, by the conclusions, limitations and future perspectives.

## 3.2 Theoretical background

### 3.2.1 Port stakeholders and port governance

Port governance and the role of the different stakeholders is a topic particularly relevant for the development of ports, since ports need informed, supportive allies to set the stage for almost any project or initiative. Among others, DE LANGEN (2006) mentions the role of stakeholders in port clusters, each of them with different interests in the port and different sources of influence. It should be also mentioned that not all stakeholders have the same power, or the same type of stakeholders have the same power on different ports. Moreover, the power of stakeholders may also change over time.

In general, following NOTTEBOOM and WINKELMANS (2002), one can consider four main port stakeholders' groups: (1) Internal stakeholders, which includes the port authority, employees, unions, shareholders, and board members; (2) External stakeholders, contemplating transport operators (shipping lines, railway and trucking companies, etc.), cruise lines, terminal operators, shipping agents, freight forwarders, and local industries; (3) Community stakeholders, including community groups, civil society organizations, the press; and (4)

Government agencies (health, customs, etc.), policy makers stakeholders, legislators and regulators. Each one of the different stakeholders have their own beliefs, intentions, and goals, acting in their own interest, through coalitions and other arrangements. Their interactions and influence produce a unique result in terms of port governance and performance, highlighting FERRARI, TEI, and MERK (2015) the role of the port authorities and that of the terminal operator companies. In general, the port authority has a coordinating role among all the players, managing the port areas through its power position and interactions with landlord, regulatory, and community manager functions (ZHANG *et al.*, 2018). Examples of port entities aggregating port interests and stakeholders being promoted by the port authorities include port advisory committees, port community consultation committees, or simply port communities. The ultimate example of this tendency is the development in recent decades of port community systems (PCS), with digitalisation of transport and logistics, centralizing the vessels' information and the cargoes they transport so that the diverse stakeholders can better control and coordinate the movements of goods, based on information and communication technology (ICT).

From the interaction between port stakeholders and their own interests, DE LANGEN (2006) identified five important conflicts of interests in relation to port development, which are environmental protection, urban development, labour conditions, resident interests, and overall economic development. All these conflicting interests are relevant in most ports and the outcome of such conflicts differ between ports, with substantial effects on the competitive position of the port.

According to WILMSMEIER, MONIOS, and PÉREZ-SALAS (2014), port development is path dependent, being heavily constrained by past actions and institutional design, but also contingent in relation to private investment and public planning, being the port authority constrained on its ability to act, stemming from its specific nature. For NOTTEBOOM, DE LANGEN, and JACOBS (2013), port reforms stretch existing institutional arrangements, while alternatives that come to mind among the stakeholders still largely reside within existing

frameworks of thought. This path dependence inhibits plasticity of port governance models, imposing a format of stretching and layering in institutional changes. In a broader perspective, RODRIGUE, COMTOIS, and SLACK (2006) highlight that some level of inertia is inherent to transportation networks, being physical attributes and historical considerations two major factors that explain this inertia. In sum, port governance is largely determined by local or regional institutional characteristics and arrangements, despite attempts to implement generic governance solutions, a tendency originally dictated by the new public management principles, as stressed by BALTAZAR and BROOKS (2006). Moreover, an increasing foothold on strategic thinking is necessary for port authorities to change their role from task-oriented organizations to more autonomous and commercially acting organizations (VAN DER LUGT, DOOMS, and PAROLA, 2013), cultivating new business models and widen the strategic scope of port systems (VAN DER LUGT, DE LANGEN and HAGDORN, 2017), in a context of constant pressure with respect to infrastructure, superstructure, equipment, efficiency and organization (WILMSMEIER *et al.*, 2014). The way these types of solutions or results are established among the port stakeholders and the consequences on port performance and development are the more diverse, depending on a great extent from the level of power of the stakeholders and the resilience of the port system.

All these topics are especially important for islands, as the role of ports in maritime transport is critic for the economic development of the islands, imposing in governments, port authorities and other stakeholders a level of responsibility that, in several cases, they are not prepared to cater. The most frequent solutions that one can observe are the prevalence of cosmetic reforms, as mentioned by PINNOCK and AJAGUNNA (2012), focusing on the Caribbean islands. BALTAZAR and BROOKS (2006), based on the contingency theory, developed the Matching Framework, subsequently improved by BROOKS and CULLINANE (2006c) and BROOKS and PALLIS (2008). In the first model the authors include the relationships between firms (i.e., stakeholders) and government (or the port authority) to illustrate that both types of stakeholders do not function in isolation, being the performance (or outcomes) of the government Matching

Framework part of the environment of firms, while the outcomes of firms integrate the environment of the government. The integration of both types of stakeholders is particularly important in the formation of a port cluster. In the second, an iterative dynamic of several steps for the evolution of port governance is included in the Matching Framework, reflecting the complexity of those processes, since their evolution take frequently more than a decade to consolidate.

Both models are relevant to illustrate the dimensions of the port industry, in space and in time. In space, since an extensive set of stakeholders are necessarily involved in every port system and in time, since the evolution of the port systems demands time to consolidate the diverse interactions and interests of the stakeholders. The interactions process was illustrated by DE LANGEN (2006), through a framework of two variables (interaction and attitudes), resulting in four possible accommodations: (1) Limited interaction and non-cooperative attitude; (2) Frequent interaction and a non-cooperative attitude; (3) Frequent interaction and a cooperative attitude; and (4) Limited interaction and a cooperative attitude.

The Advocacy Coalition Framework, to be briefly developed in the next subsection, is one of the most prominent theoretical frameworks in coalition politics and public policy, being particularly suited to frame this type of analysis.

### 3.2.2 A brief synopsis of the Advocacy Coalition Framework

The ACF emerged in the early 1980s through the works of Paul Sabatier and Hank Jenkins-Smith, in an attempt of moving towards a positive understanding of the various drivers of policy change at multiple scales. The ACF proposes an explicit model of belief systems, which are viewed as a three-tiered hierarchy of beliefs (SABATIER and WEIBLE, 2007): (1) deep core beliefs<sup>2</sup> include normative and ontological axioms applicable to multiple subsystems; (2) policy

---

<sup>2</sup> Examples of deep core beliefs are very general normative and ontological assumptions about human nature, the relative priority of the welfare of different groups, the proper role of government versus markets in general, and about who should participate in governmental decision making, etc.

core beliefs<sup>3</sup> include beliefs that support the achievement of deep core beliefs within a particular subsystem, being very difficult to change and might be considered the stickiest glue that binds coalitions together; and (3) secondary beliefs<sup>4</sup> include a multitude of instrumental propositions to achieve policy goals within the subsystem. Because these last beliefs are relatively narrow in scope than policy core beliefs, changing them requires less evidence and fewer agreements among subsystem actors and thus should be less difficult.

The ACF facilitates the study of change within policy processes that might include changes in beliefs through (1) learning, (2) changes in coalition members and their interconnections, and (3) policy change. Resistance to policy change is the norm. For this reason, the most frequent type of observed change is minor adjustments to policies or their corresponding belief systems, with major policy changes occurring less frequently. Certain contextual factors make major policy change more likely. For example, policy brokers can facilitate learning and policy change when they intervene in high-conflict situations to mediate solutions between opponents, as reported by HENRY *et al.* (2014).

For JENKINS-SMITH *et al.* (2014), as well as SABATIER and WEIBLE (2007), there are four primary pathways to policy change: (1) coalitions taking advantage of perturbations or events external to the subsystem; (2) coalitions taking advantage of events internal to the subsystem; (3) policy-oriented learning among or between coalitions; and (4) negotiated agreements between coalitions. These pathways can be considered bottom-up, as the impetus for policy change is within the policy subsystem. A fifth pathway to policy change is imposed by a hierarchically superior jurisdiction, being a top-down, as the source of policy change is from a source hierarchically superior and outside of the policy subsystem. These primary pathways

---

<sup>3</sup> Examples of policy core beliefs are the priority of different policy-related values, whose welfare counts, the relative authority of governments and markets, the proper roles of the general public, elected officials, civil servants, experts, the relative seriousness and causes of policy problems in the subsystem as a whole, etc.

<sup>4</sup> Examples of secondary beliefs are detailed rules and budgetary applications within a specific program, the seriousness and causes of problems in a specific locale, public participation guidelines within a specific statute, etc.

may occur in combination with each other or in isolation. In turn, secondary components of policy change include a diversity of topics, identifying PIERCE, PETERSON, and HICKS (2017) several alternatives, including a new dominant coalition, change in the distribution of resources, dominant coalition belief or strategy change, a hurting stalemate, or the presence of a policy broker.

In terms of the theory of policy-oriented learning, JENKINS-SMITH *et al.* (2014) identify five hypotheses about the conditions that facilitate learning among and between coalitions: (1) learning across coalitions; (2) professional learning; (3) quantitative learning; (4) normative learning; and (5) technical information.

The vast application of the ACF was investigated, among others, by PIERCE *et al.* (2017), which provided an extent analysis about policy change, identifying 131 cases of policy changes processes using the ACF in the literature. The most frequent isolated primary pathway is external events, followed by learning. Multiple primary pathways were identified, being in most cases associated to both external events and learning or external events, learning and negotiation. This demonstrates that multiple primary pathways may be necessary for policy change. In terms of secondary components, they are not explicit in policy change hypotheses, according to JENKINS-SMITH *et al.* (2014).

Policy stasis were also focused by PIERCE *et al.* (2017). Policy stasis, as identified by ACF scholars studying policy change, accounts for only 11 percent of all policy processes, either examining a single case of policy stasis, a comparison of subsystems of policy stasis and change, or the following of a policy stasis and then an eventual change over time.

Transportation and especially ports have been a totally marginal topic in ACF. Until now, only two port studies were identified, namely LU (2007) and OLIVEIRA, YOU, and COELHO (2021), on the first case focusing on the development of the most important port of Taiwan and, in the second, to a set of 17 different national port reform and port governance processes, using information from a special number of the journal *Research Transportation Business & Management*. In this last work, the authors propose three policy core beliefs (foreign

commercial liberalisation, state-market power structure and port governance centralisation), as well as eight typologies for classifying governing coalitions that are involved in the decision-making processes of port governance, covering a range from national public industrial to international private post-industrial. Results point to a positive association between countries with port decentralised governing conditions and higher key performance indicators of port governance, unveiling also that countries opting for decentralization do not necessarily intend to support trade liberalisation or port privatisation.

In the next section we will characterize the port systems of the islands in the Caribbean and Macaronesia regions.

### 3.3 Insular ports systems of the Caribbean and the Macaronesia regions

#### 3.3.1 Overview

The Caribbean and Macaronesia are two distinct regions located in the two extremes of the North Atlantic Ocean, with a significant number of islands (see Figure 3.1), especially in the Caribbean region.



Figure 3.1 The Caribbean (Panel A) and the Macaronesia (Panel B) regions

Common features of islands include, in general terms, an extremely high dependence on sea transport, disperse markets, as well as small hinterlands and reduced volumes of traffic. All

these characteristics impose diseconomies of scale and oligopolistic market structures on maritime transport operators, facts that are directly associated to higher transport costs (see, for example, CEPAL, 1997; CUBAS *et al.*, 2015; EURISLES, 1999; UNCTAD, 2014; or WILMSMEIER and HOFFMANN, 2008). Exceptions include some bigger islands, namely the Greater Antilles, with comparative higher volumes of traffic, in some cases with relevance in transshipment operations due to the proximity of the Panama Canal. The expansion of the Panama Canal, in 2016, is considered for both regions a game changer, with vast potential consequences in terms of the shipping industry in the North Atlantic area. Two contrasting situations are observed in both regions, with some island ports with an intermediate location in global or hemispheric trade routes while others are isolated small islands, outside the range of major shipping routes. In common, all islands face an extreme dependency on maritime transport, being ports truly a strategic asset for their development (SANCHEZ and WILMSMEIER, 2009; TOVAR *et al.*, 2015).

In the next two subsections we will present the main characteristics of the island ports in each region.

### 3.3.2 The Caribbean

The Caribbean, located in the western side of the North Atlantic Ocean (see panel A of Figure 3.1), due to its dimension, comprising more than 700 islands, illustrates the paradigmatic situation of many insular regions or nations, with a plea of different levels of economic and social development, different sovereignties<sup>5</sup>, and, in several cases, independent states, some of them microstates.

In respect to the port industry, their position is particularly associated to the proximity of the Panama Canal and of East-West Sea routes, which means that services to or through the Caribbean are provided by some global operators (PINNOCK and AJAGUNNA, 2012;

---

<sup>5</sup> There are islands that integrate countries like France, United Kingdom, the Netherlands, or the United States.



SANCHEZ, 2017; SANCHEZ and WILMSMEIER., 2009), covering mostly countries like Jamaica, Dominican Republic, and the Bahamas, as well as Puerto Rico. In several other cases, mainly in Eastern Caribbean islands, the situation is more challenging (see, for example, CDB, 2016; CUBAS *et al.*, 2015; or SANCHEZ, 2017). These two contrasting situations have direct consequences in terms of connectivity and on levels of maritime freight prices. MCCALLA (2008a, b), used site-situation geographic factors to discuss the situation in the Caribbean.

The port structure in the Caribbean region was, originally, designed mainly for colonial bulk and break-bulk trades (PINNOCK and AJAGUNNA, 2012). Consequently, ports infrastructure had, historically, the physical configuration of general cargo ports, with finger piers and large warehouses. In face of the advent of containerization and globalization, this type of configuration became totally inadequate. At the same time, the growing importance of cruise tourism imposed supplementary constraints to port operations, demanding the need to conciliate limited berth space between distinct types of traffic with distinct characteristics and needs (CUBAS *et al.*, 2015; PINNOCK and AJAGUNNA, 2012). The response to these challenges has been considerably diverse. Some of the islands developed adequate and modern ports, while others were not capable of modernize their port structure, remaining in the break-bulk era, with multipurpose ports serving also as cruise ports, and lagging with port configurations and governance models totally inadequate to operate in the containerised era.

The work of several international institutions<sup>6</sup>, have been important sources of technical support for Caribbean islands' port authorities and governments in their development or catching-up processes, with a diversity of results, in a great extent associated to the dimensions of the markets and site and situation geographic factors (MCCALLA, 2008a,b). SANCHEZ (2017) identified in the region, three markets which include mostly islands: (1) Central Caribbean, contemplating Jamaica, Haiti, and the Dominican Republic; (2) Northern Caribbean, which

---

<sup>6</sup> Among those institutions, one can highlight the Economic Commission for Latin America and the Caribbean (ECLAC), the Directorate for Trade and Sustainable Development of the Association of Caribbean States, the Caribbean Shipping Association, the Caribbean Development Bank, or the Port Management Association of the Caribbean.

includes the Bahamas, the United States (South Florida and Puerto Rico), as well as Cuba; and (3) Eastern Caribbean, with a multitude of the most peripheral and smaller islands of the Caribbean. The growth rates between 1998 and 2016 of these markets are diverse, presenting (1) Central Caribbean a CAGR of 4.7%, while (2) North Caribbean registered a CAGR of 3.6%, and (3) Eastern Caribbean only a CAGR of 1.6%.

Table 3.1 reproduces the throughput level and connectivity of a set of ports in the region. Central Caribbean ports are associated to global transshipment operations, with a landlord port model. Northern Caribbean ports are mostly involved in transshipment routes with the United States, also with a landlord port model. Eastern Caribbean ports are more diverse, some with relevance in regional transshipment, operating under a landlord port model, while the smaller, presenting several bottlenecks and challenges, have more restricted level of traffic and operate under a service port model.

Table 3.1 Characterisation of several island ports of the Caribbean

Port	Country/Island	Area of the Caribbean	Governance model	TEU	Year	PLSCI	Year
Kingston	Jamaica	Central Caribbean	Landlord port model	1,975,401	2021	33.82	2021
San Juan	Puerto Rico	Northern Caribbean	Landlord port model	1,438,738	2021	12.51	2021
Caucedo	Dominican Republic	Central Caribbean	Landlord port model	1,265,459	2021	39.19	2021
Freeport	Bahamas	Northern Caribbean	Landlord port model	1,642,780	2021	26.79	2021
Jary/Point a Pitre	Guadeloupe	Eastern Caribbean	Landlord port model	238,680	2021	16.60	2021
Port of Spain	Trinidad and Tobago	Eastern Caribbean	Landlord port model	238,037	2021	11.77	2021
Point Lisas	Trinidad and Tobago	Eastern Caribbean	Landlord port model	172,356	2021	7.30	2021
Fort de France	Martinique	Eastern Caribbean	Landlord port model	171,127	2021	16.82	2021
Bridgetown	Barbados	Eastern Caribbean	Landlord port model	93,044	2021	6.00	2021
Willemstad	Curacao	Eastern Caribbean	Landlord port model	92,640	2021	6.02	2021
Castries	Saint Lucia	Eastern Caribbean	Service port model	28,549	2017	4.68	2021
St. George	Grenada	Eastern Caribbean	Service port model	22,117	2021	4.68	2021
Roseau	Dominica	Eastern Caribbean	Service port model	19,905	2012	4.61	2021
Campden Park	Saint Vicent and The Granadines	Eastern Caribbean	Service port model	18,446	2020	2.07	2021
St Johns	Antigua y Barbuda	Eastern Caribbean	Service port model	17,311	2017	3.93	2021
Basseterre	St. Kitts and Nevis	Eastern Caribbean	Service port model	7,801	2012	3.56	2021
Kingstown	Saint Vicent and The Granadines	Eastern Caribbean	Service port model	2,023	2020	3.60	2021

Source: CEPAL (2022), CUBAS *et al.* (2015) and UNCTAD (2022b)

For Eastern Caribbean, the most flagrant constraints were identified by BROWN (2018), CUBAS *et al.* (2015) and PMAC (2020) including the poor state of port infrastructure, in general squeezed in downtown areas, poor landside infrastructure, low throughputs, very little private sector participation with poor institutional settings, lack of integrated IT systems, outdated regulations and politized unions, and a high level of political interference, limiting the ability to operate in an efficient basis. However, according to SANCHEZ (2017), this is the area

that registered the higher level of growth (167%)<sup>7</sup> between the announcement of the construction of the Panama Canal third set of locks, in 2006, and its conclusion, in 2016.

Following the classification of the Port Reform Toolkit (WORLD BANK, 2007), the landlord port and the public service port models, each one with its specific levels of dimension, productivity, and shareholder orientation, are dominant (see, for example, CDB, 2016 or CUBAS *et al.*, 2015). For large and medium-sized ports, the landlord port model is the predominant model, with a mixed public-private intervention and a market orientation. An additional point is the relevance of transshipment operations in some of those ports, being the involvement of international terminal operator companies a natural step in the process of evolution of ports located at potentially strategic locations, through concessions for brownfield or greenfield projects. Examples include the ports of Kingston (Jamaica), Caucedo (Dominican Republic) or Freeport (Bahamas), capitalizing their geographic location, by offering services as global transshipment hub ports with port logistics zones. In turn, Bridgetown (Barbados) and Point Lisas (Trinidad and Tobago) are examples of a landlord port working as a sub-regional hub port, from which cargoes are relayed to surrounding Caribbean islands (MCCALLA, 2008a), but still constrained by the lack of port reforms, namely in labour and institutional settings (CDB, 2016). The rest, the great majority, particularly in Eastern Caribbean, are public service ports, characterized by the public provision of the complete range of services. The port owns, maintains, and operates every available asset and cargo handling is executed by the port authority, focusing exclusively on the provision of domestic economic needs and exportation of local productions. This was the dominant model until the late 1980s, controlling the governments all port activities, in a labour-intensive industry (TRUJILLO and NOMBELA, 2000). In the Caribbean, most of smaller ports maintained this model due to several limitations, including the lack of modernization of existing public port administration, absence of

---

<sup>7</sup> Eastern Caribbean added 1 million TEU to initial 0.6 million TEU capacity, being concentrated mostly in ports like Pointe-à-Pitre (Guadeloupe), Fort-de-France (Martinique), or Bridgetown (Barbados).

commercialization and liberalization of port operations, among other constraints (CDB, 2016; PINNOCK and AJAGUNNA, 2012).

The corollary of all these characteristics is the level of connectivity presented in Table 3.1, through the Port Liner Shipping Connectivity Index (or Port LSCI)<sup>8</sup>, published by UNCTAD (2022b), permitting the establishment of a direct relationship between the three elements, i.e., the level of port throughput, the level of connectivity, and the port governance model. Ports over the threshold of one million TEU have a Port LSCI of near seven times the ports below the threshold of 100,000 TEU. Ports between 100,000 and 400,000 TEU registered a Port LSCI of three times that of ports below 100,000 TEU. This relationship between the port throughput and the level of connectivity is also associated with the relevance of landlord port governance models.

### 3.3.3 Macaronesia

The Macaronesia (see panel B of Figure 3.1) aggregates four archipelagos (the Azores, Canaries, Madeira, and Cape Verde) off the coast of the continents of Europe and Africa, with around 30 islands. The Azores, Canaries and Madeira are outermost regions of the European Union, while Cape Verde, is an independent state.

As in the case of the Caribbean islands, the importance of the maritime and port industries in this region is associated to a dual scheme of central and peripheric ports, derived from historic and geographic reasons, as well as the relation between the technological changes, the port functionality, and its spatial projection (AGUIAR *et al.*, 2007). In general, the distance from Europe (the main source of trade for the islands of Macaronesia), as well as the fragmentation of its territory is a common denominator.

---

<sup>8</sup> The index, as well as the explanation about its content, was obtained through UNCTAD internet site <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=170026>.

Table 3.2 Characterisation of several island ports of the Macaronesia

Port	Archipelago	Governance model	TEU	Year	PLSCI	Year
Las Palmas	Canary Islands	Landlord port model	951,838	2020	31.13	2021
Sta. Cruz Tenerife	Canary Islands	Landlord port model	414,972	2021	11.64	2021
Canical	Madeira	Landlord port model	114,117	2021	2.56	2021
Ponta Delgada	Azores	Tool port model	74,837	2021	3.09	2021
Praia	Cape Verde	Service port model	50,510	2021	4.12	2021
Arrecife	Canary Islands	Landlord port model	48,194	2020	4.60	2021
Praia da Vitória	Azores	Tool port model	28,086	2021	3.09	2021
Mindelo	Cape Verde	Service port model	24,036	2021	4.12	2021

Source: Port Authorities, UNCTAD (2022b)

From Table 3.2, we can see that the port of Las Palmas, in the Canary Islands, is the only port that possesses a higher level of connectivity in Macaronesia region (UNCTAD, 2022b), accounting with transshipment cargoes for nearly 69% of the total number of handled containers, according to TOVAR *et al.* (2015). The port of Santa Cruz de Tenerife is the second most important port in the region, although with a more circumscribed connectivity than Las Palmas (Santa Cruz de Tenerife has only 5% of transshipment cargoes), being the other ports limited to a reduced number of maritime connections, mostly with mainland or, in the case of Cape Verde, with the former sovereign country (Portugal). The Canary Islands and Madeira are the only archipelagos of the Macaronesia that have implemented and consolidated the landlord port model. The most important ports in the Azores operate under a tool port model<sup>9</sup>, while the rest, as well as Cape Verdean ports, are still operating under a public service port model. BRICEÑO-GARMENDIA and BENITEZ (2011) mention that Cape Verde government is considering a transition process from service port to landlord port model, a long process still not implemented. From Table 3.2, one can establish for the Macaronesia a direct relationship between port dimension and connectivity. In fact, port with higher throughputs have more sophisticated port governance models and greater market orientation. In opposition, the link between the level of connectivity and the port model, it is not as clear as observed in the Caribbean ports. All these topics form part of a dynamic process of port evolution, dictated mainly by the simultaneous

<sup>9</sup> The tool port model, implemented in the major ports of the Azores archipelago, is characterized by the public port authority providing the infrastructure and superstructure, while the provision of some services is licenced to private operators, using equipment, especially cranes, from the port authority.

intervention of market forces and of stakeholders. The role of the port authorities as well as that of governments is to reinforce the other dynamics, being the case of the port of Las Palmas clearly a reference in such context, able to capitalise its geostrategic position and its port structures in a high developed port cluster.

## 3.4 Port subsystem beliefs and application of the ACF

### 3.4.1 The structure of beliefs of port stakeholders

In this Section we will identify some of the successful cases that could constitute a reference for replication on less developed port systems, using the ACF methodology. Following the ACF methodology, one must define a set of beliefs of the political agents involved in a subsystem, in this case the port subsystems in the Caribbean and Macaronesia islands. Furthermore, the ACF concepts detailed above state that resistance to policy change is the norm among port stakeholders and that the most frequent type of observed change is minor adjustments to policies. This is in accordance with what NOTTEBOOM *et al.* (2013), RODRIGUE *et al.* (2006), or WILMSMEIER *et al.* (2014) mentioned about the inertia and path dependence of the port development processes. For example, for smaller Caribbean states, PINNOCK and AJAGUNNA (2012) mention that most reforms have been cosmetic. In opposition, in the case of the most developed island ports, like Kingston (Jamaica), Freeport (Bahamas), Caucedo (Dominican Republic) or Las Palmas (Canary Islands), they managed to identify the most adequate mechanisms for their development, obtaining a consistent site-situation relationship and defining a strategy also in accordance with the ACF methodology, through a policy change process. Additionally, these last ports have a structure globally in accordance with the conclusions of CALDEIRINHA *et al.* (2018).

This work may be considered a reference for the structure of the political beliefs in a generic port system. In fact, through an extensive literature review, the authors identified 40 main variables in port governance, from which a set of seven key topics was synthesised, using a

factor analysis. The seven critical points for port governance are: (1) port authority's autonomy from the State; (2) port authority owned by the State; (3) port focus on operations; (4) regional port fusion perspective; (5) involvement of the port community in the port authority; (6) port operations executed by private terminal operators; and (7) port focus enlargement.

Following these characteristics, the authors conclude about the most adequate port governance model, in which the port authority should adopt a landlord port model, private port operations should be executed through concessions, the port should adopt an entrepreneurial approach, with autonomy from the government or from other ports. Furthermore, the port authority should be owned by the State, with the management body integrating representatives of the port community. In addition, the authors identified three key port performance indicators: feasibility, efficiency, and effectiveness.

The adoption of this set of seven key topics as a reference for the political beliefs established in the ACF to the port industry, result in a complex set of possibilities. For simplicity, we will consider two extreme positions (favourable to or opposed to) from the port stakeholders to each factor defined in CALDEIRINHA *et al.* (2018). Table 3.3 provides a set of 14 alternative combinations, which represents the minimum set of political beliefs prevalent in a generic port community.

Table 3.3 Stakeholders' perspectives to port governance

Port governance beliefs	Stakeholders perspective	
	In accordance	In opposition
(1) Port authority autonomy	(1a) High level of autonomy in the port authority	(1b) Low level of autonomy in the port authority
(2) Port authority owned by the State	(2a) The State controls the port authority	(2b) The State has a shared control or the port authority
(3) Port authority focused on operations	(3a) The port authority is involved in the performance of the port operations	(3b) The port authority absent in relation to the port operations
(4) Regional port fusion	(4a) The fusion of ports at a regional level is important	(4b) The fusion of ports is not a relevant topic
(5) Involvement of community in the port authority	(5a) The port community should be directly involved in the port authority matters	(5b) The port community should not be directly involved in the port authority matters
(6) Private operators in port operations	(6a) The port authority should promote the existence of private port operators	(6b) The port authority should be directly involved in the port operations
(7) Port focus enlargement	(7a) The port authority should be involved in other activities in the hinterland	(7b) The port authority should be only focused in the port area

From this list of alternatives, a policy process needs to follow a holistic perspective over several topics, for which governmental agents and the other stakeholders from the port community must look in a conciliatory perspective and trying to give their contribution to the best possible result, often in a long process of more than a decade (BROOKS and PALLIS, 2008). Still according to CALDEIRINHA *et al.* (2018), the port governance model with the best performance impact corresponds to a unique combination of the items of Table 3.3 (highlighted in grey): (1a) +(2b) +(3a) +(4b) +(5a) +(6a) +(7a).

### 3.4.2 Stochastic analysis

There are many factors that influence the performance of a port, as reported by the literature (see BROOKS and CULLINANE, 2006c, for example). In addition, the evolution of ports is far from a linear process, as expansion projects are delineated to a time span of over a decade, which is directly related to the port concessions period, in general, of more than 20 years (NOTTEBOOM, PALLIS, and RODRIGUE, 2022).

According to the Matching Framework (BALTAZAR and BROOKS, 2006), port performance have two distinct indicators, which are efficiency and effectiveness. Both are related concepts. Effectiveness is associated to the objectives of those seeking it. In this sense, effectiveness-oriented port authorities tend to be more customer-focused, presenting services of quality to transportation users, resulting in satisfaction from customers. The efficiency perspective can be seen as a way to improve operations, presenting a secondary relevance (BROOKS and PALLIS, 2008).

Considering the difficulties in determining numerically effectiveness, in the present section we present an analysis of the efficiency of a set of ports covering both the Caribbean and Macaronesia to try to obtain an additional perspective over the ports of our case study.

We gathered data from 28 ports with container terminals in 18 countries and islands for a period of five years, between 2008 and 2012, being 18 ports in the Caribbean and 10 in the Macaronesia (See Table 3.4). The dataset was filled with information from several sources,



namely the Inter-American Development Bank, CEPAL (2022), CUBAS *et al.* (2015), and direct contacts with the port authorities. It contains key port infrastructure elements such as berth length in meters, terminal area in square meters and the number of mobile and quay cranes (ship-to-shore gantry cranes). This is in accordance with the literature (see, for example, BARROS *et al.*, 2012; CUBAS *et al.*, 2015; CULLINANE and WANG, 2006; SARRIERA *et al.*, 2013; SEREBRISKY *et al.*, 2016, NGUYEN *et al.*, 2016). The output variable is the port throughput in TEU, which is the most frequently used output variable in the literature. In Appendix 2 we present the total content of the dataset.

Table 3.4 Summary of the ports in the sample

Region	Subregion	Country	Ports				
Caribbean	Northern Caribbean	Bahamas	Freeport				
		Cuba	Havan				
		United States/Puerto Rico	San Juan				
	Central Caribbean	Jamaica	Kingston				
		Dominican Republic	Caucedo	Rio Haina			
		Antigua	St. John's				
		Barbados	Bridgetown				
		Dominica	Roseau				
		Grenada	St. George's				
		Martinique	Fort-de-France				
		Saint Lucia	Castries	Vieux Fort			
	Eastern Caribbean	St. Kitts and Nevis	Basseterre	Long Point Port			
		St. Vincent	Campden Park/Kingstown				
		Trinidad and Tobago	Point Lisas	Port of Spain			
		Macaronesia	Northern Macaronesia	Azores	Ponta Delgada	Praia da Vitória	Cais do Pico
Madeira			Canical				
Macaronesia	Southern Macaronesia	Canary Islands	Las Palmas	Arrecife	Rosario		
	Cape Verde	Praia	Mindelo				

Due to the diversity of port equipment in the ports of the dataset, the solution was to consider a hypothetical productivity of the different equipment (cranes) as well for ports that operate with ships' cranes. A linear regression provides a  $R^2$  equal to 0.7902. All three independent variables ('Berth', i.e., berth length in meters; 'Area', i.e., terminal area in square meters; and 'Equip', i.e., the level of equipment in terms of crane productivity) have statistical significance coefficients lower than 0.05.

The composition of the linear regression is the following:

$$\text{TEU} = -37,310 + 127 \text{ Berth} + 0.496 \text{ Area} + 1,760 \text{ Equip}$$

In Table 3.5 we present the main statistics of the dataset, while Table 3.6 presents the summary of the linear regression, using the Program *R Statistics*.

Table 3.5 Descriptive statistics, averages by subregion (2008-2012)

Region	Subregion	Ports	Statistic	Annual throughput (TEU)	Berth length (m)	Area (m2)	STS cranes (units)	Mobile cranes (units)
Caribbean	Norther Caribbean	3	Minimum	228,346	450	180,000	3	0
			Average	1,048,081	1,059	318,986	6	3
			Maximum	1,702,000	1,688	490,000	10	12
	Central Caribbean	3	Minimum	277,971	600	299,800	2	0
			Average	1,025,844	1,987	755,933	9	2
			Maximum	1,891,770	4,129	1,580,000	19	3
	Eastern Caribbean	12	Minimum	2,453	133	40,469	0	0
			Average	76,623	458	88,396	1	2
			Maximum	401,206	934	200,000	4	9
Macaronesia	Northern Macaronesia	5	Minimum	8,131	197	19,123	0	0
			Average	49,485	589	29,774	0	1
			Maximum	113,074	900	50,000	0	3
	Southern Macaronesia	5	Minimum	17,472	200	18,260	0	0
			Average	261,455	775	127,061	4	2
			Maximum	1,352,111	2,780	568,903	17	8

Table 3.6 Summary of linear regression

Residuals:					
Min	1Q	Median	3Q	Max	
-406871	-84070	-44484	-12799	1079716	
Coefficients:					
	Estimate	Std. Error	t value	Pr(> t )	
(Intercept)	-37310	30380	-1.228	0.2215	
xBerth	127	62.55	2.03	0.04427	*
xArea	0.496	0.1748	2.837	0.00525	**
xEquip	1760	320.9	5.484	2E-07	***
Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1					
Residual standard error: 241400 on 136 degrees of freedom					
Multiple R-squared: 0.7902, Adjusted R-squared: 0.7855					
F-statistic: 170.7 on 3 and 136 DF, p-value: < 2.2e-16					

The dataset includes data for ports with a wide range in terms of dimension and level of equipment. On average, Central Caribbean ports present the biggest dimension and level of equipment, being main associated to transshipment activities. In a smaller degree, also the Northern Caribbean ports have a considerable role in transshipment, mainly Freeport (Bahamas). The rest are, in general, small ports, being the most relevant in the Eastern Caribbean, the port

of Port of Spain (Trinidad and Tobago), both in endowments and throughput. In Macaronesia, the port of Las Palmas (Canary Islands) stands out as the most relevant (see Figure 3.2)<sup>10</sup>.

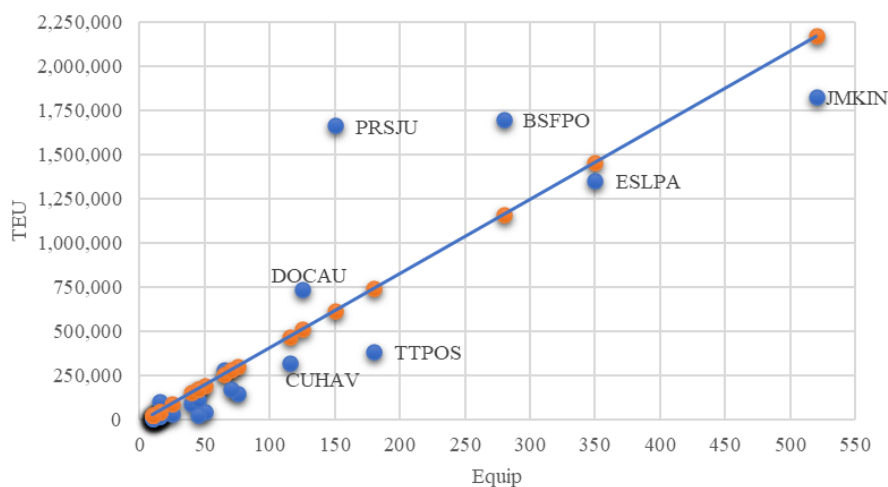


Figure 3.2 Regression line between TEU and equipment level (year 2008)

Due to the significant differences in terms of dimension in the ports of the dataset, in Figure 3.3<sup>11</sup> we present a more restrictive set, containing only ports with an annual throughput below 350,000 TEU as well as below 90 TEU/hour crane productivity ('Equip') in the regression line. We used as independent variable the level of equipment ('Equip'), given its greater significance level among all inputs (see Table 3.6). Ports above the regression line may be considered as using more efficiently their resources than ports positioned below the regression line, for the same level of throughput. In the same perspective, we may compare ports above and below the regression line for the same level of equipment.

<sup>10</sup> In Figure 3.2 we used the UNCODE for ports. For example, the port of Kingston (Jamaica) has the code JMKIN, being the first two letters for the country and the other three letter for the port. BSFPO is the code of Freeport (Bahamas), ESLPA is for Las Palmas (Canary Islands), PRSJU is for San Juan (Puerto Rico), DOCAU is for Caucedo (Dominican Republic), TTPOS is for Port of Spain (Trinidad and Tobago) and CUHAV is for Havana (Cuba).

<sup>11</sup> In Figure 3.3 one can see, among others, the ports of Rio Haina (Dominican Republic), code DOHAI, Point Lisas (Trinidad and Tobago), code TTPTS, Fort-de-France (Martinica), code MQFDF, Caniçal (Madeira), code PTCNL, Bridgetown (Barbados), code BBBGI, Ponta Delgada (Azores), code PTPDL, Arrecife (Canary Islands), code ESACE, Mindelo (Cape Verde), code CVMIN, or Rosario (Canary Islands) in the island of Fuerteventura, code ESFUE.

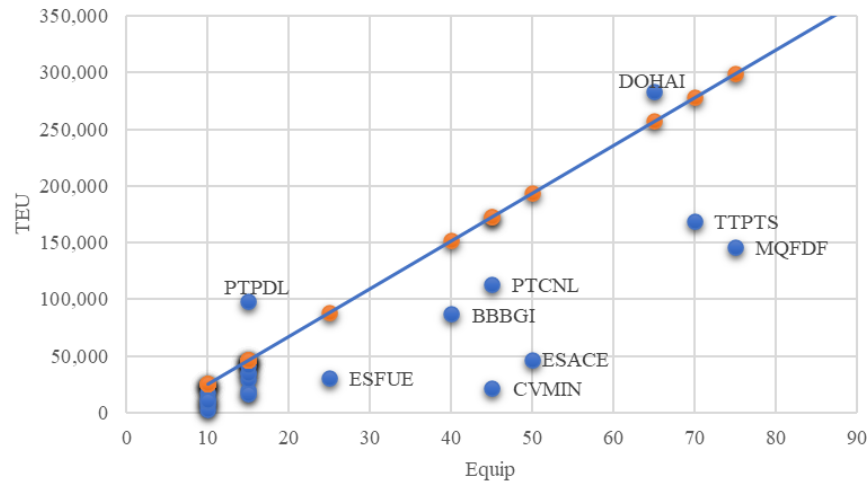


Figure 3.3 Regression line between TEU and equipment level (year 2008, smaller ports)

We used in Figures 3.2 and 3.3 the data of 2008, since they are, in most cases, the highest values observed in the years considered in the dataset. In Table 3.7 one can see that the impact of the 2008 economic crisis was significant for almost all regions, with exception for Central Caribbean.

Table 3.7 Variation of throughput (TEU)

Region	Subregion	Variation (2012/2008)	Variation (2012/2011)
Caribbean	Norther Caribbean	-19.48%	1.58%
	Central Caribbean	13.33%	9.10%
	Eastern Caribbean	-2.87%	-0.06%
Macaronesia	Northern Macaronesia	-22.22%	-13.45%
	Southern Macaronesia	-12.37%	-7.32%

From Figure 3.2, for example, the ports of Freeport (Bahamas) or San Juan (Puerto Rico) have relatively similar levels of throughput, but Puerto Rico has a lower level of equipment than Freeport. Following the same perspective, in Figure 3.3, the ports of Caniçal (Madeira) and Ponta Delgada (Azores), have a relatively similar level of throughput but Caniçal is much better equipped than Ponta Delgada. Focusing on the level of equipment, from Figure 3.2, one can see that the port of Las Palmas and Freeport as a roughly similar level of equipment, being Las Palmas below the regression line and Freeport above the regression line. The difference is

mostly associated to the difference on the number of terminals, with Las Palmas having three terminals and Freeport only one.

### 3.5 Discussion

The literature focusing on the Caribbean port systems presents mainly the assessment of small Eastern Caribbean ports, presenting several suggestions for future development and catch-up processes. Examples include CDB (2016), CUBAS *et al.* (2015), PMAC (2020), or PINNOCK and AJAGUNNA (2012), being all relatively consensual over the diagnosis: urgent need of port reforms, with heavily focus on digitalization, legislative changes, including labour restructuring and customs, and an upgrade in infrastructure and equipment. For example, the Caribbean Development Bank presented a list of future projects that could be financed, with a total between 486 and 628 million USD only for island ports in the Caribbean region (CDB, 2016). In general, the diagnoses may be considered valid and adequate, with an orientation towards the development of public-private partnerships as the path for change in the port industry. However, as time passes, and the diagnoses are reaffirmed, one can conclude that the major problem lies on the process of change, which is one of the most important approaches covered by the ACF method, confirming its relevance as a useful tool for studying this process. The same principles apply to ports of the Macaronesia.

Dimension is a critical point in the formation of port governance solutions in both the Caribbean and Macaronesia. For larger ports, the main characteristics include the following: port authorities owned by the State and operating under a landlord port model, with concession of port operations and an enlargement focus on hinterland activities, namely in free trade zones, with the potential to increase port throughput. The foreland is also important, due to high level of transshipment in port activities. Other items are less mentioned.

In the Caribbean, Jamaica, or Dominican Republic port authorities, with supervision over the ports of Kingston and of Caucedo, respectively, have management boards with wide representation of interests and qualifications, as well as local commissions integrating several

stakeholders. This structure forms part of a dynamic process of port evolution, dictated mainly by the simultaneous intervention of market forces and of stakeholders. The role of the port authorities as well as that of governments is to reinforce the other dynamics. Site and situation geographic factors are also aligned. In terms of efficiency, however, there are significant differences, as the port of Caucedo, for example, has only one terminal, while Kingston has two main terminals, each one with its own focus: one mostly associated with global transshipment, as occurs with Caucedo, while the other is more oriented to regional traffics.

In Macaronesia, the port authority of Las Palmas (Canary Islands), with jurisdiction over several ports and a management board of 18 members, representing a multiplicity of players of the port community, is paradigmatic. The diversity of perspectives at the top of the organization is critical for the formation of a comprehensive coalition with a uniform and consistent long-term perspective. In addition, the port authority integrates the State holding for all Spanish ports, which means that the island ports in the Canary Islands are part of the national strategy, providing a complementary dimension in port governance. As Kingston, the port of Las Palmas has several terminals, which may contribute to a lower efficiency level. The most important is operated by MSC in a great extent focusing on transshipment activities.

The importance of transshipment operations in all these major ports in both regions turns imperative, for the port authority, the implementation of a clear market-oriented perspective, which promotes a greater interaction between the stakeholders. Thus, one can consider that, in general, major ports have implemented a more coherent set of policy beliefs among the port stakeholders, as well as better communication mechanisms among stakeholders in the port subsystem, with proactive and market-oriented port authorities. In the ACF language, one can consider these solutions as bottom-up pathways, as the impetus for policy change is within the policy subsystem, following the perspective of JENKINS-SMITH *et al.* (2014) and SABATIER and WEIBLE (2007).

In opposition, the smaller ports have, in general, highly centralized and politicized port authorities. The board members are, without exception, nominated by the government and the

qualifications are not the main topic for their nomination. The quality of the information on port performance, finances and other metrics is, in general, very poor. In this group one can include all service ports in both the Caribbean and Macaronesia, and, in a less degree, the tool ports of Azores. The example of this last archipelago is illustrative. Dating from the end of the 1970s, the region obtained the status of autonomy from Portugal, meaning that, in opposition to what happens in the Canary Islands, there is no national coordination over the Azorean port system. The most significant port reforms in this region occurred around 1995, through national legislation that approved the creation of the landlord port model and private port operators. The solution in the Azores was the creation of local private port operators working with equipment of the port authority, all with a share of 20% by the port authority, to limit monopoly practices in port operations. The port authority also has the responsibility of authorising the licences of port operators, which is a conceptually anachronic mechanism. Interactions with stakeholders have no formal institutional representation since 2011 and the management board of the port authority is composed by three members nominated directly by the local government, with jurisdiction over 14 ports and several marinas. The unions have a considerable power, conditioning the management processes, and personnel expenses of the port authority are reaching almost 70% of the port authority revenues. In sum, one can consider that port reforms have been oriented mainly to non-priority subjects in terms of port policy, leading to an increasing dependency from the local government, starting from financial dependency relative to investment plans. In an ACF perspective, one could classify this situation as stasis, in line with PIERCE *et al.* (2017), being resistance to policy change the norm and minor adjustments to policies the natural reaction to external factors. Similar conclusions were referred by several authors and institutions for the smaller ports of the Caribbean, as detailed above. The power of unions is a clear indication about the lack of conciliatory roles among stakeholders of island's port communities. The governments, especially in the Caribbean, have also a perspective oriented to their own goals, namely in terms of customs taxes, resulting in an outdated customs policy. The role of international agencies, working as brokers, has been insufficient. The ACF

theory mentions that certain contextual factors can turn major policy change more likely to occur, namely through policy brokers, as reported by HENRY et al. (2014).

### 3.6 Conclusions

Port governance and the role of the different stakeholders, each one with their specific interests and influence capacity, is a topic particularly relevant for the developments in port industry. This reality is the natural environment for the application of the Advocacy Coalitions Framework (ACF), which provides an instrumental response to the questions of the formation of policy coalitions in response to changes, being particularly relevant for the port context, dictated by a combination of interests from port stakeholders. In the present chapter we used the concepts of the ACF to characterise and discuss the political situation of the island ports of the Caribbean and Macaronesia, dictated by two contrasting situations, with some islands registering an intermediate location in relation to the main global trade routes, while others have a more peripheral situation, being outside the range of major shipping routes. In the first case, the port systems are more developed, integrating global terminal operators, and operating with a clear market orientation. The smaller islands, with more fragile port systems, face significant mismatches in infrastructure, equipment and legislation, especially in terms of labour practices, that severely condition their future.

Port development processes are, according to the literature, dominated by some level of inertia, and associated to path dependence, imposing, thus a sequence of particular circumstances to dictate effective changes. According to the ACF, resistance to policy change is the norm, being the most frequent type of observed change minor adjustments to policies. This is particularly adequate to characterize the situation of the smaller ports in the Caribbean and Macaronesia, where most reforms have been cosmetic and providing no significant changes. In opposition, in the case of the most developed island ports, like Kingston (Jamaica), Freeport (Bahamas), Caucedo (Dominican Republic) or Las Palmas (Canary Islands), they managed to identify the most adequate mechanisms for their development, obtaining a consistent site-situation



relationship and defining a strategy through a policy change process, which is in accordance with the ACF methodology.

Based on the port literature, there are some critical points for the formation of political beliefs in a port community, following the principles of the ACF theory: (1) the level of port authority's autonomy from the State; (2) the ownership of port authority by the State; (3) the level of intervention of the port on port operations; (4) the perspective over regional port fusions; (5) the involvement of the port community in the port authority; (6) port operations executed by private terminal operators; and (7) port focus enlargement. The position in relation to these set of topics results in a complex combination of possibilities in terms of the definition of coalitions among port stakeholders relative to future port policies. For simplicity, we considered two extreme positions (favourable to or opposed to) to each factor from port stakeholders, which provides a minimum set of 14 alternative combinations of port subsystem's policy beliefs. From this set of topics, it results that port policies require a holistic perspective as well as a long-term vision for the construction of adequate policies. A port community able to manage a conciliatory process, contributing to the formation of constructive coalitions based on the perspective of market players, will result in a positive evolution with effective impacts in the port performance. The role of governments and port authorities in this process is vital, considering their characteristics as legislators and regulators or operators of the port system. For island's ports, their role is reinforced, working as the central axis of the political process of change. Until now, mainly in the Caribbean region, the role of international institutions has been of brokers, providing insights for the smaller ports to operate the necessary changes in their port systems. The role of the unions, however, have conditioned considerably the processes of change, mostly in the Caribbean, reinforced by governments' actions, unable to impose a consistent approach. For Macaronesia, there is a considerable lack of information and an absence of third parties like in the Caribbean. All these circumstances will condition the future of island ports in the next few years. For example, the adoption of onshore power supply systems, among other topics, seems unlikely to occur, placing these ports outside industry trends and gaping sustainability topics.

The lack of quantitative information has conditioned the development of the present work. It was only possible to execute a succinct numerical efficiency analysis, which is not the most insightful mechanism, according to the literature. However, the conclusions are deeply rooted in the literature produced by international institutions for the Caribbean region, that have been working as brokers in the attempt to improve the port systems of less developed countries of the region. In several topics it can be traced a parallelism between the cases remarked in the Caribbean and those observed in the Macaronesia. Future studies will explore this path, with further information regarding the type of governance and physical characteristics for the ports of the dataset to be compared with the results of the efficiency analysis.

## Chapter 4

# Equity and efficiency in regular maritime transport: The case of Azores as an outermost European archipelago

### 4.1 Introduction

Insular regions, especially those of reduced dimension, are among the spaces most penalized by higher transport costs in comparison with other regions, due to small domestic markets, small volumes of trade, as well as the predominance of indirect routes to reach most external markets. This is, however, a somehow marginal subject in the academia, being mostly referred by technical reports of United Nations agencies like ECLAC - Economic Commission for Latin America, focusing on the Caribbean region, and DESA - Department of Economic and Social Affairs of United Nations or UNCTAD – United Nations Conference on Trade and Development, for small islands developing states (SIDS). For European islands, higher transport costs are mentioned, among others, by ESPON (European Territorial Observatory Network) or EURISLES, that integrates the CPMR Island Commission, one of the six geographical Commissions of the Conference of Peripheral Maritime Regions of Europe. In this last case, the disadvantaged situation of the outermost insular regions was evidenced in comparison with Mediterranean islands of European Union, with a particular emphasis in the case of the Azores archipelago, a Portuguese territory in the North Atlantic Ocean, that registers the highest transport costs among European islands (EURISLES, 1999). Scientific papers covering the topic of high transport costs faced by insular spaces include, among others, KUWAMORY (2006), BORGATTI (2007), WILMSMEIER *et al.* (2006) or WILMSMEIER and HOFFMANN (2008).

Given the limitations imposed by the geography, islands depend heavily on air and maritime transportation for their accessibility and connectivity to outer spaces, contributing to their

greater spatial economic integration. Focusing on Europe, the liberalisation of transport markets in the final decade of the 20<sup>th</sup> century, with the creation of the European Single Market, was implemented based on theoretical grounds that it could enhance both the technical and dynamic efficiency of supply. For the case of maritime cabotage, which concerns the provision of maritime transport services within Member States, the European Regulation 3577/92 proceeded with the abolition of restrictions on the provision of such services.

However, considering the relevance of these services for the inhabitants of Europe's islands and the need to ensure the adequacy of regular maritime transport services, covering passengers and goods, to, from and between islands, European Union offered to the Member States with islands a framework to organise transport services to those islands in a compatible way with market intervention. Such framework works through restrictions on market access or funding relative to PSOs on maritime services to, from and between islands. According to the text of the Regulation, public service obligations shall mean obligations which the Community shipowner in question, if he were considering his own commercial interest, would not assume or would not assume to the same extent or under the same conditions. In this sense, Article 4 of the Regulation, includes two distinct possibilities for the provision of regular maritime services to, from and between islands: (1) freedom to provide maritime transport services; or (2) imposition of conditions for the provision of cabotage services. In this last case, there are two alternatives: (2a) imposition of public service obligations (PSOs); or/and (2b) celebration of public service contracts (PSCs).

Our case study covers the Azores archipelago, an outermost region of Europe under Portuguese sovereignty situated in the North Atlantic Ocean. Under the European Regulation 3577/92, the State established in the legislation a set of PSOs<sup>12</sup>, covering: (1) The guarantee of regularity, continuity, and quality of service; (2) Weekly connections, with biweekly calls in all islands; (3) A transit time for cargoes between origin and destination not exceeding seven days; and (4)

---

<sup>12</sup> The actual PSOs for maritime transport cabotage to and from the Azores are presently defined by Law-Decree 7/2006.

Equal freight prices for cargoes between mainland and each of the islands. However, several stakeholders claim for the revision of the legislation with two major ambivalent and conflicting perspectives at stake: some of the stakeholders claim for a better coverage and regularity, while others demand the liberalisation of the transport system, which would generate more efficiency and provide lower fares.

Due to these two opposite perspectives, one oriented to an improvement in terms of accessibility and connectivity, which means a focus on equity principles, and another oriented mainly to a more efficient allocation of resources, with favourable consequences in the level of prices supported by local companies and shippers, the present study aims to contribute to the development of an alternative regulatory system, through a rethinking about the scope, the financing mechanisms, and other arrangements pertaining the objectives of the regulatory authority.

The paper is structured as follows. In Section 4.2 some key concepts of shipping markets and cabotage are presented, highlighting the diversity of maritime cabotage regimes where several forms of public intervention and regulation are present, conditioning the level of competition on the markets. Being the risks of market failure particularly evident in island shipping routes, we detail solutions implemented in different island geographies, where public interventions with certain efficiency and equity requirements were implemented. Section 4.3 presents the case of the Azores maritime freight market and discuss how the Portuguese state managed to conciliate European rules with the geographic particularities of the archipelago and its dispersion. The characteristics of the PSOs imposed by the legislation can be considered, in a great extent, as a policy profoundly grounded on social welfare principles, comprising both efficiency and equity concepts. Taking in consideration this framework, dominated by high level of rigidity, and with only a few changes of mere detail over around three decades, in Section 4.4 we present an alternative regulatory mechanism that may contribute to an evolution of the system, based on the concept of Universal Service, validated by the literature covering liberalised network

industries, as well some related impact factors regarding mainly port industry topics, followed by the conclusions, in Section 4.5.

## 4.2 Background

### 4.2.1 Liner shipping and the diversity of cabotage regimes

Liner shipping companies provide a regular service of transport between specified ports according to timetables and prices advertised well in advance, with the obligation to accept cargo (especially containers) from all comers and to sail, whether filled or not, on the date fixed by a published schedule (STOPFORD, 2009). The evolution since the last decades of the 20th century, has been from a polycentric and dense structure towards a simplification and rationalization of networks, a tendency reinforced by containerization, with a centralization upon fewer large hubs (DUCRUET and BERLI, 2021). For modern international shipping lines operating on a context of competition, the optimization of their networks is critical, implying rationalization of ports' coverage, shipping routes and transit times. They operate along paths that are optimal for the system, with the lowest cost for the entire network being achieved by indirect routing via hubs and the amalgamation of flows (HU and ZHU, 2009). However, the more efficient the network from the carrier's point of view, the less convenient that network could be for shippers' needs (DUCRUET and NOTTEBOOM, 2012). The routing of containerized trade flows depends, thus, on both the strategies of shipping companies and the demand of the shippers for specific service characteristics. Shipping lines will determine their calling patterns and services structures in a certain region based on trade and port specific characteristics (WILMSMEIER and NOTTEBOOM, 2011).

All these decisions variables address three distinct levels of planning, namely the (1) strategic, (2) the tactical, and (3) the operational (SAMBRACOS *et al.*, 2004; CHRISTIANSEN *et al.*, 2007). Among the strategic issues, we can find: (1.1) market and trade selection; (1.2) ship design; (1.3) network and transportation system design; and (1.4) port or terminal location. The

tactical issues include: (2.1) adjustments to fleet size and mix; and (2.2) routing and berth scheduling such as most favourable speed in relation to cost. The operational issues involve: (3.1) sailing speed selection if adjustment to the sailing schedule is necessary; (3.2) ship loading and unloading; and (3.3) weather routing. Appendix 3 reproduces a synthesized model of the liner service design process presented in NOTTEBOOM *et al.* (2017), where we highlight some of the levels where public intervention may conditionate the way shipping lines operate.

Regardless all these planning levels and additional perspectives, the shipping industry has a long tradition of conservative thinking, which explains the lack of attention to topics like vessel routing and scheduling based on decision support systems and conditioning the innovation process (FAGERHOLT, 2004). This perspective changed substantially in the past few years. However, this lack of attention is still particularly evident in protected cabotage regimes, that alter substantially the main characteristics of the maritime transport services presented above and the way shipping lines operate. In this context, STYHRE (2010) identified two extreme options for shipping lines regarding vessel capacity utilisation: The “cut peaks” strategy; and the “never say no” strategy. The “cut peaks” strategy is, in general, suitable in the case of large trade imbalances and variations in demand, severe competition, stagnated or moderate growing markets, and markets with low freight rates. On the contrary, the “never say no” strategy allows a higher level of unutilised capacity in order to have good flexibility and the ability to maintain a high service level for customers by never turning down transport assignments, being suggested in cases of small or medium trade imbalances, moderate competition, time sensitive cargoes, customers with long-term relations and markets with medium or high freight rates.

In global terms, cabotage regimes are very diverse among countries, covering a wide range, from full liberalised to extreme regulated (BROOKS, 2009; PAIXÃO CASACA and LYRIDIS, 2018, 2020). In countries like Japan, China and United States, the preference is toward a high level of protectionism, while in Australia and New Zealand the cabotage regimes are very liberal. European Union is somewhere in the middle of this spectrum, according to BROOKS (2009), that refer the success of New Zealand in liberalising cabotage, which confirms that

restraining competition leads to increased costs and less efficient transport operations. In this perspective, UNCTAD (2017) argues that relaxing cabotage restrictions could help improve connectivity by linking the national, regional, and intercontinental liner shipping services. Yet, achieving this objective is a function of several policy reform parameters related to infrastructure and hinterland development. Additionally, a critical minimum volume of trade is needed to ensure that a liberalised environment can deliver its benefits (BROOKS, 2009). In this perspective, one should mention BUTTON and NIJKAMP (1997), for whom relying on market and competitive forces may not produce stable solutions, due to the characteristics associated with networks that prevail in several transport modes. Even when transport have the potential to enhance spatial cohesion, this potential may not be completely realized.

All these topics are particularly relevant for most islands and archipelagos. Even in the case of Australia, one of the most liberalised cabotage regimes, there are regulatory and subsidy schemes for specific cases (see, for example, BITRE, 2021). The rule, thus, seems to be the existence of a certain level of public intervention mechanisms, even in the most liberalised regimes for specific situations, given the objectives of the regulator towards a redistributive policy or the possibility of high volatility in the markets, with services provided on an intermittent and unreliable basis, particularly in the case of islands, where the risks of market failures are more evident.

#### 4.2.2 Maritime insular cabotage in Europe and public intervention

In the case of Europe, Regulation 3577/92 that regulates maritime cabotage, in its article 4, refers that Member States, when imposing PSOs in maritime services to/from and between islands, should be limited to requirements concerning ports to be served, regularity, continuity, frequency, capacity to provide the service, rates to be charged and manning of the vessel. All these requirements provide a wide range of combinations over possible regulatory restrictions, limiting the shipping companies' flexibility in designing their liner services and networks, and influencing their optimization processes at the three levels defined above, i.e., the strategic, the



tactical and the operational levels. Additionally, the PSOs requirements vary significantly between the Member States, depending on the specific needs the countries want to satisfy, but limited by the constraints imposed in the European Regulations. Besides the heterogeneity of the PSOs schemes, covering mainly ferry operations, several organizations at a local, national, and European levels are involved in the definition, implementation, and supervision of these schemes, generating a considerable lack of uniformity in this area by the European Union.

The most studied case in Europe is the Greek coastal system, due to the complexity of the ferry network for passengers, vehicles, and goods, which includes lifeline routes<sup>13</sup> for about 70 islands. This system is traditionally dominated by a low-capacity utilization of the fleet, low levels of service and reliability, as well as by the inadequacy of island port infrastructure, demanding a substantial public intervention, as stressed by multiple authors (see, for example, GIANNOUPOLOUS and AIFANDOPOULO-KLIMIS, 2004; SCHINAS, 2009; CHLOMOUDIS *et al.*, 2007, 2011; ANGELOPOULOS *et al.*, 2013; LEKAKOU, GEORGE, and EVANGELIA, 2021).

Historically, the lifeline routes are financed by two components: One part is financed directly by the national budget, being the other part the result of a 3% surcharge that was imposed on non-subsidised ferry services (CHLOMOUDIS *et al.*, 2007; ANGELOPOULOS *et al.*, 2013). Meanwhile, in 2018, the Greek government implemented the Island Transport Equivalent, replacing the former system of PSCs to lifeline routes. This new system equates the cost of travel by sea with the cost of land travel via intercity bus service, benefiting island residents (passengers) and enterprises (cargoes) by rebating ferry fares. LEKAKOU *et al.* (2021) proposed the revision of the minimum island connection requirements and the determination of an optimal connection network. However, they found several constraints limiting the implementation of the methodology, namely the lack of on-time data and the inexistence of a system for monitoring policy effectiveness over time.

---

<sup>13</sup> Routes of subsidized ferry services that, otherwise, would not have been provided by the free market.

Other European islands' ferry services have a relatively similar subsidy schemes, based on equalization prices to road or rail transport, namely in Scotland (KAY, 2009), and Corsica (CARRESE, CUNEO, and PATELLA, 2015). In a broader analysis covering 40 European Union islands in several Member States, JIMÉNEZ, VALIDO, and MORÁN (2018) identified prices per kilometre on subsidized routes 40% higher due to subsidies. Further literature references about European cases include, among others, the Canary Islands, Spain (ORTÚZAR and GONZÁLEZ, 2002; HERNÁNDEZ-LUIS, 2018; DELGADO-AGUIAR and HERNÁNDEZ-LUIS, 2019), the Pargas archipelago, Finland (MAKKONEN, SALONEN, and KAJANDER, 2013), or the Orkney islands, Scotland (BAIRD, 2012). One should stress two opposite perspectives: The case of the Pargas archipelago, where MAKKONEN *et al.* (2013) highlight the importance of the constant and long-term support provided by the state in the ferry network covering the archipelago, without which it would not be feasible for the shipping companies to guarantee the level of service provided. The strong involvement of the state in the development of monitoring tools of the performance of the ferry network, and on listening the islands' inhabitants were recognized also as crucial elements. For the Orkney Islands, there are two competing ferry operators, one private and the other state-owned. BAIRD (2012) questions the role of transport authorities, stressing their need to be more aware of what transport services the private sector is able and willing to provide in any given situation, with or without subsidy. For the author, a better management of stakeholders' interests is required, especially of those interested in perpetuating inefficient state-run transport services, with an unnecessary waste of scarce public resources.

Cargo services are not particularly focused by the literature. Exceptions include SAMBRACOS *et al.* (2004), that investigated the use of small containers on coastal freight shipping in the Aegean Sea (Greece), concluding about the suboptimal level of current shipping practices and that the introduction of small containers and their optimized operation is expected to drive operation costs significantly and forever alter the way business is done in this industry. Also, PÉREZ-LABAJOS *et al.* (2004), focusing on the shipping services between mainland Spain and

the Canary Islands, reported the inefficiency of the current model of freight transport, dominated by strong competition, atomisation of business and excess of capacity. The authors propose a new perspective with the creation of consortiums and a joint use of vessels of different shipping companies, as well as a fleet renovation. The combination of both actions would allow to reach economies of scale and, also, the reduction of the number of ports called, with modifications on itineraries and frequencies. Savings up to 14.75% were obtained through simulation models.

#### 4.2.3 Other insular cabotage regimes and public intervention

As already mentioned on Section 4.2.1, there is a huge diversity of cabotage regimes. For big insular countries like Indonesia, the Philippines or Japan, with extensive maritime transport systems, cabotage regimes are particularly important, being public intervention focused mainly on the creation of hub ports as a way of improving the efficiency of the maritime transport system, as well as the connectivity of the islands of each of these countries. PAIXÃO CASACA and LYRIDIS (2018) classify the policy of the first two countries as controlled protectionist. For Indonesia, the largest archipelagic country in the world, this topic was focused by, among others, AMIN *et al.* (2021), FAHMIASARI and PARIKESIT (2017), LAZUARDI *et al.* (2017), NATALIA, SUPRATA, and HIDAYAT (2020), SJAFRUDDIN, LUBIS, and FRAZILA (2010), SUNITIYOSO *et al.* (2022), TU *et al.* (2018), or ZAMAN, VANANY, and AWALUDDIN (2015), most of them stressing the importance of the Motorways of the Sea Program, a government tool to decrease the logistics costs, contemplating massive infrastructure construction, the modernization of seaports to accelerate the logistics handling processes and enhance the connectivity between islands.

In turn, Japan, with a fully protected cabotage policy, according to PAIXÃO CASACA and LYRIDIS (2018), promoted the construction of multiple local ports throughout the country which generated a considerable overcapacity of Japanese container ports (TERADA, 2002). Meanwhile, SHINOHARA (2017), reported the attempt of the Japanese government to

overcome the increasing importance of Busan Port (South Korea) as a hub port for Japanese transshipment cargoes traded with distant countries. This port policy reoriented public investments on a limited number of hub ports, selecting the government only two International Strategic Container Ports in the country. The reaction to this port policy from Japanese rural areas was immediate, claiming against the ‘Tokyo centrality’. Regarding ferry connections, subsidization schemes for several lifeline routes covering the most remote islands were studied by BAIRD (2000).

This reality illustrates the dichotomous perspective prevalent in several insular cases, for which the topics of equity and efficiency are essential, demanding a certain level of public intervention and regulation. Furthermore, the notion of social welfare comprises both equity and efficiency, according to LEVINSON (2010), also referring the author that resolving the equity versus efficiency problem requires a recognition that in complex, politically driven, mature systems like transportation, equity is efficiency. In the next sub-section both topics will be discussed in a context of the evaluation of transport policies.

#### 4.2.4 Evaluation of transport policies

Evaluation of transport policies is considered by the literature as thoroughly challenging. For VAN WEE and MOUTER (2021), in the policy analysis literature there is a consensus that “sound” policies must meet three criteria: they should be effective, efficient, and fair.

Effectiveness, according to the authors, implies that if a policy intervention aims to change the value of any indicator, it should indeed do so. In turn, efficiency is a measure of the degree to which the system outputs achieve a theoretical maximum using a minimum of inputs. Equity (or fairness, the term is used interchangeably in the literature) is a more difficult concept to define, because there are several types of equity, various ways to categorize people, numerous impacts to consider, and various ways of measuring these impacts. For example, DI CIOMMO and SHIFTAN (2017) define equity as a measure of the distribution of benefits and costs over member of society. PEREIRA and KARNER (2021), use the same perspective mentioning the

importance of the role of social, economic, and governmental institutions in shaping the distribution of transport benefits and burdens in society, stressing the importance of accessibility in understanding transportation benefits. MARTENS (2017) consider that a transportation system is fair if, and only if, it provides a sufficient level of accessibility to all under most circumstances. Thus, accessibility is at the core of the literature regarding transport justice (see for example, DI CIOMMO and SHIFTAN, 2017 or VAN WEE and MOUTER, 2021). Besides accessibility, affordability is another relevant concept in equity, being one of the main aspects that should be considered when formulating public policies in order to improve equity in transport (DI CIOMMO and SHIFTAN, 2017).

So, one can consider that two major topics are involved in equity: accessibility and affordability. This brings us to the focus of the paper, which is the maritime cabotage regime in the case of the Azores archipelago, an outermost region of Europe under Portuguese sovereignty, where a flagrant dichotomous perspective between efficient and equity principles are at stake, with the topics of accessibility and affordability particularly in evidence by the PSOs defined by the legislation.

### 4.3 The Azores maritime freight system

In this section we will present the case study of the Azores cabotage maritime freight market. At present, the market is operated by three shipping companies that call all islands under a set of PSOs imposed by national legislation based on European Regulation 3577/92. These shipping lines are the only ones that operate on a regular basis in the ports of this region, which reinforces its importance for local populations. In the following subsections we will detail the main PSOs, already presented in the introductory section of this chapter.

#### 4.3.1 The guarantee of regularity, continuity, and quality of service

Regarding this topic, one can consider it directly associated to the accomplishment of a list of generic requisites imposed on the licencing process of shipping lines. It may be considered a

concern of the regulator associated to the effectiveness of the system, as the ships deployed in the operations and the technical and financial capacities of the shipping companies are key elements regarding the regularity and continuity of operations, as well as the quality of the services provided.

#### 4.3.2 Weekly connections, with biweekly calls in all islands

This PSO is a constraint oriented to the fulfilment of an accessibility requirement since the legislator defined a precise regularity (weekly connections between mainland and the Azores islands) and a minimum of calls in all islands (biweekly calls in all islands). However, this PSO, along with the following one, are the main complains of local stakeholders, considering the constant changes in scheduled calls. Shipping lines argument that operational constraints and bad weather conditions impose some unexpected adjustments in the programming. Islanders' feelings are that the national regulator is absent, claiming for more thoughtful regulatory mechanisms to ensure that all obligations are fulfilled by the shipping lines, instead of leaving, to a great extent, the market to auto-regulate itself.

Additionally, this PSO can be considered an outdated regulatory constraint, clearly inconsistent with the evolution of logistics in recent decades. In fact, the development of logistics concepts like Just-in-Time, flexibilization, globalization or outsourcing increased the requirements on container shipping service networks in terms of frequency, schedule reliability/integrity, level of service coverage and rate setting (DUCRUET and NOTTEBOOM, 2012). A more logistics-oriented approach should be considered in the legislation, following NOTTEBOOM and RODRIGUE (2009), that consider logistics as the most fundamental and 'softest' element behind future transportation. This perspective is also associated to a holistic orientation, which is an essential component for the creation of clusters. Clustering suits particularly well to maritime businesses, according to SALVADOR (2014), and it should be considered vital in insular regions.

Table 4.1 Maritime transport services in the Azores – calls, supply, and capacity (TEUs)<sup>(\*)</sup>

Island	2011			2014			2018		
	Calls	Supply TEUs	Avg. Capacity	Calls	Supply TEUs	Avg. Capacity	Calls	Supply TEUs	Avg. Capacity
São Miguel	398	210,318	528.44	307	160,341	522.28	328	201,456	614.20
Terceira	155	90,063	581.05	139	74,849	538.48	168	103,957	618.79
Pico	103	45,776	444.43	55	23,482	426.95	55	30,336	551.56
Faial	98	58,872	600.73	56	34,310	612.68	52	34,208	657.85
São Jorge	52	25,118	483.04	53	27,690	522.45	52	29,377	564.94
Graciosa	28	14,140	505.00	26	9,724	374.00	27	16,393	607.15
Flores	26	9,812	377.38	26	10,318	396.85	26	16,439	632.27
Santa Maria	29	11,294	389.45	27	13,702	507.48	26	13,468	518.00
<b>Total</b>	<b>889</b>	<b>465,393</b>	<b>523.50</b>	<b>689</b>	<b>354,416</b>	<b>514.39</b>	<b>734</b>	<b>445,634</b>	<b>607.13</b>
Number of ships	8.00			6.00			6.50		

(\*) TEU is the acronym of Twenty Feet Equivalent Unit

From Table 4.1 one can see an extremely disproportionate market coverage among the islands. Some are connected more frequently, with a particular relevance for São Miguel Island (around 45% of total calls in the archipelago), while the more peripheral islands are called only biweekly (Graciosa, Flores, and Santa Maria Islands, with a minimum of around 4% or total each). To avoid direct calls in these last islands, and still fulfilling the PSOs, the three shipping companies established operational agreements, which results in only one shipping line calling these peripheral islands<sup>14</sup>. Such connections are, in some cases, complemented by smaller general cargo vessels that operate under a local traffic regime, established in the General Regulation of Maritime Authority<sup>15</sup>.

Table 4.2 Demand for maritime transport (full TEU)

Island	2017	2018	Var. %
São Miguel	69,799	74,179	6%
Terceira	19,767	20,683	5%
Pico	5,117	5,205	2%
Faial	4,716	4,876	3%
São Jorge	3,843	3,921	2%
Graciosa	2,353	1,934	-18%
Flores	1,613	1,741	8%
Santa Maria	1,280	1,405	10%
<b>Total</b>	<b>108,488</b>	<b>113,944</b>	<b>5%</b>

<sup>14</sup> Although this may be considered a topic of some controversy, the COMMISSION OF THE EUROPEAN COMMUNITIES (2003) considers that, when public service obligations are imposed, the requirements relating to the regularity and frequency of the service may be met collectively – and not individually – by all the shipowners serving the same route. In this sense, the itinerary allocation made for the most remote islands of the Azores is in accordance with the European Commission principles.

<sup>15</sup> The General Regulation of Maritime Authority is established in the Public Decree No 265/72.

Regardless this uneven distribution of calls among the islands, the average capacity of container vessels (see column ‘Avg. Capacity’ in Table 4.1) is not significantly different. Given the uneven economic dimension of the islands, expressed by the demand of maritime transport (see Table 4.2), one can conclude about the existence of a clearly excess of supply, especially for the smaller islands, with a huge waste of resources. For example, in the case of the least called islands the annual level of supply is between around 13,500 and 16,500 TEUs, while the demand for TEUs is, in most cases, below 2,000 TEUs.

In this sense, the profile of the itineraries is mainly oriented to a “never say no” strategy, being the vessels dimensioned for the major traffic segment, which is the route Mainland-Azores (until the first ports in the islands of São Miguel and Terceira, both representing 85% of the freight market and 70% of the calls in the Azores), but clearly oversized for the inter-island traffic segment. This operational structure cannot be avoided by any operator, since the system is structured in such a way that it is not possible to separate the segment to/from mainland from the segment of inter-islands routes.

The separation of these two distinct segments of the market would, probably, generate a market failure in services for the smaller islands, or the practice of extremely high prices combined with an insufficient number of calls, because of the reduced dimension of the market. Thus, one can infer that this system works under a huge rigidity, providing a full coverage but with inadequate services frequency.

#### 4.3.3 A transit time for cargoes not exceeding seven days

This PSO is directly associated with the previous one, being a major concern of local stakeholders, especially those that operate in the most peripheral islands, frequently affected by last minute changes in the programmed calls, altering the sequence of the ports in the itineraries and imposing delays in the cargo delivery time. These circumstances imply that this PSO is often not respected. The argument of the shipping companies is invariably the same, referring



that due to operational constraints and bad weather conditions it is impossible to respect this obligation.

For local commerce and industries these circumstances are truly penalizing, imposing extra costs that no agent of the transport chain will support. For fresh goods produced in the islands, with short expiration dates, or livestock, this is truly a serious problem. However, as already mentioned in the previous subsection, the regulator is absent and incapable of imposing solutions or adequate alternatives. The lack of a consistent logistics-oriented perspective is also evident in this PSO.

Additionally, it should be noted that all, with no exception, shipping lines use the weekend for the longer navigation leg, which consists in the route between the last port in mainland and the first in the Azores or vice-versa. This limit considerably the characteristics of the operations of all shipping lines.

#### 4.3.4 Equal freight prices to all islands

The equal freight prices constraint imposed by the legislation may be considered a reminiscence of the previous monopolistic regime that prevailed until late 1980s. This operator, privatized in 1990, had a ubiquitous presence in the market, covering all islands and practicing a price policy with equity concerns, imposed by the government.

The entry of more shipping companies into the market, and the imposition of this obligation to all operators<sup>16</sup>, resulted in a generalised practice, among all shipping lines, of cross-subsidization schemes and a tendency for price agreements.

This may be considered as an inevitable policy, as any operator, in order to comply with a simultaneous obligation of a predetermined number of calls covering several island and that of the practice of a uniform price policy, needs to obtain additional margins in the most important segment of the market (Mainland-Azores route, until the most or the two most relevant island ports of São Miguel and Terceira), to compensate the losses occurred in the less interesting

---

<sup>16</sup> The equal freight prices are mentioned for the first time in the legislation of 1998 (Law Decree 194/98).

operations, with smaller traffic volumes. This is also another reason for the absence of a segmentation of traffics from/to mainland and inter-island traffics, as discussed above in Sub-section 4.3.2. Furthermore, the freight prices are considered by local shippers as extremely high, being equivalent to those practiced on considerably longer distances, as the result of the cross-subsidizing processes.

The itinerary Mainland-Azores, representing the most important source of revenue for the shipping lines, has substantially higher prices than the opposite itinerary<sup>17</sup>. The evolution of prices, excluding additional taxes, has been of significant stability over time. During the last decade (2010-2019) the value of the reference freight prices increased only 0.67% for both legs, i.e., for the itinerary Mainland-Azores and Azores-Mainland, while the accumulated inflation for the same period was more than 12%.

Besides the promotion of cross-subsidizing schemes and coalitions that resulted implicitly from this legislative framework, one shall mention another incoherence, since all shipping lines apply discounts to their clients, varying those discounts according to the ratings attributed. In opposition to the freight prices, these discounts are not published, meaning that, in practice, the equal freight price obligation is not a fully practiced constraint.

#### 4.3.5 Equity and efficiency impacts in the Azores maritime freight system

Based on the concepts presented above on Sub-section 4.2.4, one can say that the focus of the PSOs imposed by the Portuguese legislator was almost exclusively on the equity side. In fact, the PSOs covering (2) Weekly connections, with biweekly calls in all islands, (3) A transit time for cargoes between origin and destination not exceeding seven days, and (4) Equal freight prices for cargoes between mainland and each of the islands, are clearly items oriented to the provision of greater equity, intentionally benefiting the smaller and more peripheric islands. The PSO covering (1) The guarantee of regularity, continuity, and quality of service, is the only

---

<sup>17</sup> The differences for 20' and 40' full containers are, respectively, 2.34 higher and 2.45 higher. This difference is still higher if we consider not only the freight price but also the additional taxes, namely the Terminal Handling Charge (THC) and fuel surcharge tax.

topic that is not related to equity, being considered a previous warrant of effectiveness of the system, a criterion included by VAN WEE and MOUTER (2021) in the evaluation of transport policies.

However, the PSOs established in the Portuguese legislator has significant negative consequences in terms of efficiency, as already outlined above and expressed also by several local stakeholders. Taking in consideration the content of previous sub-sections, one can consider that the maritime cabotage legislation for the Azores, results in a regime with considerable deficiencies in terms of both equity and efficiency. In the following points we will detail the equity and efficiency burdens caused by the present cabotage PSOs.

Equity burden imposed on the Azores maritime freight system

In terms of equity, the main goals of the Portuguese government include full coverage of the islands, as well as equal prices for maritime services. Full coverage constraint can be considered as part of the accessibility concept of equity, while equal prices for maritime services are part of the affordability concept of equity.

Regarding full coverage, it hides a totally disproportionate reality, as reported in Table 4.1, with the most peripheral islands having a coverage about 12 times inferior to the best-connected island. This is the result of the present system imposed by the legislation, that includes in the same itinerary both Mainland-Azores-Mainland routes and inter-island routes.

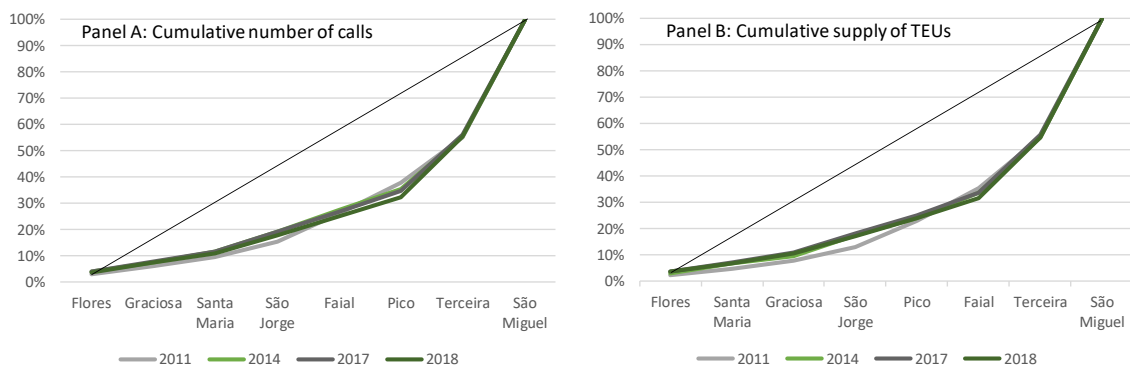


Figure 4.1 Lorenz curves for container ships' calls and supply TEUs

The most used metric for the evaluation of inequality, according to VAN WEE and MOUTER (2021) is the Gini index. To obtain a proxy of that index, we constructed the Lorenz curves for the number of calls of container ships in the Azores' ports (Panel A), as well as for the TEUs supply (Panel B), reproduced in Figure 4.1. According to the literature, the further the curve sags below a straight diagonal line the higher the degree of inequality observed. This is an approximative metric of the inequality generated by the PSO related to item (2) Weekly connections, with biweekly calls in all islands.

Regarding equal prices, one can mention that this is not a fully complied PSO, due to the rating policy of customers by the shipping lines, which favours the bigger shippers, usually located in better-connected islands.

#### Efficiency burden imposed on the Azores maritime freight system

Besides the impact on the equity principle, there are also immediate consequences in terms of efficiency, as mentioned above, with clearly inadequate levels of vessel capacity utilisation and a flagrant orientation towards a “never say no” strategy. The vessel capacity utilisation represented in Table 4.3<sup>18</sup> below, clearly proves the inefficiency of the system, particularly in the inter-island routes.

Table 4.3 Supply TEUs, demand TEUs and Vessel's capacity utilization

Island	2017			2018		
	Supply TEUs	Demand TEUs	Capacity utilization (%)	Supply TEUs	Demand TEUs	Capacity utilization (%)
São Miguel	169,030	69,799	41.29%	201,456	74,179	36.82%
Terceira	84,437	19,767	23.41%	103,957	20,683	19.90%
Pico	26,656	5,117	19.20%	30,336	5,205	17.16%
Faial	33,160	4,716	14.22%	34,208	4,876	14.25%
São Jorge	28,099	3,843	13.68%	29,377	3,921	13.35%
Graciosa	14,042	2,353	16.76%	16,393	1,934	11.80%
Flores	13,348	1,613	12.08%	16,439	1,741	10.59%
Santa Maria	13,468	1,280	9.50%	13,468	1,405	10.43%
Total	382,240	108,488	28.38%	445,634	113,944	25.57%

(\*) TEU is the acronym of Twenty Feet Equivalent Unit

<sup>18</sup> It is not possible to provide exact data for each port since the vessel carries cargo for several islands in each trip. In Table 4.3 we considered a limit constraint of 90% in the vessels' full capacity.

Additionally, based on the itineraries of the shipping lines in September 2020, we present in Table 4.4 a distribution of the time spent by shipping companies in the various phases of operations. This operations' profile, with significant downtime of vessels on mainland ports (35%) and a significant time operating in inter-island itineraries with very low load factors in most islands (from Table 4.3 one can see that only three islands have a capacity utilisation above 15%), means that more than 50% of the time of a ship's round trip is truly inefficient, an inconsistent approach in a highly capital-intensive industry. This is accordance with AROF (2015) that suggest that the reduction of ship's turn-around time in port could reduce the total time of freight movement and mitigate the slow speed of Short Sea Shipping. Additionally, it should be stressed the environmental consequences of this operations' profile, reinforcing the relevance of obtaining a higher level of efficiency, which one can consider was totally absent of the regulatory agencies' concerns.

Table 4.4 Distribution of time by ships' operations

Operations' profile of ships	Time (in %)
Inter-islands itineraries	37%
Time on mainland ports	35%
Sailing time Mainland/Azores and vv.	28%
Sum	100%

In the next Section we will present and discuss the application of universal service, a particularly robust conceptual methodology used by regulators in several network industries<sup>19</sup>, following the perspective of SAUTER (2008), as well as of FINGER and FINON (2011), both classifying universal service obligations (USOs) as a key content of public services in the context of the liberalisation of network industries in European Union. A further justification is based on POUDOU and ROLAND (2017), for whom equity is often invoked as a possible justification for the imposition of USOs.

---

<sup>19</sup> Examples of network industries include telecommunications, electricity, gas, water, rail, or postal sectors.

## 4.4 Universal Service Obligations as an alternative to the present system

### 4.4.1 Definition and implementation of USO

Universal Service Obligations (USO) are a cornerstone in regulatory policies in the major network industries of most industrialized and developing countries. The recognition that competition leads to outcomes that are not necessarily desirable from the regulator's point of view and the fact that the regulator values equality with respect to prices and/or access of all users to the market is the basis for the imposition of USO, as stated by CHONÉ, FLOCHEL, and PERROT (2000).

According to the literature, one can generally view the USO as the obligations of an operator to provide *all* users with a range of *basic* services of *good* quality at *affordable* rates, being also uniform pricing imposed as an additional requirement (CREMER *et al.*, 1998; 2001; 2008; RODRIGUEZ and STORER, 2000; CERRE, 2013; POUDOU and ROLAND, 2017). Whatever its precise definition, the USO are, in essence, a set of restrictions on the operator(s) pricing policy, that operate both in low- and high-cost areas. In fact, if the operator were free to set its prices, the USO would be an empty condition, since he could charge any consumer group a sufficiently high price to either cover costs or to ensure that their demand drops to zero.

Given low- and high-cost consumers, uniform pricing may be considered a redistribution instrument. According to CREMER *et al.* (2008), the most compelling theoretical justification for USO is their relative efficiency as a redistributive policy, with some similarities with policies involving public provision of private goods. Furthermore, it has the potential to be optimal in a second-best world when policy makers do not have the necessary information to implement (potentially) more efficient policies, as reported by POUDOU and ROLAND (2017). A particularly important topic highlighted by the literature is that the different facets of the problem need to be addressed in an integrated framework (CREMER *et al.*, 2001; GAUTIER and PAOLINI, 2011). More specifically, to take full advantage of an appropriate universal service, policy should not be designed in a sequential manner, but rather should pose

simultaneously the questions of content, cost, and financing of universal service (CREMER *et al.*, 2001). CHONÉ *et al.* (2000) identified two series of questions in USOs. First, the allocation problem, i.e., the identification of which USOs should be imposed to whom and, second, the funding problem, i.e., who should pay for the USOs. The combination of various solutions to both questions defines different regulatory mechanisms that have different implications in terms of distortions on the competitive entry process and on the equilibrium market structure, generating both social benefits and social costs. For GAUTIER and PAOLINI (2011), there is no one size fits all solution, depending the solution on three types of factors: the definition of universal service, the market characteristics and the country's geographical configuration. PANZAR (2000) stresses that the composition of the USO bundle, as well as the rate at which it is to be provided, are highly charged political questions. For regulators, the question, thus, is how to share these costs and benefits and to determine optimal rules for allocating and funding those USOs. Furthermore, the regulatory policy must strike the right balance between two potentially conflicting objectives. On one hand, competitive neutrality, which means that no excessive protection ought to be granted to the USO operator and, on other hand, if the USO is not compensated in an appropriate way, its viability may be threatened.

For JAAG, KOLLER, and TRINKNER (2009) there are two problems to solve: First, the cost of USO needs to be estimated; second, the Universal Service Provider (USP) has to be reimbursed for their services under USO. OXERA (2007), a consultancy firm that elaborated a study for a group of European postal operators, points the problems in a slightly different way, considering three topics: the definition and measurement of the cost of the USO, how it should be financed, and a quantitative analysis of the specific funding needs.

So, independently of the problem exposition, the content of universal service implies that a certain cost will be incurred by the USP(s), which demands a financial regime to compensate him/them. For JAAG *et al.* (2009) there are three different approaches to determine the costs of USO: net avoided costs (NAC), entry pricing (EP) and profitability cost (PC) approaches. In Figure 4.2 we present those three alternatives. The PC approach is considered by the authors as

the most adequate, providing the compensation that makes the designated USP(s) indifferent whether to provide the USO or not, while the other approaches do not provide guidance to derive the financing need to ensure the USO in competitive markets. In short, PC approach calculates the cost of the USO as the difference of the USP's profit between a scenario with and without obligations. It requires the simulation of non-observable market equilibrium. Such simulation includes changes in cost structures (due to obligations), as well as demand effects (customer loyalty, competitive effects of pricing restrictions).

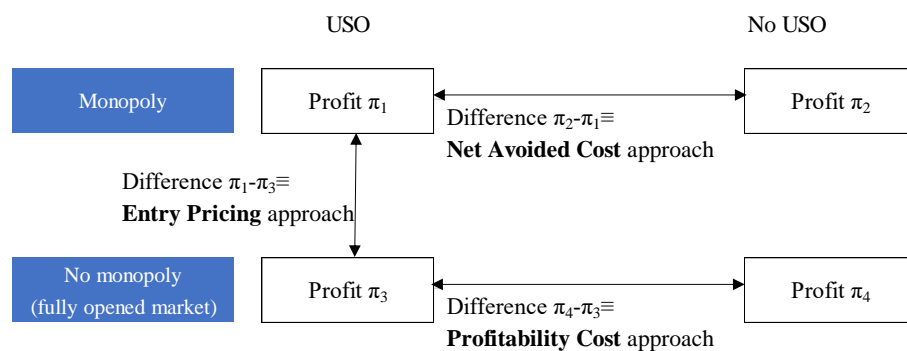


Figure 4.2 Potential approaches to calculate the cost of the USO

At a most general level, the true economic cost of universal service is, according to RODRIGUEZ and STORER (2000), related to the net welfare loss, in terms of lost allocative efficiency, that results from imposing distortions both on prices and on patterns of service delivery. For CREMER *et al.* (1998), the welfare cost can be defined as the deadweight loss implied by the USO, which can be considered approximately as the loss in total surplus, i.e., the sum of consumer and producer surplus. This welfare cost must be confronted with welfare benefits, derived from the redistributive impact of USO, which depend on the weights that the policy makers attach to the different groups of consumers. These weights are, in general, not observable.

Regarding the mechanisms to fund the USO, OXERA (2007), presents the most extensive list of financing mechanisms: reserved area; compensation funds of various forms (revenue taxes, profit taxes, lump-sum taxes, and unit taxes); state-funding; pay-or-play; access charge uplifts;



and competitive tendering, each one with its particularities and implications. In Table 4.5 we present a summary of the most relevant characteristics of each financing mechanism.

Table 4.5 Summary of the most relevant characteristics of the financing mechanisms

Financing mechanisms	Main characteristics
<b>Reserved area</b>	Under this mechanism the USP are provided with a reserved area, working as a monopoly in particular services. This regime provides the possibility of cross-subsidisation between low-cost and high-cost services, with the losses made in high-cost services offset by the profits made on low-cost services.
<b>Compensation funds of various forms</b>	The funds could have several forms and be applied on operators or consumers. Two main questions must be addressed in the establishment of compensation funds: (1) Who should contribute to the fund and how should contributions rates be determined?; (2) How should the taxable base be defined so that sufficient funds are generated to cover the USO burden while distortions in the market are minimised?
Revenue taxes	The taxes are associated to the revenues of the operators. It may score highly in terms of efficiency, and also as competitive neutrality. Provided that the taxable base is wide enough, revenue taxes might generate sufficient funds to cover the costs of the USOs.
Profit taxes	It works the same way the revenue taxes. However, practical problems may arise and would be more serious than revenue taxes.
Lump-sum taxes	The difficulty in identifying ex-ante the number of operators that would be included in the taxable base is to be considered as a restriction to this mechanism, imposing a low score in terms of practicability, proportionality and certainty. If the taxes are set too high, entry into the market could be discouraged and productive efficiency affected. There are no cases in reality of application of this type of tax.
Unit taxes	The USO has been funded through unit taxes in a number of cases. In practice, these taxes have taken the form of surcharges per unit provided/consumed. As with revenue taxes, unit taxes may score highly in terms of productive and dynamic efficiency. If volumes can be measured easily, the use of unit taxes is less likely to be problematic.
<b>State funding</b>	This mechanism is the most direct or indirect form of governments to finance USOs. It has the advantage of a wide base, spreading the tax burden, being the welfare loss lower than if taxes were levied on operators (or consumers) only. This mechanism can score highly in terms of efficiency and competitive neutrality. Moreover, competition in the markets is unlikely to be distorted since firms do not have to assume directly the USO burden.
<b>Pay-or-play</b>	This is one of the most sophisticated mechanisms available, as it combines the question of how the USO should be funded with that of who the USP should be. It has the same starting point as a compensation fund: those who only operate in low-cost areas need to pay into some form of compensation fund. The attraction of this mechanism derives largely from the fact that it allows competition for high-cost USO customers. It has a low score in terms of practicability, due to its relative sophistication. Moreover, concerns about the transparency and certainty of the mechanism are evident. There are no examples of implementation of such mechanism.
<b>Access charge uplifts</b>	This mechanism works by imposing a tax that entrants would pay to the incumbent for using its network to deliver products. In practice, the access charge would be increased by an amount or percentage, used to finance the USO costs faced by the USP. There are two possibilities to consider: Bypass of the incumbent's network is prohibited; and Bypass is not allowed. Furthermore, there are two types of access charges: Uniform access charges; and Zonal access charge, which depends on the delivery costs of each region.
<b>Competitive tendering</b>	Under this mechanism, also known as franchise bidding, the USP is selected endogenously, as occurs in the case of Pay-or-play mechanism. Economic literature establishes that a competitive tender mechanism could be useful in instances of asymmetric information—ie, where the owner of the property rights (eg, the regulator) is the less informed agent regarding important variables such as value or cost of provision associated with the service in question. The appropriate design of the bidding process would depend on the general conditions of the universal service and on the characteristics of the sector in question (eg, technology, number of potential actors, etc).

Source: own elaboration, based on OXERA (2007)

Their application will depend on the particularities of the markets. For example, if the USP is selected using the market force mechanism (in an endogenous selection process), the incumbent or the entrants or both could provide the USO. In this case, funding mechanisms, such as competitive tendering or 'pay-or-play', could become relevant to the analysis. Alternatively, if the regulatory authority determines that the USO should be provided by the incumbent only, or

shared between the incumbent and the entrants, in an exogenous selection process, different funding mechanisms could become available, such as reserved area, compensation funds or access charge uplift. This illustrates the diversity of solutions that may be possible under a USO policy. The mechanisms to be applied will depend on the characteristics of the market in consideration.

#### 4.4.2 Application of a USO framework for the Azores maritime freight system

As reported in Section 4.3, until now the Portuguese State opted by a set of legislative constraints with evident negative impacts both in terms of equity and efficiency, as well as a totally opaque financing mechanism, based exclusively in cross-subsidizing policies among firms. Based on the topics briefly presented in the previous subsection, we may now define an integrated analytical framework which may clarify the debate about the Azores maritime freight system, contemplating the three simultaneous questions of content, cost, and financing, following CREMER *et al.* (2001). Before that, however, let us consider PANZAR (2000), as well as DE DONGER, CREMER, and RODRIGUEZ (2002), for whom any USO costing exercise must begin with a careful specification of an unsubsidized market scenario that would prevail in the absence of the USO. Such specification allows us to identify the most probable solutions in the absence of any regulatory constraints for the Azores maritime freight market.

In Section 4.3 we already presented some clues about this point, foreseeing that, in a liberalised market, the shipping companies would only call the more attractive ports in the Azores, applying different price policies for each port, in accordance with their costs and strategies. The expected results would be the separation of the market in two distinct segments, one contemplating (1a) the routes between mainland and some of the Azores's islands and vice-versa, and (1b) the Azores inter-island market, from a given port in the Azores with connection to mainland. Also, (2) different freight prices would be fixed by shipping lines for each port, depending on the origin and destination of cargoes. The most relevant segment of the market will be composed by the routes between mainland and the Azores, that would, in principle,

work without the need of public intervention and with a price significantly lower than the present one (due to the inexistence of cross-subsidy policies as actually occurs). In opposition, the inter-island market would work as a contingent market, dependent on the ports with direct connections to mainland, and with considerably higher freight prices than the present ones, due to the cost of provision of services and the low volume level of cargoes.

Thus, under a Universal Service policy, the solution could be to liberalise (or relax the constraints imposed through the preliminary licencing process) the market of connections to/from mainland and circumscribe equity restrictions to inter-island connections, where competition is less expected to occur, and higher prices are inevitable. Additionally, a clear financing mechanism could be implemented, based on some of the alternatives presented in the previous subsection.

In Table 4.6 we present the basic structure of the framework of the Azores maritime freight system under a Universal Service policy, focused on the basic characteristics of the market structure and financing mechanisms, as well as the way funds are collected and transferred to the USP(s).

Table 4.6 The Azores maritime freight system framework under a Universal Service policy

Market segments	Legal regime	Number of operators	Determination of the USP	Possible sources of revenues to operators	Contribution to the Universal Service Fund	Mechanisms to finance USOs
(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1a) Mainland-Azores-Mainland	Liberalised (or relaxed constraints)	Several operators	N.A.	Freight prices	Taxes on operators Pay-or-play	N.A.
(1b) Azores inter-island itineraries	Universal Service Obligations (USOs)	One operator (USP)	Endogenous process	Freight prices Universal Service Fund State funding	N.A.	Pay-or-play Competitive
			Exogenous process	Freight prices Universal Service Fund State funding	N.A.	State funding via USF
		Several operators (USPs)	Endogenous process	Freight prices Universal Service Fund State funding	N.A.	Pay-or-play Competitive
			Exogenous process	Freight prices Universal Service Fund State funding	N.A.	State funding via USF

The main components of this framework included in Table 4.6 include the following:

- (1) A separation between the two segments, i.e., (1a) the mainland-Azores-mainland traffic that will operate under a liberalised regime, or with relaxed constraints<sup>20</sup>, and (1b) the Azores traffic that will operate under a USOs regime. Regarding the Azorean ports, it is not possible to anticipate which will be served under a liberalised regime, since that solution will depend on the solutions provided by the market forces (see columns 1 and 2 of Table 4.6 );
- (2) The number of shipping lines in the liberalised segment (1a) will be variable, depending on their number from the market forces (see column 3). Additionally, the revenues of the shipping lines will consist of freight prices for their services (see column 5);
- (3) The operators of the liberalised market will contribute to the universal service fund (USF) through a set of different possibilities: taxes on operators (revenue taxes, profit taxes, lump-sum taxes, or unit taxes); or a pay-or-play alternative, allowing those who only deliver in low-cost areas to operate in high-cost areas or to pay to the compensation fund (see column 6);
- (4) The number of shipping lines in the segment under USOs (1b) will depend on the process oriented by the regulator. One can consider the following: (3a) a single operator will support all USOs, or (3b) several operators, covering the different islands excluded from the liberalised market, like in the present situation, will support the USOs. The processes of determination of the USPs can be endogenous (no intervention of the regulator) or exogeneous (promoted by the regulator) (see column 3 and 4);
- (5) The source of revenues for the operators supporting USOs in (1b) the inter-island market will be a weighted average of freight prices, as well as other sources like State funding and/or access to USF resources, depending on the dimension of the fund (see column 5);

---

<sup>20</sup> The relaxed constraints means that in the licencing process a set of constraints could be defined by the legislation, namely in terms of regularity, characteristics of the vessels used on the routes, etc., but not with constraints associated to prices and market coverage, which is a universal service policy.

(6) Depending on the intentions of the regulatory authority in terms of their intervention in terms of the selection process (exogenous or endogenous), the financing mechanisms of USOs on (1b) the inter-island market will be totally different. For example, in case of an exogenous process, led by the regulatory authority, state funding will finance the USPs, while in endogenous processes a pay-or-play or a competitive tendering are possible mechanisms (see column 7).

In short, the proposed solution implies the separation of the two market segments, with some alternative funding possibilities. The funds are raised, partially or in total, in the mainland-Azores-mainland routes and applied in the inter-island itineraries. In case of insufficiency, the resources from the liberalise segment could be complemented through state-funding. There are two distinct possibilities for the regulatory authority in terms of USPs. One is to assign the USOs to a single operator or, alternatively, to define a mechanism for the selection of the USPs. In the limit, several operators could provide USOs. In this last situation, all USPs should have access to the USF to finance its operations.

The price level is a topic decided by the regulatory authority, based on equity principles. Two alternatives are defined under USO, i.e., affordable prices, or uniform prices. The decision for this topic is a point dependent on the funds raised on the market segment of mainland-Azores-mainland, as well as the intention of the government in terms of state funding. It should be mentioned that, according to the conclusions of POUDOU and ROLAND (2017), uniform pricing is welfare-enhancing, but it does not necessarily improve equity.

A final note on a practical perspective about the most adequate financing mechanisms. For example, according to OXERA (2007), there are no cases in the postal sector of application of the pay-or-play concept, which is a possibility in the case of an endogenously determination of USPs. Similarly, the competitive tendering is a more complex mechanism when in presence of several USPs, involving different pricing levels. In this sense, the more practical mechanisms would be an exogenous process led by the regulatory authority and with funding mechanisms limited to taxes on operators, particularly revenue taxes or unit taxes, eventually reinforced

through state funding. Other taxes like lump-sum taxes or profit taxes may reduce the taxable base, presenting some inconvenient consequences to the regulatory authority.

#### 4.4.3 Complementary topics

Besides the technical aspects of universal service, there are some other topics to take in consideration. In this section we will only illustrate some of them. First, based on the perspective of LEKAKOU *et al.* (2011), three main parameters with direct impact on the performance of the system are to be considered: (1) The regulatory framework; (2) The business strategies; and (3) Users' attitudes, perceptions, and usage of the offered services. Each one of these parameters are associated to a different set of entities: public authorities; the elements of the supply side of the market; and those of the demand side of the market. All players should be involved in the process, contributing to the construction and future refinement of the maritime freight model, including the local traffic operator, with smaller general cargo vessels. Furthermore, this involvement of all players is particularly relevant for the development of a maritime logistics perspective, combining transportation and supply chains in a convergent framework. This is a fundamental topic in insular regions, given their huge dependency on maritime transport.

Other topics have a more practical composition but contributing also to a better efficiency of the system, particularly those linked to the requisites of the port systems, both in mainland and in the Azores islands. On one side, there is the need to centralise the operations in only one port terminal in mainland, being the best solution Aveiro, a port at the central region of the Portuguese coast, with an equidistant location between the ports of Leixões and Lisbon, used presently. This would provide considerable advantages in terms of logistics, reducing costs and easing the transport processes. Regarding Azorean ports, it would be essential to improve a set of topics, mostly related to governance and management topics. First, the level of equipment, namely cranes, at least in the most central ports, as well as the productivity of the stevedoring. Another topic is the need of a uniform price regime 24 hours a day, seven days a week. This

uniform port tariffs would allow an improvement in terms of flexibility of operations, eliminating the present restrictions for the ships to navigate exclusively during the weekend between mainland and the Azores, and vice-versa. Additionally, it would be expectable to improve the port governance model in the archipelago, dominated by some tool ports in São Miguel, Terceira, Horta, Pico and São Jorge, with the rest operating under a service port model. At least on the ports with greater level of external connections it would be important to consider the implementation of a landlord model, with increased levels of port efficiency.

At this point, it should be made a brief comparison with the example of the Canary Islands, that established a set of PSOs of minimum nature, contemplating only one weekly service between Cadiz (in mainland) and Las Palmas and between Cadiz and Tenerife. Additionally, the government of the Canaries promoted a Transinsular Axis of Infrastructure and Transport, to lessen the territorial fragmentation of the islands. Under this regime, one of the main shipping lines (Boluda Corporación Marítima) will launch soon (in December 2022) an innovative service of freight transport to Canary Islands from Cadiz. This service involves six vessels and the operation in night-time hours in several terminals in the Canaries to maximise the operations. Additionally, train connections in mainland to Cadiz will be used, promoting environmental efficiency.

This example puts in evidence the huge differences between the cases of the Canary Islands and the Azores, namely in terms of the level of strategic thinking promoted by the shipping industry in both archipelagos. Moreover, it confirms the strong possibility of tacit oligopolistic positioning between all shipping lines in the Azores market.

#### 4.4.5 Evaluation of the present PSOs and the alternative USO regimes

The last step of this process is the comparative evaluation of both regimes. Following VAN WEE and MOUTER (2021), three criteria should be met: effectiveness, efficiency, and fairness. In terms of efficiency, the USOs alternative presents several advantages, derived from the distinction of the two segments of the markets, i.e., the mainland-Azores and the inter-island. In

terms of fairness, or equity, the USO alternative has several advantages, since it is possible to improve the level of connectivity of the more peripheral islands, limited at present to biweekly calls. The only open point is the freight prices level, that will depend on the volume of taxes obtained in the liberalised market segment, preferably through revenue or unit taxes, depending also on the intentions and objectives of the regulatory authority. Finally, in terms of effectiveness, both systems can be considered effective, but the USO alternative is undoubtedly more flexible, as well as market driven, considering the possibility of a liberalised market (or of a limited set of constraints).

In short, the USOs alternative presents a scientific background which is totally absent in the present PSOs, enabling to implement a consistent perspective focused on equity and efficiency objectives, as well as a more logistics-oriented approach. In opposition, the present PSOs are exclusively focused on the shipping side of the problem and on the maintenance of a historical situation in terms of equity (including pricing policy).

## 4.5 Conclusions

The Azores maritime freight system, framed by the European Regulation 3577/92, has been dominated over the last decades by a set of PSOs mainly oriented to equity objectives, generating substantial inefficiencies. In fact, according to data presented in this study, more than 50% of the time vessels are operating with extremely low level of capacity utilisation or immobilised in mainland ports. Over the equity perspective, the present system could be also considered inadequate, given the huge level of concentration of ships' operations in a small number of ports in the Azores, leaving the most peripheral islands with only biweekly calls. This means that the Azores maritime freight system could be improved, both in terms of efficiency and equity, providing a more effective transport policy.

Considering the nature of this problem, framed in an equity-efficiency trade-off perspective, and the similitude to those present in most network industries, in particular the postal sector, we propose an alternative approach, based on the application of the universal service concept.



Universal service is a tool especially designed for the provision of public services in the context of the liberalisation of network industries, focused on the geographic obligation of ubiquity and equality of treatment. Under this approach, several changes in the present system could be implemented, namely the establishment of two market segments, i.e., a liberalised, or with relaxed PSOs, segment on mainland-Azores-mainland routes, with significantly lower freight prices, and an inter-island segment subject to USOs, for which the costs of service provision will be, expectably, substantially higher, and particularly subject to market failures. For this last segment, the universal service solution involves the need of a public intervention in both frequencies and prices, with a funding mechanism that would transfer the funds obtained in low-cost routes into the high-cost routes subject to USOs. The most practical solution for financing the universal service fund would be through revenue or unit taxes on shipping lines operating in the liberalised market. Those taxes would be subsequently transferred for operators responsible for USOs in the inter-island segment. Two possibilities are to be considered in the inter-island market segment. The most practical would be an exogenous determination of the USPs, defined by the regulatory authority.

We also claim that three different types of entities should be involved in the process: public authorities, working at the regulatory side of the system; the structures of the supply side of the market, namely the shipping companies, and the structures of the demand side of the market, i.e., shippers and local industries. Such integration of entities could lead to a more logistics-oriented approach, as well as a clustering perspective, both presently absent on the system. The port system could also be improved, contributing to a better level of the efficiency of the freight system. Suggestions include, on the mainland coast, the concentration of the operations in only one port terminal, instead of several terminals in two different ports, which would mean significant advantages in terms of logistics, reducing costs, and easing the transport processes. Additionally, some changes must be promoted in the ports of the Azores, namely in terms of port governance, with the introduction of a landlord model in the main ports and the improvement of the level of equipment, especially cranes, as well as the implementation of a 24

hours a day seven days a week tariff regime in all Azorean ports, promoting a greater flexibilization of the ships' operations. In this sense, a profound change process is needed, contributing decisively to a better connectivity of the islands, as well as to lower freight prices, with positive impacts on the development of the Azores islands.

The present paper was mostly focused on the definition of a broad picture in terms of USOs, evidencing its applicability and advantages in terms of equity and efficiency. In the future we intend to develop further the application of the concept, refining the allocation and funding problems of USOs, and comparing quantitatively and qualitatively those alternatives with the present solution.

## Chapter 5

# Impacts of Cruise Tourism: A Study Focusing on the Macaronesia Region

### 5.1 Introduction

The cruise industry ranks currently among the most dynamic tourism segments, with a growth rate of twice the observed in the whole tourism sector (LESTER and WEEDEN, 2004; DIAKOMIHALIS *et al.*, 2009; SORIANI *et al.*, 2009; BRIDA and ZAPATA, 2010a; TEYE and PARIS, 2011; VOGEL, 2011; PALLIS, 2015). Future perspectives are optimistic, particularly with the continuous increase in the number, size and capacity of ships (BRIDA and ZAPATA, 2010b; BRIDA *et al.*, 2010; TEYE and PARIS, 2011; RODRIGUE and NOTTEBOOM, 2012; PALLIS, 2015). Ports and coastal cities, considering the potential impact of the cruise market, try to increase their attractiveness in this area to better capture the economic benefits that cruise passengers can bring to local businesses and communities (KLEIN, 2005, BRIDA and AGUIRRE, 2009; EUROPEAN COMMISSION, 2009; BRIDA and ZAPATA, 2010b). In turn, cruise operators seek to diversify their itineraries, in a constant attempt to create new products or exploit new alternative destinations (DIAKOMIHALIS *et al.*, 2009; RODRIGUE and NOTTEBOOM, 2012).

The archipelagos of the Azores, Canaries, Cape Verde, and Madeira, situated in the North Atlantic Ocean, form the Macaronesia region (Figure 5.1). The name 'Macaronesia' comes from the Greek words for 'islands of the fortunate', a term used by the ancient Greek geographers for the islands to the west of the Strait of Gibraltar. These archipelagos registered in recent years a significant increase in the number of cruise calls and passenger movement, with a growth rate significantly above that of the whole industry. The Canaries are a noteworthy example of a well-established destination and constitute a reference for the other archipelagos of the region.

In fact, ports, governments, and the industry are becoming increasingly aware of the potential that these islands may represent. The investment in infrastructure made recently in all four archipelagos is a clear expression of that perspective and a prerequisite for the future growth of the cruise industry in this region.

In this paper, we describe a study about the economic impacts of cruise tourism focusing on the Macaronesia region. With respect to this region, we characterize the current situation of the cruise industry, discuss the individual strategies that are being pursued to promote it, and provide insights into the challenges that both ports and destinations have to overcome to ensure their long-term sustainable growth in the context of the global cruise market. To the best of our knowledge, this is the first paper where cruise tourism in Macaronesia is dealt with in a comprehensive manner.

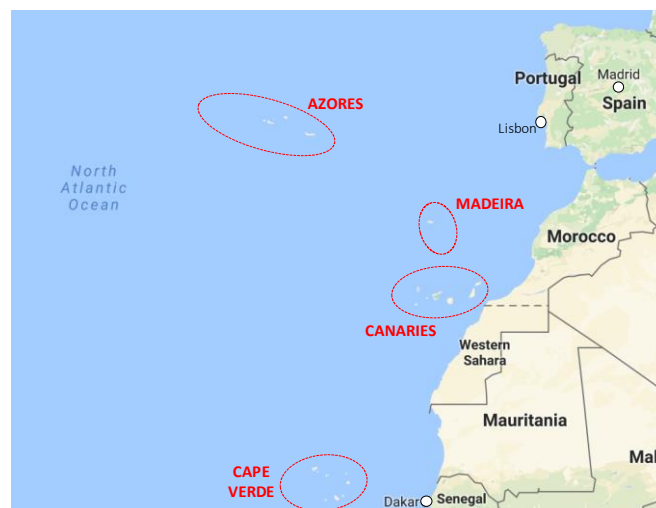


Figure 5.1 The Macaronesia region

The structure for the paper is as follows. In the next section we provide an overview of the cruise industry and of its relationship with ports. Then we focus on the literature about the economic impacts of cruise tourism and about the connections between cruise lines, ports and destinations. The situation in the different archipelagos of Macaronesia is addressed in the following section, where, in particular, we discuss the strategies adopted by governments and ports in relation to cruise tourism. The final part of the paper summarizes our work and indicates directions for further research.

## 5.2 Cruise Industry and Ports

### 5.2.1 Cruise industry

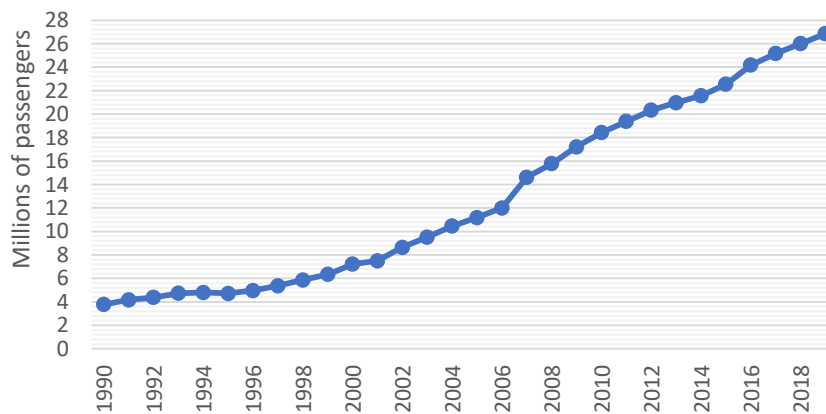
The cruise industry presents as main characteristic the combination of maritime transportation, trip, and leisure tourism (WILD and DEARING, 2000; PALLIS, 2015). Cruise ships encompass all four facets of tourism: transport, accommodation (including food and beverage), attractions and tour operators (SEIDL *et al.*, 2006; BRIDA and AGUIRRE, 2009; BRIDA and ZAPATA, 2010b). In this sense, although not operating as a tourism destination, cruises are direct competitors of major land-based resorts such as Cancun, Cozumel, Orlando or Las Vegas (BRIDA and ZAPATA, 2010b; GUI and RUSSO, 2011).

The major factors in the development of the cruise industry include the achievement of economies of scale, the main reason behind the continuous increase of the size and capacity of ships, and the creation of opportunities in terms of generation of additional revenues on board of ships. The capacity of cruise ships in the beginning of the 1970s was about 1,000 passengers. Now the larger cruise ships exceed 6,000 passengers, in a tendency toward gigantism (SORIANI *et al.*, 2009).

The processes of mergers and acquisitions observed since the early 1990s and the marketing strategies of several companies are also relevant factors in the success of the cruise industry (DOUGLAS and DOUGLAS, 2004; GUI and RUSSO, 2011; VOGEL, 2011; PALLIS, 2015). LEKAKOU, PALLIS, and VAGGELAS (2009) describes the cruise market as an oligopoly dominated by three major groups: Carnival, with 10 brands, Royal Caribbean, with 5 brands, and Norwegian Cruise Lines, with 4 brands. The multiplicity of brands, covering a variety of market segments, creates in the consumer an illusion of supply diversity (RODRIGUE and NOTTEBOOM, 2012).

The dynamics of the industry may be measured by the evolution of the volume of transported passengers, which surpassed in 2019, according to CRUISE MARKET WATCH (2022), 26

million passengers (Figure 5.2). The global growth rate of the cruise industry has also revealed a strong stability, with an annual average since the beginning of the 1990s at around 7% in spite of economic cycles of growth and recession (LESTER and WEEDEN, 2004; DIAKOMIHALIS *et al.*, 2009; BRIDA and ZAPATA, 2010b; VOGEL, 2011; RODRIGUE and NOTTEBOOM, 2012; PALLIS, 2015). This growth rate is twice as large as the rate observed for the tourism sector as a whole, and the expectations are that it will keep at the same level in the near future (KLEIN, 2005; BRIDA and AGUIRRE, 2009; LEKAKOU *et al.*, 2009; TEYE and PARIS, 2011).



Source: Cruise Market Watch (2022)

Figure 5.2 Total number of passengers carried by cruise ships

As most other tourism activities, the cruise industry is affected by seasonality. Operators cope with that phenomenon essentially by offering Caribbean cruises in winter and Mediterranean cruises in summer, thus combining the two major markets (together they amount to around 70% of the total industry size). In doing so, cruise lines manage to circumvent seasonality, optimizing the utilization of their assets all year round.

### 5.2.2 Itineraries and positioning of ports

The cruise industry sells itineraries, not destinations. RODRIGUE and NOTTEBOOM (2012) consider three main types of itineraries:

- (1) **Perennial.** In this case, the region is covered by the itinerary throughout the year, although with seasonal variations in the number of ships deployed. Caribbean and Mediterranean are the main markets of this type, particularly in the first case;
- (2) **Seasonal.** Some regions have a market potential only during a specific season. This is the case for Baltic, Norwegian, Alaskan and New England cruises, with operations in summer months. South America and Australia have itineraries during winter months;
- (3) **Repositioning.** Because of the industry's seasonality, cruise ships need to be repositioned. This type of itineraries occurs in the Atlantic, in the connection between the Caribbean and the Mediterranean.

The classification of ports depends on their position in the itinerary of the cruise, and the characteristics of their infrastructures. Ports in the beginning or ending of the cruise, for example, are naturally much more important than mere ports of call. According to THOMPSON CLARKE SHIPPING (2006), the following categories of ports are to be considered:

- (1) **Destination ports or ports of call.** Ports where passengers spend a few hours. There is no embarking of new passengers. Basic facilities are provided to cruise ship and, for the passengers, activities like shore excursions;
- (2) **Turnaround ports or ports of embarkation/disembarkation.** These ports have the same attributes of the ports of call, and some others like embarking and disembarking of passengers or supply of products. There exist good facilities for embarking and disembarking, treatment of luggage, customs and good accommodation for passengers. In many situations, there is also supply of fuel for the next cruise;
- (3) **Base ports or hub ports.** These ports have all attributes of the previous ones, and are also the base of a branch of the cruise company. Facilities for repair and maintenance are normally available in these ports.

The most obvious challenge for ports and local tourism authorities in the marketing of the destination is the inclusion of the port in the itinerary of a cruise. Additionally, the expectation of every port is to obtain a major role in the cruise industry, considering the possibilities of

creation of services that can generate added value activities, directly linked with the expansion of the number of passengers ashore or the supply of goods and services for new cruises. Other motivations for the promotion of ports are associated with a hypothetical future tourist visit to the city or region where the port is located, significantly longer than the previous as cruise passenger. According to TEYE and PARIS (2011), cruise passengers are seen as ‘samplers’ of destinations, making a cruise trip a precursor to an extended resort or land-based vacation. PENCO and DI VAIO (2014) stress the importance of non-monetary value of cruise traffic for destinations, through word-or-mouth (recommendation to relatives, friends and colleagues).

In the case of a base port, ships provide direct income from provisioning and other spending by the ship and its crew, as well as from embarking and disembarking passengers who stay in town for a night or two before or after the cruise. LEKAKOU *et al.* (2009) mention that in this case a cruise passenger spends six to seven times more money than the amount he or she would spend at a port of call.

With respect to the possibility of a port becoming a base port, it is necessary to bear in mind that a cruise trip has two segments: the flight to the base port (and return); and the cruise trip. Therefore, it is essential that the port is served by an airport with good international connections, and also that the port is in a region or city that is, by itself, a tourist destination. LEKAKOU *et al.* (2009) argue about the absence of any significant regional variation insofar as the criteria used by the cruise industry to choose their base ports, mentioning the work of UNCTAD (2001) that established five key points: (1) outstanding port services and an equally appealing city; (2) modern and efficient airport with substantial airlift; (3) attractive tourist destinations and itineraries; (4) large population center; and (5) good land accessibility to that center.



## 5.3 Economic Impacts of Cruises

### 5.3.1 Cruise lines, ports and destinations

Cruise lines, ports and destinations (cities or regions) are highly interrelated in the provision of the final cruise product. They establish a kind of joint venture that needs to satisfy all the parties involved. Cruise lines invest in the ship and destinations invest in port facilities. Nevertheless, the continuous increase of ship size and the need for better facilities from the cruise lines put the ports under substantial pressure. PALLIS (2015) refers that, while competing, cruise ports also develop cooperation practices to strengthen their market position, in a perfect case of ‘coopetition’. A manifestation of this behaviour is the existence of several port cruise associations, particularly in Europe.

According to SEIDL *et al.* (2006), economic issues surrounding the cruise industry go far beyond the typically tracked tourist expenditures, including direct and potential impacts on port authorities and port communities, hidden environmental impacts on marine and coastal ecosystems, or distributional impacts and cultural implications of cruise tourism development.

GUI and RUSSO (2011), in their study of the relationship between a port city and cruise lines, considered a Global Value Chain approach, which is a key tool for analysing economic transactions between global players and local/regional economic systems, particularly suited for the study of the tourism production system.

The vast number of interactions involved in the cruise Global Value Chain is depicted in Figure 5.3. The activities that normally link cruise lines with visited destinations are highlighted in black. Following the tourists through all the sequence of travel-related activities permits to better understand the productive interactions associated with the vacation experience. The chart provides a clear – albeit simplified – representation of the complexity, variety, number of actors and relationships that substantiate this tourism product. Transport, hotel, port and onshore services have evident linkages with the visited destinations.

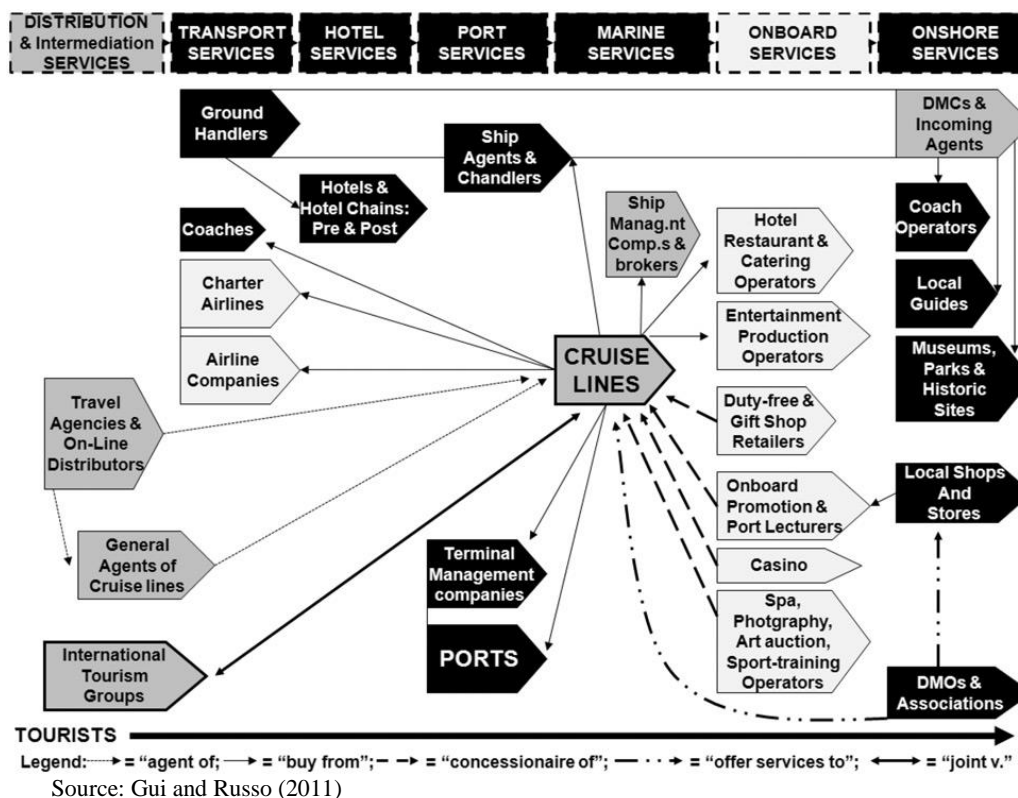


Figure 5.3 The cruise Global Value Chain approach

### 5.3.2 Types and measurement of expenditures

DWYER, DOUGLAS, and LIVAIK (2003), mentioned by DOUGLAS and DOUGLAS (2004), and BRIDA and AGUIRRE (2009), report four types of expenditure that must be considered when analysing the economic impacts of cruises: (1) passenger-related expenditure; (2) crew-related expenditure; (3) vessel-related expenditure; and (4) support expenditure. DWYER and FORSYTH (1998) considered three basic categories of expenses: cruise line, passenger, and crew expenses, as LEKAKOU *et al.* (2009), BREA (2012) and TORBIANELLI (2012) did. The EUROPEAN COMMISSION (2009) differs slightly from previous authors with respect to cruise line outlays, considering that the economic impacts generated by shipbuilding, cruise ship suppliers, and the setting up of headquarters of the cruise companies should be left out from the analysis, as their impact does not ultimately affect coastal regions.

Apart from the definition of such categories, the most immediate impacts of cruise ship calls are due to expenditures by passengers and crew.

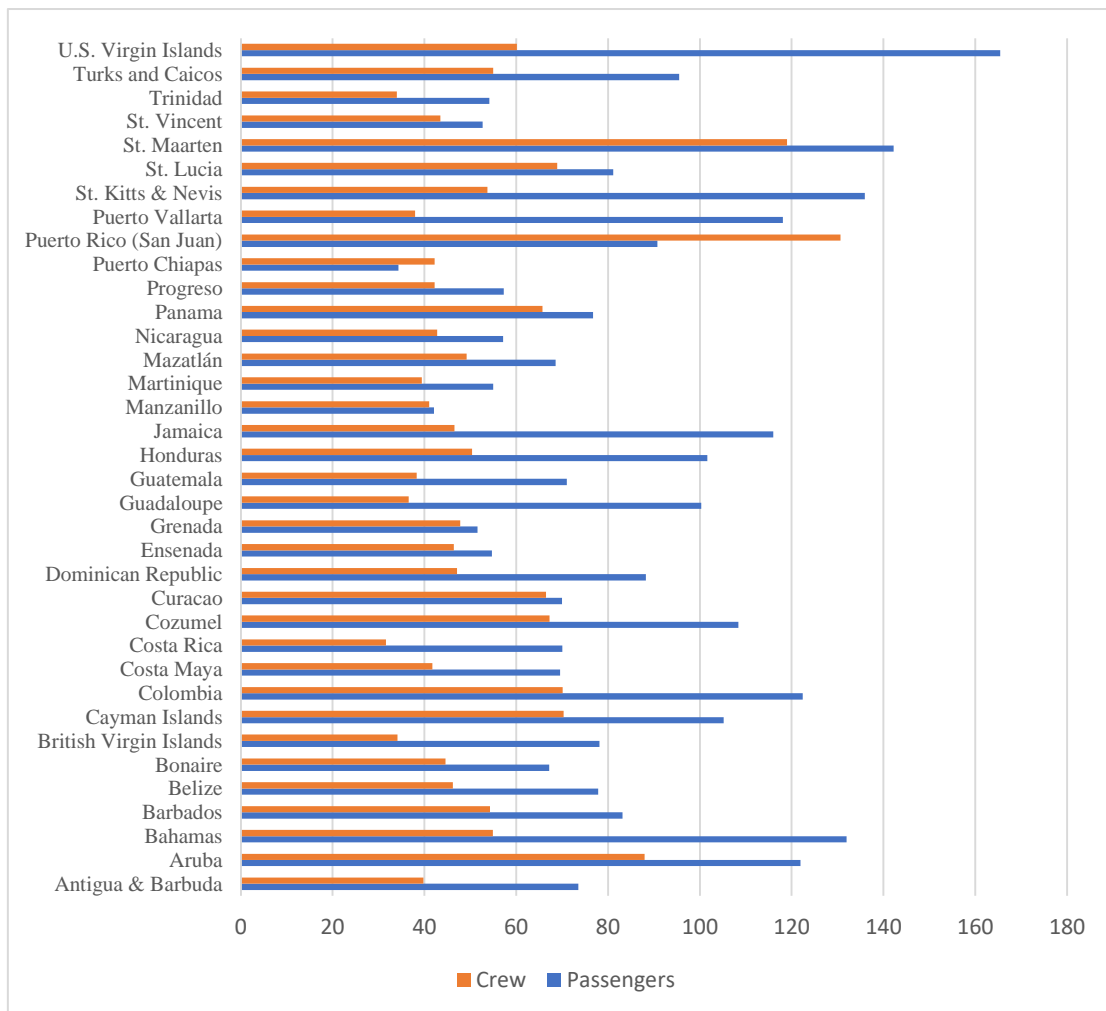
DWYER *et al.* (2003), according to DOUGLAS and DOUGLAS (2004), mention a set of arguments about the difficulties in measuring the impacts of a cruise visit. In this context, most work to date has been based on a mixture of hypothetical and observational data, sample expenditure surveys and multipliers. BRIDA and ZAPATA (2010b) put in evidence the question about the quality of the surveys and DIAKOMIHALIS *et al.* (2009) the lack of sufficient and reliable data. KLEIN (2005) is particularly critical about the figures presented by the cruise industry. The author refers a particular study done for Key West in 2004/2005, which revealed significantly lower values than those projected from the industry since the values obtained did not include tickets for tours and attractions purchased by passengers while on board the cruise ship.

Furthermore, DOUGLAS and DOUGLAS (2004) point out several relevant aspects that can have a major impact on the behaviour of passengers: (1) the weather during the time in port, being natural that the most pleasant the weather the greater the propensity to spend; (2) the port characteristics, in which those with direct access to the city are more likely to spend; (3) the profile of passengers of the cruise, differing significantly the consumption pattern depending on the age of cruisers; (4) the profile of vendors, in which cultural and linguistic aspects are determinants; and (5) the acquisition of shore excursions, which for the great majority is done on board several days before the respective port is reached. All these aspects can greatly influence the level of spending by passengers and crews on a cruise call. Additionally, other studies mention a positive relationship between the number of hours in a port and the money spent there (HENTHORNE, 2000; BRIDA *et al.*, 2010).

### 5.3.3 Spending in a cruise visit

In a study for OECD's Port-Cities Program, MERK (2013) assembled data from 75 different ports, obtaining a minimum of 34 USD, an average of 100 USD and a maximum of 309 USD

for the amount spent per passenger in cruise visits. The same average value was encountered before by KLEIN (2005) and RODRIGUE and NOTTEBOOM (2012). The EUROPEAN COMMISSION (2009) also presents some important information on this type of spending based on results from 17,400 surveys conducted in different European cruise destinations. The average expenditure by a transit tourist in a European destination is 86 USD, while a turnaround tourist spends 136 USD. Crews tend to spend 36 USD per disembarkation and person, and it was found that, on average, 50% of the crew disembarks in a port visit. Nevertheless, crew spending is frequently overlooked.



Source: BREA (2018)

Figure 5.4 Average expenditure of passengers and crew members in Caribbean ports (USD)

Data for the Caribbean in the season 2017/2018 is presented in Figure 5.4, being the average for passengers and crew members significantly different: 101.52 USD and 60.44 USD, respectively, but with significant variations across destinations. Furthermore, average expenditure per passenger remained almost unchanged relative to the value observed in the season 2014/2015, and with only a slight increase from the average expenditure of 95.92 USD registered in the season 2011/2012. For average expenditures by crew, a continued drop over time is observed. In fact, data for the season 2011/2012, for example, presented similar average expenditures for both cruise passengers and crew, around 96 USD (BREA, 2012).

The different spending categories of cruisers are a subject of particular interest, being shore excursions a very popular expenditure. For Caribbean destinations, according to BREA (2018), over half (52.6%) of all passengers make such excursions, being the average value of each excursion 74.68 USD. Furthermore, according to the same report, the weighted average spend per passenger on shore excursions was 25.27 USD and local tour operators received an average of 48.01 per passenger directly from cruise passengers and cruise lines. In turn, the EUROPEAN COMMISSION (2009) estimates that 65% of the passengers participate in an organized tour and that around 80% of them purchase it on the ship. This fact has consequences for expenditure, since tours that are pre-booked on the ship tend to be more expensive, by around 50%. This phenomenon of on-board acquisition of excursions, with prices substantially higher than on shore, is part of the business model of cruise operators, established mainly after the terrorist's attacks of 9/11, with a tendency for the reduction of ticket prices and additional on-board revenues (GUI and RUSSO, 2011; VOGEL, 2011; KLEIN, 2005).

## 5.4 Cruise Tourism in Macaronesia

### 5.4.1 Overview

Insularity is, somehow, the paradise condition, nurtured by operator and travel agents, being the Caribbean the first example of this reality (LESTER and WEEDEN 2004). Progressively, the

phenomenon has expanded to other islands that saw in tourism an important tool for local development. For small islands, tourism specialization is a vital part of their development strategies, since it allows them to transform most of their natural disadvantages into a productive factor (BRESSION and LOGOSSAH, 2011). This specialization in tourism has two main components: stayover and cruise tourism.

The North Atlantic islands of Azores, Canaries, Cape Verde and Madeira, which form the Macaronesia region, are examples of a reality where tourism is, although in different degrees, a particularly important activity. Cruise tourism has been growing considerably, complementing the more traditional sector of stayover tourism. In fact, the long tradition of connection between the old and new continents of Europe and the Americas prevalent in those islands has been renewed by the development of cruise tourism in those archipelagos, mainly in the Canaries and Madeira, which account for the vast majority of cruises and cruise tourists. The southern archipelagos of Canaries and Cape Verde have, in addition, strong relations with Western African countries.

Table 5.1 Stayover tourists and cruise tourists in Macaronesia (2011-2019)

Destinations	Stayover tourists (thousands)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Azores	382	364	373	396	506	626	765	841	972	
Canary Islands	12,000	11,768	12,188	11,792	13,301	14,981	15,976	15,561	15,116	
Cape Verde	475	534	552	540	569	644	717	766	819	
Madeira	1,037	995	1,083	1,140	1,217	1,365	1,435	1,608	1,591	
Destinations	Cruise tourists (thousands)									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Azores	87	103	87	96	142	126	136	164	149	
Canary Islands	1,589	1,718	1,624	1,913	2,185	1,983	2,206	2,351	2,554	
Cape Verde	26	37	64	63	62	72	38	47	52	
Madeira	543	594	477	477	580	522	541	541	595	
Destinations	Cruise tourists/Stayover tourists									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Azores	23%	28%	23%	24%	28%	20%	18%	20%	15%	
Canary Islands	13%	15%	13%	16%	16%	13%	14%	15%	17%	
Cape Verde	5%	7%	12%	12%	11%	11%	5%	6%	6%	
Madeira	52%	60%	44%	42%	48%	38%	38%	34%	37%	

Source: National/Regional and Port Authority Statistics

Globally, as shown in Tables 5.1 and 5.2, cruise tourism has been growing rapidly over the last years in the different Macaronesian archipelagos, with a few exceptions. Between 2007 and 2019 the average growth rate was approximately the double of the observed for the industry as a

whole in the same period. The differences between the archipelagos and their ports are particularly evident in the data contained in the same tables. For example, the importance of tourism in the Canary Islands stands out very notoriously, with more than 15 million stayover tourists and over 2.5 million cruise tourists in 2019. These volumes of tourists suggest that this destination is well-established in both segments. In respect to cruise tourism, for example, itineraries include this archipelago as a specific destination, with base ports in Santa Cruz (Tenerife) and Las Palmas (Gran Canaria), and contemplating, in a significant number of calls, Madeira's main port (Funchal).

Table 5.2 Cruise passengers in the main ports of Macaronesia (2011-2019) <sup>(\*)</sup>

Destinations/Ports	2011	2012	2013	2014	2015	2016	2017	2018	2019
<b>Azores</b>	<b>87</b>	<b>103</b>	<b>87</b>	<b>96</b>	<b>142</b>	<b>126</b>	<b>136</b>	<b>164</b>	<b>149</b>
Ponta Delgada (São Miguel)	79	87	73	79	104	97	99	123	107
Horta (Faial)	3	10	7	11	20	17	13	16	9
<b>Cape Verde</b>	<b>26</b>	<b>37</b>	<b>64</b>	<b>63</b>	<b>62</b>	<b>72</b>	<b>38</b>	<b>47</b>	<b>52</b>
Porto Grande (Mindelo)	17	28	40	37	36	49	23	23	28
Praia (Santiago)	8	9	24	26	26	23	12	18	16
<b>Canary Islands</b>	<b>1,589</b>	<b>1,718</b>	<b>1,624</b>	<b>1,913</b>	<b>2,185</b>	<b>1,983</b>	<b>2,206</b>	<b>2,351</b>	<b>2,554</b>
Santa Cruz (Tenerife)	607	669	528	545	644	559	618	663	739
Las Palmas (Gran Canaria)	426	426	425	588	683	611	642	676	722
Arrecife (Lanzarote)	258	328	320	359	435	378	425	423	520
Santa Crua (La Palma)	183	183	207	230	207	224	246	256	247
<b>Madeira</b>	<b>543</b>	<b>594</b>	<b>477</b>	<b>477</b>	<b>580</b>	<b>522</b>	<b>541</b>	<b>541</b>	<b>595</b>
Funchal (Madeira)	540	593	476	476	578	520	539	538	592

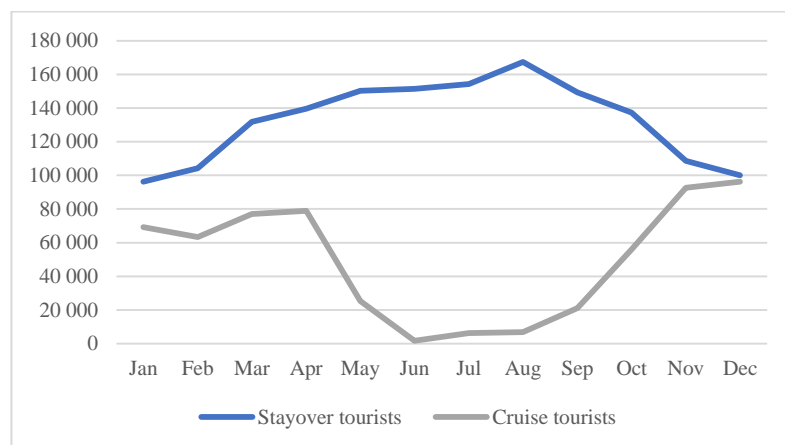
<sup>(\*)</sup> Thousands

Source: National/Regional and Port Authority Statistics

The archipelago of Madeira has a particular profile in the context of the Macaronesia region, due to the higher relevance of cruise tourists relative to the number of stayover tourists. This higher percentage of cruise passengers relative to stayover tourists may constitute a harmful combination with shore tourism. In fact, according to MARUSIC *et al.* (2008), land-based tourists dislike seeing cruise passengers in the destination and complain about the noise generated by the cruise ships. In the case of Funchal, these circumstances are mitigated by the fact that, as shown in Figure 5.5, the peaks in cruise tourists and stayover tourist are not coincident. The same does not happen in Mediterranean ports, where both peaks occur in summer season.

Tourism in Azores and Cape Verde is, in comparison to the other archipelagos, still in an early stage. Azores is an example of a destination dominated until 2015 by stagnation, in great extent

due to the restrictions imposed by Public Service Obligations (PSO) in air transport until that year. In opposition, its cruise tourism policy, which combined a considerable investment in major ports (Ponta Delgada and Horta) with continuous promotion efforts, has led to a steady increase in the number of cruise calls and passengers in recent years, with some yearly fluctuations. In turn, Cape Verde have been registered a considerable increase in stayover tourists over the last decade but a slow development in cruise activity. In fact, only in the years of 2013 to 2016 the number of cruise passengers became more significant. The lack or deficient conditions of port infrastructure is, for sure, a relevant factor in this context, limiting the number of calls in this archipelago.



Source: Madeira Statistics Office and Port Authority

Figure 5.5 Cruise tourists and stayover tourists in Madeira in 2019

The seasonal characteristics of cruise passenger movements in the archipelagos of Macaronesia and also in the Northwest European and Mediterranean ports, the main closest destinations, is evidenced in Table 5.3 (using data from year 2019 for Macaronesia). One of these characteristics deserves to be underlined: the high incidence of cruises in winter months for all archipelagos of Macaronesia, in contrast to the Northwest European and Mediterranean ports. The Azores and Cape Verde are mainly associated with repositioning or transition calls, which occur twice a year: in the months of March, April and May; and in the months of October, November and December. In the case of Madeira and Canary Islands, reality is somehow different, covering all winter months. This fact is directly linked with the existence of an



established cruise market, which means a significant and regular number of cruises calls in those two archipelagos during the entire winter season due to the favourable climate conditions. In the summer season the preference of cruise operators is for itineraries covering Mediterranean and Northwest European ports, as shown in Table 5.3.

Table 5.3 Seasonality of cruise passengers in Macaronesia and Europe

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Azores	6%	2%	14%	27%	21%	3%	0%	1%	4%	5%	12%	4%
Cape Verde	11%	1%	10%	8%	0%	0%	0%	0%	0%	11%	42%	16%
Canary Islands	15%	14%	17%	12%	2%	0%	1%	1%	2%	5%	16%	17%
Madeira	12%	11%	13%	13%	4%	0%	1%	1%	4%	9%	16%	16%
Northwest European ports	0%	0%	0%	3%	13%	24%	28%	24%	10%	0%	0%	0%
Mediterranean ports	2%	2%	4%	8%	13%	11%	10%	11%	13%	15%	8%	3%

Source: National/Regional and Port Authority Statistics and European Commission (2009)

The geographic location of the archipelagos also contributes to this level of performance. In fact, the relative proximity to Europe has been a vital element for the development of cruise tourism in Macaronesia, especially in the archipelagos of Canaries and Madeira, where the climate is more temperate than in Europe, particularly in the winter months. Furthermore, their attractiveness is linked with the level and density of activities highlighted in black in Figure 5.3 for these two destinations, especially in respect to onshore services that include coach operators, local guides, museums, parks or historic sites and local shops or stores.

In the following subsections, we characterize in more detail the situation in the different archipelagos.

#### 5.4.2 Cape Verde

Cape Verde is the only independent country amongst the archipelagos of Macaronesia and its strategy towards cruise tourism is in a particular early stage. This archipelago has two main cruise ports: Mindelo (Sao Vicente), with 61% of total passengers in average between 2011 and 2019, and Praia (Santiago), with 35% for the same period.

Most cruises calling at present at Cape Verde correspond to transatlantic repositions, connecting Europe with South America and the Caribbean, and some head to Asia (for example Singapore

or India). Usually, these cruises also make a call at the Canaries. Aida Cruises, for example, with ships based on the Canaries, have several 14-day cruises with calls in Cape Verde (Mindelo and Praia) or, alternatively, 7-day cruises with calls in Funchal.

The perspective of the government of Cape Verde is to develop cruise tourism as a complement to stayover tourism, thus enlarging their tourist product portfolio. The recent efforts of the authorities are very significant, focusing on three main areas: the construction of a cruise terminal in the port of Mindelo, scheduled for the first months of 2022; the continuous presence in several conventions to promote the cruise destination; and the creation, in 2013, of *Comunidade Cabo-Verdiana de Cruzeiros* (Cape-Verdean Community of Cruises), to associate several partners of the port community involved in the cruise business.

Regarding the port infrastructure of Mindelo, the government of Cape Verde presented in 2011 a project of around 44 million USD to ORIO – Facility for Infrastructure Development, a program managed by the Netherlands Enterprise Agency. The project consists in the construction of a berth of 400 meters, a dedicated cruise ship terminal of 900 m<sup>2</sup> and auxiliary facilities, and was considered eligible by ORIO for partial funding, as well as by the OPEC Fund for International Development.

This measure is part of a Strategic Plan for Cruise Tourism prepared by PWC (2014). The expectations are high: to contribute to national economic growth by developing Cape Verde as an attractive cruise destination and increasing the marketability of their tourist product. Furthermore, the objective is to transform the cruise terminal of Mindelo into a base port for cruises in the archipelago, and not exclusively a port of call, following the examples of some Caribbean Islands and of the Canarian ports of Santa Cruz de Tenerife and Las Palmas.

One of the main challenges to overcome is linked with the logistic aspects related with land transport, reception planning and tourist operations, especially excursions, associated to the calls of the larger cruise ships, for such magnitude the ports of Cape Verde are not yet prepared. Finally, a reference about spending patterns of cruise passengers in Cape Verde: PWC (2014) mentions a rough estimate of 62 USD, without further details.

### 5.4.3 Azores

Similarly to Cape Verde, the Azores are in a relatively early stage regarding cruise tourism. In this outermost region of the European Union, the reality is still a predominance of repositioning calls and calls associated to the Caribbean itineraries. These itineraries represent around 60% of the calls in Azorean ports and 80% in the particular case of the port of Ponta Delgada, while cruises linked to Atlantic islands account for about 15%. Cruises inside the Azores, which are mainly expedition/exploration cruises, represent 30% of the calls in the Azorean ports. However, in respect to number of passengers, this type of cruises is absolutely marginal (5% of the total passengers), due to the reduced size of the ships involved.

The literature about cruise tourism in Azores is rather scarce. One of the few studies available is RAMALHO (2006), which contains a characterization of cruise passengers in the port of Ponta Delgada. According to this study, the average passenger is 64 years old, and 52% of the passengers belong to the age range between 60 and 74 years old. British and North American are the main nationalities, respectively for 39% and 47% of the passengers. Many passengers travel accompanied by the spouse (61%). A very large fraction of passengers (92%) is composed by cruise repeaters, which testifies the high degree of customer loyalty in the industry. For 83% of the passengers the first information about the destination was obtained in the ship, and 69% considered that the visit was better or much better than expected. The value of spending is mentioned in this work without great emphasis, being the average 73.42 USD. The main items acquired are liquors and alcohol (19.4 USD) and excursions (14.05 USD). However, data from the Statistical Bureau of the Azores, covering all islands of the archipelago, present a significant lower average value of 13 USD per cruise passenger, being the evaluation of the destination extremely high, with 9 in a 10 points scale (SREA, 2018).

In another study (SILVESTRE, SANTOS, and RAMALHO, 2008), the two main factors driving the behavioural intentions of cruise passengers in Azores are linked, in the first place, to

the city, its attractions in general and the individual's level of satisfaction with the overall visit, and secondly, with lesser importance, to the perceptions of hospitality, safety, services and cleanliness of the environment.

Finally, LUZ (2014) analysed the importance of excursions in the port of Ponta Delgada and estimated that in 2012 around 40% of cruisers bought an organized excursion package. The estimate of global revenue is about 2.5 million USD, being around one million USD retained by local operators.

Some particularities about cruising with special interest for the Azores should be mentioned here, based on DOUGLAS and DOUGLAS (2004). It is, for instance, the case of weather conditions, with direct influence over spending patterns of passengers when at ports. The Azores are characterized by a rather unpredictable weather and particularly exposed to this situation. In opposition, long days of sailing time before a ship call make it more appealing for passengers to visit the city and the island. LUZ (2014) points out that the sequence of the call on the cruise ship itinerary may also be important in spending patterns, due to the fact that the proximity of the ending of the cruise trip may imply a stronger appeal to shopping, especially for gifts to relatives or friends.

As in the case of Cape Verde, the government and local authorities of the Azores have the perception that the financial return generated by the cruise terminals is not enough to compensate for operating costs. The investments in the cruise terminals of Ponta Delgada (an 88 million USD project) and Horta (with a global cost of around 44 million USD), both part of urban renewals of the seafront, provided a remarkable improvement in the conditions for reception of cruise ships and passengers. These ports are among the main cruise ports of the archipelago, while the other ports, with exception of the port of Praia da Vitória, in the island of Terceira, do not have the proper conditions for mass cruise tourism, being more tailored for expedition cruises, a niche market involving smaller ships and fewer passengers.

#### 5.4.4 Madeira

With almost 600,000 cruise passengers in 2019, the importance of cruise tourism in Madeira is considerably higher than in the Azores and Cape Verde. The port of Funchal concentrates almost all port calls in the archipelago, being one of the two main cruise port of Portugal. Funchal is also a major port of call in the context of the cruise product ‘Atlantic Islands’, due to its proximity to the Canary Islands. The port authorities of Madeira and Canary Islands have a strong relationship and created a mutual brand especially focused on the promotion of their destinations. The brand ‘Cruises in the Atlantic Islands’ was created in 1994 (Cape Verde joined the brand in 2006). This complementarity between both archipelagos was emphasized by EDEI, a consulting firm that has been producing reports about cruise tourism in the Canary Islands since the year 2000, in some cases including information about Madeira.

Madeira is considered a destination with a high degree of satisfaction and recommendation of the destination (ALMEIDA, 2011; GOUVEIA, 2015). Also, SOUSA (2004) considers, notwithstanding the peripheral situation of Madeira relative to the major source markets, that the island managed to position itself in the cruise market. The tourism product of Madeira, the existence of facilities and services to visitors, the gentleness of the people, the peacefulness and political stability, in addition to the climate and geographical location, are the main advantages of this destination in cruise tourism. The level of satisfaction of cruise tourists is even higher than that observed for stayover tourists (DRCIE, 2011).

Additionally, the port of Funchal has received in the last few years several awards by Dream World Cruise Destinations and by Cruise Insight, in annual Cruise Shipping Miami events. All these prizes are the recognition for the work carried out by regional authorities since the early 1990s to gradually transform the port of Funchal into an infrastructure dedicated to cruise tourism and nautical recreation, with transfer of freight and containers to a new infrastructure. This transformation, completed in 2015, included the construction of more 330 meters of quay integrated in a 20 million USD rehabilitation project of Funchal’s seafront.

There are, notwithstanding, several risks associated with this policy, as one can see in the noteworthy decrease observed in 2013 and 2014 in the number of cruise passengers (see Table 5.2), and also the already observed particularly high number of cruise tourists relative to stayover tourists. Additionally, being Madeira part of cruise itineraries that also comprise several Canarian ports, one can consider that the relatively less favourable tax system of Madeira may have direct consequences in the level of spending of cruise passengers and crews. In this sense, shopping is particularly oriented to local products like wine, flowers and handicraft, attracting the attention of a substantial number of cruise tourists and being directly associated to the main activity of cruisers, which is walking through the city and visiting the main local market (GOUVEIA, 2015). Taking in consideration that, according to CHASE and ALON (2002), cruise passenger spending is often directed towards shopping where local content is low, the preference for local products in the case of Madeira may be considered an exception, particularly in comparison with the main cities of Canary Islands, where cruisers' spending is mainly oriented to international brands whose prices are lower than in origin countries due to the tax regime in this destination.

In Madeira, excursions are not a particularly important activity for cruisers. In the last surveys carried out by EDEI that included Madeira, regarding the season 2004/2005, this activity attracted only 20.3% of the passengers, which is significantly less than the percentages observed in the Caribbean and in the Mediterranean. Excursions are mainly acquired on board (ALMEIDA, 2011; GOUVEIA, 2015), although a growing percentage of alternative solutions, like sightseeing buses, taxis, or car rental are being used by cruisers. These alternative solutions are directly associated to a significant (around 30%) percentage of cruise repeaters of the destination (DRCIE, 2011; GOUVEIA, 2015).

The profile of cruise tourists visiting Madeira was described in the already mentioned studies of DRCIE (2011) and GOUVEIA (2015): the great majority of the respondents are German and British, travelled accompanied and being most of them older than 65 years. GOUVEIA (2015)

identified that 85% of cruise passengers have already embarked in previous cruises, with an average of nine cruises, which represents an extremely high level of cruise repeaters.

The Tourism Board of Madeira calculated an average spending of around 90 USD, reviewed later to 104 USD, according to ALMEIDA (2011). This author, though, could not confirm these values, obtaining, through a survey, spending values almost always lower than 52 USD. This has to do, for sure, with spending values without excursions, notably excursions contracted on board, as mentioned by the literature about the topic. Furthermore, DRCIE (2011) also presented some information about the values spent for stayover and cruise tourists, with a prevalence of values below 65 USD for the latter ones. More recent data presented by GOUVEIA (2015) points to an average spending by cruise passengers of 53.47 USD. Cruise repeaters presented a lower level of spending (50,42 USD) relative to first-visit cruise passengers (69 USD). Another relevant element is the comparison between the average level of spending with and without excursion. On the first case, the average expenditure per passenger is higher, reaching 79.20 USD, while passengers that don't buy excursions on this destination present an average spending value of 47,64 USD.

Crew expenditures on the destination was also identified by GOUVEIA (2015). Curiously, according to the author, the spending level of the crew is higher than that of the passengers (69.42 USD). The main item of the spending pattern is shopping (61,97 USD), followed by food and beverage (23,56 USD).

Relative to the possibility of visiting the destination as a conventional tourist and that of recommendation of the destination to relatives and friends, GOUVEIA (2015) obtained from the respondents an extremely high value of 4.45 in a 5-point Likert scale. The respondents indicated an average of 10 to 11 persons to which they would recommend the destination. This number provides an interesting perspective about the potential of a cruise visit in terms of the promotion of the destination directly on potential visitors, confirming the perspective of PENCO and DI VAIO (2014) about the importance of word-of-mouth in the enhancement of the image of the destination.

#### 5.4.5 Canary Islands

The dimension of cruise tourism in Canary Islands is absolutely outstanding in the context of Macaronesia, as evidenced before in Tables 5.1 and 5.2. In fact, the Canary Islands are currently a mature cruise destination, with itineraries covering a group of islands, each one with its own peculiarities, with start and ending in Las Palmas or Santa Cruz de Tenerife, ports that work as base ports in such itineraries. The volume of cruise passengers that embarked and disembarked in these ports is very significant, particularly in the port of Las Palmas with over 60% of the total of cruise passengers in 2019, and in Santa Cruz de Tenerife, with a percentage around 20% for the same year. Aida Cruises, Thomson Cruises, TUI Cruises are examples of cruise companies based on the Canary Islands at least since the winter season of 2011/2012.

The pivotal condition of Canarian ports in the region is supported by some particular characteristics: (1) ideal location for cruise itineraries due to their distance relatively to Europe and air connectivity for traditional tourism that can be used also for cruise tourism; (2) geographic position that can capture repositioning cruises between Europe and the Caribbean; (3) moderate climate, attractive and differentiated environments that are extremely valued by tourists, with a mixture of typical cities and natural landscapes; (4) port infrastructure with high quality for cruise calls; (5) high quality land tourism services. These points are quite similar to those referred by UNCTAD (2001) about base ports. Additionally, it should be stressed the political stability and safety of the destination, as well the synergies between cruise tourism and the tourism sector in general.

The successive works of EDEI covering about two decades of cruise tourism in the Canarian Islands contain relevant information based on industry inquiries and passengers' surveys, promoting a perspective over time.

Concerning the characterization of cruise tourists and that of the trip, one can consider a stable and consolidated market of winter cruises dedicated to the islands of the Canaries and Madeira,



but also covering the Azores and Cape Verde. The main source market is the European countries, mainly from Germany and United Kingdom, representing those two nationalities more than 80% of all cruise passengers.

In general, the cruise tourists of the Canaries travel accompanied, in couple. There are two main groups: one group of passengers between 41 and 65 years old, with an average or high average revenue class; and the other of more than 65 years old, of an average or low average revenue class. Over the years, there has been a growing percentage of passengers that declared that this was not the first time they were visiting the Canary Islands, with an increase of 10 percentage points between 2012 and 2015, reaching 70% in the winter season 2014/2015 (EDEI 2015). This level of repetition is particularly high for older passengers. For those, the most relevant aspect is the climate. The motivation and interests revealed are mainly the itinerary and the quality-price relationship. Other aspects include the confidence in the cruise operator, a factor especially important for older cruisers. This is clearly the recognition about the attractiveness of the tourism destination, but it also carries several risks regarding its future sustainability as a cruise destination.

The main activity of cruisers when visiting the Canary Islands is to visit the city, followed by shopping. According to data from EDEI (2015), 63.3% of the respondents shopped, being the acquisition of local products more frequent in the islands of Tenerife, La Palma and La Gomera, while in Gran Canaria, Lanzarote and Fuerteventura, shopping is oriented mainly to clothes of international brands. Excursions to visit the island are not a priority for cruisers. Only around 10% of cruisers have contracted excursions, with first-time cruisers contracting slightly more excursions than cruise repeaters. Additionally, excursions are more frequent in islands such as Tenerife and Lanzarote than, for instance, in Gran Canaria, where cruisers are more focused on visiting the city, shopping and going to the beach.

The evolution about the level of spending by cruise passengers in the Canary Islands is shown in Table 5.4, reflecting the impact of the economic crisis in recent years and, eventually, the high level of repetition of the cruise destination, as the values observed in the winter season

2014/2015 advocate the need of a careful and delicate analysis. It should be mentioned that the acquisition of shore excursions has a significant impact on the level of expenditure, leading the presentation of two distinct values per year, with and without excursion. Aggregate average expenditure in winter season 2014/2015 reached 48.30 USD, with higher average spending values obtained in the islands of Lanzarote (59.22 USD), Tenerife (57.13 USD) and Gran Canaria (53.05 USD).

Table 5.4 Cruise passengers' expenditure in several seasons

	Average Expenditure (USD)	
	With Excursion	Without Excursion
Season 2001/2002	64.42	39.11
Season 2003/2004	104.21	70.80
Season 2004/2005	103.76	73.37
Season 2008/2009	80.04	44.14
Season 2011/2012	88.86	50.60
Season 2014/2015	51.17	47.75

Source: EDEI (2012); EDEI (2015)

For the cruise tourists that contract an excursion, this is their main expenditure (44% of the average expenditure for winter season 2014/2015). Remaining spending includes shopping (36%), food and beverage (15%) and other residual items. For those that do not contract any excursion, expenditures consist mainly in shopping (56%), food and beverage (22%) and transport services (16%). In global terms, more than half of cruise passengers in the Canary Islands spend money.

Regarding the intention of repeating or recommending the destination, positive responses about cruise repetition intention were extremely high. The valuation of the destination experience was extremely high and stable, being the sum of "as expected" or "better than expected" of 95% of the respondents. Recommendation from friends and family is particularly relevant for younger cruisers with less than 40 years old, confirming thus the perspective of PENCO and DI VAIO (2014) about the importance of word-of-mouth in the enhancement of the image of the destination. The preference for this destination, in the moment of deciding which one to choose, is mainly associated with the climate and the possibility of visiting a diversity of islands in the same area, besides the possibility of enjoying the cruise trip. It should be stressed that this high

level of intention of repeating or recommending the Canarian destinations is relatively similar to those registered in the case of Madeira, confirming the attractiveness of both archipelagos as cruise destinations.

A further relevant point to be mentioned is related to the situation of base port in itineraries covering the islands and the possibility of generating additional revenues for the destination, as extensively reported by the literature. For such cases, EDEI (2012, 2015) mention that the possibility of airlifting from Europe to the Canaries in the same day have a direct impact on the low adherence to “cruise & stay” packages. In fact, for the season 2014/2015, only 4.5% of cruise passengers opted for that type of packages, being the most relevant island for this option Gran Canaria. Thus, the potential of extra overnight stay in hotels at the destination related to the possibility of starting and/or ending the cruise in the Canaries have no significant impact on the local economy.

Table 5.5 Comparison between Canary Islands and other cruise destinations

Cruise Destinations	Better	Equal	Worse
	Than Canary Islands		
Caribbean	19%	77%	4%
West Mediterranean	13%	86%	1%
East Mediterranean	13%	83%	4%
North Europe/Baltic Sea	28%	66%	6%
Alaska	40%	48%	12%
Transatlantic	29%	63%	8%
Turkey and Greek Islands	9%	84%	7%
Midle East	18%	56%	26%
Asia	15%	75%	11%

Source: EDEI (2015)

The comparison of the Canary Islands with other cruise destinations is another interesting exercise. In this domain, the data from EDEI (2012, 2015) reveals that the Canary Islands are not a particularly distinctive destination: a large percentage of respondents stated that the Canary Islands are mainly equal or worse than other destinations. In table 5.5 we present the results obtained in the survey for winter season 2014/2015, comparing the Canary Islands to the several other cruise destinations. The conclusion is that the Canaries are relatively well positioned in comparison with the most relevant cruise markets, namely the Caribbean and the Mediterranean, with a substantial percentage of passengers classifying identically both regions.

The major differences were observed to less massified cruise destinations like North Europe, the Baltic Sea or Alaska, that were considered in a higher percentage by the respondents better than the Canaries.

One of the main areas where destinations may intervene directly to improve the satisfaction of cruisers is investing in ports, which has been done consistently by Canarian ports. In the season of 2015/2016, the port of Santa Cruz began to operate a new cruise terminal, with capacity to receive cruise ships of 4,000 passengers and to act as base port for up to five cruise ships, in a 9 million USD project, announced as the most modern cruise terminal in the Macaronesia region, designed to handle the next generation of green cruise ships powered by liquefied natural gas (LNG). The port of Las Palmas has also been modernizing its infrastructure. In 2008 the quay was prolonged by 310 meters through a 10 million USD project and, in 2013, an upgrade in the access to the cruise terminal was conducted, a 6 million USD project. Also, the port of Arrecife (Lanzarote) was substantially improved with the construction of a new terminal with 315 meters of quay for cruise ships, concluded in 2012, for a total investment of almost 20 million USD.

Meanwhile, the two port authorities that own the cruise terminals of Canary Islands have been promoting and implementing significant improvements regarding a greater interaction with international cruise industry players and an upgrade in the governance model applied to cruise terminals operation. In this sense, a concession agreement between the Port Authority of Santa Cruz de Tenerife and Carnival was signed in 2018 to operate the Santa Cruz de Tenerife Cruise Terminal. More recently, in 2021, the Las Palmas Port Authority launched a public tender process for the concession of a new cruise terminal in the port of Las Palmas and the exploitation of all the cruise terminals of that Port Authority.

Additionally, it should be stressed that during the COVID-19 pandemic, unlike other European ports that were closed to cruise traffic during 2020, the ports in the Canary Islands welcomed over 800,000 passengers with “bubble cruises” around the islands in that year. This is a clear example of resilience that illustrates the ability of Canary Islands to overcome the present challenging times.

## 5.5 Conclusions

Cruise tourism is an increasingly important industry, revealing a particularly dynamic profile with strong annual growth rates and resilience to seasonality and to cyclical international crises. This dynamic profile has also been evident in the increasing number and size of cruise ships. Three main cruise operators concentrate a substantial share of the cruise market, through a variety of brands, covering the main expectations of cruise customers. They are mainly oriented to the Caribbean and the Mediterranean, representing around 70% of the cruise market.

The development of the sector, with increasingly larger ships equipped with increasingly sophisticated entertainment facilities, demands from ports and destinations a continuous process of modernization and adaptation, with considerable levels of investment in port infrastructure. In this context, and as highlighted by TEYE and PARIS (2011), while there can be positive benefits of cruise tourism in small islands, often development decisions are based on an illusion and on limited data supporting the expected impacts.

The islands are typical destinations for cruisers, being the Caribbean the most notorious example with the greatest market share in the industry. The study described in this paper addressed the economic impacts of cruise tourism with a focus on the Macaronesian archipelagos (Azores, Canary Islands, Cape Verde and Madeira), which are increasingly relevant destinations for the cruise industry.

This dynamism that characterizes the Macaronesia region has been fostered by two key drivers: first, the proximity to Europe, the second largest cruise emission market; second, the favourable climate conditions for tourism activity in the winter season, complementing thus the Mediterranean and North European markets, which are more important in the summer months.

The recent investments in various port structures carried out in all four archipelagos with a direct implication in the improvement of service quality, was a critical factor for the development of this cruise destination. Nevertheless, the development has been uneven, as Macaronesian archipelagos are in two distinct stages with respect to cruise tourism. The Canary

Islands and Madeira are well-established destinations for cruises, as expressed by the number of calls and passengers, being in a consolidation phase. The Canary Islands play a pivotal role in cruise itineraries in the area, due to the number of ports with suitable facilities for cruise ships and including the main port of Madeira in the itineraries. Additionally, the ports of the Canarian Islands are devoting significant attention to the evolution of governance models in cruise ports, promoting the concession of their terminals. In contrast, the Azores and Cape Verde, still with a limited number of calls and passengers, are in a development phase. The insufficient number of adequate terminals in these two archipelagos determines the future development of cruising for the smaller islands. In this case, the more appropriate option may be expedition cruises, with smaller ships and fewer passengers. Due to the proximity of Cape Verde to the Canaries, Cape Verde is highly dependent on the evolution of the Canary Islands with respect to cruise activity. The Azores are a destination more difficult to include in cruises in the Macaronesia region due to their distance to the pivotal ports. In this last case, the future is still of predominance of repositioning calls and calls to the Caribbean itineraries. However, in the last few years there have been increasing the number of expedition cruises with itineraries covering the archipelago, which means that this archipelago has a great potential for this type of cruises.

The study we described in this paper is, to the best of our knowledge, the first where the situation of the cruise industry in the Macaronesian archipelagos was dealt with in a comprehensive manner. However, it can certainly be improved, especially if we were able to obtain more up-to-date and detailed data. In the future, part of our work will be conducted with this purpose in mind. Indeed, for the archipelagos of Azores, Cape Verde and, to a lesser extent, Madeira, we need better information, in particular regarding the profile of spending and the opinion of cruisers about the services they receive on shore. Surely, this will allow a more accurate monitoring of the future evolution of cruise activity in the area. Other topics we expect to work with relate to how the Macaronesia region can cope with two major challenges: first, the growing gigantism of the cruise industry and the pressure it puts on port terminals; second, the increasing competition it faces from other markets. The latter issue is particularly important

because this region is not a marquee destination for the cruise industry. Inadequate answers to these challenges will undoubtedly put in question the strategies pursued by the various Macaronesian archipelagos in respect to cruise activity.

## Chapter 6

# Cruise destination characteristics and performance: Application of a concept model to North Atlantic islands of Macaronesia

### 6.1 Introduction

The cruise industry ranks among the most dynamic tourism segments (CHEN *et al.*, 2019; LOPES and DREDGE, 2018; PENCO and DI VAIO 2014; WANG *et al.*, 2014), with a stable growth rate since the 1980s of around 7% per year, despite economic cycles of growth and recession (CRUISE MARKET WATCH, 2022). This dynamic profile was possible through the continuous increase of the number, size and capacity of ships (CRUISE MARKET WATCH, 2022; RODRIGUE and NOTTEBOOM, 2013;), in a tendency towards gigantism (SORIANI *et al.*, 2009), and obtention of increasing economies of scale. Additionally, the processes of mergers and acquisitions observed since the early 1990s and the marketing strategies of several companies are also relevant factors in the success of the cruise industry (GUI and RUSSO, 2011; VOGEL, 2011; PALLIS, 2015). LEKAKOU, PALLIS, and VAGGELAS (2009) describes the cruise market as an oligopoly dominated by three major groups: Carnival, Norwegian Cruise Lines, and Royal Caribbean, each one with multiple brands covering a variety of market segments. This multiplicity of brands creates in the consumer an illusion of supply diversity (RODRIGUE and NOTTEBOOM 2013).

In this context, cruise lines marketing and designing of new ships have been consistently working on the development of the cruise ship as the focal point of the vacation experience (WHYTE, PACKER, and BALLANTYNE, 2018). In this sense, RODRIGUE and NOTTEBOOM (2013) considers that the cruise industry sells itineraries, not destinations. However, for KARLIS and POLEMIS (2018), the cruise product is a combination that includes the ship as a destination as well as the itinerary, which encompasses the ports-of-call along the



way. In fact, ports still continue to be a central element in consumers' choice of the cruise product (LOPES and DREDGE, 2018; WHYTE, 2018). In this perspective, the cruise lines and the port cities establish a kind of joint venture that need to satisfy all the parties involved. Hence, cruise lines invest in the ships and ports cities invest in port facilities.

It is worth noting that cruise ports compete in two levels: on the first level, they try to be included in the cruise itineraries and attract cruise visitors; on the second level, they attempt to become a home-port, which is a port in the beginning of a cruise itinerary and/or the final disembarkation port, receiving thus greater economic benefits for the port and the local economies (PAPACHRISTOU, PALLIS, and VAGGELAS 2022). However, and regardless the position of the cruise ports as homeports or a mere port-of-call, cruise ports also develop cooperation practices to strengthen their market position in a perfect case of 'coopetition', in a constant attempt to increase their attractiveness and to better capture the economic benefits that cruise passengers can bring to local businesses and communities (PALLIS, 2015).

For both port authorities and cruise destinations stakeholder it is thus essential to investigate what are the most relevant attributes that ports should retain and develop in order to increase their attractivity as cruise destinations and guarantee their future economic growth and sustainability. However, the literature has not dedicated much attention to these aspects, including only sporadically some topics associated to the attractiveness of cruise destinations and the maximisation of the benefits derived from cruise tourism. Major exceptions include MARTI (1990), MCCALLA (1998), WANG *et al.* (2014), LEMMETYINEN *et al.* (2016), WHYTE *et al.* (2018) and TAO and KIM (2019), that framed the importance of onshore attributes for cruise ports and destinations. Instead, the focus of the literature has been directed, to a great extent, to the economic impacts of cruise tourism on destinations (CHASE and ALON, 2002; BRIDA and ZAPATA, 2010a; MERK, 2013; BREA, 2015; CASTILLO-MANZANO, FAGEDA, and LAXE, 2014; VAYÁ *et al.*, 2017; ARTAL-TUR, NAVARRO-AZORÍN, and RAMOS-PARREÑO, 2019; CHEN *et al.* 2019; etc.), to environmental impacts (BUTT, 2007; CARIC and MACKELWORTH, 2014; LAMERS, EIJGELAAR, and

AMELUNG, 2015; ASERO and SKONIECZNY 2018; etc.), or both (BRIDA and ZAPATA, 2010b; MACNEIL and WOZNIAK, 2018; STEFANIDAKI and LEKAKOU, 2014). Furthermore, the literature does not establish the connection between the endogenous attributes of the ports and destinations and how these attributes may directly influence the performance of the destinations. There is, thus, a considerable gap in the literature about the identification of the most relevant attributes that cruise ports and destinations should possess to become relevant parties in the cruise industry.

The present study tries to contribute to fulfil this gap, enlightening about the multifaceted attributes, or drivers, that both ports (i.e., ports-of-call or homeports) and destinations must develop to become increasingly relevant players in the cruise industry. Furthermore, the study establishes how those attributes can influence the performance of the cruise destinations. For that, a conceptual model was developed, through which the main onshore attributes of cruise port and destination were identified and connected to the overall performance of the destination. Information obtained through a survey focused on the particular case of the North Atlantic region of Macaronesia, which comprises the archipelagos of Azores, Canaries, Cape Verde and Madeira, was applied as an illustration of the conceptual model. The Macaronesia region, which has never been studied previously, has been gradually consolidating its position in the global market of cruise tourism, with a diversity of itineraries, especially during winter season, covering several islands with the Canary ports of Tenerife and Las Palmas working as homeports, or repositioning itineraries mainly between the Caribbean and Europe or vice versa. It is believed that this study is the first attempt to determine both what are the main attributes of port destinations and the connection between those port destination attributes and the performance of the cruise destination. This is a particularly important topic for the policymakers and port authorities involved in the definition of their policies for this sector.

## 6.2 Literature review

The expectations of ports and local destinations is that cruise related activities will generate a catalytic effect on the city or region through the creation or development of businesses and the generation of added value activities directly linked to passenger visits ashore and to the supply of goods and services to cruise ships (CHANG *et al.*, 2016; VAYÁ *et al.* 2017). This is particularly important for policymakers, port authorities and local stakeholders involved on the cruise sector. The multiplicity of actors and complexity of activities associated to the cruise tourism business was illustrated by GUI and RUSSO (2011) through the presentation of the cruise Global Value Chain (GVC) that establishes the links between ports, local destinations actors and global cruise lines<sup>21</sup>. The cruise GVC puts in evidence the need of a holistic perspective for the local agents to enhance the generation of value at destination level. In this sense, local port destinations need to create an articulated and coherent set of attributes that creates on the cruise passenger an appeal to disembark and visit the destination. Also, LEMMETYINEN *et al.* (2016) highlighted the need of a holistic perspective in the analysis of the cruise tourism business and particularly regarding the onshore experiences of the cruisers. According to BREA (2015), 88% of cruise passengers disembark on the port and make an onshore visit. The expenditures by cruise passengers onshore are a particularly important source of revenue and generation of value at destinations, mainly associated to shore excursions, food and beverage and shopping, namely crafts. Furthermore, their behaviour when onshore is a fundamental aspect on the creation of economic impacts on destinations, referring the literature a positive relationship between the number of hours in a port and the money spent there by passengers (HENTHORNE, 2000; ANDRIOTIS and AGIOMIRGIANAKIS, 2010; PENCO and DI VAIO, 2014; AZIZ, EL-SAID, and BONTENBAL, 2020). Other relevant sources of revenue

---

<sup>21</sup> GUI and RUSSO (2011) mention a variety of actors that establish a complex set of relationships on their cruise global value chain, highlighting transport, hotel, port and onshore services, which have evident linkages with the visited destinations.

and generation of value at destinations include crew member spending, mainly associated to food and beverage, and cruise line purchases of shipping storage and port services. All these items constitute direct economic impacts, according to CHEN *et al.* (2019) or BREA (2015), covering several geographical areas, namely in the American Continent, including the Caribbean (for example CHASE and ALON, 2002; BRIDA and ZAPATA, 2010a, 2010b; BREA, 2007, 2015) and Mediterranean or North Europe (EUROPEAN COMMISSION, 2009; CASTILLO-MANZANO *et al.*, 2014; VAYÁ *et al.*, 2017; ARTAL-TUR *et al.*, 2019) destinations, but also on less relevant markets like North Europe, Alaska or Australia or Asia (CHANG *et al.*, 2016). The perspectives and methodologies are diverse, including restrict methods focused almost exclusively on the level of expenditure of cruise passengers (for example EUROPEAN COMMISSION, 2009; MERK, 2013; BREA, 2015) and more sophisticated macroeconomic models contemplating also indirect and induced impacts (for example VAYÁ *et al.*, 2017; ARTAL-TUR *et al.*, 2019).

Regarding the average values for passengers' spending on destinations, there is an extreme diversity of values, depending on the authors and the geographical areas under study<sup>22</sup>. The work of CHEN *et al.* (2019), which presented a meta-analysis of the direct economic impacts of cruise tourism on port communities provides a very appropriate synthesis on the topic. The authors found that expenditures per passenger, number of passengers, number of crew members, expenditures per cruise line, and number of cruise lines would add direct economic impacts on ports significantly.

For both monetary and non-monetary impacts, the attractivity factors of the port and the destination are critical elements, being produced by the plethora of actors and activities that

---

<sup>22</sup> For further detail about the topic one can read the work of MERK (2013), that assembled data for 75 different ports, obtaining a minimum of 34 USD, an average of 100 USD, and a maximum of 309 USD. Similar values were reported by RODRIGUE and NOTTEBOOM (2013). The EUROPEAN COMMISSION (2009), based on responses to 17,400 questionnaires conducted in different European cruise destinations, reported an average expenditure by a transit tourist in a European destination of 86 USD, while a turnaround tourist spends 136 USD.

operate on the cruise destination, as highlighted above by the cruise GVC of GUI and RUSSO (2011). MARTI (1990), in his seminal work about cruise port selection process, identified site and situation geographic conditions as the most important factors affecting cruise port selection. His work is the first reference on the literature about the influence of onshore elements that work as attractivity factors on the context of the cruise-ship port selection process. The site conditions of the port refer to physical and economic characteristics of outstanding significance (such as port infrastructures and superstructures), being mostly related to the attributes of a location. The situation conditions are physical or cultural qualities related to other locations (such as the proximity to markets of cruise passengers and the attractiveness of the port region for cruising), reflecting the connectivity of a location in relation to others and its constant changing pattern.

Regarding home-ports performance, the author includes the following criteria: (1) close proximity to other forms of transportation; (2) capacity to handle with a great amount of people at one time; and (3) ability to provide a pleasing environment, adding the need of easy access to the port from an airport since many cruise passengers join the vessel via scheduled air services as a part of an air/sea package. MCCALLA (1998) followed the work of MARTI (1990), stressing also the importance of site and situation requirements for cruise ports. For the author the identification of what are exactly these characteristics or requirements for each port varies according to the classification of cruise ports. For example, in the case of homeports, a good connectivity to airports is essential. These ports also need modern, efficient and large dedicated cruise ships terminals and need to be close to the cruising area, although not necessarily in its heart.

More recently, WANG *et al.* (2014), focusing on East Asian markets, identified (1) tourism attractions, (2) connectivity and agility, (3) cruise terminal facilities and (4) natural environment of the hinterland as the most important categories for cruise port selection. WHYTE *et al.* (2018), based on the concept of co-destination, developed a quantitative measurement scale for cruise destination attributes, identifying five factor groups: (1) onshore activities; (2) learning

and exploration; (3) visual surroundings; and (5) destination development. These attributes contribute directly to the overall competitiveness of a destination and directly and/or indirectly impact visitor satisfaction and may be framed on the site concept mentioned above. Also, TAO and KIM (2019), based on big data analytics of online comments of Asian cruisers, concluded that onshore attributes of cruise were the most important factor associated with cruiser satisfaction, contemplating six dimensions: “Shuttle”, “Bus”, “Taxi”, “Airport”, “Hotel” and “Shopping”, which, again, may be considered site and situation dimensions. According to the authors, these attributes occupy an instrumental role in the cruise overall experience, although rarely studied or mentioned in the literature.

The marketing of onshore attributes experienced by cruisers can influence destination image and the potential for repeat visitation. In this line, FERRANTE, DE CANTIS, and SHOVAL (2016) stressed that services provided by the destinations should be markedly customized in order to maximise the benefits derived from cruise tourism. Furthermore, the authors mention the importance of an improved understanding of cruise passengers’ behaviour at their destination as an essential prerequisite for the management of tourism destinations, given the challenges of cruise tourism at many coastal destinations. Following this direction, LEMMETYINEN *et al.* (2016) contributed to the cruise destination literature by linking the perceived brand awareness of a destination to motivational factors of the tourists.

Besides these references, several other authors have sparsely mentioned some onshore-related elements that justify the success of cruise destinations from the economic perspective. For SORIANI *et al.* (2009) the most relevant aspects for the maximisation of the benefits derived from cruise tourism include the organization and operability of the individual ports and the passengers’ terminals, as well as the economic and infrastructural characteristics of the catchment areas of the cruise port. ANDRIOTIS and AGIOMIRGIANAKIS (2010) found that ‘product and services’, formed by variables assessing onshore satisfaction on attributes of the offered product and services, and ‘tour pace’, which include variables associated to feelings of personal safety and security, overall feelings about visiting the destination (Crete, Greece) and

time do use comfort facilities and shops, were important dimensions that affect cruise passengers' satisfaction. For TEYE and PARIS (2011), satisfaction with a port destination and the activities in which passengers participated in could influence passengers' intention to return. Furthermore, passengers that ranked the more developed destinations higher, spent more money on port and travelled further from the port area. AZIZ *et al.* (2020) found that the level of passengers' expenditure varies according to age and length of the visit. PENCO and DI VAIO (2014) consider that the cruisers' expenditures are influenced by a variety of factors such as weather conditions, the number of hours spent ashore and the demographic, economic and sociocultural characteristics of the cruise tourists. FERRANTE *et al.* (2016) found that passengers with higher incomes, a higher education level, and aged between 36 and 55 years seem to seek what can be described as an intense experience of the destination, in terms of time spent onshore, places visited, and transportation mode. DOUGLAS and DOUGLAS (2004) point out a set of factors with direct influence on the level of passengers' spending, namely: (1) weather in the port, whereas most pleasant weather leads to a greater propensity to spend; (2) port characteristics, in which those with direct access to a city are more likely to encourage spending; (3) cruise passengers' profile, depending on cruisers' age, consumption patterns differ; (4) vendors' profile, in which cultural and linguistic aspects are contributing factors; and (5) acquisition of shore excursions, the majority of passengers buying it on board several days before arriving to the respective port. This topic of shore excursions is a particularly important spending category for passengers (BREA, 2015) and a relevant part of the actual business model of cruise operators (GUI and RUSSO, 2011; VOGEL, 2011), being in most cases sold onboard, with prices substantially higher than onshore (by around 50% according to HUIJBENS, 2015, or up to 70%, according to LOPES and DREDGE, 2018)<sup>23</sup>. Other literature references that illustrate the relevance of the topic include JOHNSON (2006), PAROLA *et al.*

---

<sup>23</sup> BREA (2015) calculated that 53% of the passengers that disembark on Caribbean destinations go on such excursions, being the average value of each excursion 43,99 USD. Also, the EUROPEAN COMMISSION (2009) estimates that 65% of the passengers participate in an organized tour and that around 80% of them purchase it on the ship.

(2014), LEE and LEE (2017), BUZOVA, SANZ-BLAS, and CERVERA-TAULET (2019), or NAVARRO-RUIZ, CASADO-DÍAZ, and IVARS-BAIDAL (2019).

UNCTAD (2001) mentions five key points as the criteria used by the cruise industry to choose their homeports: (1) outstanding port services and an equally appealing city; (2) modern and efficient airport with substantial airlift; (3) attractive tourist destinations and itineraries; (4) large population centre; and (5) good land accessibility to that centre, following the perspective already expressed by MARTI (1990) and MCCALLA (1998). CASTILLO-MANZANO *et al.* (2014) that studied the case of the homeport of Barcelona, found that the likelihood of having cruise traffic seems to be linked to ports located in populous areas and close to large airports, and to ports not specialized in container traffic but sharing facilities with regular ferry passenger traffic and having a minimum depth of berth and channels. PAPACHRISTOU *et al.* (2022) stressed the importance of the presence of an international airport with good international connections, along with the guaranteed security levels at the port, as sine que non-elements for the selection of a port as a homeport. For NIAVIS and VAGGELAS (2016) there are internal and external factors that affect the potential of a port to become a cruise homeport. Internal factors include adequate infrastructure allowing the facilitation of the last generation of cruise ships and the presence of a private enterprise in ports' operations seems to foster home-port traffic. Additionally, efficiency in operations seems to be a crucial element. For external factors, i.e., hinterland elements, connectivity of ports' hinterlands, tourism infrastructures and the level of economic growth increase the likelihood of a port to attract additional cruise port traffic. BAYAZIT *et al.* (2015), based on data from cruise industry key players, consider that the main factors in selecting a homeport are the cost of port services and the port services to ships.

In short, most of the onshore elements stressed by the literature may be framed on two major groups, directly related to site and situation geographic factors, following the perspective of MARTI (1990) and also that of MCCALLA (1998). Other elements highlighted by the literature, namely those associated to the cruise passengers' profile (DOUGLAS and DOUGLAS, 2004; PENCO and DI VAIO, 2014 or AZIZ *et al.*, 2020) or the number of hours



spent ashore (PENCO and DI VAIO, 2014; FERRANTE *et al.*, 2016 or AZIZ *et al.*, 2020) are mainly external factors, oriented by the cruise operator decisions or policies. In this sense, although they may have direct consequences on the performance of both the port and the destination, they transcend the category of onshore drivers and cannot be included on the model. Regarding the cruise tourism impact on local economies, the literature focuses on three distinct dimensions: the direct impact, mostly associated to passengers' expenditures, crew member spending and cruise lines purchases; the indirect and induced impacts, illustrated by indicators like the creation of jobs on the economy or the increase on the GDP derived from the activities promoted by cruise tourism; and the non-monetary impacts, expressed by the possibility to visit the destination as a land-based tourist or the word-of-mouth publicity.

### 6.3 Cruise Tourism in Macaronesia

In the present section we will focus on the Macaronesia region, showed in Figure 5.1 (Chapter 5). This is a group of four archipelagos on the North Atlantic Ocean, just outside Gibraltar Strait, and with enormous potential for cruise tourism. In fact, its proximity to Europe, the second most important source market for cruise tourism, and the importance of the tourism sector on all four archipelagos, representing more than 18 million tourists annually, means an outstanding opportunity for this region regarding cruise tourism.

The evolution of cruise tourism in Macaronesia has been dominated by several exogenous drivers. First of all, as mentioned, the proximity to Europe, the second largest cruise market source after North America. Secondly, the favourable climate conditions for tourism activity in the low and medium seasons. An additional driver is associated to the political instability in the Eastern and Southern Mediterranean, which has been compromising the development of the cruise industry in that area. Furthermore, the region is composed exclusively by island cruise destinations, which is a major strength for cruise destinations, as stressed by CASTILLO-MANZANO *et al.* (2014).

The magnitude of cruise tourism in the Canaries is absolutely outstanding in the context of Macaronesia, with two major ports, Santa Cruz de Tenerife and Las Palmas de Gran Canaria that work as homeports for itineraries covering several islands of this region. The volume of passengers starting and/or ending a cruise in these two main Canary ports is significantly, representing about 30% of all passengers in each port, according to reports of both port authorities. Investments in several port infrastructure and facilities have been consistently executed over the years. In the season of 2016/2017, the port of Santa Cruz began to operate a new cruise terminal with capacity to become the base-port for up to five simultaneous cruise ships.

Focusing on Madeira, SOUSA (2004) highlights the existence of good-quality facilities and services to visitors, the mild climate, a favourable geographical location, the gentleness of the people and the peacefulness and political stability. Investment dedicated to cruise tourism began in the early 1990s with the transformation of the port of Funchal. More recently, in 2015, the port finished the construction of additional 330 meters of quay integrated in a rehabilitation project of Funchal seafront. Yet, the port of Funchal did not manage to reach the level of attractiveness of the major ports of the Canary Islands regarding embarkation or disembarkation operations.

In relation to the Azores, SILVESTRE, SANTOS, and RAMALHO (2008) consider that the two main factors driving the behavioural intentions of cruise passengers are linked, in the first place, to the city and its attractions in general, and secondly, with less importance, to the perceptions of hospitality, safety, services and cleanliness of the environment. Ponta Delgada and Horta are the only two dedicated cruise terminals of the archipelago, in both cases built in the framework of seafront city renewals executed in the last two decades.

On the other hand, Cape Verde is characterized by the inexistence of dedicated cruise terminals and a limited number of good-quality facilities and services to visitors. The port of Mindelo, the most important cruise port of this archipelago, will only start the building of a cruise terminal later this year (2021).

In regard to onshore attributes, the archipelagos of Madeira and Canaries, have an established set of facilities with a positive impact on the attractiveness and dynamics of the cruise destinations, due to their long tourism tradition. The Azores and Cape Verde have a relatively modest endowment of onshore attributes, with difficult logistic operations, particularly in smaller islands.

The diverse levels in terms of port and onshore endowments are the result of the particular political status of the different archipelagos. In fact, the European outermost regions of Azores, Canary Islands and Madeira have access to European Funds for the provision of infrastructure, being therefore more developed than Cape Verde, the only independent state among all Macaronesian archipelagos. This puts in evidence the fact that the Macaronesia archipelagos are in two distinct stages concerning cruise tourism. The Canary Islands and Madeira are well-established destinations for cruises, as expressed by the number of calls and passengers, being at the consolidation phase. In contrast, the Azores and especially Cape Verde, still with a limited number of calls and passengers, are at the developing phase. Table 6.1 highlights the main characteristics of the archipelagos of the Macaronesia region in the context of the cruise industry.

Table 6.1 Characterization of the archipelagos of Macaronesia in the cruise industry

	Azores	Cape Verde	Canary Islands	Madeira
Political status	Outermost region	Independent state	Outermost region	Outermost region
Position in cruise activity	Development phase	Development phase	Consolidation phase	Consolidation phase
Characteristics of cruise itineraries	Repositioning	Repositioning	Seasonal	Seasonal, repositioning
Classification of cruise ports	Ports-of-call	Ports-of-call	Hybrid ports, ports-of-call	Ports-of-call
Number of main cruise ports	3	2	6	1
Number of modern cruise terminals	2	0	4	1
Number of cruise calls (2018)	138	199	1,135	293
Number of cruise passengers (2018)	164,073	47,094	2,352,684	541,467
Main cruise related recent actions	Infrastructure development, promotion	Promotion, aggregation of partners	Infrastructure development, promotion	Infrastructure development, promotion
Shore excursions percentage	40%*	Unkown	13%	<20%
Amount spent by passengers in a cruise visit	14 USD	62 USD	57 USD	< 65 USD

\* Value obtained only for the main port

## 6.4 Conceptual model

The present section focuses on the perspective of the industry players that operate in Macaronesia. For this purpose, a conceptual model was defined, based on the empirical literature, and the authors knowledge about the topic, reinforced by previous contacts with cruise industry operators. Later, the conceptual model was applied to the Macaronesia region, through a survey directed at cruise specialists and stakeholders that operate directly on this region.

### 6.4.1 Conceptual model

The conceptual model was defined considering that a multiplicity of activities and a diversity of actors are involved in this industry, being in general onshore elements associated to site and situation concepts, as depicted earlier on in Sections 6.2 and 6.3. It follows from this multiplicity and diversity that the performance in this industry has a multidimensional character. The model aims to identify the most relevant onshore characteristics or drivers with direct impact on the performance of the cruise destination. Some variables such as port infrastructure and other transportation services are vital to the access of cruise ship and passengers to the destination. Additionally, shore excursions and tourist services on the destination, including shops, museums, hotels, and restaurants, etc., were also considered in the literature as important elements for cruise passengers when ashore. Those elements can be included on the category of site factors. Other elements such as the proximity to large airports with modern and efficient infrastructure and substantial international connections are associated to the location of the cruise port and destination and, in this sense, can be defined as situation factors. Our hypothesis is that all these aspects as a whole have a direct influence on the performance of the cruise destination. Due to different port development stages registered in Macaronesia, a moderator variable was also included on the model, reflecting the expectation that significant differences occur between ports in a consolidated situation and ports in a developing phase, in which ports

in consolidated position can work as homeports for some itineraries, while ports in a developing phase will work as mere ports-of-call.

The aim of the conceptual model is to provide an understanding and a measure of the importance of the cruise port and onshore characterization factors and how they are related to the overall performance of the cruise destination. As far as we are concerned, this methodology has never been used in the literature covering the cruise industry. Thereby, it may be considered particularly relevant to the selection, prioritization and aggregation of the most important drivers that cruise ports and destinations should consider when establishing a strategy on the area.

The conceptual research model reproduced in Figure 6.1 consists of three factors covering: (1) ‘Port/onshore site-related characteristics’; (2) ‘Port/onshore situation-related characteristics’; and (3) ‘Cruise destination performance’, being the first two factors linked to a set of attributes of both the port and destination and working as independent factors. The model also establishes a connection between the port and destination attributes and the performance of the cruise destination, as a dependent construct. Moreover, a moderator variable was included to determine how this connection varies depending on the port development level.

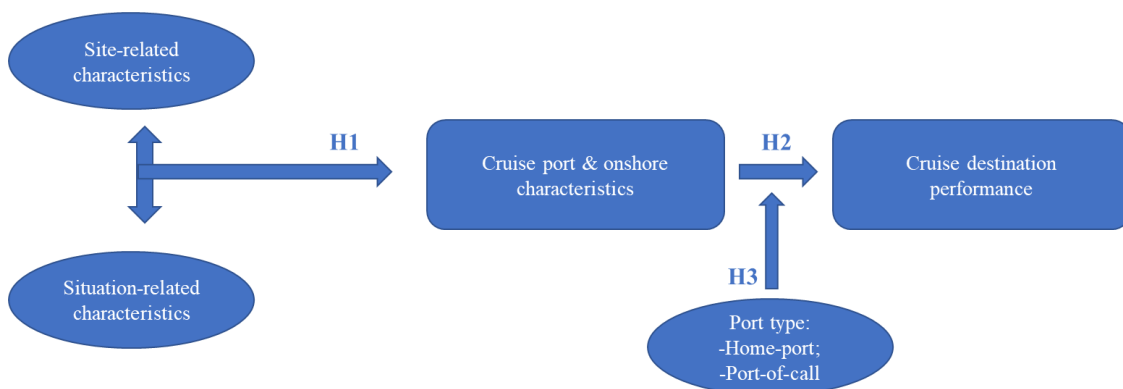


Figure 6.1 Conceptual model

Therefore, the main hypothesis can be disaggregated as follows:

H1 – The factors that characterize the cruise port and onshore model are ‘Port/onshore site-related characteristics’ and ‘Port/onshore situation-related characteristics’.

H2 – ‘Port/onshore site-related characteristics’ and ‘Port/onshore situation-related characteristics’ constructs have a direct influence on ‘Cruise destination performance’.

H3 – ‘Port type’ is a moderator variable associated to the level of development of the port and its impact on the relation between ‘Cruise port and onshore characteristics’ and ‘Cruise destination performance’. A significant difference between ports on a consolidated phase, namely those of the Canary Islands and Madeira, and those in a developing phase of the Azores and Cape Verde islands, is expected.

The factor ‘Port/onshore site-related characteristics’ aggregates a set of variables associated to tourism services, tours excursions and quay capacity for cruise ships, being partially based on the cruise Global Value Chain approach. Further variables to be considered in this factor are related to cleanness and safety, other port services like fuel supply, waste management, bus parking for excursions and promotion of the port. In opposition, the factor ‘Port/onshore situation-related characteristics’ aggregates variables associated to the connectivity of the port region, including passenger terminal capacity for cruise starting or ending, airport with good international connections and location of the port relative to cruise itineraries.

#### 6.4.2 Application to the Macaronesia region

The application of the conceptual model on the particular case of the Macaronesia was possible through a survey carried out with cruise experts and industry players that operate on this region (Appendix 4). The data obtained was subsequently used in a confirmatory factor analysis over the factor scores to test the validity of the conceptual model. The survey covered several variables associated to the port and onshore characteristics as well as to cruise destination performance. Additionally, the survey included questions about the cruise ships’ profile, companies and cruise passengers’ profile. A 7-point Likert scale was used and a total of 41 closed questions were included in the survey.

Regarding port and onshore characteristics, the survey distinguished two perspectives. The first one, with 10 questions, reflected the general opinion of the respondents about the characteristics

that both ports and destinations should have to become well positioned in this industry. The other, with 11 questions, focused on the real conditions of the ports and destinations they knew best. Those topics included elements such as port infrastructure and services, onshore infrastructure and services, as well as marketing strategies of the destination in respect to cruise tourism. Appendix 4 presents the structure of the survey and identifies all the variables.

Concerning the profile of cruise ships and cruise lines that operate in the region, a total of 7 questions addressed the cruise ship type and dimension, the position of the port in the cruise itinerary, the port of origin of the cruise voyage and the level of seasonality registered in the port. When defining passengers' profile, the focus was on their nationality, age, if they travelled with family and friends, if they previously knew the destination or if they were cruise repeaters. A set of 7 questions were used in this case.

Finally, a set of 6 questions addressed the indicators associated to port and destination performance, namely the number of cruise ships' calls, the number of cruise passengers, the creation of employment and GDP increase, as well as the quality of the experience for the passengers and their intention to return.

In summary, 16 variables were considered to carry out the proposed analysis. These variables are shown in Table 6.2, where they are grouped according to the set of factors of the proposed conceptual model to which they belong. Additionally, Table 6.2 shows the main previous studies where these variables were also included.

The survey was made available online in July 2018 to 170 cruise experts and professionals operating on that cruise market. The total number of valid responses was 96 (56%). Respondents covered all Macaronesian archipelagos, with a relative predominance of the Azores (45% of the answers). Port authority officials, consultants, shipping agents and destination management companies (DMC) were the stakeholders covered, being the first category the most represented, accounting for 38% of the respondents.

Table 6.2 Factors, variables, and references

Factor	Variable	Name of the variable	References
Port/onshore site-related characteristics	Terminal with capacity for transit passengers in general	TransitTerminalGen	ANDRIOTIS and AGIOMIRGIANAKIS (2010); BAYAZIT <i>et al.</i> (2015); BREA (2015); BUZOVA <i>et al.</i> (2019); DOUGLAS and DOUGLAS (2004); FERRANTE <i>et al.</i> (2016); GUI and RUSSO (2011); HUIBENS (2015); JOHNSON (2006); LEE and LEE (2017); LEMMETYINEN <i>et al.</i> (2016); LOPES and DREDGE (2017); MARTI (1990); MCCALLA (1998); NIAVIS and VAGGELAS (2016); PAROLA <i>et al.</i> (2014); PENCO and DIVAIO (2014); SILVESTRE <i>et al.</i> (2008); SOUSA (2004); TAO and KIM (2019); TEYE and PARIS (2011); WANG <i>et al.</i> (2014);
	Tour excursions in general	ToursGen	
	Quay capacity for cruise ships in general	QuayGen	
	Bus park for excursions in general	BusParkGen	
	Promotion of the port in general	PromotionGen	
	Tourism services in general	TourismServicesGen	
Port/onshore situation-related characteristics	Cleaness and safety in general	CleanessGen	
	Airport with international connections in general	AirLinksGen	BAYAZIT <i>et al.</i> (2015); CASTILLO-MANZANO <i>et al.</i> (2014); MARTI (1990); MCCALLA (1998); NAVARRO-RUIZ <i>et al.</i> (2019); NIAVIS and VAGGELAS (2016); TAO and KIM (2019); UNCTAD (2001)
	Location of the port in the itineraries of cruise ships in general	LocationGen	
Cruise destination performance	Terminal with capacity for embark and disembark in general	InOutTerminalGen	
	Number of cruise passengers	NbPaxOut	ARTAL-TUR <i>et al.</i> (2019); BREA (2007,2015); BRIDA and ZAPATA (2010a,b); CASTILLO-MANZANO <i>et al.</i> (2014); CHANG <i>et al.</i> (2016); CHASE and ALON (2002); CHEN <i>et al.</i> (2019); DOUGLAS and DOUGLAS (2004); EUROPEAN COMMISSION (2009); MERK (2013); RODRIGUE and NOTTEBOOM (2013); VAYÁ <i>et al.</i> (2017)
	Number of cruise ships	NbCruisesOut	
	Jobs creation	JobsIncreaseOut	
	GDP increase	GDPIncreaseOut	
Quality of the cruiser experience	ExperiencePaxOut		
Intention to return as shore tourist	ReturnPaxOut		

## 6.5 Results and analysis

### 6.5.1 Results for Macaronesian port and destination characteristics

In general, the answers confirmed the perceptions expressed above on Section 6.3 about the existence of two distinct levels of development on Macaronesia. In Figure 6.2, relative to the real conditions of both the port and onshore characteristics the respondents knew best, i.e., the Macaronesian cruise destinations, one can see that the Canaries have significantly more adequate or sophisticated port infrastructure and services and also a more strategic situation than the equivalent ones in the other archipelagos. The variable ‘TransitTerminalPort’, associated to the capacity of the terminal to support the volume of transit passengers, and ‘PortServicesPort’, associated to port services to cruise ships like supply of goods and waste reception facilities, are the only ones in which respondents’ opinions reveal some similitude between the ports of the Canary Islands, Madeira and Azores. This is an immediate consequence of the investments made over time in cruise terminals on the ports of those archipelagos. For Cape Verde, the opinions reflect the lack of adequate port infrastructure, with direct impact on the level of



quality of services provided. This is even clearer when comparing the characteristics of only the main ports of each archipelago (Figure 6.3).

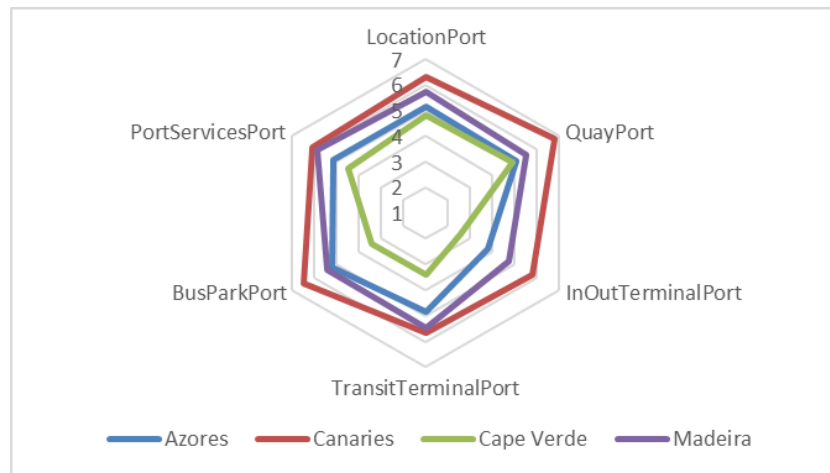


Figure 6.2 Port characteristics of all ports of each archipelago

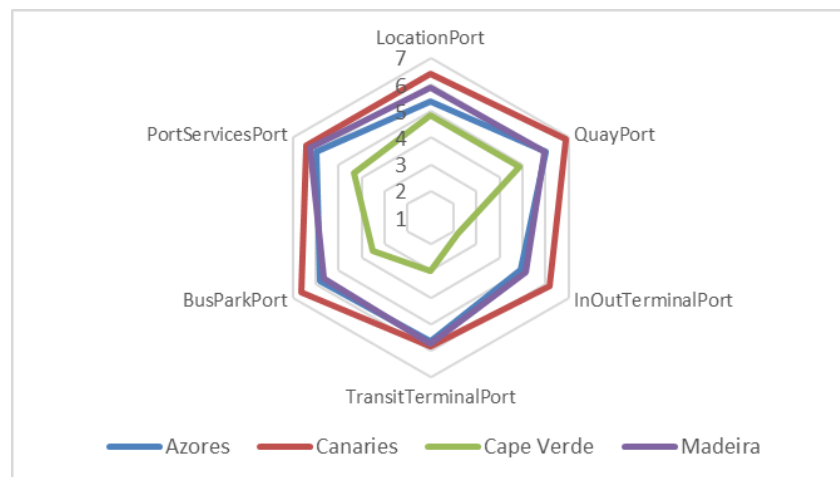


Figure 6.3 Port characteristics of the main ports of each archipelago

In the context of onshore infrastructure and services on the destination, presented in Figure 6.4, the relevance of the marketing promotion strategies is recognized by the respondents of all archipelagos as a vital element for the projection and recognition of the destination by cruise operators (variable ‘PromotionPort’). The other items considered in this group of questions presented less homogeneous results. In fact, the respondents’ answers reveal the existence of two different levels of service. On one hand, the Canary Islands and Madeira are characterized by the existence of a set of well-established services to cruises and tourism in general. In this

sense, onshore services, including coach operators, local guides, museums, parks or historic sites, and local shops or stores contribute to the quality and diversity of the cruise product in both archipelagos.

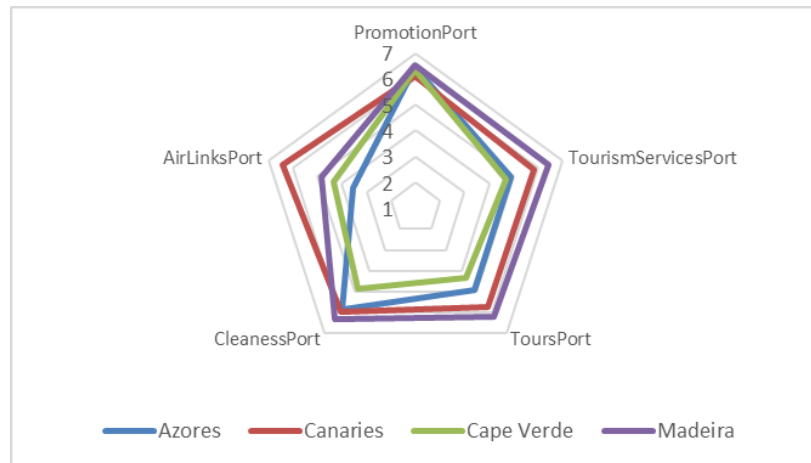


Figure 6.4 Onshore characteristics of each archipelago

In contrast, the perceived quality of tourism services provided in Cape Verde and the Azores is significantly lower than the registered in the Canaries or Madeira, according to the inquired specialists. It should also be highlighted the opinion of the specialists about the restrictive conditions in air connectivity of the Azores, even more than Cape Verde, which may be interpreted as a severe limitation for the development of cruises with itineraries in the archipelago.

Due to the huge amount of investment still necessary to the development of the cruise industry in Macaronesia both in port infrastructure and onshore services, particularly in less developed destinations, the information collected through the survey is an important source to set priorities when defining future strategies.

On several other topics, the survey responses were not very conclusive and failed in terms of statistical consistency. It was the case of the opinion of specialists about the profile of cruise ships and companies or the profile of cruise passengers. In both cases the information gathered was omitted from this analysis without major loss.

## 6.5.2 Model validity and model results

The data analysis was performed in the following sequence of stages. Firstly, the reliability and validity of the answers of the survey were assessed by a confirmatory factor analysis to test the main model factors and measure their scores and observed variables coefficients, using SPSS25. This was followed by the execution of the confirmatory structural equation model. A set of latent variables with Cronbach's Alpha greater than 0.6, corresponding to 16 variables of the general perspective model, was selected (Table 6.3). One of the factors is 'Cruise destination performance' that aggregates six variables. The remaining two factors are related to site-related characteristics of cruise ports and destinations and also to situation-related characteristics of cruise ports and destinations, aggregating ten variables.

Table 6.3 Variables' statistics

Factor	Name of the variable	Mean	SD	Variance
Port/onshore site-related characteristics	PromotionGen	6.33	1.102	1.214
	CleanessGen	6.21	0.857	0.735
	ToursGen	6.16	1.136	1.291
	QuayGen	5.97	1.244	1.546
	BusParkGen	5.96	1.045	1.093
	TourismServicesGen	5.89	1.195	1.429
	TransitTerminalGen	5.39	1.625	2.639
Port/onshore situation-related characteristics	LocationGen	5.75	1.231	1.516
	AirLinksGen	5.32	1.720	2.958
	InOutTerminalGen	4.88	1.669	2.784
Cruise destination performance	ExperiencPaxOut	5.91	0.996	0.991
	NbPaxOut	5.88	1.190	1.416
	ReturnPaxOut	5.71	1.187	1.409
	NbCruisesOut	5.48	1.170	1.368
	GDPIncreaseOut	5.21	1.486	2.209
	JobsIncreaseOut	5.10	1.504	2.263

Using structural equation modelling for the confirmatory analysis of the research model for the variables concerning the general perspective of cruise ports, and hypotheses, we obtain important coefficients of the relations between latent and some of the observed variables. The model's convergent validity was confirmed, implying that the model is suitable for data (GARVER and MENTZER 1999). The results confirmed the validity of the latent variables, distinct and robust. Results also confirmed unidimensionality and robustness of the structural

equation model (HAIR *et al.* 1998). The goodness-of-fit indicators for the total data demonstrate the adequacy of the measurement model:  $\chi^2 = 250.958$ ,  $\chi^2/df = 2.642$ , IFI = 0.843, CFI = 0.829, RMSEA = 0.131.

The results (see Figure 6.5) reveal the importance of the latent exogenous variable of ‘Port/onshore site-related characteristics’ ( $\beta=0.54$ ), including the observed exogeneous variables ‘QuayGen’ ( $\beta=0.86$ ), related to the adequacy in terms of length and depth of the quay to cruise ships, ‘ToursGen’ ( $\beta=0.73$ ), related to the availability of shore excursions at the destination, ‘TourismServicesGen’ ( $\beta=0.72$ ), related to the diversity of tourism services at the destination, namely restaurants, hotels, museums, parks, etc., ‘PromotionGen’ ( $\beta=0.64$ ), associated to the level of promotion of the port and destination directed to the cruise industry players, ‘TransitTerminalGen’ ( $\beta=0.64$ ), related to the existence of a cruise terminal with capacity to transit cruise passengers, ‘BusParkGen’ ( $\beta=0.60$ ), related to the existence of a bus parking area at the cruise terminal, and ‘CleanessGen’ ( $\beta=0.48$ ), related to the feelings of safety, cleanness and adequate signage for cruise passengers at the cruise destination.

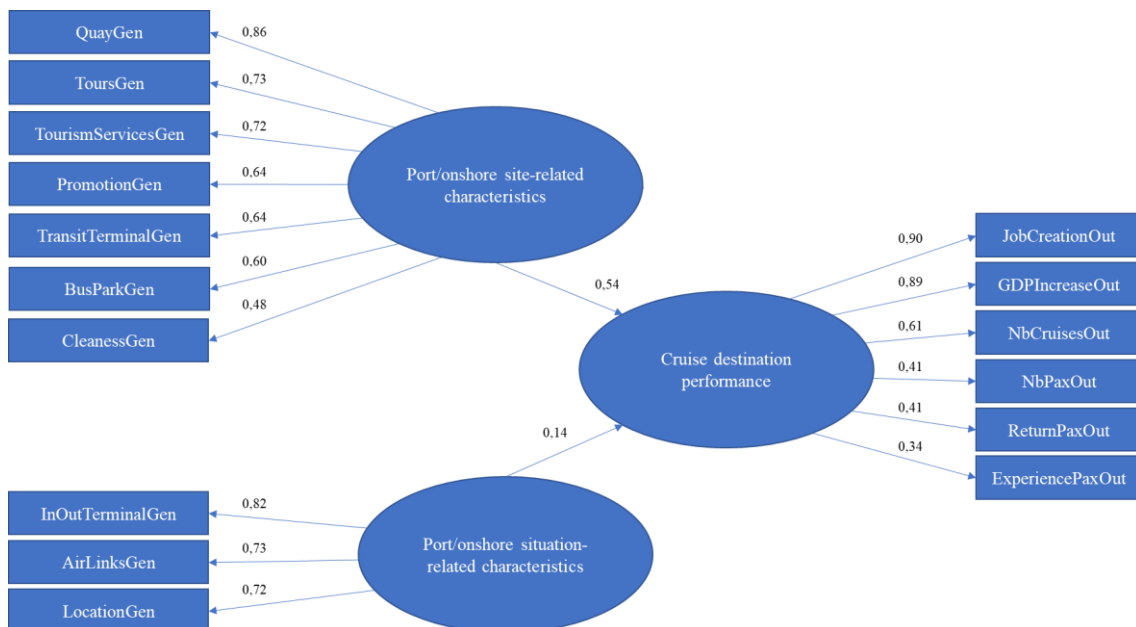


Figure 6.5 Results of the confirmatory model

The results show the relevance of the latent exogenous variable of 'Port/onshore situation-related characteristics' ( $\beta=0.14$ ), including the observed exogenous variables 'InOutTerminalGen' ( $\beta=0.82$ ), related to the existence of a cruise terminal with capacity to cruise passengers in embarking and disembarking operations, 'AirLinksGen' ( $\beta=0.73$ ), related to the existence of an airport with good international connections, and 'LocationGen' ( $\beta=0.72$ ), related to the location of the port in the context of cruise itineraries and in relation to other cruise ports.

Additionally, the results also reveal the importance of the latent endogenous variable of 'Cruise destination performance' ( $R^2=0.42$ ), including the observed endogenous variables 'JobCreationOut' ( $\beta=0.90$ ), related to the creation of new jobs derived from the cruise tourism impact, 'GPDIncreaseOut' ( $\beta=0.89$ ), related to the increase on GDP derived from the cruise tourism impact, 'NbCruisesOut' ( $\beta=0.61$ ), associated to the number of cruise ship calls at the port, 'NbPaxOut' ( $\beta=0.41$ ), associated to the number of cruise passengers that visit the port and the destination, 'ReturnPaxOut' ( $\beta=0.41$ ), related to the expectation of the cruise passengers to return as shore tourists, and 'ExperiencePaxOut' ( $\beta=0.34$ ), related to the quality of the experience of the cruise passengers at the destination as an indicator of a probable future visit as shore tourist.

The variables mean, resulting from the survey and used in the factor analysis, assumes values higher than 3.5 (in a 7-point Likert scale), reinforcing its importance. The results confirm the factors used in the model. These results verify H1, which defines that the factors that characterize the cruise destination conceptual model were 'Port/onshore site-related characteristics', and 'Port/onshore situation-related characteristics'.

Regarding H2, which is related to 'Port/onshore site-related characteristics' and 'Port/onshore situation-related characteristics', both mechanisms have a direct influence on 'Cruise destination performance', and the  $R^2$  obtained and the values of the relations confirm H2. These results are, in general, in accordance with the literature, as mentioned in Section 6.2.

Due to the difference observed between the archipelagos of Macaronesia, being the Canaries and Madeira at a more developed stage concerning cruise tourism when compared to the Azores and Cape Verde, we also proceeded with a separated analysis of the two groups of islands, considering in the model a moderator variable named ‘Port type’, associated to the level of development of the port and its impact on the relation between. ‘Cruise port and onshore characteristics’ and ‘Cruise destination performance’. H3 assumes that a significant difference between ports at the consolidation phase, namely those of the Canary Islands and Madeira, and those at the development phase, namely Azorean and Cape Verdean ports, is expected.

The results obtained on the analysis of main and secondary cruise ports, namely for the ports of the Canary Islands and also of Madeira, on one side, and those of the Azores and Cape Verde, on the other, are shown in Table 6.4.

Table 6.4 Results of the confirmatory model and comparison of groups of ports

Factors and variables	Regression weights		
	General model	More developed ports	Less developed ports
Port/onshore site-related characteristics	0,54	0,44	0,63
QuayGen	0,86	0,86	0,84
ToursGen	0,73	0,64	0,84
TourismServicesGen	0,72	0,59	0,88
PromotionGen	0,64	0,63	0,54
TransitTerminalGen	0,64	0,83	0,38
BusParkGen	0,60	0,61	0,66
CleanessGen	0,48	0,57	0,40
Port/onshore situation-related characteristics	0,14	0,42	0,22
InOutTerminalGen	0,82	0,95	0,54
AirLinksGen	0,73	0,81	0,67
LocationGen	0,72	0,61	0,99
Cruise destination performance	0,42	0,65	0,60
JobCreationOut	0,90	0,95	0,67
GDPIncreaseOut	0,89	0,95	0,62
NbCruisesOut	0,61	0,67	0,74
NbPaxOut	0,41	0,63	0,85
ReturnPaxOut	0,41	0,46	0,55
ExperiencePaxOut	0,34	0,53	0,43

These results reveal a significant difference between the regression weights of the latent exogenous variables of ‘Port/onshore site-related characteristics’ and of ‘Port/onshore situation-related characteristics’. For the main ports, ‘Port/onshore site-related characteristics’ ( $\beta=0.44$ ) and ‘Port/onshore situation-related characteristics’ ( $\beta=0.42$ ) are quite similar, while on the less

developed cruise ports of the Azores and Cape Verde, the 'Port/onshore site-related characteristics' ( $\beta=0.63$ ) have a clearly predominance over 'Port/onshore situation-related characteristics' ( $\beta=0.22$ ). This is in accordance with the literature, as evidenced by MARTI (1990) or MCCALLA (1998), who highlighted the importance of situation attributes for homeports, that work as the main ports in the cruise itineraries.

Regarding the site-related exogenous variables, a significant similitude occurs on the variable 'QuayGen', which is related to the length and depth of the quay for the berthing of cruise ships. This is a vital element of the cruise visit since, as noticed by DOUGLAS and DOUGLAS (2004), in case of a tendering call, the majority of tourists may choose not to go ashore at all. For 'BusParkGen', a variable related to the existence of a bus parking area for shore excursions, the results are relatively similar, meaning that this is also an important element for the experience at the destination of the cruise passengers. For 'ToursGen', a variable associated to the quality and diversity of shore excursions at the destination, the results for both types of ports are important, particularly for less developed ports where the limitation of tourism services and the small size of the cities turn shore excursions a relevant option for cruise passengers.

In opposition, significant differences between both types of ports occur on the variables 'TourismServicesGen' and 'TransitTerminalGen'. On the first case, associated to tourism services at the destination, the beta coefficient is substantially higher on less developed ports relatively to more developed ports, which can result from the perception among local players on less developed ports about the need of a greater diversity of activities for cruise passengers at the destination, which does not occur in more developed ports. For the variable 'TransitTerminalGen', associated to the existence of a terminal with adequate conditions for transit passengers, the beta coefficient is significantly higher on more developed ports, which can be interpreted as the recognition among local players about of the need of a terminal with capacity to accommodate a significant number of simultaneous calls of cruise ships. For less developed ports, the number of cruise passengers in the terminal is much lower than in more developed ports and, therefore, the importance of the terminal is not so critical.

For situation-related exogenous variables, one can see that the location of the port ('LocationGen') is particularly important for less developed ports. This may be related to the fact that, in this case, the port is not a marquee or relevant destination, which increases substantially the possibility of the port to be excluded from the cruise ship itinerary. In opposition, for more developed ports, the exogenous variables associated to existence of an airport with good and frequent international connections ('AirLinksGen') and to the existence of a terminal with adequate capacity for cruise passengers at the beginning or ending of a cruise ('InOutTerminalGen') are critical to the consolidation of the cruise port and destination success. Finally, the results reveal the importance of the latent endogenous variable of 'Cruise destination performance' ( $R^2=0,65$ ) on more developed ports and of also of less developed ports ( $R^2=0,60$ ). The observed endogenous variables have, however, different beta coefficients. For more developed ports, the creation of jobs in local communities ('JobCreationOut') and GDP increase in the region ('GDPIncreaseOut') have substantial higher impact than on less developed ports. This can be associated to the significant difference regarding the dimension of the cruise activity on both types of ports, with a considerably major flow of cruisers on developed ports (2.3 million cruise passengers on the Canary Islands and less than 50.000 on Cape Verde). For the less developed ports, the major beta coefficient is associated to the number of cruise passengers ('NbPaxOut'). This is clear evidence about the margin for progress of these ports regarding cruise tourism and the impacts on the local communities. For the indicators associated to the quality of experience of the cruise passengers ('ExperiencePaxOut') and the expectation of their return as shore tourists ('ReturnPaxOut') the results obtained reveal that they are not particularly relevant for the local specialists that operate on this region.

### 6.5.3 Model confirmation

Due to the limitations derived from the size of the sample, we proceed with eight open interviews to cruise line operators in order to obtain a complementary and confirmatory analysis about the results of the survey and the model obtained (see Table 6.5). The cruise line operators



interviewed included senior international officials of Crystal Cruises, Hapag-Lloyd, MSC, Mystic Cruises and Saga Cruises, accessed with CLIA (Cruise Lines International Association) support.

Table 6.5 Means of the survey and interviews for site and situation-related attributes

Factor	Variable	Name of the variable	Means	
			Survey	Interviews
Port/onshore site-related characteristics	Promotion of the port in general	PromotionGen	6.33	4.25
	Cleanness and safety in general	CleannessGen	6.21	6.00
	Tour excursions in general	ToursGen	6.16	6.13
	Quay capacity for cruise ships in general	QuayGen	5.97	5.75
	Bus park for excursions in general	BusParkGen	5.96	5.25
	Tourism services in general	TourismServicesGen	5.89	4.50
	Terminal with capacity for transit passengers in general	TransitTerminalGen	5.39	3.13
Port/onshore situation-related characteristics	Location of the port in the itineraries of cruise port in general	LocationGen	5.75	6.25
	Airport with international connections in general	AirLinksGen	5.32	6.00
	Terminal with capacity for embark and disembark in general	InOutTerminalGen	4.88	5.63

In general, the cruise line operators considered the model as a reference tool for the ports and destinations cruise market, with only one cruise operator considering it an oversimplification. Three other cruise operators considered the need of additional topics but classified the model as an interesting tool. Four of them classified the model as globally adequate. Thus, the conceptual model can be considered valid, with site- and situation-related factors that directly influence the performance of the cruise ports and destinations.

For the interviewed cruise operators, it was possible to order the site-related factor variables, confirming the importance of the factors included on the model. The *Availability of tour excursions at the destination* (mean value: 6.13; maximum possible: 7.00) is the most relevant variable to cruise line operators, followed by *Cleanness and safety of port and destination* (6.00), as well as *Quay capacity for cruise ships* (5.75). Regarding to situation-related items, the cruise line operators classified the *Location of the port* (6.25) as the most important element, followed by the existence of an *Airport with adequate international links* (6.00). Despite the differences between the averages for the factors obtained through the survey and the interviews to cruise line operators, these interviews confirm the conceptual model obtained from the survey, as well as the importance of the explanatory variables.

As mentioned above, some of the cruise line operators expressed the need to include additional attributes on the model. The most relevant ones are linked to environmental and social impacts. Taking in consideration that cruise ships constitute one of the most energy-intensive forms of tourism, generating large amounts of waste and emissions, environmental impacts stand as a relevant dimension of cruise shipping, leading to unwanted externalities that cannot be neglected. The literature has widely covered the topic, including LESTER and WEEDEN (2004), BUTT (2007), EUROPEAN COMMISSION (2009), CARIC and MACKELWORTH (2014), LAMERS *et al.* (2015), PAOLI *et al.* (2017) and MACNEILL and WOZNIAK (2018). Social sustainability aspects were also a major concern for the interviewed cruise operators. The increasingly antagonistic relationships between locals and visitors were particularly highlighted by one of the interviewees that stated that “we don’t want to go to places where we aren’t wanted”. STEFANIDAKI and LEKAKOU (2014) addressed the topic, putting in evidence the need of a monitoring scheme to prevent it. Therefore, both topics should be analysed in future studies and considered in further developments of the conceptual model.

Other issues reported by the cruise line operators were mainly associated to cruise port costs, a particularly important attribute for cruise companies, given the fact that they are constantly looking at the profitability of their activities. This is in accordance with the literature as referred, among others, by BAYAZIT *et al.* (2015). These variables should also be included in further studies.

An unanimously aspect highlighted by the cruise operators interviewed is linked to the future possibility of a further involvement of cruise lines and terminal operators in the development of cruise terminals, a topic recently introduced in the literature. For example, PALLIS *et al.* (2018) consider that the cruise terminal industry is experiencing the first phase of a privatization and internationalization path, with the emergence of International Cruise Terminal Operators (ICTOs) and the active presence of cruise lines and other types of entities (including port and shipping companies, shipping agents, chambers of commerce, etc.). This subject is directly associated to the evolution of cruise port governance models. PALLIS *et al.* (2019) analysed the

diverse patterns of governance regimes, identifying four distinctive cruise port governance models: (1) the active leader; (2) the investor (ICTO); (3) the marketer; and (4) the passive managers. Thus, it seems plausible that, following the opinion of the cruise line operators and the perspective of the literature, a further evolution is inevitable on the cruise industry with a growing involvement and synergies between players. However, as argued by PALLIS and PAPACHRISTOU (2021), it should be questioned how much a “one size fits all” policy approach would provide an effective response.

For Macaronesian ports, with substantial differences in terms of dimension, all these issues are keen and pertinent. As stated by NIAVIS and VAGGELAS (2016), the risks entailed in port investments should be extensively evaluated by port authorities. This is particularly important for the less developed cruise ports in the Azores and Cape Verde. Furthermore, a closer relationship between ports and cruise lines would be essential for a desired longer-term engagement in the cruise industry of these archipelagos. Following the perspective of PALLIS and PAPACHRISTOU (2021), ports capable to interact in the planning phase with cruise lines, and then balance the quality and quantity of the services offered with the requests of cruise lines, are the ones best positioned to reach the desired longer engagement of cruise lines. Additionally, ports should develop knowledge about the differences between cruise lines that might call, including their source markets and the basics of how they operate, but also to research other ports and itineraries in order to define the goals for the ports and destinations.

## 6.6 Conclusions

The present paper has developed a cruise destination conceptual model that aims to identify the most important port and onshore attributes of the cruise destination as well as the more relevant performance indicators associated to the cruise destinations. Additionally, the conceptual model establishes the connection between the port and onshore attributes and the performance indicators. Due to the potential differences between ports at distinct levels of development, a moderator variable was also included on the model, reflecting the possibility of significant

differences between the different types of ports. Finally, in order to illustrate the conceptual model, the data resulting from a survey applied on the Macaronesia islands, an insular region in the North Atlantic Ocean, was used on a structural equation model and validated afterwards through the consultation of international senior cruise line operators.

The results of the structural equation methodology reveal the importance of the latent exogenous variable of port and onshore site-related characteristics and, in a lower degree, of port and onshore situation-related characteristics. However, a significant difference between the most developed ports and the less developed ones was observed, with a quite similar relevance between site and situation-related factors for the main ports, while on the secondary cruise ports, the site-related factors have a clearly predominance over the situation factors.

Regarding site-related characteristics, the results highlight the following observed exogenous variables, in decreasing order of importance: the quay' adequacy for cruise activity; the availability of diversified shore excursions at the destination; a wide variety of tourism services at the destination, namely in terms of restaurants, hotels, museums, parks, etc.; the promotion of both the port and the destination oriented to the cruise industry players; the existence of a cruise terminal with capacity to transit cruise passengers; the existence of a bus parking area at the cruise terminal; and finally, the feelings of safety, cleanness and the adequate signage for cruise passengers at the cruise destination. Although some differences between both types of ports were observed, they are not particularly substantial.

For port and onshore situation-related characteristics, the existence of a cruise terminal with capacity to cruise passengers in embarking and disembarking operations is the most relevant factor, followed by the existence of an airport with good international connections and by the location of the port in the context of cruise itineraries and in relation to other cruise ports and destinations. For the main cruise ports of the Macaronesia region, the main situation factors are related to the last two variables, while for the less developed ports the main variable is associated to the location of the ports relative to the cruise itineraries.

The results also reveal the importance of the latent endogenous variable of cruise destination performance, particularly for the observed endogenous variables associated to the level of employment and regional GDP generated by cruise tourism. Other endogenous variables like the volume of cruise ship activity and passengers or the expectation to return at the cruise destination as a shore tourist have also relevant impact, while the variable associated to the quality of the passenger' experience obtained the less significant results.

The data collected through the survey and the results presented in this study are an important source of information about the understanding of the most important drivers for the development of cruise destinations for port and destinations stakeholders, namely authorities and operators, enabling a more accurate definition of priorities for local stakeholders when establishing future strategies. Furthermore, the methodology used on this study may be considered a valuable and innovative contribution to science and management, since it presents a clear and structured approach for cruise destinations stakeholders on the promotion of more reliable interventions for the qualification of the destinations.

This is particularly valuable for developing cruise destinations, taking into consideration the substantial investments that still need to be made. Furthermore, the challenges that cruise ports face differ substantially depending on their stage of development, their size and their governance model. For more developed cruise ports, it is expected that they will evolve to a greater intervention of private players and a more complex cruise port governance model.

Additionally, we must not ignore the effect of COVID-19 on the tourism sector worldwide and, in particular, on the cruise industry. In the case of Macaronesia, the resumption of the cruise activity raises the possibility of the establishment of a coordinated process of regionalisation with individual improvements in the provision of local services. This process would contribute to the creation of more integrated itineraries in the region, based on the 'Cruises in the Atlantic Islands' brand, and the maximization of mutual benefits for destinations. The alternative would be a competition strategy, with uncertain results for each archipelago. It should be expected that the more developed ports and destinations would reach better results in the future than the less

developed ones, but the potential impact of a cooperation is probably much higher. So, a more collaborative reflection and the strengthening of coordination and cohesion between the different port and local authorities and stakeholders is necessary, in order to enhance the economic impacts and at the same time promote sustainable destinations in the post COVID-19 scenario.

To the best of our knowledge, this is the first study where the situation of the cruise industry in the Macaronesia region is dealt with in a comprehensive manner. However, some limitations must be considered. The first one has to do with the reduced size of the dataset, directly associated to the small number of experts or managers that operate in the region. In this regard, it should be stressed that this was not a survey to a population but to specialists of a particular field in a specific geographical area with a substantial potential in the cruise industry, due to its proximity to Europe and the favourable climate conditions in the low and medium seasons. A possible field for future work would be to extend the study to other destinations to enlarge the dataset and confirm the results of the present study. Another possible field for future work would be to study in more detail the variables that integrate onshore services in the perspective of shippers, passengers and local operators.

## Chapter 7

### Conclusion

This doctoral thesis has addressed several topics directly associated to three key industries that integrate the blue economy. These industries are, on one side, the port and shipping industries, directly associated to the levels of freight costs and of connectivity of the regions or countries involved, and, on the other side, the cruise tourism industry, which has the potential of creating in local economies value-added activities and employment, contributing to economic development. The perspective adopted in the present document is mostly focused on the particularities of the islands, that face special circumstances, although some of the analyses could be replicated in broader realities than insular ones.

In all these three industries the port system operates as the common denominator, serving as an interface between sea and land, also involving, directly or indirectly, a multiplicity of stakeholders. In this sense, one could consider that the topics discussed in the document have relevance for private stakeholders that carry out a diversity of economic activities associated to these industries, as well as for public stakeholders that regulate or provide certain services on these industries. From this diversity of activities and players, stands out the need of a holistic perspective in approaching these sectors' problems.

In this sense, the topics presented can be used by several types of agents in all three sectors, as well as those with more indirect connections. Examples of private stakeholders involved in the port industry include, among others, shipping companies, shipping agents, port operators, shippers, truck (or rail) companies, freight forwarders, and final consumers. On the shipping industry, the private stakeholders include shippers, namely industrial firms involved in the production of goods to other industries and of consumer goods, or commercial firms involved in the commercialization of goods, freight forwarders, final customers, etc. Finally, in the cruise shipping industry, the private agents are extremely diverse, integrating bus operators, taxis,

hotels, restaurants, bars, shops, parks, museums, craftsmen, tourist guides, fuel suppliers, ship chandlers, garbage collectors, etc.

Given the importance of the role of central governmental entities and local public entities involved in the definition, regulation, or provision of services, the several chapters presented specific perspectives on their role and how they can effectively contribute to the construction of better feasible solutions.

The thesis pursued three global objectives set in the Introduction, being linked to the topics presented in the first paragraphs of the present chapter: one oriented to the establishment of the most adequate port governance model characteristics, investigated in Chapter 2 and that could be also replicated with some adjustments in island ports, as discussed in Chapter 3; another one linked to the definition of the best tool for the provision of regular shipping market covering several islands, reconciling both efficiency and equity criteria, discussed in Chapter 4; and the last one dedicated to the determination of the most appropriate island cruise port and destination factors that could be implemented in cruise destinations policies, presented in chapters 5 and 6. All three global objectives are considered relevant contributions to the knowledge in the port, shipping, and cruise tourism industries, as well as to the provision of a comprehensive strategy framework with a coherent articulation between the technical and institutional systems, based on conceptual tools and innovative approaches, especially for insular spaces.

Throughout the various chapters the specific objectives were detailed.

Chapter 2 presents a conceptual model to determine the best port governance model mechanisms and its relationship with higher levels of performance. This is an important topic, given the economic impacts that results for both port authorities and port operators.

The main governance characteristic is private port operations, through concessions, and without intervention of the port authority. In addition, the port authority should adopt a business mindset and be autonomous from the government, with freedom to take business actions, namely in logistics areas, as a true Port Development Company. The control of the port authority should be through an internal organization of the port itself and not through government supervision.



The model also explains port performance. The relevance for the literature is the study presented in this chapter is the definition of the set of factors that public managers may decide upon when changing the characteristics of the port governance models to ensure their performance.

Chapter 3 is dedicated to the insular regions of the Caribbean and Macaronesia, describing the port systems in both regions, and presenting a framework approach (Advocacy Coalition Framework - ACF) to characterise the port communities and the dynamic of port stakeholders in the construction of coalitions with potential to change that subsystem. Given the complexity of the port industry and the roles of the different stakeholders involved in this industry, according to their activities and goals, the principles established in the ACF are particularly suitable to frame the difficulties that islands face regarding the construction of dynamic port communities and consistent port systems, with a long-term vision. Two opposite results were observed. In some islands there are, in general, consolidated port systems, with a market orientation that results in proactive policies and consolidated port systems, while, in some other islands, especially the smaller ones, more limited in financial resources and with lower levels of connectivity, the port communities are less dynamic, with powerful unions, and financially feeble port authorities, resulting in unsatisfactory levels of port performance and jeopardizing their sustainability in the long-term.

Chapter 4 describes the present situation of the maritime freight market covering the Azores archipelago, an outermost region of Europe significantly penalised by high freight prices and registering a low connectivity level. The present regime is mostly focused on equity topics, neglecting efficiency from public goals. The main contribution of this chapter is the definition of a tool (universal service) for the provision of regular shipping services that integrates both equity and efficiency criteria. This approach is particularly suited for the network industries under liberalisation processes. The result of the application of the universal service concept implies the establishment of two distinct markets or segment markets, one with a more liberalised set of rules, over which the government could obtain financial resources through

taxes; and another with public intervention, including a financing mechanism to transfer the funds obtained in the first market to equalise freight prices. The central and local government agencies in charge of the shipping and port policies could benefit from the concepts applied on the case study when studying the revision of the present system, contested in recent years by several stakeholders. Some additional elements in the port system, like the concentration of operations on mainland and a promotion of landlord port governance models could contribute also to a more efficient system, with positive impacts in terms of logistics and freight prices.

In Chapter 5 we characterize the Macaronesia cruise destination markets, which includes the archipelagos of the Azores, Madeira, Canary Islands and Cape Verde, their recent evolution, as well as the economic impacts of cruise tourism. We also discuss the individual strategies of the Macaronesian archipelagos that are being pursued to promote cruise tourism and provide insights into the challenges that both ports and destinations should overcome to ensure their long-term sustainable growth in the context of the global cruise market. The dynamic that characterizes the Macaronesia region has been fostered by two key drivers: first, the proximity to Europe, the second largest cruise emission market; and second, the favourable climate conditions for tourism activity in the winter season. Nevertheless, the development has been uneven, as Macaronesian archipelagos are in two distinct stages with respect to cruise tourism, being the Canary Islands and Madeira in a consolidation phase, concentrating most itineraries in the region, while the Azores and Cape Verde are still in a development phase, with still a lack of port infrastructure and integrated services at the destination to cruise passengers.

Chapter 6 presents a cruise destination conceptual model for ports and cruise destinations, also establishing a relationship between their characteristics and the performance of the cruise destination. The purpose is to identify the most important port and onshore attributes of the cruise destination as well as the more relevant performance indicators associated to the cruise destinations, based on a survey applied to cruise destination specialists and managers operating in the Macaronesia islands, complemented by interviews to international senior cruise line operators. Due to the potential differences between ports at distinct levels of development, a

moderator variable was also included on the model, reflecting the possibility of substantial differences in the way the relation between port characteristics and port performance occurs. With this new variable, the results obtained revealed that in more developed ports the situation-related geographic factors predominate, while for less developed ones there is an equal relevance for both site- and situation-related factors. These results are an important source of information for port and destinations stakeholders, public and private, when deciding their future strategies in the sector, enabling a more accurate definition of priorities.

Despite the efforts developed in the case-studies, it should be emphasized that the approaches are far from exhausting the discussion. In fact, the topics discussed are complex, dynamic, and with a multitude of perspectives. However, our methods are innovative and constitute an important contribution to the literature over these topics. In addition, we tried to present a vivid and dynamic perspective, trying to illustrate through the case studies of the various chapters the reality of insular spaces.

We faced several limitations during our work, namely the lack of data, in quality and quantity. Nevertheless, we believe that the usefulness of the methods and that of the practical analyses presented through the case studies reveal its validity and pertinency, being of considerable help for private and public stakeholders at these three important fields of the blue economy. For public stakeholders, as highlighted along the various chapters, the quality of their intervention is decisive for the islands to accomplish better levels of connectivity and development. We also consider that the approaches used in the various chapters could be applied to other regions, with minor adjustments, mainly in the cases of chapters 2, 3 and 6, as well as, although in a more limited level, in chapter 4. Improvements and future research works identified in chapters 2 to 6 should enhance the accuracy of the debate, applying other methodologies, and proceeding on the discussion of other similar case studies. We shall proceed on this path since the topics debated here will, certainly, keep its relevance in the future.

## References

- AGUIAR, G. D., MORALES, A. G., LUIS, J. A., and MARRERO, V. S. (2007). Puertos y sistemas portuarios de las islas atlánticas europeas (Canarias, Azores y Madera). Ediciones Idea. Santa Cruz de Tenerife.
- ALMEIDA, J. (2011). Os Cruzeiros e o Porto do Funchal: Importância Económica para o Turismo na Região. Master's Thesis, University of Madeira, Portugal.
- AMIN, C., MULYATI, H., ANGGRAINI, E., and KUSUMASTANTO, T. (2021). Impact of maritime logistics on archipelagic economic development. *The Asian Journal of Shipping and Logistics*, 37(2), 157-164.
- ANDRIOTIS, K., and AGIOMIRGIANAKIS, G. (2010). Cruise Visitors' Experience in a Mediterranean Port of Call. *International Journal of Tourism Research*, 12(4), 390-404.
- ANGELOPOULOS, J., CHLOMOUDIS, C., CHRISTOFAS, P., and PAPADIMITRIOU, S. (2013). Cost Assessment of Sea and Air Transport PSO Services: The Case of Greece. *International Journal of Maritime, Trade & Economic*, 1, 3-39.
- AROF, A. M. (2015). Determinants for a Feasible Short Sea Shipping: Lessons from Europe for ASEAN. *Asian Social Science*, 11(15), 229-238.
- ARTAL-TUR, A., NAVARRO-AZORÍN, J. M., and RAMOS-PARREÑO, J. M. (2019). Estimating the impact of cruise tourism through regional input-output tables. *Anatolia*, 30(2), 235-245.
- ARVIS, J.-F., and SHEPHERD, B. (2011). The Air Connectivity Index Measuring Integration in the Global Air Transport Network. Policy Research Working Paper 5722. Poverty Reduction and Economic Management Network. International Trade Department. World Bank.
- ASERO, V., and SKONIECZNY, S. (2018). Cruise Tourism and Sustainability in the Mediterranean. Destination Venice. In: BUTOWSKI, L. (Ed.). *Mobilities, Tourism and Travel Behavior – Contexts and Boundaries*. Intechopen.
- AZIZ, H., EL-SAID, O., and BONTENBAL, M. (2020). An analytical approach to cruise tourism as an option for development: A case study of the Sultanate of Oman. *Tourism in Marine Environments*, 15(2), 95-109.
- BAIRD, A. J. (2000). State subsidy system for remote island liner services in Japan. Special Interest Group on Maritime Transport and Ports International Workshop, Genoa, June 8-10.
- BAIRD, A. J. (2012). Comparing the efficiency of public and private ferry services on the Pentland Firth between mainland Scotland and the Orkney Islands. *Research in Transportation Business & Management*, 4, 79-87.
- BALTAZAR, R., and BROOKS, M. R. (2001). The Devolution of Port Management: A Tale of Two Countries. Paper presented at the world conference on transport research, Seoul.

- BALTAZAR, R., and BROOKS, M. R. (2006). Chapter 17 Port Governance, Devolution and the Matching Framework: A Configuration Theory Approach. *Devolution, Port Governance and Port Performance. Research in Transportation Economics*, 17(1), 379–403.
- BANDARA, Y. M., and NGUYEN, H.-O. (2015). Port Infrastructure Pricing Policy and Practice: A Case Study of Australia and New Zealand Seaports. *Australian Journal of Maritime & Ocean Affairs*, 7(2), 110–131.
- BANDARA, Y. M., NGUYEN, H.-O., and CHEN, S.-L. (2013). Determinants of Port Infrastructure Pricing. *The Asian Journal of Shipping and Logistics*, 29(2), 187–206.
- BARROS, C. P., FELÍCIO, J. A., and FERNANDES, R. L. (2012). Productivity analysis of Brazilian seaports. *Maritime Policy & Management*, 39(5), 503-523.
- BAYAZIT, S., SUNYER, A., and KIRVAL, L. (2015). Main factors to select a cruise homeport in the Mediterranean region: A perspective from the cruise industry agents. 2015 International Conference on Logistics, Informatics and Service Sciences (LISS), 27-29 July. Barcelona, Spain.
- BERGQVIST, R., and CULLINANE, K. (2017). Port Privatisation in Sweden: Domestic Realism in the Face of Global Hype. *Research in Transportation Business & Management*, 22, 224–231.
- BITRE (BUREAU OF INFRASTRUCTURE, TRANSPORT & RESEARCH ECONOMICS) (2021). Tasmanian Freight Equalisation Scheme. Monitoring Review 2020, BITRE, Canberra, April. <https://bitre.gov.au/> (accessed 25 August 2022).
- BORGATTI, L. (2007). Pacific Island's Bilateral Trade: The Role of Remoteness and of Transport Costs, World Institute for Development Economics Research, United Nations University.
- BRAY, S., CAGGIANI, L., and OTTOMANELLI, M. (2015). Measuring transport systems efficiency under uncertainty by fuzzy sets theory based Data Envelopment Analysis: theoretical and practical comparison with traditional DEA model. *Transportation Research Procedia*, 5, 186-200.
- BREA (BUSINESS RESEARCH AND ECONOMIC ADVISORS). (2007). Economic contribution of cruise tourism in Mexico, Vol. I, Impact Analysis. Caribbean Cruise Association of Florida. Retrieved from <http://www.f-cca.com/downloads/mexico-study2.pdf>.
- BREA (BUSINESS RESEARCH AND ECONOMIC ADVISORS) (2012). Economic contribution of cruise tourism to the Destination Economies. Volume I – Aggregate Analysis. Business Research & Economic Advisors, Pembroke Pines, Florida, USA.
- BREA (BUSINESS RESEARCH AND ECONOMIC ADVISORS). (2015). Economic Contribution of Cruise Tourism to the Destination Economies. Business Research & Economic Advisors, Pembroke Pines, Florida, USA.
- BREA (BUSINESS RESEARCH AND ECONOMIC ADVISORS). (2018). Economic Contribution of Cruise Tourism to the Destination Economies. Volume I – Aggregate Analysis. Business Research & Economic Advisors, Pembroke Pines, Florida, USA.

- BRESSON, G., and LOGOSSAH, K. (2011). Crowding-Out Effects of Cruise Tourism on Stay-Over Tourism in the Caribbean: Non-Parametric Panel Data Evidence. *Tourism Economics*, 17(1), 127-158.
- BRICEÑO-GARMENDIA, C., and BENITEZ, D. A. (2011). Cape Verde's Infrastructure A Continental Perspective. Policy Research Working Paper 5687. The World Bank.
- BRICEÑO-GARMENDIA, C., BOFINGER, H.C., CUBAS, D., and MILLAN-PLACCI, M.F. (2015). Connectivity for Caribbean Countries. An Initial Assessment. Policy Research Working Paper 7169. Transport and ICT Global Practice Group. World Bank.
- BRIDA, J. G., and AGUIRRE, S. (2009). Cruise tourism: Economic, socio-cultural and environmental impacts. *International Journal of Leisure and Tourism Marketing*, 1(3), 205-226.
- BRIDA, J. G., BUKSTEIN, D., GARRIDO, N., and TEALDE, E. (2010). Cruise passengers' expenditure in the Caribbean port of call of Cartagena de Indias: A cross-section data analysis. *Estudios y Perspectivas en Turismo*, 19(5), 607-634.
- BRIDA, J. G., and ZAPATA, S. (2010a). Economic impacts of cruise tourism: The case of Costa Rica. *Anatolia*, 21(2), 322-338.
- BRIDA, J. G., and ZAPATA, S. (2010b). Cruise tourism: Economic, socio-cultural and environmental impacts. *International Journal of Leisure and Tourism Marketing*, 1(3), 205-226.
- BROOKS, M. R. (2009). Liberalization in Maritime Transport. *International Transport Forum. Forum Paper 2009-2*. OECD/ITF, Paris.
- BROOKS, M. R. (2017). A New Direction or Stay the Course? Canada's Port-Specific Challenges Resulting from the Port Reform Program of the 1990s. *Research in Transportation Business & Management*, 22, 161-170.
- BROOKS, M. R., and CULLINANE, K. (2006a). Chapter 1: Introduction. *Devolution, Port Governance and Port Performance. Research in Transportation Economics*, 17(1), 3-28.
- BROOKS, M. R., and CULLINANE, K. (2006b). Chapter 18: Governance models defined. *Research in Transportation Economics*, 17(1), 405-435.
- BROOKS, M. R., and CULLINANE, K. (2006c). Chapter 26: Conclusions and research agenda. *Research in Transportation Economics*, 17(1), 631-660.
- BROOKS, M. R., CULLINANE, K., and PALLIS, A. A. (2017). Revisiting Port Governance and Port Reform: A Multi-Country Examination. *Research in Transportation Business & Management*, 22, 1-10.
- BROOKS, M. R., and PALLIS, A. A. (2008). Assessing Port Governance Models: Process and Performance Components. *Maritime Policy & Management*, 35(4), 411-432.
- BROOKS, M. R., and PALLIS, A. A. (2012). Chapter 25: Port Governance. In: TALLEY, W. T. (Ed.). *The Blackwell Companion to Maritime Economics*, 491-516. Chichester: Blackwell Publishing.

- BROOKS, M. R., SCHELLINCK, T., and PALLIS, A. A. (2011). A Systematic Approach of Evaluating Port Effectiveness. *Maritime Policy & Management*, 38 (3), 315–334.
- BROWN, S.-A. (2018). The Role of Technical Efficiency & Productivity Evolution in Port Development: An Application to Caribbean Small Island Developing States (SIDS) Ports. Ph.D. Thesis. Edinburgh Napier University. June 2018.
- BUTT, N. (2007). The impact of cruise ship generated waste on home ports and ports of call: A study of Southampton. *Marine Policy*, 31, 591-598.
- BUTTON, K., and NIJKAMP, P. (1997). Network Industries, Economic Stability and Spatial Integration. Tinbergen Institute Discussion Papers 97-047/3, Tinbergen Institute.
- BUZOVA, D., SANZ-BLAS, S., and CERVERA-TAULET, A. (2019). ‘Tour me onshore’: Understanding cruise tourists’ evaluation of shore excursions through text-mining. *Journal of Tourism and Cultural Change*, 17(3), 356-373.
- CALDEIRINHA, V. R., FELÍCIO, J. A., and DA CUNHA, S. F. (2017). Government Policies and Portuguese Port Governance in the Period from 2005 to 2015. *Research in Transportation Business & Management*, 22, 11–20.
- CALDEIRINHA, V. R., FELÍCIO, J. A., CUNHA, S. F., and LUZ, L. M. (2018). The nexus between port governance and performance. *Maritime Policy & Management*, 45(7), 877-892.
- CARIC, H., and MACKELWORTH, P. (2014). Cruise tourism environmental impacts – The perspective from the Adriatic Sea. *Ocean & Coastal Management*, 102, 350-363.
- CARRESE, S., CUNEO, V., and PATELLA, S. M. (2015). A cost evaluation analysis for naval accessibility to Sardinia and Corsica, paper presented at the Models and Technologies for Intelligent Transportation Systems (MT-ITS), Budapest.
- CASTILLO-MANZANO, J. I., FAGEDA, X., and LAXE, F. G. (2014). An analysis of the determinants of cruise traffic: An empirical application to the Spanish port system. *Transportation Research Part E: Logistics and Transportation Review*, 66, 115-125.
- CDB (CARIBBEAN DEVELOPMENT BANK) (2016). Transforming the Caribbean Port Services Industry: Towards the Efficiency Frontier.
- CEPAL (COMISIÓN ECONÓMICA PARA AMÉRICA LATINA Y EL CARIBE) (1997). El transporte marítimo en el Caribe, Boletín FAL – Facilitación del Comercio y el Transporte en América Latina y el Caribe, No. 136.
- CEPAL (COMISIÓN ECONÓMICA PARA AMÉRICA LATINA Y EL CARIBE) (2022). Perfil Marítimo y Logístico. [https://perfil.cepal.org/l/en/portmovements\\_classic.html](https://perfil.cepal.org/l/en/portmovements_classic.html) (accessed 18 August 2022).
- CERRE (CENTRE ON REGULATION IN EUROPE) (2013). Public service obligations and competition. Final report. [www.cerre.eu](http://www.cerre.eu) (accessed 1 August 2022).
- CHANG, Y.-T., PARK, H., LIU, S.-M., and ROH, Y. (2016). Economic impact of cruise industry using regional input-output analysis: a case of Incheon. *Maritime Policy & Management*, 43(1), 1-18.

- CHASE, G., and ALON, I. (2002). Evaluating the economic impact of cruise tourism: A case study of Barbados. *Anatolia*, 13(1), 5-18.
- CHEN, P. S. L., PATEMAN, H., and SAKALAYEN, Q. (2017). The Latest Trend in Australian Port Privatisation: Drivers, Processes and Impacts. *Research in Transportation Business & Management*, 22, 201–213.
- CHEN, J. M., PETRICK, J. F., PAPATHANASSIS, A., and LI, X. (2019). A meta-analysis of the direct economic impacts of cruise tourism on port communities. *Tourism Management Perspectives*, 31, 209-218.
- CHEON, S. (2007). Evaluating Impacts of Institutional Reforms on Port Efficiency Changes Malquimist Productivity Index for World Container Ports. Post-Doctoral research. Berkeley: University of California.
- CHEON, S. H., DOWALL, D. E., and SONG, D. W. (2010). Evaluating Impacts of Institutional Reforms on Port Efficiency Changes: Ownership, Corporate Structure, and Total Factor Productivity Changes of World Container Ports. *Transportation Research Part E: Logistics and Transportation Review*, 46(4), 546–561.
- CHLOMOUDIS, C. I., PALLIS, P. L., PAPADIMITRIOU, S., and TZANNATOS, E. S. (2007). The liberalisation of maritime transport and the island regions in EU. Evidence from Greece. *European Transport*, 37, 1-15.
- CHONÉ, P., FLOCHEL, L., and PERROT, A. (2000). Universal service obligations and competition. *Information Economics and Policy*, 12, 249-259.
- CHRISTIANSEN, M., FAGERHOLT, K., NYGREEN, B., and RONEN, D. (2007). Maritime Transportation. In: BARNHART, C., and LAPORTE, G. (Eds.) *Handbook in Operations Research and Management Science*. New York.
- CLARK, X., DOLLAR, D., and MICCO, A. (2004). Port Efficiency, Maritime Transport Costs and Bilateral Trade. NBER Working Paper Series 10353. National Bureau of Economic Research.
- COMBES, P. P., and LAFOURCADE, M. (2005). Transport costs: measures, determinants and regional policy implications for France. *Journal of Economic Geography*, 5, 319-349.
- COMMISSION OF THE EUROPEAN COMMUNITIES (2003). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on the interpretation of Council Regulation (EEC) No 3577/92 applying the principle of freedom to provide services to maritime transport within Member States (maritime cabotage). Brussels, 22.12.2003. COM(2003) 595 final.
- COTO-MILLAN, P., BANOS-PINO, J. and RODRIGUEZ-ALVAREZ, A. (2000). Economic efficiency in Spanish ports: some empirical evidence. *Maritime Policy & Management*, 27(2), 169-174.
- CREMER, H., GASMI, F., GRIMAUD, A., and LAFFONT, J.-J. (1998), *The Economics of Universal Service: Theory*, The Economic Development Institute of the World Bank.



- CREMER, H., GASMI, F., GRIMAUD, A. and LAFFONT, J.-J. (2001). Universal Service: An Economic Perspective. *Annals of Public and Cooperative Economics*, 72(1), 5-43.
- CREMER, H., DE DONDER, P., BOLDRON, F., and ROY, B. (2008). Social Costs and Benefits of the Universal Service Obligation in the Postal Market. In: CREW, M. A., and KLEINDORFER, P. R. (Eds.), *Competition and Regulation in the Postal and Delivery Sector*, chapter 2, Edward Elgar Publishing.
- CRUISE MARKET WATCH (2022). <http://www.cruisemarketwatch.com/growth/> (accessed 23 July 2022).
- CUBAS, D., BRICEÑO-GARMENDIA, C., and BOFINGER, H. (2015). OECS Ports: An Efficiency and Performance Assessment. Policy Research Paper 7162. World Bank.
- CULLINANE, K., and WANG, T.-F. (2006). Chapter 23: Data Envelopment Analysis (DEA) and Improving Container Port Efficiency. *Research in Transportation Economics*, 17, 517-566.
- CULLINANE, K., WANG, T.-F., SONG, D.-W., and JI, P. (2006). The technical efficiency of container ports: Comparing data envelopment analysis and stochastic frontier analysis. *Transportation Research Part A: Policy and Practice*, 40(4), 354-374.
- DE DONGER, P., CREMER, H., and RODRIGUEZ, F. (2002). Funding the Universal Service Obligation under Liberalisation. In: CREW, M. A., and KLEINDORFER, P. R. (Eds.), *Postal and Delivery Services. Topics in Regulatory Economics and Policy Series*, vol. 41. Springer, Boston, MA.
- DE LANGEN, P. (2006). Chapter 20: Stakeholders, Conflicting Interests and Governance in Port Clusters. *Research in Transportation Economics*, 17(1), 457-477.
- DE LANGEN, P., and VAN DER LUGT, L. (2017). Institutional Reforms of Port Authorities in the Netherlands; The Establishment of Port Development Companies. *Research in Transportation Business & Management*, 22, 108–113.
- DE LANGEN, P., and PALLIS, A. A. (2006). Analysis of the Benefits of Intra-Port Competition. *International Journal of Transport Economics*, 33(1), 69–86.
- DE MONIE, G. (2004). Mission and Role of Port Authorities after Privatization. Paper presented at the ITMMA PPP seminar, Antwerp, Belgium: November.
- DEBRIE, J., LACOSTE, R., and MAGNAN, M. (2017). From National Reforms to Local Compromises: The Evolution of France's Model for Port Management, 2004–2015. *Research in Transportation Business & Management*, 22, 114–122.
- DELGADO-AGUIAR, G., and HERNÁNDEZ-LUIS, J. A. (2019). Maritime Transport, Atlantic and Mediterranean Port Networks. The Example of the Canary Islands. *Revista de Estudios Andaluces*, 38, 28-49.
- DESA (UNITED NATIONS DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS) (1996). Progress in the Implementation of the Programme of Action for the Sustainable Development of Small Island Developing States, Report of the Secretary-General, United Nations.

- DIAKOMIHALIS, M. N., LEKAKOU, M. B., STEFANIDAKI, E., and SYRIOPOULOS, T. C. (2009). The economic impact of the cruise industry on local communities: The case of Greece. Proceedings of the 4th International Scientific Conference Planning for the Future Learning from the Past: Contemporary Developments in Tourism, Travel & Hospitality, Rhodes Island, Greece.
- DI CIOMMO, F., and SHIFTAN, Y. (2017). Transport equity analysis. *Transport Reviews*, 37(2), 139-151.
- DOUGLAS, N., and DOUGLAS, N. (2004). Cruise ship passenger spending patterns in Pacific island ports. *International Journal of Tourism Research*, 6(4), 251-261.
- DRCIE (DIREÇÃO REGIONAL DO COMÉRCIO, INDÚSTRIA E ENERGIA) (2011). *Barómetro Regional da Qualidade: Avaliação da Satisfação dos Turistas*. Direção Regional do Comércio, Indústria e Energia, Funchal, Madeira, Portugal.
- DUCRUET, C., and BERLI, J. (2021). The geography of maritime transport. *International Encyclopaedia of Transportation*, Elsevier, 517-534.
- DUCRUET, C., and NOTTEBOOM, T. (2012). Chapter 6: Developing Liner Service Networks in Container Shipping. In: SONG, D. W., and PANAYIDES, P. (Eds.). *Maritime Logistics: A complete guide to effective shipping and port management*, Kogan Page, London, 77-100.
- DWYER, L., DOUGLAS, N., and LIVAIC, Z. (2003). Measuring the economic impacts of a cruise ship visit. *Riding the Wave of Tourism and Hospitality Research*, CAUTHE Conference, Coffs Harbour, Australia, 5–8 February.
- DWYER, L., and FORSYTH, P. (1998). Economic significance of cruise tourism. *Annals of Tourism Research*, 25(2), 393–415.
- EDEI (EDEI CONSULTORES) (2012). *Estudio del Mercado del Turismo de Cruceros en Canarias – Informe Final*. EDEI – Consultores de Dirección, Las Palmas, Canary Islands, Spain.
- EDEI (EDEI CONSULTORES) (2015). *Estudio del Mercado de Turismo de Cruceros en Canarias – Temporada 2014-2015 – Informe Final*. EDEI – Consultores de Dirección, Las Palmas, Canary Islands, Spain.
- ESMER, S., and DURU, O. (2017). Port Governance in Turkey: The Age of the Global Terminal Operators. *Research in Transportation Business & Management*, 22, 214–223.
- EURISLES (EUROPEAN ISLANDS SYSTEM OF LINKS AND EXCHANGES) (1999). “As regiões insulares e o preço do transporte de mercadorias intracomunitário”, *European Islands System of Links and Exchanges*, 6.
- EUROPEAN COMMISSION (2009). *Tourist Facilities in Ports*. Office for Official Publications of the European Communities, Luxembourg.
- FAGERHOLT, K. (2004). A computer-based decision support system for vessel fleet scheduling – experience and future research. *Decision Support Systems*, 37(1), 35-47.

- FAHMIASARI, H., and PARIKESIT, D. (2017). Container Shipping Network Efficiency Comparison in Indonesia: Nusantara Pendulum and Sea Tollway. *The Asian Journal of Shipping and Logistics*, 33(2), 79-84.
- FELÍCIO, J. A., CALDEIRINHA, V., and DIONÍSIO, A. (2015). The Effect of Port and Container Terminal Characteristics on Terminal Performance. *Maritime Economics & Logistics*, 17, 493–514.
- FERRANTE, M., DE CANTIS, S., and SHOVAL, N. (2016). A general framework for collecting and analysing the tracking data of cruise passengers at the destination. *Current Issues in Tourism*, 21(12), 1426-1451.
- FERRARI, C., TEI, A., and MERK, O. (2015). The Governance and Regulation of Ports: The Case of Italy. Discussion Paper 2015-01, International Transport Forum. OECD
- FINGER, M., and FINON, D. (2011). From the “public service” model to the “universal service” obligation. In: FINGER, M., and KUNNEKE, R. (Eds.), *Handbook of liberalised infrastructure sectors*. London, Edward Elgar publisher.
- FINK, C., MATTOO, A., and NEAGU, I. C. (2002). *Trade in International Maritime Services: How Much Does Policy Matter?*. Washington, DC: World Bank. World Bank.
- FYNES, B., and ENNIS, S. (1997). *Competing from the periphery core issues in international business*. Dryden Press.
- GALLUP, J. L., SACHS, J. D., and MELLINGER, A. (1999). *Geography and Economic Development*, CID Working Paper n. ° 1, Harvard, Harvard University.
- GALVÃO, C. B., ROBLES, L. T., and GUERISE, L. C. (2017). 20 Years of Port Reform in Brazil: Insights into the Reform Process. *Research in Transportation Business & Management*, 22, 153–160.
- GARVER, M. S., and MENTZER, J. T. (1999). Logistics Research Methods: Employing Structural Equation Modelling to Test for Construct Validity. *Journal of Business Logistics*, 20, 33-57.
- GAUTIER, A., and PAOLINI, D. (2011). Universal Service Financing in Competitive Postal Markets: One Size Does Not Fit All. *Review of Network Economics*, 10(3), 1-30.
- GIANNOPOULOS, G. A., and AIFANDOPOULOU-KLIMIS, G. (2004). Inland Maritime Transport in Greece after the Lifting of the Cabotage and Full Liberalization: A Review. Part 1: The Situation ‘before’ and Expected Impacts. *Transport Reviews*, 24(4), 465–483.
- GOUVEIA, A. (2015). *O Impacto Económico do Turismo de Cruzeiros: O caso do porto do Funchal*. Master's Thesis, University of Aveiro.
- GUI, L., and RUSSO, A. P. (2011). Cruise ports: a strategic nexus between regions and global lines-evidence from the Mediterranean. *Maritime Policy & Management*, 38(2), 129-150.
- HAIR, J., ANDERSON, R., TATHAM, R., and BLACK, W. (1998). *Multivariate Data Analysis* 5th ed. London: Prentice Hall International.

- HARALAMBIDES, H. E. (2007). Structure and Operations in the Liner Shipping Industry. In: HENSHER, D. A., and BUTTON, K. J. (Eds.) *Handbook of Transport Modelling* (Vol. 1), Emerald Group Publishing Limited, Bingley, 761-775.
- HAVENGA, J., SIMPSON, Z., and GOEDHALS-GERBER, L. (2017). International Trade Logistics Costs in South Africa: Informing the Port Reform Agenda. *Research in Transportation Business & Management*, 22, 263–275.
- HENRY, A. D., INGOLD, K., NOHRSTED, D., and WEIBLE, C. M. (2014). Policy Change in Comparative Contexts: Applying the Advocacy Coalition Framework Outside of Western Europe and North America. *Journal of Comparative Policy Analysis: Research and Practice*, 16(4), 299-312.
- HENTHORNE, T. L. (2000). An analysis of expenditures by cruise ship passengers in Jamaica. *Journal of Travel Research*, 38(3), 246-250.
- HERNÁNDEZ-LUIS, J. A. (2018). Diagnosis of the transinsular transportation axis in the context of the Canary Islands' territorial integration. *Boletín de la Asociación de Geógrafos Españoles*, 77, 549-580.
- HU, Y., and ZHU, D. (2009). Empirical analysis of the worldwide maritime transportation network. *Physica A*, 388, 2061-2071.
- HUIJBENS, E. H. (2015). Cruise tourism in Iceland and the North Atlantic: Gateways to the Arctic and the challenges to port readiness programs. *Tourism in Marine Environments*, 10(3-4), 241-254.
- JAAG, C., KOLLER, M., and TRINKNER, U. (2009). Chapter 8: Calculating the Cost of the Universal Service Obligation: The Need for a Global Approach. In: CREW, M. A., and KLEINDORFER, P. R. (Eds.), *Progress in the Competitive Agenda in the Postal and Delivery Sector*, Edward Elgar Publishing.
- JENKINS-SMITH, H., NOHRSTEDT, D., WEIBLE, C., and SABATIER, P. (2014). The advocacy coalition framework: Foundations, evolution, and ongoing research. In: SABATIER, P., and WEIBLE, C. (Eds.). *Theories of the Policy Process*, 3rd ed. (Boulder, CO: Westview Press), 183–223.
- JIA, H., LAMPE, O. D., SOLTESZOVA, V., and STRANDENES, S. (2017). Norwegian Port Connectivity and Its Policy Implications. *Maritime Policy & Management*, 44(8), 956-966.
- JIMÉNEZ, J. L., VALIDO, J., and MORÁN, N. (2018). Do maritime passengers' subsidies in Europe affect prices?. *Maritime Policy & Management*, 45(7), 911-923.
- JOHNSON, D. (2006). Providing ecotourism excursions for cruise passengers. *Journal of Sustainable Tourism*, 14(1), 43-54.
- KARLIS, T., and POLEMIS, D. (2018). Cruise homeport competition in the Mediterranean. *Tourism Management*, 68, 168-176.
- KAY, N. (2009). Scottish ferry policy, *Fraser of Allander Economic Commentary*, 9(2), 293-306.

- KLEIN, R. A. (2005). *Playing off the Ports: BC and the Cruise Tourism Industry*. Canadian Centre for Policy Alternatives, Vancouver, Canada.
- KNATZ, G. (2017). How Competition Is Driving Change in Port Governance, Strategic Decision-Making and Government Policy in the United Governments. *Research in Transportation Business & Management*, 22, 67–77.
- KRUGMAN, P. (1992). *Geography and Trade*. Gaston Eyskens Lectures. MIT Press.
- KUWAMORY, H. (2006). *The Role of Distance in Determining International Transport Costs: Evidence from Philippine Import Data*, Institute of Developing Economies.
- LAMBERT, M. (2009). A Review of Images of Organization. *International Journal of Complexity & Education*, 6(2), 156–158.
- LAMERS, M., EIJGELAAR, E., and AMELUNG, B. (2015). The Environmental Challenges of Cruise Tourism: Impacts and Governance. In: HALL, C. M., GOSSLING, S., and SCOTT, D. (Eds.). *The Handbook of Tourism and Sustainability*. London: Routledge.
- LAXE, F., SÁNCHEZ, R., and GARCIA-ALONSO, L. (2016). The Adaptation Process in Port Governance: The Case of the Latin Countries in South America and Europe. *Journal of Shipping and Trade*, 1(1), 1-20.
- LAZUARDI, S. D., VAN RIESSEN, B., ACHMADI, T., HADI, F., and MUSTAKIM, A. (2017). Analyzing the National Logistics System through Integrated and Efficient Logistics Networks: A Case Study of Container Shipping Connectivity in Indonesia. *Applied Mechanics and Materials*, 862, 238-243.
- LEE, G., and LEE, M.-K. (2017). Estimation of the shore excursion expenditure function during cruise tourism in Korea. *Maritime Policy & Management*, 44(4), 524-535.
- LEKAKOU, M. B., GEORGE, R., and EVANGELIA, S. (2021). Applying the Island Transport Equivalent to the Greek Islands. *International Transport Forum Discussion Papers*, No. 2021/02, OECD Publishing, Paris.
- LEKAKOU, M. B., PALLIS, A. A., and VAGGELAS, G. K. (2009). Which Homeport in Europe: The Cruise Industry's Selection Criteria. *Tourismos: an International Multidisciplinary Journal of Tourism*, 4(4), 216-240.
- LEKAKOU, M. B., PALLIS, A. A., VAGGELAS, G. K., and VITSOUNIS, T. (2011). Coastal transport as a determinant of islands attractiveness: The European case and an evaluation from a Greek island. IAME 2011 Conference. Santiago de Chile, the 25th – 28th of October 2011.
- LEMMETYINEN, A., DIMITROVSKI, D., NIEMINEN, L., and POHJOLA, T. (2016). Cruise destination brand awareness as a moderator in motivation-satisfaction relation. *Tourism Review*, 71(4), 245-258.
- LESTER, J. A., and WEEDEN, C. (2004). Stakeholders, the natural environment and the future of Caribbean cruise tourism. *International Journal of Tourism Research*, 6(1): 39-50.
- LEVINSON, D. (2010). Equity Effects of Road Pricing: A Review. *Transport Reviews*, 30(1), 33-57.

- LIMÃO, N., and VENABLES, A. (2001). Infrastructure, Geographical Disadvantage, Transport Costs, and Trade. World Bank, Washington, DC. World Bank.
- LOPES, M. J., and DREDGE, D. (2018). Cruise Tourism Shore Excursions: Value for Destinations? *Tourism Planning & Development*, 15(6), 633-652.
- LU, W. (2007). An Analysis of Taiwan's Free Port Policy Process: A Policy Advocacy Coalition Perspective. *Review of Social Sciences*, 1(1), 95-126.
- LUZ, L. M. (2014). Turismo de Cruzeiros nos Açores: A Importância das Excursões para a Economia Local. Proceedings of 20th APDR Congress on Renaissance of the Regions of Southern Europe, University of Evora, Portugal, 1165-1175.
- MACNEIL, T., and WOZNIAK, D. (2018). The economic, social and environmental impacts of cruise tourism. *Tourism Management*, 66, 387-404.
- MAKKONEN, T., SALONEN, M., and KAJANDER, S. (2013). Island accessibility challenges: Rural transport in the Finnish archipelago. *EJTIR*, 13(4), 274-290.
- MARE (2014). Innovations in Public Managers' Selection Systems in EU Member Governments. Athens: Hellenic Republic.
- MARTENS, K. (2017). Seeking Transportation Justice. *Transport justice: designing fair transportation systems*. New York/London. Routledge.
- MARTI, B. E. (1990). Geography and the cruise ship port selection process. *Maritime Policy & Management*, 17(3), 157-164.
- MARTINEZ-BUDRÍA, E., DIAZ-ARMAS, R., NAVARRO-IBAÑEZ, M., and RAVELO-MESA, T. (1999). A Study of the Efficiency of Spanish Port Authorities using Data Envelopment Analysis. *International Journal of Transport Economics*, XXVI(2), 237-253.
- MARTINEZ-ZARZOSO, I., and SUAREZ-BURGUET, C. (2005). Transport costs and trade: empirical evidence for Latin America imports from European Union. *Journal of International Trade and Economic Development*, 14, 227-245.
- MARUSIC, Z., HORAK, S., and TOMLJENOVIC, R. (2008). The Socioeconomic Impacts of Cruise Tourism: A Case Study of Croatian Destinations. *Tourism in Marine Environments*, 5(2-3), 131-144.
- MCCALLA, R. J. (1998). An Investigation into Site and Situation: Cruise Ship Ports. *Journal of Economic and Human Geography*, 89(1), 44-55.
- MCCALLA, R. J. (2008a). Container Transshipment at Kingston, Jamaica. *Journal of Transport Geography*, 16(3), 182-190.
- MCCALLA, R. J. (2008b). Site and Situation Factors in Transshipment Ports: The Case of the Caribbean Basin. *Journal of Economic and Human Geography*, 99(4), 440-453.
- MERK, O. (2013). The Competitiveness of Global Port-Cities: Synthesis Report. Port-Cities Programme, OECD, Paris: France.
- MICCO, A., and PÉREZ, N. (2001). Maritime transport costs and port efficiency, Proceedings of the Seminar Towards Competitiveness: The Institutional Path, Annual Meetings of the

- Board of Governors, Inter-American Development Bank and Inter-American Investment Corporation, Santiago, 1-50.
- MONIOS, J. (2017). Port Governance in the UK: Planning without Policy. *Research in Transportation Business & Management*, 22, 78–88.
- MONTEIRO, J. (2018). Measuring productivity and efficiency of seaports in India using DEA technique. *Central European Review of Economics and Management*, 2(3), 153-172.
- NATALIA, C., SUPRATA, F., and HIDAYAT, T. P. (2020). Determination of Optimum Domestic Hub Port for Eastern Indonesia in Container Shipping. *International Journal of Advanced Science and Technology*, 29(7), 3211-3219.
- NAVARRO-RUIZ, S., CASADO-DÍAZ, A. B., and IVARS-BAIDAL, J. (2019). Cruise tourism: The role of shore excursions in the overcrowding of cities. *International Journal of Tourism Cities*, 6(1), 197-214.
- NGUYEN, H.-O., NGUYEN, H.-V., CHANG, Y.-T., CHIN, T. H., and TONGZON, J. (2016). Measuring port efficiency using bootstrapped DEA: the case of Vietnamese ports. *Maritime Policy & Management*, 43(5), 644-659.
- NIAVIS, S., and VAGGELAS, G. (2016). An empirical model for assessing the effect of ports' and hinterlands' characteristics on homeports' potential: The case of Mediterranean ports. *Maritime Business Review*, 1(3), 186-207.
- NOTTEBOOM, T. (2009). Path Dependency and Contingency in the Development of Multi-Port Gateway Regions and Multi-Port Hub Regions. In: NOTTEBOOM, T., DUCRUET, C., and DE LANGEN, P. (Eds.) *Ports in Proximity: Competition and Coordination among Adjacent Seaports*, 55–74. Aldershot: Ashgate.
- NOTTEBOOM, T., DE LANGEN, P. and JACOBS, W. (2013). Institutional plasticity and path dependence in seaports: interactions between institutions, port governance reforms and port authority routines. *Journal of Transport Research*, 27, 26-35.
- NOTTEBOOM, T., PAROLA, F., SATTA, G., and PALLIS, A. A. (2017). The relationship between port choice and terminal involvement of alliance members in container shipping. *Journal of Transport Geography*, 64, 158-173.
- NOTTEBOOM, T., PALLIS, A. A., and RODRIGUE, J.-P. (2022). *Port Economics, Management and Policy*. New York: Routledge.
- NOTTEBOOM, T., PAROLA, F., SATTA, G., and PALLIS, A. A. (2017). The relationship between port choice and terminal involvement of alliance members in container shipping. *Journal of Transport Geography*, 64, 158-173.
- NOTTEBOOM, T., and RODRIGUE, J.-P. (2005). Port Regionalization: Towards a New Phase in Port Development. *Maritime Policy & Management*, 32(3), 297–313.
- NOTTEBOOM, T. and RODRIGUE, J.-P. (2009). The future of containerization: perspectives from maritime and inland freight distribution. *Geo Journal*, 74, 7-22.

- NOTTEBOOM, T., and YANG, Z. (2017). Port Governance in China since 2004: Institutional Layering and the Growing Impact of Broader Policies. *Research in Transportation Business & Management*, 22, 184–200.
- NOTTEBOOM, T., and WINKELMANS, W. (2002). Stakeholder Relations Management in ports: dealing with the interplay of forces among stakeholders in a changing competitive environment, IAME 2002. *Maritime Economics: setting the foundations for port and shipping policies*, Panama City, 2002.
- OECD (ORGANIZATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT) (1999). *OECD Principles of Corporate Governance*. Ad-hoc taskforce on corporate governance. SJG/CG, 5 April. Paris.
- OLIVEIRA, H. C., YOU, J., and COELHO, A. P. (2021). Governing coalitions and key performance indicators of port governance. *Maritime Transport Research*, 2, 100023.
- ONUT, S., TUZKAYA, U., and TORUN, E. (2011). Selecting Container Port via A Fuzzy ANP-based Approach: A Case Study in the Marmara Region, Turkey. *Transport Policy*, 18, 182–193.
- ORTÚZAR, J. D., and GONZÁLEZ, R. M. (2002). Inter-Island Travel Demand Response with Discrete Choice Models. *Journal of Transport Economics and Policy*, 36(1), 115-138.
- OXERA (OXERA CONSULTING) (2007). Funding universal service obligations in the postal sector. <https://www.oxera.com/wp-content/uploads/2018/03/Funding-the-USO-in-the-postal-sector.pdf>.
- PAIXÃO CASACA, A. C., and LYRIDIS, D. V. (2018). Protectionist vs liberalised maritime cabotage policies: a review. *Maritime Business Review*, 3(3), 210-242.
- PAIXÃO CASACA, A. C., and LYRIDIS, D. V. (2020). The reasons and the policy instruments behind cabotage policies. *Maritime Policy & Management*, 48(3), 391-418.
- PALLIS, T. (2015). Cruise shipping and urban development: State of the art of the industry and cruise ports. *International Transport Forum, Discussion Paper No. 2015-14*, OECD, Paris, France.
- PALLIS, A. A., ARAPI, K. P., and PAPACHRISTOU, A. A. (2019). Models of cruise ports governance. *Maritime Policy & Management*, 46(5), 630-651.
- PALLIS, A. A., and PAPACHRISTOU, A. A. (2021). European Cruise ports: challenges since the pre-pandemic era. *Transport Reviews*, 41(3), 352-373.
- PALLIS, A. A., PAROLA, F., SATTA, G., and NOTTEBOOM, T. (2018). Private entry in cruise terminal operations in the Mediterranean Sea. *Maritime Economic & Logistics*, 20, 1-28.
- PALLIS, A. A., and VAGGELAS, G. K. (2017). A Greek Prototype of Port Governance. *Research in Transportation Business & Management*, 22, 49–57.
- PANAYIDES, P. M., LAMBERTIDES, N., and ANDREOU, C. (2017). Reforming Public Port Authorities through Multiple Concession Agreements: The Case of Cyprus. *Research in Transportation Business & Management*, 22, 58–66.



- PANZAR, J. C. (2000). A methodology for measuring the costs of universal service obligations. *Information Economics and Policy*, 12, 211-220.
- PAOLI, C., VASSALO, P., DAPUETO, G., FANCIULLI, G., MASSA, F., VENTURINI, S., and POVERO, P. (2017). *Journal of Cleaner Production*, 166, 1462-1478.
- PAPACHRISTOU, A. A., PALLIS, A. A., and VAGGELAS, G. K. (2022). Cruise home-port selection criteria. *Research in Transportation Business & Management*, 45(B),100584.
- PAROLA, F., FERRARI, C., TEI, A., SATTA, G., and MUSSO, E. (2017). Dealing with Multi-Scalar Embeddedness and Institutional Divergence: Evidence from the Renovation of Italian Port Governance. *Research in Transportation Business & Management*, 22, 89–99.
- PAROLA, F., SATTA, G., PENCO, L., and PERSICO, L. (2014). Destination satisfaction and cruiser behaviour: The moderating effect of excursion package. *Research in Transportation Business & Management*, 13, 53-64.
- PENCO, L., and DI VAIO, A. (2014). Monetary and non-monetary value creation in cruise port destinations: an empirical assessment. *Maritime Policy & Management*, 41(5), 501-513.
- PEREIRA, R. H., and KARNER, A. (2021) *Transportation Equity*. In: VICKERMAN, R. (Ed.), *International Encyclopedia of Transportation*, 1<sup>st</sup> Edition, Elsevier.
- PÉREZ-LABAJOS, C., BLANCO ROJO, B., and CRISTÓBAL MATEO, J. R. (2004). Regular shipping lines between the Canary Islands and the Spanish peninsula: Competition or collusion? *Journal of Maritime Research*, 1(3), 67-84.
- PIERCE, J. J., PETERSON, H. L. and HICKS, K. C. (2017). Policy Change: An Advocacy Coalition Framework Perspective. *The Policy Studies Journal*, 48(1), 64-86.
- PILCHER, N., and TSENG, P. (2017). Can We Really Measure the Impact of Port Governance Reform?. *Maritime Policy & Management*, 44(8), 981–994.
- PINNOCK, F. H. and AJAGUNNA, I. A. (2012). *The Caribbean Maritime Transport Sector: Achieving Sustainability through Efficiency*. Caribbean Paper No. 13, The Centre for International Governance Innovation.
- PMAC (PORT MANAGEMENT ASSOCIATION OF THE CARIBBEAN) (2020). *Challenges of Caribbean Ports*. Presentation prepared for The ACS (Association of Caribbean States) Meeting of Transport Stakeholders, via videoconference, on the 28<sup>th</sup> of May 2020.
- POUDOU, J.-C., and ROLAND, M. (2017). Equity justification for universal service obligations. *International Journal of Industrial Organizations*, 52, 63-95.
- PWC (PRICEWATERHOUSECOOPERS) (2014). *Plano Estratégico do Turismo de Cruzeiros de Cabo Verde: Draft for Discussion*. PricewaterhouseCoopers, Praia, Cape Verde.
- RAMALHO, C. (2006). *Avaliação do Potencial Turístico do Destino Açores no Mercado de Cruzeiros*. Master's Thesis, University of Azores, Portugal.
- RODRIGUE, J.-P. (2017). The Governance of Intermediacy: The Insertion of Panama in the Global Liner Shipping Network. *Research in Transportation Business & Management*, 22, 21-26.

- RODRIGUE, J.-P., COMTOIS, C., and SLACK, B. (2006). *The Geography of Transport Systems*. Routledge. New York.
- RODRIGUE, J.-P., and NOTTEBOOM, T. (2010). Foreland-Based Regionalization: Integrating Intermediate Hubs with Port Hinterlands. *Research in Transportation Economics*, 27, 19–29.
- RODRIGUE, J.-P., and NOTTEBOOM, T. (2012). The geography of cruise shipping: Itineraries, capacity deployment and ports of call. *Proceedings of the International Association of Maritime Economists (IAME) 2012 Conference*, Taipei, Taiwan.
- RODRIGUE, J.-P., and NOTTEBOOM, T. (2013). The geography of cruises: Itineraries, not destinations. *Applied Geography*, 38, 31-42.
- RODRIGUEZ, F., and STORER, D. (2000). Alternative approaches to estimating the cost of the USO in posts. *Information Economics and Policy*, 12(3), 285-299.
- ROQUE, L. (2015). *A Influência Do Modelo De Governação Das Autoridades Portuárias No Desempenho*. Porto: Edições Riscos.
- SABATIER, P. A., and WEIBLE, C. M. (2007). The Advocacy Coalition Framework: Innovations and Clarifications. In: SABATIER, P. A. (Ed.). *Theories of the Policy Process*, 189-222.
- SALVADOR, R. (2014). Maritime Clusters Evolution. The (not so) Strange Case of the Portuguese Maritime Cluster. *Journal of Maritime Research*, XI(1), 53-59.
- SAMBRACOS, E., PARAVANTIS, J. A., TARANTILIS, C. D., and KIRANOUDIS, C. T. (2004). Dispatching of small containers via coastal freight liners: The case of the Aegean Sea. *European Journal of Operational Research*, 152(2), 365-381.
- SANCHEZ, R. J. (2017). Caribbean container port catchment areas: 1998-2016 evolution and the risks of over-investment. *PortReport. PortEconomics Discussion Paper No. 2*, 08/2017.
- SANCHEZ, R. J., HOFFMANN, J., MICCO, A., PIZZOLITTO, G., SGUT, M., and WILMSMEIER, G. (2003). Port efficiency and international trade: Port efficiency as a determinant of maritime transport cost. *Maritime Economics and Logistics*, 5, 199–218.
- SANCHEZ, R. J., and WILMSMEIER, G. (2009). Maritime sector and ports in the Caribbean: the case of CARICOM countries. *ECLAC (Economic Commission for Latin America and the Caribbean)*, Santiago. Chile.
- SANZ-BLAS, S., CARVAJAL-TRUJILLO, E., and BUZOVA, D. (2017). Assessing Cruise Port of Call Performance: A Passenger Based Approach Using PLS Modelling. *Maritime Policy & Management*, 44(8), 967-980.
- SARRIERA, J. M., SEREBRISKY, T., ARAYA, G., BRICEÑO-GARMENDIA, C. and SCHWARTZ, J. (2013). Benchmarking Container Port Technical Efficiency in Latin America and the Caribbean. *IDB Working Paper Series No. IDB-WP-474*.
- SAUTER, W. (2008). Services of general economic interest and universal service in EU Law. *European Law Review*, 33(2), 167-192.
- SCHINAS, O. D. (2009). Exploring the possibility for hub-and-spoke services in the Greek Coastal System. *International Journal of Ocean Systems Management*, 1(2), 119-134.

- SEIDL, A., GUILIANO, F. and PRATT, L. (2006). Cruise tourism and community economic development in Central America and the Caribbean: The case of Costa Rica. *Pasos*, 4(2), 213-224.
- SEREBRISKY, T., SARRIERA, J., SÚAREZ-ALEMÁN, A., ARAYA, G., BRICEÑO-GARMENDÍA, C. and SCHWARTZ, J. (2016). Exploring the drivers of port efficiency in Latin America and the Caribbean. *Transport Policy*, 45, 31-45.
- SHINOHARA, M. (2017). Characteristics of Japanese port policy: Strategic ports and policy dilemma. *Research in Transportation Business & Management*, 22, 100-107.
- SILVESTRE, A. L., SANTOS, C. M., and RAMALHO, C. (2008). Satisfaction and behavioural intentions of cruise passengers visiting the Azores. *Tourism Economics*, 14(1): 169-184.
- SJAFRUDDIN, A. LUBIS, H. S., and FRAZILA, R. B. (2010). Policy Evaluation of Multimodal Transportation Network: The Case of Inter-island Freight Transportation in Indonesia. *Asian Transport Studies*, 1(1), 18-32.
- SONG, D. W., and LEE, S. W. (2017). Port Governance in Korea: Revisited. *Research In Transportation. Business & Management*, 22, 27–37.
- SORIANI, S., BERTAZZON S., DI CESARE, F., and RECH, G. (2009). Cruising in the Mediterranean: structural aspects and evolutionary trends. *Maritime Policy & Management*, 36(3), 235-251.
- SOUSA, J. F. (2004). O Porto do Funchal no Contexto do Sistema Portuário Insular Regional: As Infraestruturas, os Tráfegos e as Funções Portuárias. Ph.D. Thesis, Nova University of Lisbon, Portugal.
- SREA (SERVIÇO REGIONAL DE ESTATÍSTICA DOS AÇORES) (2018). Inquérito ao Turismo Internacional Região Autónoma dos Açores 2016. Destaque Informação Estatística, 22 de novembro de 2018.
- STEFANIDAKI, E., and LEKAKOU, M. (2014). Cruise carrying capacity: A conceptual approach. *Research in Transportation Business & Management*, 13, 43-52.
- STOPFORD, M. (2009). *Maritime Economics*, Third Edition, Routledge. London.
- STOPHER, P., and STANLEY, J. (2014). *Introduction to Transport Policy. A Public Policy View*. Edward Elgar.
- STYHRE, L. (2010). Capacity utilisation in short sea shipping. Ph.D. Thesis. Department of Technology, Management and Economics. Chalmers University of Technology, Goteborg, Sweden.
- SUNITIYOSO, Y., NURAENI, S., PAMBUDI, N. F., INAYATI, T., NURDAYAT, I. F., HADIASSYAH, F., and TIARA, A. R. (2022). Port performance factors and their interactions: A systems thinking approach. *The Asian Journal of Shipping and Logistics*, 38, 107-123.
- SUYKENS, F., and VAN DE VOORDE, E. (1998). A Quarter of a Century of Port Management in Europe: Objectives and Tools. *Maritime Policy & Management*, 25(3), 251–261.

- TAO, S. and KIM, H.-S. (2019). Cruising in Asia: what can we dig from online cruiser reviews to understand their experience and satisfaction. *Asia Pacific Journal of Tourism Research*, 24(6), 514-528.
- TERADA, H. (2002). An analysis of the overcapacity problem under the decentralized management system of container ports in Japan. *Maritime Policy & Management*, 29(1), 3-15.
- TEYE, V., and PARIS, C.M. (2011). Cruise Line Industry and Caribbean Tourism: Guests' Motivations, Activities, and Destination Preference. *Tourism Review International*, 14, 17-28.
- THOMPSON CLARKE SHIPPING (2006). *Cruise Destinations – A How to Guide*. Tourism Queensland, Queensland, Australia.
- TONGZON, J. (2001). Efficiency measurement of selected Australian and other international ports using data envelopment analysis. *Transportation Research Part A: Policy and Practice*, 35(2), 107-122.
- TONGZON, J. (2002). Port Choice Determinants in a Competitive Environment. Paper presented at IAME Conference, Panama.
- TORBIANELLI, V. (2012). The local economic impact of cruises: From figures to the active policies of the European Harbour cities. *Pomorstvo*, 26(1), 139-150.
- TOVAR, B., HERNÁNDEZ, R., and RODRÍGUEZ-DÉNIZ, H. (2015). Container port competitiveness and connectivity: The Canary Islands main ports case. *Transport Policy*, 38, 40-51.
- TRUJILLO, L., and NOMBELA, G. (2000). Seaports. In: ESTACHE, A., and RUS, G. (Eds.) *Privatization and Regulation of Transport Infrastructure: Guidelines for Policymakers and Regulators*. WBI Development Studies. World Bank.
- TSENG, P. H., and PILCHER, N. (2017). Port Governance in Taiwan: How Hypocrisy Helps Meet Aspirations of Change. *Research in Transportation Business & Management*, 22, 38-48.
- TU, N., ADIPUTRANTO, D., FU, X., and LI, Z.-C. (2018). Shipping network design in a growth market: The case of Indonesia. *Transportation Research Part E: Logistics and Transportation Review*, 117, 108-125.
- TULL, M., and REVELEY, J. (2001). The Merits of Public versus Private Ownership: A Comparative Study of Australian and New Zealand Seaports. *Economic Papers: A Journal of Applied Economics and Policy*, 20(3), 75–99.
- UNCTAD (UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT) (2001). *The economic impact of cruise ports: The case of Miami*. UNCTAD Monographs on Port Management 17, United Nations, New York, USA.
- UNCTAD (UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT) (2014). *Review of Maritime Transport 2014*. United Nations. New York and Geneva.

- UNCTAD (UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT) (2017). Rethinking maritime cabotage for improved connectivity. Transport and Trade Facilitation Series No 9. United Nations.
- UNCTAD (UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT) (2022a). Liner Shipping Connectivity Index <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=92> (accessed 23-08-2022).
- UNCTAD (UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT) (2022b). Port Liner Shipping Connectivity Index <https://unctadstat.unctad.org/wds/TableViewer/tableView.aspx?ReportId=170026> (accessed 23-08-2022).
- VAN DE VOORDE, E., and VERHOEVEN, P. (2017). Port Governance and Policy Changes in Belgium 2006–2017: A Comprehensive Assessment of Process and Impact. *Research in Transportation Business & Management*, 22, 123–134.
- VAN DER LUGT, L., DE LANGEN, P., and HAGDORN, L. (2015). Beyond the Landlord: Worldwide Empirical Analysis of Port Authority Strategies. *International Journal of Shipping and Transport Logistics*, 7(5), 570–596.
- VAN DER LUGT, L., DE LANGEN, P. and HAGDORN, L. (2017). Strategic beliefs of port authorities. *Transport Reviews*, 37(4), 412-441.
- VAN DER LUGT, L., DOOMS, M. and PAROLA, F. (2013). Strategy making by hybrid organizations: The case of the port authority. *Research in Transportation Business & Management*, 8, 103-113.
- VAN WEE, B., and MOUTER, N. (2021). Chapter Five - Evaluating transport equity. In: MOUTER, N. (Ed.), *New Methods, Reflections and Application Domains in Transport Appraisal*, *Advances in Transport Policy and Planning*, 7, 103-126.
- VAYÁ, E., GARCIA, J. R., MURILLO, J., ROMANÍ, J., and SURIÑACH, J. (2017). Economic impact of cruise activity: the case of Barcelona. *Journal of Travel & Tourism Marketing*, 35(4), 479-492.
- VENABLES, A., and LIMÃO, N. (1999), *Geographical Disadvantage: a Heckscher-Ohlin-von Thunen Model of International Specialization*, Policy Research Working Paper Series 2256. The World Bank.
- VERHOEVEN, P. (2010). A Review of Port Authority Functions: Towards A Renaissance? *Maritime Policy & Management*, 37(3), 247–270.
- VERHOEVEN, P. (2014). Port Privatisation in the United Kingdom and Continental Europe: An Evaluation of Past Experience and New Drivers. In: MEERSMAN, H., VAN DE VOORDE, E., and VANELSLANDER, T. (Eds.). *Port Infrastructure Finance* 111–140. London: Taylor.
- VERHOEVEN, P., and VANOUTRIVE, T. (2012). A Quantitative Analysis of European Port Governance. *Maritime Economics & Logistics*, 14, 178–203.

- VIEIRA, G., SILVA, R., NETO, F., SENNA, L., and MULINAS, A. (2014). Port Governance Model by Managers' and Customers' Point of View: A Study at Port of Valencia, Spain. *International Business Research*, 7(8), 1-16.
- VILLA, J. C. (2017). Port Reform in Mexico: 1993–2015. *Research in Transportation Business & Management*, 22, 232-238.
- VOGEL, M. P. (2011). Monopolies at Sea: The role of onboard sales for the cruise industry's growth and profitability. In MATIAS, A., NIJKAMP, P., and SARMENTO, M. (Eds). *Tourism Economics, Impact Analysis*, Physica-Verlag, Berlin, Germany, 211-229.
- WANG, Y., JUNG, K.-A., YEO, G.-T., and CHOU, C.-C. (2014). Selecting a cruise port of call location using the fuzzy-AHP method: A case study in East Asia. *Tourism Management*, 42, 262-270.
- WANG, C., CHEN, Q., and HUANG, R. (2018). Locating Dry Ports on A Network: A Case Study on Tianjin Port. *Maritime Policy & Management*, 45(1), 71-88.
- WHYTE, L. J. (2018). Eliciting cruise destination attributes using repertory grid analysis. *Journal of Destination Marketing & Management*, 10, 172-180.
- WHYTE, L. J., PACKER, J., and BALLANTYNE, R. (2018). Cruise destination attributes: measuring the relative importance of the onboard and onshore aspects of cruising. *Tourism Recreation Research*, 43(4), 470-482.
- WILD, P., and DEARING, J. (2000). Development of and prospects for cruising in Europe. *Maritime Policy & Management*, 27(4), 315-333.
- WILMSMEIER, G., and HOFFMANN, J. (2008). Liner Shipping Connectivity and Port Infrastructure as Determinants of Freight Rates in the Caribbean. *Maritime Economics & Logistics*, 10, 130-151.
- WILMSMEIER, G., HOFFMANN, J., and SANCHEZ, R. J. (2006). The Impact of Port Characteristics on International Maritime Transport Costs. *Research in Transportation Economics*, 16, 117-140.
- WILMSMEIER, G., MONIOS, J., and PÉREZ-SALAS, G. (2014). Port system evolution: the case of Latin America and the Caribbean, *Journal of Transport Geography*, 39, 208-221.
- WILMSMEIER, G., and NOTTEBOOM, T. (2011). Determinants of liner shipping network configuration: a two region comparison. *Geojournal*, 76, 213-228.
- WILMSMEIER, G., and SÁNCHEZ, R. J. (2017). Evolution of National Port Governance and Interport Competition in Chile. *Research in Transportation Business & Management*, 22, 171-183.
- WORLD BANK (2007). *Port Reform Toolkit*. 2nd ed. Washington: The International Bank for Reconstruction and Development. The World Bank.
- WORLD BANK (2017). *The Potential of the Blue economy. Increasing Long-term Benefits of the Sustainable Use of Marine Resources for Small Island Developing States and Coastal Least Developed Countries*. International Bank for Reconstruction and Development/The World Bank/United Nations.

- ZAMAN, M. B, VANANY I., and AWALUDDIN, K. D. (2015). Connectivity Analysis of port in Eastern Indonesia. *Procedia Earth and Planetary Science*, 14, 118-127.
- ZHANG, Q., GEERLINGS, H., EL MAKHLOUFI, A., and CHEN, S. (2018). Who governs and what is governed in port governance: A review study. *Transport Policy*, 64, 51–60.

# Appendix 1

(Survey to port managers and specialists in the Portuguese port industry – Chapter 2)

Name of the variable	Survey content
A	Please, select the entity where you work
	Port authority
	Shipping agent
	Freight forwarder
	Terminal operator
	Shipping line
	Land carrier
	Logistics firm
	Shipper
	Other
B	Please, select the port being assessed
	Leixões
	Lisbon
	Aveiro
	Setúbal
	Sines
	Other
C	In general terms, do you consider that the following measures of port performance are very important?
	1 Clients satisfaction. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	2 Impact on regional development. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	3 Profitability. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	4 Efficiency and productivity. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
D	In general terms, and ideally, do you consider that the following characteristics of port governance are important for a good port performance?
	5 The port authority has a strongly entrepreneur role orientation. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	6 The port authority has a strongly business orientation. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	7 The port authority is a firm owned by the state. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	8 The port authority has a high level of cooperation with neighbour ports. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	9 The port authority is a department of the state. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	10 The port authority has high level of profits and pays dividends. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	11 The port authority has a joint management of several neighbour ports. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	12 The port authority is a private firm. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	13 The port authority has a high level of internationalisation. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	14 The port authority has a high business facilitator role orientation. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	15 The port authority has a substantial level of intervention in the logistics chain in the hinterland. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	16 The port authority leaders are determined through a political selection. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	17 The small ports depend from their city/region. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	18 There is a high level of concessions in the port operation. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	19 The port authority is the port operator. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	20 The port authority participates in the operation of railways and on logistics platforms in the hinterland. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	21 The port authority has a high level of freedom to negotiate port taxes. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	22 The port authority submit their port taxes to approval by the state. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	23 There is a high level of private activities in the port. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	24 There is a high level of competition in the port. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	25 There is a high level of private firms in the port operation. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	26 The city/region participates in the port management. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	27 There is a focus of the port authority in the competition with neighbour ports. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	28 Great autonomy regarding the state. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree



Name of the variable	Survey content
29	Definition of a single national port authority. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
30	Very conservative posture of the port authority. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
31	The state has a strong management control over the port authority. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
32	The port community participates in the port management. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
33	Port authority focus at the core of the operation. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
34	Port strategy well defined and accepted. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
35	Competition regulation in the port held by an independent body. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
36	The port authority has the a healthy balance sheet. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
37	Strong state stance in the port authority. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
38	Undefined or uambitious port strategy. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
39	Selection of port authority managers based on merit. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
40	There is a high level of autonomy in the port management of each port. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
41	The neighbour ports are merged. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
42	The port has a functional dependency form the city/region. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
43	The port authority has a high level of financial dependency from the state. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree
44	The port authority has a high level of control over their statutory bodies. *
	Strongly disagree 1-2-3-4-5-6-7 Strongly agree

## Appendix 2

(Dataset of island ports in the Caribbean and Macaronesia regions – Chapter 3)

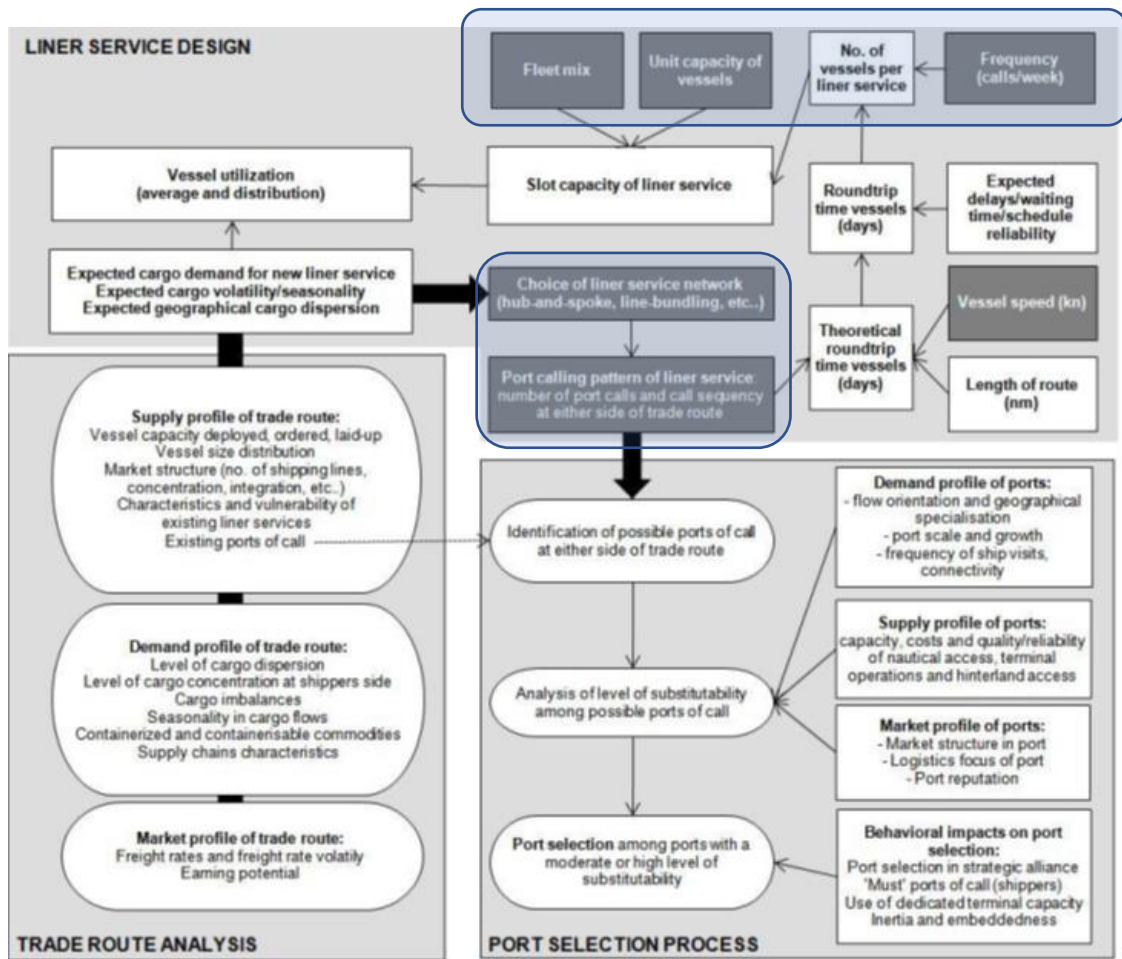
PortCode	Name c	Name c	Area (C)	Year	TEU	LSCI	Berth	Area	Equip
BSFPO	Freeport	Bahamas	Caribbean	2008	1702000	18.69563	1033	490000	280
BSFPO	Freeport	Bahamas	Caribbean	2009	1323000	18.92932	1033	490000	280
BSFPO	Freeport	Bahamas	Caribbean	2010	1125000	22.24267	1036	477428	430
BSFPO	Freeport	Bahamas	Caribbean	2011	1189125	24.07031	1036	477428	430
BSFPO	Freeport	Bahamas	Caribbean	2012	1278309	23.65366	1036	477428	430
BBBGI	Bridgetow	Barbados	Caribbean	2008	87253	7.143158	771	100000	40
BBBGI	Bridgetow	Barbados	Caribbean	2009	82832	6.549597	771	100000	40
BBBGI	Bridgetow	Barbados	Caribbean	2010	80430	8.829926	740	100000	40
BBBGI	Bridgetow	Barbados	Caribbean	2011	77051	6.034755	740	100000	40
BBBGI	Bridgetow	Barbados	Caribbean	2012	72163	6.385182	740	100000	40
CUHAV	Havana	Cuba	Caribbean	2008	319000	7.405415	457	200254	115
CUHAV	Havana	Cuba	Caribbean	2009	290099	7.233379	457	200254	115
CUHAV	Havana	Cuba	Caribbean	2010	228346	7.421667	450	180000	90
CUHAV	Havana	Cuba	Caribbean	2011	246773	9.253554	450	180000	90
CUHAV	Havana	Cuba	Caribbean	2012	265281	8.570316	450	180000	90
MQFDF	Fort-de-Fr	Martiniqu	Caribbean	2008	146380	7.564089	450	160000	75
MQFDF	Fort-de-Fr	Martiniqu	Caribbean	2009	142240	8.127506	450	160000	75
MQFDF	Fort-de-Fr	Martiniqu	Caribbean	2010	150710	8.038439	450	160000	75
MQFDF	Fort-de-Fr	Martiniqu	Caribbean	2011	147258	7.677557	450	160000	75
MQFDF	Fort-de-Fr	Martiniqu	Caribbean	2012	143728	8.692641	450	160000	75
DOCAU	Caucedo	Dominicar	Caribbean	2008	736879	16.83974	600	500000	125
DOCAU	Caucedo	Dominicar	Caribbean	2009	906279	19.50066	600	500000	125
DOCAU	Caucedo	Dominicar	Caribbean	2010	1201861	19.6993	600	500000	125
DOCAU	Caucedo	Dominicar	Caribbean	2011	850679	21.06005	900	500000	180
DOCAU	Caucedo	Dominicar	Caribbean	2012	995040	24.6053	900	500000	180
DOHAI	Rio Haina	Dominicar	Caribbean	2008	283229	15.46639	1216	299800	65
DOHAI	Rio Haina	Dominicar	Caribbean	2009	277971	12.29179	1216	299800	65
DOHAI	Rio Haina	Dominicar	Caribbean	2010	340867	11.81449	1216	299800	65
DOHAI	Rio Haina	Dominicar	Caribbean	2011	353159	12.55859	1216	299800	65
DOHAI	Rio Haina	Dominicar	Caribbean	2012	379632	10.37923	1216	299800	65
JMKIN	Kingston	Jamaica	Caribbean	2008	1830000	21.72063	4129	1300000	520
JMKIN	Kingston	Jamaica	Caribbean	2009	1728042	21.49548	4129	1300000	520
JMKIN	Kingston	Jamaica	Caribbean	2010	1891770	22.13078	3954	1580000	520
JMKIN	Kingston	Jamaica	Caribbean	2011	1756832	21.78638	3954	1580000	520
JMKIN	Kingston	Jamaica	Caribbean	2012	1855425	26.56343	3954	1580000	520
PRSJU	San Juan	Puerto Ric	Caribbean	2008	1663619	13.19241	1688	288000	150
PRSJU	San Juan	Puerto Ric	Caribbean	2009	1657348	13.47072	1688	280000	150
PRSJU	San Juan	Puerto Ric	Caribbean	2010	1525532	11.9902	1688	288000	150
PRSJU	San Juan	Puerto Ric	Caribbean	2011	1484595	11.03762	1688	288000	150
PRSJU	San Juan	Puerto Ric	Caribbean	2012	1423192	11.34871	1688	288000	150
ESLPA	Las Palma	The Canar	Macarone	2008	1352111	23.27124	2780	568903	350
ESLPA	Las Palma	The Canar	Macarone	2009	1007968	23.91633	1877	464613	275
ESLPA	Las Palma	The Canar	Macarone	2010	1126612	23.69938	2619	568903	520
ESLPA	Las Palma	The Canar	Macarone	2011	1285586	24.58662	2619	466848	530
ESLPA	Las Palma	The Canar	Macarone	2012	1193350	29.13833	2619	568903	480
ESACE	Arrecife	The Canar	Macarone	2008	46252	5.260341	375	29411	50
ESACE	Arrecife	The Canar	Macarone	2009	40083	4.245719	375	29411	50
ESACE	Arrecife	The Canar	Macarone	2010	37825	4.075183	375	29411	75
ESACE	Arrecife	The Canar	Macarone	2011	39617	4.619627	375	29411	75
ESACE	Arrecife	The Canar	Macarone	2012	35062	3.615483	375	29411	75
ESFUE	Rosario	The Canar	Macarone	2008	31094	4.392698	200	18260	25
ESFUE	Rosario	The Canar	Macarone	2009	24982	1.950107	200	18260	25
ESFUE	Rosario	The Canar	Macarone	2010	22672	2.570699	390	18260	75
ESFUE	Rosario	The Canar	Macarone	2011	24765	3.572383	390	18260	50
ESFUE	Rosario	The Canar	Macarone	2012	24793	3.572383	390	18260	50

PortCode	Name of Port	Name of Country	Area (Country)	Year	TEU	LSCI	Berth	Area	Equip
PTCNL	Canical	Madeira	Macarone	2008	113074	2.215567	900	35000	45
PTCNL	Canical	Madeira	Macarone	2009	100469	2.215567	900	35000	45
PTCNL	Canical	Madeira	Macarone	2010	98778	2.215567	900	35000	45
PTCNL	Canical	Madeira	Macarone	2011	95993	2.215567	900	35000	45
PTCNL	Canical	Madeira	Macarone	2012	85872	3.774077	900	35000	45
TTPTS	Point Lisas	Trinidad and Tobago	Caribbean	2008	169093	7.651896	645	82000	70
TTPTS	Point Lisas	Trinidad and Tobago	Caribbean	2009	164183	11.65935	645	82000	85
TTPTS	Point Lisas	Trinidad and Tobago	Caribbean	2010	188903	11.97837	645	82000	85
TTPTS	Point Lisas	Trinidad and Tobago	Caribbean	2011	172256	7.381044	645	82000	85
TTPTS	Point Lisas	Trinidad and Tobago	Caribbean	2012	176451	8.558491	645	82000	85
TTPOS	Port of Spain	Trinidad and Tobago	Caribbean	2008	385000	11.78851	934	197000	180
TTPOS	Port of Spain	Trinidad and Tobago	Caribbean	2009	401206	16.08474	934	197000	180
TTPOS	Port of Spain	Trinidad and Tobago	Caribbean	2010	388960	16.84064	857	200000	235
TTPOS	Port of Spain	Trinidad and Tobago	Caribbean	2011	379837	15.26096	857	200000	235
TTPOS	Port of Spain	Trinidad and Tobago	Caribbean	2012	365895	15.25595	857	200000	235
AGSJO	St. John's	Antigua	Caribbean	2008	20052	3.990675	366	61715	15
AGSJO	St. John's	Antigua	Caribbean	2009	17365	4.0704	366	61715	15
AGSJO	St. John's	Antigua	Caribbean	2010	14878	3.629396	366	61715	15
AGSJO	St. John's	Antigua	Caribbean	2011	14006	3.790284	366	61715	15
AGSJO	St. John's	Antigua	Caribbean	2012	13485	3.790022	366	61715	15
GDSTG	St. George	Grenada	Caribbean	2008	17799	5.29789	335	42492	10
GDSTG	St. George	Grenada	Caribbean	2009	14904	4.261404	335	42492	10
GDSTG	St. George	Grenada	Caribbean	2010	15008	4.012795	335	42492	10
GDSTG	St. George	Grenada	Caribbean	2011	14365	4.17511	335	42492	10
GDSTG	St. George	Grenada	Caribbean	2012	13920	5.477205	335	42492	10
KNBAS	Basseterre	St. Kitts and Nevis	Caribbean	2008	7100	3.707614	133	101171	10
KNBAS	Basseterre	St. Kitts and Nevis	Caribbean	2009	7511	3.707614	133	101171	10
KNBAS	Basseterre	St. Kitts and Nevis	Caribbean	2010	7214	3.049305	133	101171	10
KNBAS	Basseterre	St. Kitts and Nevis	Caribbean	2011	7312	3.049305	133	101171	10
KNBAS	Basseterre	St. Kitts and Nevis	Caribbean	2012	7801	3.049305	133	101171	10
KNLPP	Long Point	St. Kitts and Nevis	Caribbean	2008	2453	3.707614	355	40469	10
KNLPP	Long Point	St. Kitts and Nevis	Caribbean	2009	3002	3.707614	355	40469	10
KNLPP	Long Point	St. Kitts and Nevis	Caribbean	2010	2852	3.049305	355	40469	10
KNLPP	Long Point	St. Kitts and Nevis	Caribbean	2011	3046	3.049305	355	40469	10
KNLPP	Long Point	St. Kitts and Nevis	Caribbean	2012	2665	3.049305	355	40469	10
VCCPK	Campden	Saint Vincent and the Grenadines	Caribbean	2008	16569	1.70299	495	63749	15
VCCPK	Campden	Saint Vincent and the Grenadines	Caribbean	2009	16238	1.70299	495	63749	15
VCCPK	Campden	Saint Vincent and the Grenadines	Caribbean	2010	16967	1.70299	495	63749	15
VCCPK	Campden	Saint Vincent and the Grenadines	Caribbean	2011	16419	1.70299	495	63749	15
VCCPK	Campden	Saint Vincent and the Grenadines	Caribbean	2012	16827	1.683975	495	63749	15
CVMIN	Mindelo	Cape Verde	Macarone	2008	21742	5.056114	470	40000	45
CVMIN	Mindelo	Cape Verde	Macarone	2009	20471	4.456339	470	40000	45
CVMIN	Mindelo	Cape Verde	Macarone	2010	17472	4.27852	470	40000	45
CVMIN	Mindelo	Cape Verde	Macarone	2011	20342	5.236513	470	40000	45
CVMIN	Mindelo	Cape Verde	Macarone	2012	18181	4.832392	470	40000	45
CVRAI	Praia	Cape Verde	Macarone	2008	29350	3.786464	215	20000	15
CVRAI	Praia	Cape Verde	Macarone	2009	29609	4.376043	215	20000	15
CVRAI	Praia	Cape Verde	Macarone	2010	30800	4.27852	215	20000	15
CVRAI	Praia	Cape Verde	Macarone	2011	29618	5.236513	215	20000	15
CVRAI	Praia	Cape Verde	Macarone	2012	26006	4.832392	215	20000	15
DMRSU	Roseau	Dominica	Caribbean	2008	12611	2.723864	252	43000	10
DMRSU	Roseau	Dominica	Caribbean	2009	13320	3.119762	252	43000	10
DMRSU	Roseau	Dominica	Caribbean	2010	13868	3.305388	252	43000	10
DMRSU	Roseau	Dominica	Caribbean	2011	14055	3.305388	252	43000	10
DMRSU	Roseau	Dominica	Caribbean	2012	19905	3.305126	252	43000	10
LCSLU	Castries	Saint Lucia	Caribbean	2008	35977	6.651854	448	117360	15
LCSLU	Castries	Saint Lucia	Caribbean	2009	30186	4.95074	448	117360	15
LCSLU	Castries	Saint Lucia	Caribbean	2010	30648	4.815756	448	117360	15
LCSLU	Castries	Saint Lucia	Caribbean	2011	29550	3.695379	448	117360	15
LCSLU	Castries	Saint Lucia	Caribbean	2012	29163	4.997474	448	117360	15
LCVIF	Vieux Fort	Saint Lucia	Caribbean	2008	34225	5.807268	373	50000	15
LCVIF	Vieux Fort	Saint Lucia	Caribbean	2009	21756	4.071337	373	50000	15
LCVIF	Vieux Fort	Saint Lucia	Caribbean	2010	21831	3.534491	373	50000	15
LCVIF	Vieux Fort	Saint Lucia	Caribbean	2011	33048	4.920629	373	50000	15
LCVIF	Vieux Fort	Saint Lucia	Caribbean	2012	45668	5.279351	373	50000	15

PortCode	Name c	Name c	Area (C)	Year	TEU	LSCI	Berth	Area	Equip
PTPDL	Ponta Del	Azores-Po	Macarone	2008	98295	3.780156	785	24790	15
PTPDL	Ponta Del	Azores-Po	Macarone	2009	92644	3.782294	785	24790	15
PTPDL	Ponta Del	Azores-Po	Macarone	2010	96532	3.573494	785	24790	15
PTPDL	Ponta Del	Azores-Po	Macarone	2011	92803	3.637219	785	24790	15
PTPDL	Ponta Del	Azores-Po	Macarone	2012	78068	3.772127	785	24790	15
PTPRV	Praia da V	Azores-Po	Macarone	2008	41796	2.790511	550	50000	15
PTPRV	Praia da V	Azores-Po	Macarone	2009	37943	2.79265	550	50000	15
PTPRV	Praia da V	Azores-Po	Macarone	2010	39903	2.161248	550	50000	15
PTPRV	Praia da V	Azores-Po	Macarone	2011	37848	2.278603	550	50000	15
PTPRV	Praia da V	Azores-Po	Macarone	2012	32082	2.783024	550	50000	15
PTHOR	Horta	Azores-Po	Macarone	2008	10038	2.478472	514	19957	10
PTHOR	Horta	Azores-Po	Macarone	2009	10024	2.48061	514	19957	10
PTHOR	Horta	Azores-Po	Macarone	2010	10334	2.161248	514	19957	10
PTHOR	Horta	Azores-Po	Macarone	2011	10221	2.07212	514	19957	10
PTHOR	Horta	Azores-Po	Macarone	2012	8633	2.388373	514	19957	10
PTCDP	Cais do Pi	Azores-Po	Macarone	2008	10384	1.66547	197	19123	10
PTCDP	Cais do Pi	Azores-Po	Macarone	2009	8745	1.66547	197	19123	10
PTCDP	Cais do Pi	Azores-Po	Macarone	2010	9504	1.35343	197	19123	10
PTCDP	Cais do Pi	Azores-Po	Macarone	2011	9001	2.033052	197	19123	10
PTCDP	Cais do Pi	Azores-Po	Macarone	2012	8131	2.222124	197	19123	10

## Appendix 3

(Synthesized model of the liner service design process presented in NOTTEBOOM et al. (2017), where we highlight some of the levels where public intervention may conditionate the way shipping lines operate – Chapter 4)



## Appendix 4

(Survey to cruise managers and specialists in the Macaronesia region – Chapter 6)

Name of the variable	Survey content
	Please, select the port being assessed Funchal (Madeira) Horta (Azores) Las Palmas (Canary Islands) Mindelo (Cape Verde) Ponta Delgada (Azores) Praia (Cape Verde) Santa Cruz de Tenerife (Canary Islands) Other (identify the port)
	A How do you classify the port taking into account the characteristics indicated below?
LocationPort	1 The port is conveniently located in relation to the main cruise routes. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
QuayPort	2 The port has docks of suitable length and depth for cruise ships. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
InOutTerminalPort	3 The cruise terminal has appropriate passenger movement capacity at the start / end of the cruise. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
TransitTerminalPort	4 The cruise terminal has an appropriate capacity for the movement of passengers in transit. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
BusParkPort	5 The cruise terminal has appropriate capacity for parking buses for excursions. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
PortServicesPort	6 The port offers other port services (for example, waste collection, supply of food, fuel, etc.). * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
PromotionPort	7 The promotion of the port and the destination together with the cruise industry is relevant for the destination in the sector. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
TourismServicesPort	8 The destination is endowed with attractions and services in appropriate number and diversity (restaurants, hotels, museums, parks, etc.) for cruise passengers. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
ToursPort	9 The destination provides a diversified range, in number and quality, of excursions. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
CleanessPort	10 The destination has good conditions in terms of security, cleanliness and local signage. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
AirLinksPort	11 The destination has flight connections that allow the development of the port as the start / end of the cruise. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	12 What other characteristics do you consider that the port and / or destination should develop to promote cruise tourism? (open question)
	B How does the port rank when it comes to the profile of cruise lines?
RepositionPort	13 Cruise lines use the port as a stopover on replenishment itineraries. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
UKCallsPort	14 Cruise lines use the port as a stopover on itineraries that start in the UK. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
InOutCallsPort	15 Cruise lines use the port as the starting and / or ending point of a cruise on the islands of Macaronesia. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
PremiumPort	16 The main cruise segment in the port is luxury or premium. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
AdventuresPort	17 The main cruise ship segment in the port is the adventure or expedition segment. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
More3000PaxPort	18 Large cruise ships (over 3,000 passengers) are the most frequent in the port. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
SeasonPort	19 Cruise calls are concentrated only in certain months of the year. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	20 What other characteristics in terms of the profile of the cruise lines do you consider relevant? (open question)
	C How does the port rank when it comes to the profile of cruise passengers?
UKOriginPort	21 The main origin of passengers in the port is the United Kingdom. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
EUOriginPort	22 The main origin of passengers in the port is Germany and other countries of the European Union. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
USOriginPort	23 The main origin of passengers in the port is the United States. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
More65YearsPort	24 The main age range of passengers in the port is equal to or greater than 65 years. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
Family&FriendsPort	25 Passengers on cruise ships calling at the port travel with family or friends. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
RepeatCruisesPort	26 Cruise passengers are repeaters of cruise trips. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
RepeatDestinationPort	27 Cruise passengers previously knew the destination of the port. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	28 What other elements in the profile of cruise passengers do you consider important? (open question)

Name of the variable	Survey content
	D How do you classify the influence of the following characteristics on the performance of the port (1) and the region (2) in general terms? (1) Number of ships and number of passengers in the port. (2) Impact on job creation; Impact on GDP; Quality of the passenger experience at the destination; Intention to return as a tourist.
LocationGen	29 Location with respect to the main cruise routes. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
QuayGen	30 Dimension (docks with adequate length and depth) for cruise ships. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
InOutTerminalGen	31 Existence of a terminal with appropriate passenger capacity at the beginning / end of the cruise. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
TransitTerminalGen	32 Existence of a terminal with appropriate capacity for passengers in transit. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
BusParkGen	33 Existence of a terminal with appropriate capacity to park buses for excursions. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
PromotionGen	34 Level of promotion of the port and the destination in the cruise industry. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
TourismServicesGen	35 Diversity of attractions and services (restaurants, hotels, museums, parks, etc.) for cruise ship passengers. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
ToursGen	36 Diversified excursions, in number and quality. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
CleanessGen	37 Safety, cleanliness and local signage conditions at the cruise destination. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
AirLinksGen	38 Direct flight connections with foreign countries that allow the development of the port as the beginning / end of cruises. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	E How do you rank the importance of the port (1) and destination (2) performance indicators listed below in cruise activity? (1) Number of ships and number of passengers in the port. (2) Impact on job creation; Impact on GDP; Quality of the passenger experience at the destination; Intention to return as a tourist.
NbCruisesOut	39 Number of cruise ships. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
NbPaxOut	40 Number of cruise passengers. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
JobsIncreaseOut	41 Job creation in the region. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
GDPIncreaseOut	42 Increase in GDP (Gross Domestic Product) of the region. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
ExperiencePaxOut	43 Quality of the passenger experience at the cruise destination. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
ReturnPaxOut	44 Passenger's intention to return as a tourist. * Strongly disagree 1-2-3-4-5-6-7 Strongly agree
	45 What other performance indicators of the ports and destinations of Macaronesia do you consider relevant for measuring the impact of the activity? (open question)

