



# Identifying stakeholder perceptions and realities of Paris MoU inspections

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## Abstract

In the globalized maritime transport sector, with its preponderance of open registries, the controls implemented by the Port State Control should be rigorous but equitable. In this article, we present both stakeholder perceptions of these inspections (based on a questionnaire to which 343 people responded) and a descriptive analysis of real data, using information obtained from European Maritime Safety Agency (EMSA), the Paris Memorandum of Understanding (Paris MoU) and other regional and national databases. The homogeneity of results was evaluated by country, port and inspector profile based on certain indicators that we developed over the course of our work. The results show significant differences in the number of ships detained and deficiencies found at each port, including within the same maritime administration of the Paris MoU.

**Keywords** Maritime safety · Port State Control · Paris MoU · Open registries · Inspections

## 1 Introduction

In recent years, maritime transport has undergone consolidation of so-called open registries; in 2015, open registries (OR) accounted for 71.3% of the global fleet, up from 21.6% in 1970. The global fleet continues to maintain a strong separation between the nationality of the shipowner and the flag state of the ship. As of 1 January 2015, Panama, Liberia and the Marshall Islands have the largest vessel registries in the world. Together, these registries account for 41.8% of the world fleet in terms of tonnage, with

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the Marshall Islands registry increasing by more than 13% in 2014 (UNCTADStat 2015). Flag states have become exploited as private companies, currently with high-quality standards in their operations and with the majority of their obligations outsourced (Piniella et al. 2017). The first OR, which initially were characterized by low regulatory standards regarding security and the environment, now constitute the principle international regulatory scheme governing maritime transport, replacing traditional registries. This transition has permitted the emergence of other low-principle ship registries that give cover or protection to the substandard global fleet (UNCTAD 2018; Piniella et al. 2014).

As a result of this development, the international scene has changed, which has led to modifications of the control tools used to enforce compliance with the international regulatory principles established by the International Maritime Organization (IMO) regarding security and the prevention of pollution (Piniella et al. 2017). Furthermore, labour regulations from the International Labour Organization (ILO) have been added through the Maritime Labour Convention (MLC, 2006), which has been in effect since 2013 (Piniella et al. 2013).

Since 1982, countries within the European Union and Canada established an accord between maritime administrations to cooperate in the fight against substandard vessels using inspections conducted by the Port State Control (PSC): The Memorandum of Understanding (MoU) was signed in Paris by 14 coastal countries; today, it is accepted by 27 countries, and it has served as a model for accords in other regions of the world,<sup>1</sup> the most consistent of which is the Tokyo MoU, which was signed by authorities in the Asia-Pacific zone in 1993 (Özçayir 2004; EU 2009; Chatzirigopoulou et al. 2010).

Shipowners and the most important flag registries, including classification societies, recognize the importance of MoU inspections. The detection of deficiencies in vessels due to a lack of compliance with IMO and ILO conventions can lead to the detention of vessels until such deficiencies have been corrected (IMO 2001, 2011, 2012, 2014). The detention of a vessel at port causes delays in a regular shipping line and may necessitate the charter of an alternative vessel (Cariou et al. 2007; Cariou and Wolff 2011, 2015). In addition to penalizing all implicated maritime agents, detention of a vessel potentially elevates the level of risk involved in noncompliance with international standards and thereby increases the impact of these controls. Therefore, the MoU inspections generate a certain level of anxiety among maritime traffic stakeholders.

Substandard vessels that fail to comply with international maritime regulations are the target of PSC inspections (Cariou et al. 2009). On average, approximately 600 vessels are detained annually in the MoU region, many inspections do not lead to any detentions, and, in a significant number of cases, no deficiencies are detected. The number of detentions decreased from 668 in 2013 to 612 in 2014. The average detention rate in 2014 was 3.32% (expressed as a percentage of the number of inspections) (Paris MoU 2014). The maritime administrations rely on many factors when selecting vessels eligible for a PSC inspection (Cariou et al. 2007, 2009). These factors are set to target substandard vessels, defined as vessels that represent hazards to

<sup>1</sup> Nine regional agreements on Port State Control – Memoranda of Understanding or MoUs – have been signed: Europe and the North Atlantic (Paris MoU), Asia and the Pacific (Tokyo MoU), Latin America (Acuerdo de Viña del Mar), Caribbean (Caribbean MoU), West and Central Africa (Abuja MoU), the Black Sea region (Black Sea MoU), the Mediterranean (Mediterranean MoU), the Indian Ocean (Indian Ocean MoU) and the Riyadh MoU. The United States Coast Guard maintains the tenth PSC regime (IMO 2019).

safety, health or the marine environment, which may therefore be subject to detention. Usually, targeting factors are identified based on the type of vessel, age, flag, classification societies, deficiencies recorded, etc. (Cariou et al. 2007; Knapp and Franses 2007a; Cariou and Wolff 2015). This targets specific types of deficiencies that address the Concentrated Inspection Campaigns (CIC) (Cariou and Wolff 2015). CIC focus on specific areas where high levels of deficiencies have been encountered by Port State Control Officers (PSCO) or where new convention requirements have recently entered into force (Paris MoU 2019; Tokyo MoU 2019).

One basic objective that permeates the policies of the Paris MoU is that all inspections should be equally rigorous and objective, regardless of country, port, flag state or PSCO who executes the inspection. National maritime authorities, the European Maritime Safety Agency (EMSA) and the Secretariat of the Paris MoU on PSC organize various training courses and seminars for PSCOs (Degre 2008; IMO 2001). These courses are designed to ensure effective and uniform inspection procedures throughout the Paris MoU region. A Code of Good Practice (in Resolution A.1052(27) of the IMO) provides guidelines regarding the standards of integrity, professionalism and transparency that are expected of all PSCOs under the Paris MoU (IMO 2011). Furthermore, IMO hosted workshops for PSC MoU and Agreement Secretaries and Database Managers. The workshops aimed to provide support to regional Port State Control regimes by establishing a platform for cooperation and also providing a forum for the people involved to meet and exchange ideas and experiences. They also aimed to encourage harmonization and coordination of PSC activities (IMO 2019).

This paper inquires into the adequacy in the Paris MoU region as reflected by either relative homogeneity or heterogeneity in inspection outcomes depending on where vessels are inspected or who executed the inspection. Based on this, the objective of this study is to determine the extent to which these inspections are perceived as equitable within the entire MoU region. For that purpose, this paper examines the point of view of key maritime stakeholders (it is covered by a survey,  $n = 343$ ) with objective data regarding the number of inspections and detentions of vessels by country, port and professional profile of the PSCO (data set from the THETIS/ESPO/Eurostat/EMSA). Furthermore, we address the possibility of moving towards the IMO's goal of a global accord, analysing a possible union of the Paris and Tokyo MoUs.

The paper is organized as follows. Section 2 provides a review of the specific aspects of inspection and effectiveness of the PSC adopted by regional PSC agreements to select ships for inspection. In Section 3 of this paper, materials and methods are described to develop the study design and data collection. Section 4 discusses and examines perceptions of equity inspections under Paris MoU. In Section 4, the paper investigates the implementation of inspections in all countries belonging to the Paris MoU and different ports within the same country (case study of Spain). Moreover, the possibility of a common MoU unifies the Paris and Tokyo agreements. Finally, conclusion is presented in Sect. 5.

## 2 Literature review

Considerable changes have taken place in maritime transport safety control in recent decades. In 2013, Yang, Wang and Li review the challenges of maritime safety analysis

(Yang et al. 2013), the different approaches used to quantify the risks in maritime transportation and the importance of risk quantification analysis to facilitate the transformation of maritime safety culture, a term introduced by Håvold in 2000 (Håvold 2000). Nearly 20 years ago, Brooks noted the privatization trend in maritime safety control (Brooks 1996).

There are many studies on the development of PSC, but Knapp and Franses in 2004 and 2007 pioneered the application of econometrics in this area to more accurately quantify global PSC effectiveness through the use of binary logistic regression to identify differences among multiple PSC regimes (Knapp and Franses 2007b, 2007a; Knapp 2004). In 2007, these researchers concluded that it was necessary to revise the frequency of inspections according to ship risk profile, and their recommendations were subsequently implemented by parties to the Paris MoU. The new inspection regime (NIR) took effect in 2011 (Knapp and Van de Velden 2009; Bijwaard and Knapp 2009; Knapp and Franses 2010).

In 2008, Li and Zheng studied the effectiveness of PSC and the methods adopted by regional PSC agreements to select ships for inspection (Li and Zheng 2008); their study confirmed that the enforcement of PSC is effective in terms of improving ship safety levels in maritime transport. In 2012 and 2014, more recent and novel studies include those by Bang and Li, Yin and Fan (Bang and Jang 2012; Li et al. 2014), who explored the relation between PSC inspections and a ship's involvement in accidents and incidents using Bayesian networks based on inspection, accident and incident data, with two alternative algorithms. Following the stream of effective PSC inspections, Özçayir (2009) studied the use of PSC in maritime industry and application of Paris MoU (Özçayir 2009).

In 2014, although Wu et al. have studied specific aspects of inspection (Wu et al. 2014), only Knapp and Franses have conducted a general analysis about the influence of the professional profile of inspectors and the results of inspections (Knapp and Franses 2007a). They concluded that there are differences in the average probabilities of detention based on inspector's background, but it was necessary, a further insight in order to make a final conclusion on the subject in question. In 2016, more recent studies include those by Ravira and Piniella (Ravira and Piniella 2016), who analysed the influence of the professional background of PSCOs within the framework of the Spanish administration. The authors concluded that both professional background and the use or lack of teams for the conduction of an inspection have an influence on the inspection outcome.

The professional press has reported on claims of possible corruption in this sector. Recently, Intercargo chairman John Platsidakis asserted that corruption is "a fact of life" and that the problem is so great that the shipping industry's Round Table association wrote to all MoUs 1 year ago concerning blackmail in certain ports (Glass 2015). There are also web forums that collect anonymous experiences from sailors who denounce the arbitrariness in inspections in blunter terms.

Compared with existing research, our study has two distinctive features. The first is the introduction of the concept of perception's stakeholder of inspections (Aydogdu 2014), and the second is the empirical analysis of inspections using concrete cases and the indices of detained vessels in specific ports.

## 3 Materials and methods

### 3.1 Study design

Once the general and specific objectives of this study were defined, an instrument to collect information was prepared, and the study was designed. Different proposals were considered, some more extensive than others. Ultimately, a relatively brief survey was chosen with the aim of achieving a high level of participation by creating a survey that could be answered anonymously in only 5 min. The excessive demand for professionals to participate in surveys was taken into account, and thus, we focused on several questions that would yield an objective assessment of the issue. Possible recipients of the final model of the survey were selected from a specific group of profiles to avoid interference with the model and more extensive proposals to control the proposed items.

The first questionnaire was reviewed and evaluated by a group of 10 experts in the maritime sector (academics  $n = 2$ , port authority  $n = 2$ , PSCOs  $n = 3$ , ship operators  $n = 3$ ), who were informed of the objectives of the study and the research question. As a result of this process, the final survey (Appendix 1– Survey) comprised only 5 questions. Both phases of the survey were evaluated for soundness and reliability, and we were able to validate acceptable cohesive values from the descriptive statistics, intraclass correlation coefficient (ICC) and Cronbach's alpha coefficient (values higher than 0.7–0.8 were considered acceptable). These values, even if they were not significant, allowed validation of the models, which was justified because the closed questions in the survey and the existence of only two control options limited both the variability of the model and the discriminating reference levels.

The first question on the survey (Q1) identified the nature of the relation between each participant and MoU inspections. Participants chose from three alternatives: experience as a sailor, experience as a PSCO or simply a relationship with the maritime port sector. The remainder of the survey assembled the experts' perceptions in four closed questions:

- (Q2) the implementation of inspections (degree of preciseness) in all member countries of the Paris MoU
- (Q3) in different ports (within the same country)
- (Q4) the importance of the professional background of the PSCO
- (Q5) the possibility of a common MoU that unifies the Paris and Tokyo agreements

Therefore, we conducted a cross-sectional study in which participants answered a very simple structured written survey with five questions related to PSC inspections and participants' perceptions, which are analysed in this paper. Another analysis considered the behaviour of different ports within the same maritime administration. For this analysis, we chose the case study of Spain. It is important to note that, owing limited scope of data collection and the lack of the different types of data sets (see Sect. 3.3).

### 3.2 Participants

Using the professional social network *LinkedIn*®, we identified participants whose *curriculum vitae* indicated that they fit the stakeholder profile established by the panel

of experts (e.g. PSCOs, captains and officials of the merchant navy, shipping companies, vessel registries, classification societies, P&I and insurance companies and different maritime administrations), as well as a cultivated group of academics and professionals in areas related to the issue. All individuals invited to participate met the condition of being a stakeholder in maritime trade through one of the roles identified in the first survey question, and approximately 75% of them were from European countries. Communication with these participants was conducted by email or directly through internal messages on the social network. The survey was open for 1 month (in 2016) on the *SurveyMonkey*© platform, and 343 people responded (assuming an error rate of 5.25% in the confidence range of the number of participants). Participant relationships with the issue in question are shown in Table 1. The nationality of the participants varied (62 different countries were represented, with 78% of respondents coming from the European Union) and is reflected in Table 2.

### 3.3 Measures

To evaluate the current situation reality by country (Q2), we obtained objective data from the THETIS database regarding inspections over a 15-year period (1999–2014). Besides, we obtained information regarding the weight of maritime traffic in each State from the trimestral data of Eurostat (Eurostat [n.d.](#)). By combining these data, we obtained the ratio of detained vessels per 10,000 GT for each country (because certain Paris MoU countries are not registered in Eurostat, this study does not address all 27 member countries of the Paris MoU).

Additionally, using data from the European Sea Ports Organisation (ESPO) (ESPO [2015](#)), we conducted a more detailed study of the ten most important ports in the Paris MoU zone in the last 3 years. We ultimately increased the number of ports in our study to 11 by including Genoa, which variably appeared in the top 10 ranking.

The final measurement was a comparison of all ports within a single State. We chose a case study of the Spanish maritime administration for this part of the analysis because Spain is among the MoU States with the greatest number of ports in the great oceanic routes (E/W and N/S axes in the Mediterranean and Atlantic watersheds) and has the highest rate of inspections (9.8%) within the MoU region (the UK has the second highest inspection rate, 7.8%). In this analysis, we used data obtained from the State Ports Public Entity (Puertos del Estado) (Puertos del Estado [n.d.](#)), which differed slightly from the data provided by ESPO and THETIS for details regarding detained vessels.

**Table 1** Participants' background

	Frequencies	%
No answer	4	1.2
PSCO	55	16.0
Seafarers	146	42.6
Maritime sector	138	40.2
Total	343	100.0

**Table 2** Participants' nationalities

a) Frequencies.				
		Frequencies		%
Africa		8		2.3
America		29		8.5
Asia		33		9.6
Europe		269		78.4
Oceania		4		1.2
Total		343		100.0
b) Types of participants				
	DK/NA	PSCO	Seafarers	Maritime Sector
Africa	0	0	5	3
America	0	7	13	9
Asia	1	2	18	12
Europe	3	46	107	113
OCEANIA	0	0	3	1

To investigate the impact of the professional profile of the PSCO (Q4) and its relationship to the results of PSC inspections, we used data from a study of the 92 accredited PSCOs in Spain. Of these PSCOs, we selected 36 who had conducted a significant number of inspections (> 30 per year). Data regarding the inspectors' backgrounds were collected directly from the 29 Harbour Masters' Offices at which the PSCOs were based. The number of PSCOs was reduced from 36 to 15 because we excluded periodic inspections of ferries that regularly sail from Spain. Thus, we selected all inspections performed over 1 year by 15 inspectors with different professional profiles. The initial contact was made by phone; then, data were collected from the THETIS database. The final sample included 387 inspections, which accounted for 21.5% of all inspections conducted in that year.

Regarding the method used to "measure" the possibility of a unified accord between the two regions (Q5), one alternative was to analyse the control mechanisms in both MoUs (Tokyo and Paris), as well as the number of deficiencies and detained vessels in each region. To conduct a comparative review of the control mechanisms employed by port States in the two covered regions, we first analysed the legal instruments that govern the two regional agreements. Then, we assessed the effectiveness of those agreements in practice using data provided by the respective secretariats regarding detained vessels.

## 4 Results and discussions

### 4.1 Perceptions of inspections

The principal result is that the majority of respondents perceive an issue with the equity of PSC inspections in the Paris MoU. The results of the survey reflect the perception that the exercise of vessel control is not consistent across countries (Q2 – No: 76.4%).



Even within countries, differences are perceived among ports (Q3 – Yes: 58%). Differences are also clearly perceived among PSCOs with different professional profiles (Q4 – Yes: 70.2%).

If we consider the views held by the different participant segments established by the responses to Q1:

- a) PSCOs themselves perceive a lack of equity among the maritime administrations that compose the Paris MoU (70.9%), and there is a significant perception of discrepancies even with respect to their own colleagues at other ports (56.4%). Regarding background, nearly three out of four inspectors (74.6%) believe that their background influences the manner in which they conduct inspections and therefore affects the extent to which deficiencies are detected in vessels.
- b) Among seafarers, the perception of discrepancies among countries is much more evident (81.5%). The perception of discrepancies based on the profiles of inspectors is also substantial (73.3%), whereas a smaller portion perceives discrepancies among ports (55.5%).
- c) Regarding the “on land” maritime sector, although the percentages in their assessments differ (73.9%, 62.3% and 65.2% of these professionals perceive discrepancies among countries, ports and PSCOs, respectively), individuals in this segment also perceive a lack of consistency in the performance of MoU inspections.

Table 3 shows countries with the greatest number of survey participants (> 5). The results among these countries do not vary considerably, even with respect to countries outside of the Paris MoU. In all cases, the majority of respondents perceive differences in inspections as a function of the country and the background of the inspector. There is also a perception of variation in the manner in which inspections are conducted at ports within the same country, but the proportion of respondents with this perception is smaller compared with the other two issues.

The final question of the survey (Q5) asks about the possibility of expanding the regional frameworks of the Paris and Tokyo MoUs. The result is noteworthy:

**Table 3** Perceptions of participants by countries

	Q2 (N)	Q3 (Y)	Q4 (Y)
Paris MoU members			
Germany	54.5	45.5	54.5
Greece	68.7	50.0	68.7
Netherlands	77.8	66.7	77.8
Portugal	62.5	50.0	62.5
Spain	75.3	64.1	66.9
Sweden	90.0	30.0	80.0
UK	75.0	59.4	59.4
Non-members			
USA	92.9	57.1	71.4
Turkey	53.8	30.8	69.2



Approximately 80% of respondents believe that a concerted effort should be made to unify the two MoUs. This question will be discussed in more detail in sub-section (e) “The possibility of a common MoU that unifies the Paris and Tokyo agreements”.

## 4.2 Relationship between perception and reality

### 4.2.1 Implementation of inspections in all countries belonging to the Paris MoU

To analyse the “reality” of inspections, it was necessary to evaluate whether the results for certain indicators were homogeneous across countries, ports and inspectors.

Initially, it is difficult to make comparisons by country or to evaluate States with very different harmonization, inspection practices, human factor, maritime authorities, etc. (Sage 2005; Cariou et al. 2007; Knapp and Franses 2007a; Cariou and Wolff 2015; Knudsen and Hassler 2011; Bloor et al. 2006). Nevertheless, for the purposes of this paper, we decided to compare the results of inspections conducted by member countries of the Paris MoU during a significant period of time (the 15-year period from 1999 to 2014). The number of detained vessels was analysed not quantitatively but rather in accordance with the weight of each country, considering the great diversity of States that compose the European Union. As noted earlier, the maritime traffic data for these 23 countries were obtained from Eurostat because four of these countries are not part of the EU. The results are shown in Table 4.

In absolute terms, the number of vessels detained varies greatly by country; figures greater than 100 are underscored in red to highlight extreme values. It is evident that nearly all countries with numbers underscored in red have experienced a reduction in the number of vessels detained. The index we calculated considers the size of the vessel in terms of its gross tonnage (GT), meaning that the ratio may be disproportionate for countries with lighter traffic, such as Romania, Cyprus or Slovenia. However, if we focus our attention on the six countries with minimum annual traffic of 100,000 GT (bolded in Table 4c), we observe certain particularities, such as the incremental decrease of the ratio in Spain from 20.70 to 4.69, whereas other countries have maintained a certain regularity; for example, Denmark did not reach an index of 1 in any year.

Note that all of these assessments are susceptible to bias. The type of maritime traffic that arrival a particular port may be more or less susceptible to the arrival of substandard vessels. Regardless, it is assumed that the average of all types of traffic should yield similar values within a single country, and the comparison of countries can be complicated in any case.

### 4.2.2 Implementation of inspections at different ports within the same country

To complete the previous analysis, we shifted our focus to the port level; this process required an analysis of both absolute and weighted data, with an index of the weight of each port. We based our analysis on ESPO data (European Sea Ports Organisation 2013–2014) regarding the tonnage moved at each port (ESPO 2015). The results are presented in Table 5.

As shown in Table 5, the data are not homogeneous. Although uniformity among ports in the same country is greater than that among ports in different countries,

**Table 4** a) Maritime traffic (GT) – source: Eurostat. Maritime transport – vessel traffic – main ports – number and gross tonnage of vessels. All type of vessels – direction: inwards only. b) Detentions of substandard vessels – source: Paris MoU. c) Detention vessels' ratio by maritime traffic (1/10,000 GT)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
a)																
Belgium	30,484	32,760	32,252	31,661	30,326	30,264	32,427	32,236	34,043	34,028	27,441	28,812	28,306	26,795	25,000	24,383
Bulgaria			2821	2834	3076	3370	3356	3762	3734	3676	2941	3168	3566	3648	3620	3611
Croatia							171,376	185,385	194,782	200,292	211,837	195,262	207,995	205,040	202,537	205,191
Cyprus							4980	5250	5466	5002	4803	2743	2606	2324	2366	2536
Denmark	378,541	363,560	348,640	363,923	361,665	366,981	367,364	370,036	371,600	382,247	374,188	356,657	349,133	348,391	344,186	345,670
Estonia				20,146	8793	10,831	10,824	10,265	9689	8470	6733	25,370	28,483	28,474	30,504	30,350
Finland	31,224	33,230	37,592	38,427	38,077	41,245	40,655	40,583	40,431	39,721	33,331	34,682	34,784	33,818	32,673	33,758
France	29,291	74,182	75,508	80,644	82,384	82,556	75,182	64,396	73,670	70,883	72,276	71,579	71,928	71,753	71,841	71,797
Germany	68,160	115,695	111,529	111,878	111,842	125,975	113,057	119,608	125,578	120,905	118,866	107,197	114,431	111,989	118,586	119,565
Greece	165,808	194,362	331,893	370,094	461,244	470,083	493,146	517,143	487,922	477,841	489,098	532,429	511,951	466,727	43,587	
Ireland	11,461	11,894	12,394	13,438	13,708	13,109	13,176	13,078	13,097	12,094	12,967	12,818	11,615	11,378	11,712	12,098
Italy	531,180	527,578	509,439	514,182	514,182	520,719	454,008	486,729	459,600	457,916	444,877	518,666	485,000	437,058	411,167	459,354
Latvia				2091	2256	2688	2735	2343	2750	2455	2202	6872	6998	7404	6638	6023
Lithuania				2688	2735	2747	2886	2934	2503	4526	4766	4857	4418	4324		
Malta				3045	3045	2346	2933	3265	2894	23,248	23,276	23,030	23,043	22,600	22,882	23,288
Netherlands	46,071	46,048	45,920	45,839	46,215	47,755	46,684	49,476	48,630	47,623	41,033	44,535	37,160	35,609	33,820	35,530
Poland				14,884	13,810	14,454	16,208	17,059	15,315	16,316	15,748	15,300	14,716	15,255		
Portugal				11,293	11,115	12,035	11,862	13,940	15,123	12,559	11,882	12,230	12,125	11,137	12,351	12,176
Romania				2648	3273	3521	3115	2990	1986	1822	4749	4678	4593	4264		
Slovenia				1765	1862	1920	2071	2312	2251	2230	1959	2039	1996	1980	1941	1909
Spain	99,051	114,122	116,558	120,564	120,467	121,444	123,395	133,357	124,655	117,095	122,845	151,460	148,959	141,167	147,195	
Sweden	119,145	107,214	96,007	89,281	87,787	87,078	88,352	86,779	99,254	99,932	90,729	78,357	80,518	77,345	78,262	78,708
United Kingdom	171,539	167,518	161,776	157,583	152,183	143,487	133,795	139,812	130,180	116,838	122,242	101,740	114,096	115,818	120,279	
b)																
Belgium	168	139	102	80	78	51	50	69	83	70	77	37	11	13	23	15

Table 4 (continued)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Bulgaria									10	30	23	25	24	25	20	14
Croatia	53	44	37	47	24	25	16	31	18	33	22	16	12	5	13	10
Cyprus								15	26	55	53	27	10	6	8	18
Denmark	31	35	29	31	20	27	14	29	26	23	11	8	2	4	3	6
Estonia								7	4	4	3	1	1	1	1	0
Finland	34	24	15	11	9	6	7	7	10	3	2	1	2	1	3	2
France	91	118	69	83	95	59	51	78	89	91	66	57	38	45	41	36
Germany	110	161	111	112	70	60	36	53	51	47	48	36	37	46	29	44
Greece	155	85	80	93	160	63	33	34	67	45	53	47	54	42	49	68
Ireland	11	21	15	18	32	20	19	28	23	30	28	11	14	21	23	14
Italy	211	283	404	375	357	346	226	261	250	212	171	119	114	110	131	88
Latvia								6	4	5	3	1	1	2	1	0
Lithuania								1	9	9	9	5	1	5	4	0
Malta								10	17	21	9	10	10	12	17	11
Netherlands	139	141	99	93	78	81	71	70	54	41	35	34	55	36	57	11
Poland	37	35	31	30	22	26	12	29	26	33	27	22	12	17	12	24
Portugal	57	121	164	110	64	63	60	51	69	39	23	13	8	4	9	8
Romania									33	31	41	48	17	16	16	24
Slovenia					22	48	69	48	33	53	36	28	29	6	12	4
Spain	176	205	208	201	198	116	131	173	173	165	138	95	122	117	63	69
Sweden	17	14	12	16	7	10	10	13	5	9	9	5	5	5	3	4
United Kingdom	134	108	113	121	116	104	90	82	81	71	59	50	42	63	51	63
c) Detention vessels' ratio by maritime traffic (1/10,000 GT)																
Belgium	55.11	42.43	31.63	25.27	25.72	16.85	15.42	21.40	24.38	20.57	28.06	12.84	3.89	4.85	9.20	6.15
Bulgaria									26.78	81.61	78.20	78.91	67.30	68.53	55.25	38.77
Croatia							0.93	1.67	0.92	1.65	1.04	0.82	0.58	0.24	0.64	0.49
Cyprus								28.57	47.57	109.96	110.35	98.43	38.37	25.82	33.81	70.98

Table 4 (continued)

	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Denmark	0.82	0.96	0.83	0.85	0.55	0.74	0.38	0.78	0.70	0.60	0.29	0.22	0.06	0.11	0.09	0.17
Estonia	10.89	7.22	3.99	2.86	2.36	1.45	1.72	6.82	4.13	4.72	4.46	0.39	0.35	0.35	0.33	—
Finland	31.07	15.91	9.14	10.29	11.53	7.15	6.78	12.11	2.47	0.76	0.60	0.29	0.57	0.30	0.92	0.59
France	16.14	13.92	9.95	10.01	6.26	4.76	3.18	4.43	4.06	3.89	4.04	3.36	3.23	4.11	2.45	3.68
Germany	9.60	17.66	12.10	13.39	23.34	15.26	14.42	21.41	17.56	24.81	21.59	8.58	12.05	18.46	19.64	11.57
Greece	5.33	5.13	4.12	2.80	4.32	1.37	0.70	0.69	1.30	0.92	1.11	0.96	1.01	0.82	1.05	15.60
Ireland	5.33	5.33	7.66	7.36	6.94	6.64	4.98	5.36	5.44	4.63	3.84	2.29	2.35	2.52	3.19	1.92
Italy	—	—	—	—	—	—	—	25.61	14.55	20.37	13.62	1.46	1.43	2.70	1.51	—
Latvia	—	—	—	—	—	—	—	3.64	31.19	30.67	35.96	11.05	2.10	10.29	9.05	—
Lithuania	—	—	—	—	—	—	—	30.63	58.74	9.03	3.87	4.34	4.34	5.31	7.43	4.72
Malta	—	—	—	—	—	—	—	14.15	11.10	8.61	8.53	7.63	14.80	10.11	16.85	3.10
Netherlands	30.17	30.62	21.56	20.29	16.88	16.96	15.21	20.06	16.04	19.34	17.63	13.48	7.62	11.11	8.15	15.73
Poland	—	—	—	—	—	17.47	8.69	36.59	45.63	31.05	19.36	10.63	6.60	3.59	7.29	6.57
Portugal	—	107.15	147.55	91.40	53.95	54.04	42.71	—	105.94	103.68	206.45	263.45	35.80	34.20	34.84	56.29
Romania	—	—	—	—	—	—	—	207.61	146.60	237.67	183.77	137.32	145.29	30.30	61.82	20.95
Slovenia	—	—	—	—	118.15	250.00	333.17	14.02	12.97	13.24	11.79	7.73	8.05	7.85	4.46	4.69
Spain	—	20.70	18.23	17.24	16.42	9.63	10.79	1.50	0.50	0.90	0.99	0.64	0.62	0.65	0.38	0.51
Sweden	1.43	1.31	1.25	1.79	0.80	1.15	1.13	6.27	5.79	5.45	5.05	4.09	4.13	5.52	4.40	5.24
UK	6.30	6.30	6.75	7.48	7.36	6.27	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13	6.13

**Table 5.** Top 11 EU Ports > 50 million tonnes

Total throughput accumulated data from January to December				
	2012	2013	2014	Media
Rotterdam	441,528	440,464	444,733	442,242
Antwerp	184,136	190,849	199,011	191,332
Hamburg	130,938	139,050	145,673	138,554
Amsterdam	94,298	95,752	97,790	95,947
Algeciras	83,421	85,865	88,077	85,788
Marseille	85,633	79,953	78,520	81,369
Bremen/Bremerhaven	83,979	78,768	78,260	80,336
Valencia	65,663	68,716	71,850	68,743
Le Havre	63,516	67,172	66,886	65,858
Constanta	50,579	55,137	55,642	53,786
Genoa	50,207	48,524	50,969	49,900
Detention vessels				
Rotterdam	18	40	14	24.00
Antwerp	11	19	10	13.33
Hamburg	10	5	10	8.33
Amsterdam	11	6	9	8.67
Algeciras	15	13	13	13.67
Marseille	7	11	12	10.00
Bremen/Bremerhaven	4	4	9	5.67
Valencia	0	1	1	0.67
Le Havre	5	3	3	3.67
Constanta	10	12	20	14.00
Genoa	3	5	2	3.33
Ratio det. vessels by 1,000,000 tonnes				
Rotterdam	0.041	0.091	0.031	0.054
Antwerp	0.060	0.100	0.050	0.070
Hamburg	0.076	0.036	0.069	0.060
Amsterdam	0.117	0.063	0.092	0.090
Algeciras	0.180	0.151	0.148	<b>0.159</b>
Marseille	0.082	0.138	0.153	<b>0.123</b>
Bremen/Bremerhaven	0.048	0.051	0.115	0.071
Valencia	0.000	0.015	0.014	0.010
Le Havre	0.079	0.045	0.045	0.056
Constanta	0.198	0.218	0.359	<b>0.260</b>
Genoa	0.060	0.103	0.039	0.067

unbalanced ratios exist. Geographically, there exists certain symmetry, albeit with some exceptions (such as Valencia). For example, the ports of the Northern Europe (Rotterdam, Antwerp, Hamburg, Bremen/Bremerhaven and Le Havre) maintain a mean ratio of 0.05–0.09 vessels detained per million tonnes, whereas the Mediterranean ports

(Algeciras, Marseille and Constanta) exhibit a ratio of 0.1–0.2. This tendency may indicate greater stringency in southern European ports than in northern European ports, an intuition indicated in professional sailors' forums.

As an adjustment measure of the data used in the above analysis, we calculated the number of deficiencies in vessels detained at these ports. The results, shown in Table 6, did not reveal great differences. Rather, in the majority of important ports, with certain exceptions, detained vessels incurred between 10 and 20 deficiencies.

#### 4.2.3 Case study: Detained vessels in all Spanish ports

Another analysis considered the behaviour of different ports within the same maritime administration. For this analysis, we chose the case study of Spain, which is one of the most important countries in the region in terms of the application of the Paris MoU. We obtained all available information at the level of each port, with two indicators of weight: the number of vessels arrival each port and the number of annual tonnes handled at each port. The results of comparing of these indicators with the number of vessels detained are presented in Table 7. Table 7 also shows a variety of ratios, including quite disparate ratios (0.14, 0.06 and 0.01) for a relatively homogeneous group of ports (the three great Spanish ports of Algeciras, Barcelona and Valencia, respectively).

To conduct a more rigorous analysis, we configured a table with all of the vessels detained at Spanish ports in 2014 and the number of deficiencies found for each vessel, highlighting the deficiencies that were the reason for detention. These vessels were later divided into the fifteen most important groups, adding the age of each detained vessel and the number of days it remained at port until the deficiencies were corrected. The results are presented in Table 8, and again, we find great differences among the inspections at each port with respect to the types of deficiencies, etc. In our view, the reason for these differences is the particularities of the fleet that reaches each type of port, as well as the volume of traffic and the type of merchandise (containers, solid and liquid bulk, passenger ships, etc.).

**Table 6** Detention of vessels in Top 11 EU ports > 50 million tonnes (2014)

Average number of deficiencies that leads to a detention	
Rotterdam	15.57
Antwerp	17.30
Hamburg	15.20
Amsterdam	12.89
Algeciras	11.38
Marseille	6.58
Bremen/Bremerhaven	22.44
Valencia	16
Le Havre	4.33
Constanta	16.35
Genoa	3.00

**Table 7** Detention of vessels in all Spanish Ports (2014)

PORT	No. of vessel	Tonnes	Det.	Ratio	
				Det./10,000 V	Det./1,000,000 tonnes
A Coruña	1124	11,956,980	1	8.90	0.08
Algeciras	26,754	95,049,417	<b>13</b>	4.86	0.14
Alicante	804	2,461,723	3		<b>1.22</b>
Almería	1363	5,140,882	0	–	–
Avilés	809	4,861,600	1	12.36	0.21
Baleares	33,911	12,892,640	2	0.59	0.16
Barcelona	7771	46,353,638	3	3.86	0.06
Bilbao	2862	31,009,013	5	17.47	0.16
Cádiz	1025	3,542,878	2	19.51	0.56
Cartagena	1777	32,524,327	2	11.25	0.06
Castellón	1500	15,618,071	4	26.67	0.26
Ceuta	11,179	2,268,895	0	–	–
Ferrol-S. Cibrao	1074	13,091,673	1	9.31	0.08
Gijón	1320	18,986,956	1	7.58	0.05
Huelva	1847	27,350,288	2	10.83	0.07
Las Palmas	10,940	22,170,302	9	8.23	0.41
Málaga	1381	2,293,521	4	<b>28.96</b>	<b>1.74</b>
Marín ...	604	1,923,971	0	–	–
Melilla	1406	1,004,112	0	–	–
Motril	886	1,928,038	2	<b>22.57</b>	<b>1.04</b>
Pasaia	921	3,503,141	4	<b>43.43</b>	<b>1.14</b>
S/C Tenerife	12,116	12,412,107	0	–	–
Santander	1393	5,317,869	1	7.18	0.19
Sevilla	994	4,390,580	2	20.12	0.46
Tarragona	2640	31,881,438	5	18.94	0.16
Valencia	7370	67,019,769	1	1.36	0.01
Vigo	1541	4,087,402	1	6.49	0.24
Vilagarcía	261	989,082	0	–	–
Total	137,573	482,030,313	69	5.02	0.14

Comparing similar ports, such as Algeciras and Barcelona, the similarities become more apparent, and we can speak about more precise ranges: a detained vessel aged between 14 and 18 years with a mean of 11 deficiencies and an abundance of severe deficiencies (which lead to detention), including deficiencies related to certificates, ISM Code, navigation insurance and work conditions on board the vessels.

Nonetheless, there are more cases that make this combination heterogeneous. For example, the port of Valencia has the lowest ratio of detentions among all Spanish ports and among the top 11 ports of the EU (these results are shown in Tables 5 and 7). This heterogeneity gives rise to several questions; for example, is the fleet that ports at Valencia very different from that entering Barcelona? Are the PSCOs different?



**Table 8** Average number of identified deficiency and detentions of vessels in all Spanish Ports by type, age and number of detention days

Port	Age	Days	No. of Def.	No. of Def. Ground for DETENTIONS	CERTIFICATE & DOC.	SAFETY OF NAVIGATION	LIVING AND WORKING CONDITIONS + LABOUR	POLLUTION PREVENTION	LIFE SAVING APPLIANCES	RADIO COMMUNICATIONS
A Coruña	7.00	69.00	8.00	4.00	1.000	1.000	1.000	1.000	0.000	0.000
Algeciras	13.62	7.38	11.38	6.00	0.231	0.769	0.923	0.769	0.615	0.231
Alicante	25.67	8.67	14.00	3.67	0.333	0.333	0.333	0.000	0.000	0.000
Almería	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Avilés	16.00	15.00	11.00	5.00	0.000	0.000	1.000	2.000	0.000	0.000
Baleares	31.00	6.00	12.00	6.50	0.500	1.000	0.500	0.000	0.500	0.500
Barcelona	18.33	4.00	11.00	4.00	0.333	0.667	1.000	0.000	0.667	0.000
Bilbao	13.00	6.20	7.20	3.40	0.000	0.000	0.200	0.200	0.600	0.200
Cádiz	14.00	5.00	7.50	1.50	0.000	0.000	0.000	0.000	0.000	0.000
Cartagena	49.00	2.50	14.00	4.50	0.500	0.000	1.500	0.000	1.000	0.500
Castellón	32.50	5.25	14.50	4.75	0.750	0.500	0.500	0.000	0.000	0.750
Ceuta	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Ferrol-S. Cibrao	39.00	1.00	10.00	7.00	0.000	0.000	1.000	1.000	1.000	0.000
Gijón	22.00	8.00	15.00	11.00	1.000	3.000	1.000	1.000	1.000	0.000
Huelva	15.50	9.00	20.50	3.00	0.500	0.500	1.000	0.000	0.000	0.000
Las Palmas	23.33	17.44	13.44	3.78	0.556	0.333	0.222	0.444	0.222	0.333
Málaga	32.25	18.75	17.50	7.75	2.250	1.500	0.500	0.000	0.250	0.000
Marín y Ría de Pontevedra	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Melilla	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Motril	25.50	1.00	11.50	6.00	3.000	1.000	0.500	0.500	0.500	0.000
Pasaia	20.25	6.25	14.00	4.50	1.750	0.250	0.250	0.250	0.750	0.000
Santa Cruz de Tenerife	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000

Table 8 (continued)

Port	Age	Days	No. of Def.	No. Of Def. Ground for DETENTIONS	CERTIFICATE & DOC.	SAFETY OF NAVIGATION	LIVING AND WORKING CONDITIONS + LABOUR CONDITIONS	POLLUTION PREVENTION	LIFE SAVING APPLIANCES	RADIO COMMUNICATIONS
Santander	36.00	32.00	7.00	7.00	6.000	0.000	0.000	0.000	0.000	0.000
Sevilla	20.50	5.00	8.50	3.00	0.500	0.000	1.000	0.000	0.000	0.500
Tarragona	35.00	5.60	17.80	6.20	1.000	1.400	0.800	0.000	0.400	0.200
Valencia	18.00	7.00	16.00	15.00	1.00	0.00	14.00	0.00	0.00	0.00
Vigo	50.00	18.00	15.00	3.00	2.000	0.000	0.000	1.000	0.000	0.000
Vilagarcía	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Mean in all Spanish ports	23.16	9.83	12.80	5.10	0.80	0.59	0.80	0.33	0.39	0.20

Port	EMERGENCY SYSTEMS	FIRE SAFETY	ISM	PROPULSION AND AUXILIARY MACHINERY	STRUCTURAL CONDITIONS	CARGO OPERATIONS INCLUDING EQUIPMENT	OTHER	ALARMS	WATER/ WEATHER/TIGHT CONDITIONS
A Coruña	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Algeciras	0.615	0.308	0.769	0.231	0.231	0.154	0.077	0.077	0.000
Alicante	0.000	0.333	1.000	0.667	0.333	0.000	0.000	0.333	0.000
Almería	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Avilés	0.000	0.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000
Baleares	0.000	2.500	0.000	0.000	0.500	0.000	0.000	0.500	0.000
Barcelona	0.333	0.000	1.000	0.000	0.000	0.000	0.333	0.000	0.000
Bilbao	0.600	0.200	0.800	0.400	0.000	0.000	0.000	0.200	0.000
Cádiz	1.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Cartagena	1.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Castellón	0.000	0.500	1.000	0.250	0.000	0.000	0.250	0.000	0.000

Table 8 (continued)

Port	EMERGENCY SYSTEMS	FIRE SAFETY	ISM	PROPULSION AND AUXILIARY MACHINERY	STRUCTURAL CONDITIONS	CARGO OPERATIONS INCLUDING EQUIPMENT	OTHER	ALARMS	WATER/WEATHER/TIGHT CONDITIONS
Ceuta	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Ferrol-S. Cibrao	1.000	0.000	0.000	0.000	3.000	0.000	0.000	0.000	0.000
Gijón	1.000	1.000	1.000	0.000	0.000	0.000	0.000	0.000	1.000
Huelva	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Las Palmas	0.111	0.333	0.556	0.222	0.111	0.111	0.111	0.000	0.111
Málaga	1.000	0.333	0.500	0.000	1.000	0.000	0.000	0.000	0.500
Marín y Ría de Pontevedra	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Melilla	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Móvil	0.000	0.000	0.000	0.500	0.000	0.000	0.000	0.000	0.000
Pasaia	0.000	0.000	0.750	0.250	0.000	0.000	0.000	0.250	0.000
Santa Cruz de Tenerife	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Santander	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Sevilla	0.000	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
Tarragona	0.800	0.600	1.000	0.000	0.000	0.000	0.000	0.000	0.000
Valencia	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Vigo	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Vilagarcía	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mean in all Spanish ports	0.41	0.31	0.63	0.22	0.19	0.04	0.06	0.07	0.06

### 4.2.4 Professional profiles of PSCOs

In a recent study that considered differences among the professional profiles of PSCOs and differences in the results of inspections (Ravira and Piniella 2016), the data presented in that study clearly showed the different results obtained for our sample of 387 inspections, as shown in Fig. 1. These data coincide with the results of the perception survey.

Among the participants in our perception survey, individuals within the PSCO segment, who conduct these inspections, clearly evidenced these differences. The requirements for becoming an inspector vary based on the applicable MoU and by country. The reality is that PSCOs can be naval architects, merchant marine captains, chief engineers and even radio officers with seagoing experience. The main qualitative findings of Knapp and Franses (2007b) (Knapp and Franses 2007a) coincide with those of our national survey: The probability of detention by inspectors with an engineering background seems to be slightly higher compared with inspectors with a nautical background.

### 4.2.5 The possibility of a common MoU that unifies the Paris and Tokyo agreements

On this issue, we cannot “measure” realities but only compare the accords in terms of their procedures and their results. Except for several minor differences, the Paris and Tokyo MoUs are reasonably uniform in terms of the provisions of the international instruments that they seek to monitor. Our comparative study of detained vessels in 2011 showed that there are more similarities than differences in the deficiencies detected under the Paris and Tokyo MoUs (Piniella et al. 2014). In both geographic regions, the substandard vessels are detected in similar ways by the respective PSCOs, and the reported data are similar (including age, typology and flag), although they

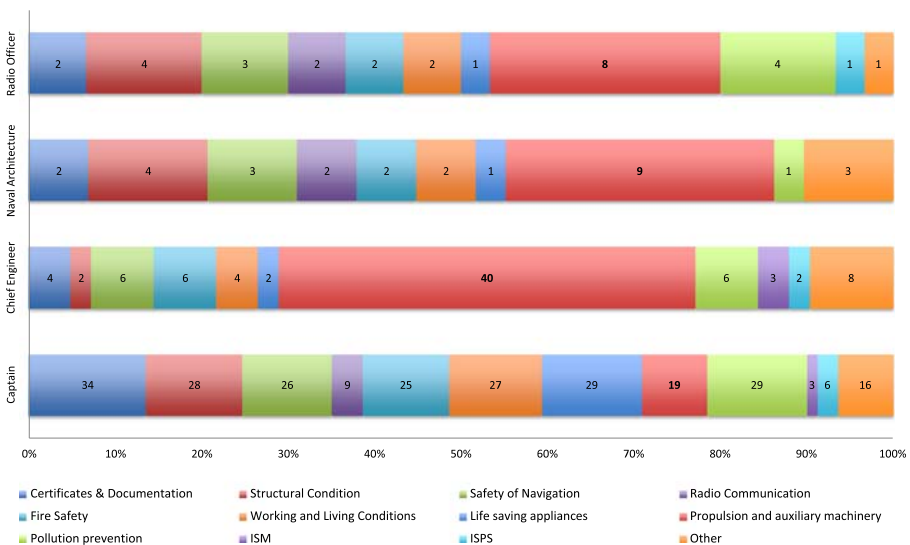


Fig. 1 Types of deficiencies for each of those four PSCO profiles

**Table 9** Ships inspected per number of PSC regions, by type in the last 3 years

Year	Number of regions											
	1		2		3		4		5		6	
	Ships	%	Ships	%	Ships	%	Ships	%	Ships	%	Ships	%
2014	15,887	54.74	8277	28.52	3588	12.36	1089	3.75	171	0.59	10	0.03
2013	17,329	62.62	6554	23.68	2933	10.60	790	2.85	68	0.25		
2012	17,919	62.93	6642	23.33	3027	10.63	817	2.87	68	0.24		

Source: Equasis – Paris MoU, Tokyo MoU, Indian Ocean MoU, US Coast Guard, Viña del Mar MoU and Mediterranean MoU\* (\*only 2014)

obviously address the specific regional characteristics of each case. On the other, a good PSC record is a competitive factor, and accurate data is essential for shipping while also negatively affecting the effective deployment of PSC resources, enhancing the sharing of information, including equity of PSC data (Corbett 2019).

The statistical publication Equasis provides several important data. For example, the total number of ships inspected per number of PSC regions is notable (Table 9). In addition, data regarding the number of vessels in the geographic areas covered by different MoUs show that the number of vessels navigating more than one MoU region is increasing.

## 5 Conclusion

The generalized use and consolidation of OR implies that PSC inspections are more relevant when they are undertaken to monitor compliance with the safety and environmental protection standards established in international regulations, particularly the IMO and ILO. These controls must be rigorous but equitable. Analysing the equity of these inspections is not an easy task. In this article, we analysed the perceptions of equity among important stakeholders. The results show conclusively that the applications of these controls are not perceived as consistent but rather as dependent on the country, the port or even the professional profile of the PSCO. The data provided in this article are important, especially if we consider the increased participation of PSCOs and sailors in the survey, besides land-based professionals in sectors related to shipping, registers, classification societies, insurance companies and maritime administrations. The data are also important because they show that despite the different stakeholder segments, the results among participants are very similar.

However, it is difficult to draw definitive conclusions from these results. The results show that the indices of detained vessels and deficiencies differ by port. Even with comparable indices, the results differ. Moreover, even within the same maritime administration, as in the case of Spain, the results differ in many respects (including types of deficiencies, age of the detained vessels and types of deficiencies that lead to detention). In addition, the type of deficiency detected also differs based on the professional profile of the PSCO.

It is difficult to evaluate States with different levels of challenges (legislation, resources, administrative structure, etc.). Nonetheless, the high number of vessels detained during the study period in Italy and Spain is significant. In relative terms, the ratios of Romania, Cyprus and Slovenia are also very high. Ports such as Algeciras and Marseilles have ratios of vessel detention by PSC inspections that are three times higher than those of Rotterdam and Antwerp. In certain cases, such as the port of Constanta, the ratio can be five times higher. These differences fall along a north-south axis, and with certain exceptions in both maritime regions, they have generated a perception among stakeholders that inspections are not equitable but can be discriminatory or have a greater propensity to detain vessels.

Regarding the different professional profiles of the inspectors, which is an issue previously discussed by the authors, both the survey results and the sample results confirm that perception and reality coincide in the sense that consequences differ and can even be predicted, depending on the type of inspector. Stakeholders are also unanimous about the need to further globalize the geographic coverage of the accords that authorize inspections. The most favourable case is the unification of the Paris and Tokyo MoUs because this consolidation is consistent with existing statistics. In addition, global data show that the number of vessels inspected in recent years by more than one MoU due to mobility through regions covered by up to six different accords has increased over the last 3 years.

However, more studies similar to this one will provide important measures of both the equity of the various aspects of PSC inspections and the progress towards a global integration of controls in all existing MoU regions. If maritime transport is a global reality, controls to ensure safety and protect the marine environment should be global as well.

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## Appendix 1 – Survey

Q1 – This survey may be answered in 5 min and is designed to know maritime professionals' opinion regarding Paris MoU inspections. In this first question we would like to know what your profile is:

- I have experience as a seafarer.
- I have experience as a PSC officer.
- I have a direct relationship with the shipping industry.

Q2 – Do you think that the implementations of the inspections are even (i.e. with the same degree of preciseness) in all countries belonging to Paris MoU?

- Yes
- No

Q3 – Do you think that inspections are more stringent in ports within the same country?

- Yes
- No

Q4 – Do you think that the so far identified deficiencies are related to the professional background of the PSC officer (i.e. master, chief engineer, naval engineer, radio officer, specific inspector training, etc.)?

- Yes
- No

Q5 – Do you think that it is possible to consider a common Memorandum, which gathers both the Paris and Tokyo MoUs?

- Yes
- No

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