

PASSENGER PORTS BENCHMARKING DUE
TO THE E-SERVICES THEY OFFER

POZICIONIRANJE PUTNIČKIH LUKA POSREDSTVOM
E-USLUGA KOJE PRUŽAJU

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Abstract: *This paper represents a particular attempt to categorize some relevant passenger ports e-services. Generally speaking, ports' e-services might be categorized due to their functionality as navigational, ship and passengers related ones; logistics, business, entertainment, safety, security, environmental, and others. In this paper, only those ports' e-services related directly to the passengers' needs, mostly in the context of cruising tourism, are taken into consideration and accordingly categorized as core, or as value added ones, and as informational and/or transactional ones. Then, each of the e-services for the analysed passenger port, taken from a predefined set of ports, has been assigned with 1 or 0 values depending on that if the port offers related e-service or not. These values are later weighted by the appropriate, subjectively evaluated, indexes and employed in the calculation of the total score of the performance measures for each passenger port. Finally, in such way obtained scores have been used in the process of the considered passenger ports benchmarking, i.e. their proper positioning at the respective e-market.*

Key words: *Passenger Ports, e-services, Categorization, Evaluating, Benchmarking*

Apstrakt: *Prije Ovaj rad predstavlja određeni pokušaj u pravcu kategorizacije e-usluga koje pružaju putničke luke. Uopšteno govoreći, lučke e-usluge se mogu podijeliti prema svojoj funkcionalnosti na navigacione, one koje su vezane za brod i putnike; logističke, poslovne, bezbjednosne, sigurnosne, te one koje se odnose na zaštitu životne sredine i druge. U ovom radu, jedino one lučke e-usluge koje se odnose direktno na potrebe putnika, posebno u kontekstu krucizing turizma, uzete su u razmatranje i kategorizovane kao osnovne i usluge dodatnih vrijednosti, odnosno, kao informacione i/ili transakcione. Potom je svakoj od e-usluga analizirane putničke luke, iz predefinisane skupine luka, dodijeljena vrijednost 1 ili 0, u zavisnosti od toga da li ona pruža određenu e-uslugu ili ne. Ove vrijednosti su zatim ponderisane odgovarajućim, subjektivno procijenjenim, težinski koeficijentima i tako ponderisane korišćene su u određivanju ukupne mjere izvršnosti, sa stanovišta e-servisa, za svaku od analiziranih luka. Na kraju, ovako dobijene zbirne vrijednosti su poslužile za pozicioniranje posmatranih putničkih luka na odnosnom e-tržištu.*

Ključne riječi: putničke luke, e-usluge, kategorizacija, procjena, pozicioniranje

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1. Introduction

The new era emerged ports to operate as enterprises, trying to reach maximum efficiency and competitiveness. Consequently, both freight and passenger (cruise) ports need to transform the service (product) they offer by using modern information and communication technologies (ICT) [1].

The innovative uses of ICT throughout the ports as enterprises, transform their functioning toward digital economy. The rapidly increased use of the Internet (Web, e-mail, skype), intranets, extranets, e-business and e-commerce, social networking, and mobile computing changes how business is done in almost all world ports being treated as enterprises. Also the integration of the ports resource planning, customer relationship management and knowledge management with e-commerce is vitally important. There is resurgence of intelligent systems and automated decision systems, both for facilitating security and increasing productivity and competitive

advantage of a port. Besides managerial and artificial intelligence issues, ethical and legal issues are also of crucial importance within this context of growing ICT business and social implications everywhere, so as in the contemporary (passenger) ports proper functioning [2].

2. Web revolution and modern passenger ports

The Web revolution is the most influential technological revolution in the modern era. The access and connectivity provided by the Web keep transforming the way that we work, shop, vote, invest, study, play, interact, and, of course the way we decide when, where and how to travel, around the whole world. E-services of passenger ports worldwide provide us with such very convenient opportunities toward better conducting our leisure time, and ultimately our lives.

The Web driven revolution (transformation) is considerably faster than those occurred during the industrial revolution. For example, two years ago social network-

ks were novelty, but today more than 500 million people all around the globe participate in social networking as an instrument used in commerce, socialization, politics, healthcare, finance, entertainment, and travel, again [2].

As a more concrete example in this context of Web supported passenger ports functioning more efficiently, let's mention the following curiosity: Carnival Cruise Line has been sponsoring social networking site few years ago (carnivalconnections.com) that attracts cruise fans to the site to exchange opinions, get organized in groups for a trip, and much more. It costs the company about \$300,000 to set up the site, but the company anticipates covering the cost through increased business [3].

Web brings to the passenger ports in feedback via social networking sites (blogs, wikis, forums, chat rooms) closer relationships with customers (i.e. passengers). Passenger ports might find these "conversational marketing" outlets not only generate faster and cheaper results than traditional focus groups, but also foster ports feedback management. The enterprise (passenger port) feedback management is to be interested not only in collected information but also in interaction between customers and the port's employees, and in properly distributing passengers feedback thought the port as an organization.

3. Briefly on Benchmarking

Within this context it is also of importance to interpret benchmarking shortly. Thus, let's consider the genesis of its meaning firstly. The term benchmarking was first used by cobblers to measure people's feet for shoes. They would place someone's foot on a "bench" and mark it out to make the pattern for the shoes. Benchmarking is most used to measure performance using a specific indicator (cost per unit of measure, productivity per unit measure, cycle time per unit, etc.) resulting in a metric of performance that is then compared to others.

Here, benchmarking is employed in measuring value of performance of a passenger port accordingly to the categories and types of e-service it offers to the passengers, mostly of the cruising ships. It is sort of *discrete, static* benchmarking, based on binary values assigned to the related port e-service and multiplied by the approximately evaluated weight coefficients as it is shown in the next section of the paper. Due to the total scores of in such manner obtained numerical values corresponding to the e-services that a certain passenger port offers, it becomes possible to benchmark it due to the other considered ports in a current moment.

4. Concerning Some Passenger Ports e-services and Their Benchmarking

It is evident that contemporary high sophisticated ICT solutions and tools have great impact to the whole economy and society, and consequently to the ports as enterprising entities at the global market, and particularly to the passenger ports as their special category.

Since the passenger ports and their services are under-researched segment of the marine industry and business, some recently written review and research papers represent effort in acquiring more knowledge in this domain (see [4] for more references).

This paper is an attempt to identify some e-services of the crucial importance in the passenger ports. Ten most frequent EU passenger ports* have been taken into the consideration [4;5;6;7-15]: P1 - Southampton (UK); P2 - Limassol (CY); P3 - Dover (UK); P4 - Calais (FR); P5 - Helsingborg (SE); P6 - Barcelona (ES); P7 - Palma de Mallorca (ES); P8 - Venice (IT); P9 - Genoa (IT); P10 - Civitavecchia (IT).

Legend: $\overline{P_{i,i} = 1,10}$ - the EU passenger ports;

$\overline{SP_{i,i} = 1,10}$ - see Eq. (1)

By surveying the official Web sites of the above listed ports, we recognized e-services given in Table 1, as those of relevance to the passengers. The shadowed columns represent the categorization of the passenger related services in the ports as core - c, value added - v; and, as informational - i, transactional - t, and informational and/or transactional ones - i/t. Then, for each of the ten considered EU passenger ports the score $\overline{SP_{i,i} = 1,6}$, depending of that does the port offer a certain e-service or not, has been calculated due to the Excel formulae given by the Eq. (1):

$$=SUM(IF(D2=1,IF($B2="v",1.2,1),0),IF(D2=1,IF($C2="t",1.7,IF($C2="i/t",1.5,1)),0)) \quad (1)$$

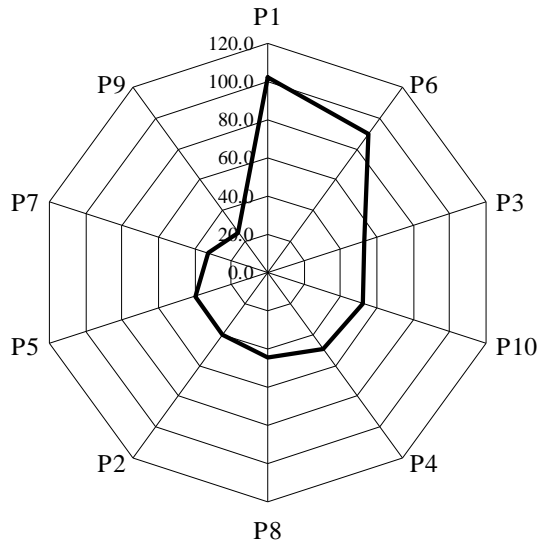
This means, if the observed passenger port offers certain e-service it is assigned by 1, and otherwise, if it does not offer such service, it is assigned by 0. Furthermore, if noticed e-service is core one (c), it will be pondered by 1, but if it is value added one (v), it will be pondered by 1.2. If the certain e-service is informational, it will be formally multiplied by (1), i.e. it will keep the same value, if it is transactional (t), it will be pondered by 1.7, and finally, if it is informational and/or transactional (i/t) one, it will be pondered by 1.5. The above given weight/relevance coefficients (1, 1.2, 1.5, 1.7) have been subjectively estimated, thus their values may be of interest within the forthcoming more detail investigations in the domain.

The relative positions of the analysed ports from the aspect of the e-services they offer to the passengers are given in Figure 1. Due to the each port total score ($\overline{SP_{i,i} = 1,10}$, see Table 1) it becomes possible to realize the benchmarking. In such way obtained positions might be treated as one of few possible indicators of their competitiveness at the e-market of the passenger services offer.

Table 1. Concerning some e-services of ten most frequent EU passenger ports*

Some passenger's port e-services	c/v	i/t	P1	SP1	P2	SP2	P3	SP3	P4	SP4	P5	SP5	P6	SP6	P7	SP7	P8	SP8	P9	SP9	P10	SP10
Tourist information center (virtual desk)	v	i	1	2.2	1	2.2	0	0.0	1	2.2	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0	1	2.2
Accommodation	c	i/t	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5
Booking possibilities	v	t	1	2.9	0	0.0	1	2.9	0	0.0	0	0.0	1	2.9	1	2.9	1	2.9	0	0.0	1	2.9
Transport	c	i/t	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	0	0.0	1	2.5	1	2.5	1	2.5
Car parking information	v	i/t	1	2.7	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Information on parking charges	v	i/t	1	2.7	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Map of the location of car parks	v	i/t	1	2.7	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Spaces available (current state, on-line available)	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bus information	c	i/t	1	2.5	0	0.0	1	2.5	1	2.5	1	2.5	1	2.5	0	0.0	0	0.0	0	0.0	1	2.5
Travel tickets	v	i/t	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	1	2.7
Discount card	v	i/t	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0
Taxi	v	i/t	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0
Renting vehicles	v	i/t	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7
Renting vehicles on-line	v	i/t	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7
Rail and coach information	c	i/t	1	2.5	0	0.0	1	2.5	1	2.5	1	2.5	1	2.5	0	0.0	0	0.0	0	0.0	1	2.5
Sea information	c	i/t	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5	1	2.5
Airport	c	i/t	1	2.5	0	0.0	1	2.5	1	2.5	0	0.0	1	2.5	0	0.0	1	2.5	0	0.0	1	2.5
Airport guide: containing the latest relevant news	v	i/t	1	2.7	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7
Language	v	i	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0
Currency	c	i	0	0.0	1	2.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.0	0	0.0	1	2.0	0	0.0
Calculator	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0
Exchange offices	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bank services	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Maps	c	i	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0
Leaflets, brochures	v	i	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0	1	2.2	1	2.2	1	2.2	0	0.0	1	2.2
Restaurants and bars	c	i	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0
Shopping	c	i	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0
Duty free shops	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Malls, markets	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	1	2.2	0	0.0	0	0.0
Shopping on-line	v	i/t	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0
Events	v	i	1	2.2	0	0.0	1	2.2	1	2.2	1	2.2	1	2.2	1	2.2	0	0.0	0	0.0	0	0.0
Special events tickets	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0
Nightlife	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0
Tickets on-line	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Casinos	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Casinos on-line	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Excursions	v	i/t	0	0.0	1	2.7	1	2.7	1	2.7	1	2.7	1	2.7	0	0.0	1	2.7	0	0.0	1	2.7
Sightseeing	c	i	0	0.0	0	0.0	1	2.0	0	0.0	1	2.0	1	2.0	1	2.0	1	2.0	0	0.0	1	2.0
Gondola rides	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0
Walking routes	v	i	1	2.2	0	0.0	0	0.0	0	0.0	1	2.2	1	2.2	0	0.0	0	0.0	0	0.0	1	2.2
Pedestrian routes	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0
Biking zone	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0
What to see and do?	c	i	1	2.0	0	0.0	1	2.0	0	0.0	1	2.0	1	2.0	1	2.0	1	2.0	0	0.0	1	2.0
Top free sights	c	i	0	0.0	0	0.0	0	0.0	0	0.0	1	2.0	1	2.0	0	0.0	1	2.0	0	0.0	0	0.0
Fisheye	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0
Videos	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0
Parks	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0
Art Galleries	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0
Museums	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0
Theatres	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Sports	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Weather	c	i	0	0.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	0	0.0	0	0.0
Cruise passenger information	c	i	1	2.0	1	2.0	0	0.0	1	2.0	0	0.0	1	2.0	1	2.0	0	0.0	1	2.0	0	0.0
Cruise terminal(s) location (map)	c	i	1	2.0	0	0.0	0	0.0	1	2.0	0	0.0	1	2.0	0	0.0	0	0.0	0	0.0	0	0.0
Cruise terminal(s) facilities	c	i	1	2.0	1	2.0	0	0.0	1	2.0	0	0.0	1	2.0	0	0.0	0	0.0	0	0.0	0	0.0
Crew information	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0
Crew members information	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Seafarers center	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Telecommunications	c	i	0	0.0	0	0.0	0	0.0	1	2.0	0	0.0	1	2.0	0	0.0	0	0.0	0	0.0	0	0.0
Telephone	c	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.0	0	0.0	0	0.0	0	0.0	0	0.0
Internet access	c	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	2.0	0	0.0	0	0.0	0	0.0	0	0.0
WiFi centers	c	i	0	0.0	0	0.0	0	0.0	1	2.0	0	0.0	1	2.0	0	0.0	0	0.0	0	0.0	0	0.0
Visitors with disabilities	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Parking	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Toilets	v	i	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Shopmobility	v	i/t	1	2.7	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Environmental protection	v	i	0	0.0	0	0.0	0	0.0	0	0.0	1	2.2	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Links	c	i	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0	1	2.0
Other	v	i	1	2.2	1	2.2	1	2.2	1	2.2	1	2.2	1	2.2	1	2.2	1	2.2	1	2.2	1	2.2
Score:				102.0		40.4		52.5		49.7		40.0		91.5		32.5		44.8		26.1		52.2

Figure 1. Benchmarking passenger ports due to the e-services which they offer



This is one of the possible approaches to the benchmarking process. We also offer two additional models: one related to the core or value added services, and the other related to the informational and/or transactional services. In the first model, the Eq. (2) has been used:

$$=SUM(IF(D2=1,IF($B2="v",1,0),0)) \quad (2)$$

In the second model the Eq. (3) has been employed, with the purpose of mutual positioning the ports due to the number of value added services they

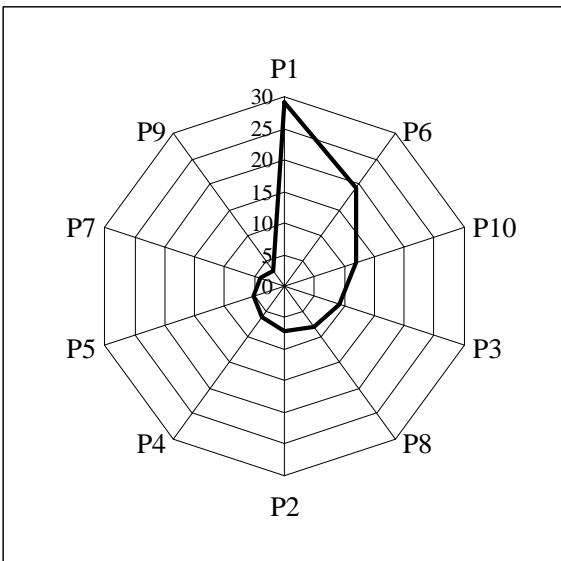
supply to the passengers and due to the number of transactional, or informational and/or transactional e-services that they make available to the passengers:

$$=SUM(IF(D2=1,IF(OR($C2="t",$C2="i/t"),1,0),0)) \quad (3)$$

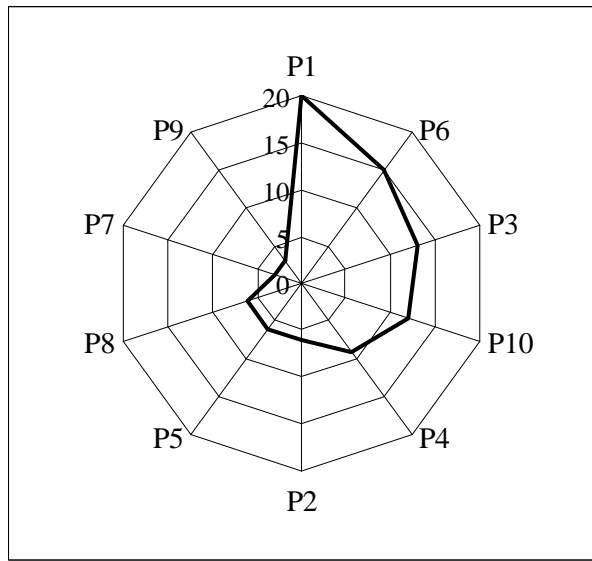
The obtained results on the basis of Eq. (2) and Eq. (3) are presented graphically below in Figure 2.

Some calculus results being in the background of the observations presented in Figure 2 ((a) and (b)), are given in Tables 2 and 3.

Figure 2. Benchmarking passenger ports due to:
(a) value added, and (b) transactional and informational/transactional e-services which they offer



(a)



(b)

It is to be mentioned, that there are some additional e-services that can be found on the Web cites of

some relevant passenger ports which are not included into this research. Ports of New York and Rotterdam, e.g.

supply the passengers with some e-services that are not included into the list of about seventy different e-services listed above (Table 1). Some of these e-services are: detail information about passenger embarking/disembarking

(embarking from buses, limousines, taxis, private vehicles, and disembarking upon returning from the cruise in opposite order), etc.

Table 2. The value added e-services in ten most frequent EU passenger ports*

Some passenger's port e-services	c/v	i/t	P1	SP1	P2	SP2	P3	SP3	P4	SP4	P5	SP5	P6	SP6	P7	SP7	P8	SP8	P9	SP9	P10	SP10
Tourist information center (virtual desk)	v	i	1	1.0	1	1.0	0	0.0	1	1.0	0	0.0	1	1.0	0	0.0	0.0	0	0.0	1	1.0	0.0
Accommodation	c	i/t	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Booking possibilities	v	t	1	1.0	0	0.0	1	1.0	0	0.0	0	0.0	1	1.0	1	1.0	1	1.0	1	0.0	1	1.0
Transport	c	i/t	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0	0.0	1	0.0	1	0.0	1	0.0
Car parking information	v	i/t	1	1.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	1.0
Information on parking charges	v	i/t	1	1.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Map of the location of car parks	v	i/t	1	1.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Spaces available (current state, on-line available)	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bus information	c	i/t	1	0.0	0	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Travel tickets	v	i/t	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	1	1.0
Discount card	v	i/t	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	1.0
Taxi	v	i/t	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Renting vehicles	v	i/t	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Renting vehicles on-line	v	i/t	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0
Rail and coach information	c	i/t	1	0.0	0	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Sea information	c	i/t	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Airport	c	i/t	1	0.0	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	1	0.0
Airport guide: containing the latest relevant news	v	i/t	1	1.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0
Language	v	i	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	1.0
Currency	c	i	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0
Calculator	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0
Exchange offices	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Bank services	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Maps	c	i	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Leaflets, brochures	v	i	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	1	1.0	1	1.0	1	1.0	0	0.0	1	1.0
Restaurants and bars	c	i	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Shopping	c	i	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Duty free shops	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	1.0
Malls, markets	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	1	1.0	0	0.0	0	0.0
Shopping on-line	v	i/t	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Events	v	i	1	1.0	0	0.0	1	1.0	1	1.0	1	1.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Special events tickets	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Nightlife	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Tickets on-line	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Casinos	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Casinos on-line	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Excursions	v	i/t	0	0.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	0	0.0	1	1.0	0	0.0	1	0.0
Sightseeing	c	i	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0	0.0	1	0.0
Gondola rides	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	1.0
Walking routes	v	i	1	1.0	0	0.0	0	0.0	0	0.0	1	1.0	1	1.0	0	0.0	0	0.0	0	0.0	1	0.0
Pedestrian routes	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	1.0
Biking zone	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
What to see and do?	c	i	1	0.0	0	0.0	1	0.0	0	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0	0.0	1	0.0
Top free sights	c	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0
Fisheye	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0
Videos	v	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0
Parks	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Art Galleries	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Museums	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0
Theatres	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Sports	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Weather	c	i	0	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	0	0.0	0	0.0
Cruise passenger information	c	i	1	0.0	1	0.0	0	0.0	1	0.0	0	0.0	1	0.0	1	0.0	0	0.0	1	0.0	0	0.0
Cruise terminal(s) location (map)	c	i	1	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Cruise terminal(s) facilities	c	i	1	0.0	1	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Crew information	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0
Crew members information	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Seafarers center	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Telecommunications	c	i	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Telephone	c	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Internet access	c	i	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
WiFi centers	c	i	0	0.0	0	0.0	0	0.0	1	0.0	0	0.0	1	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Visitors with disabilities	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Parking	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Toilets	v	i	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Shopmobility	v	i/t	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Environmental protection	v	i	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Links	c	i	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Other	v	i	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0	1	1.0
Score:					29.0		7.0		9.0		6.0		5.0		19.0		4.0		8.0		3.0	12.0

Legend: $P_{i,i=10}$ - the EU passenger ports; $SP_{i,i=1,10}$ - see Eq. (2)

within cruise facilities and services. Some ports offer possibilities of authorization for some special (intranet or extranet) services, some ports offer possibilities of authorization for different types of green cards, etc. Thus, there are numerous unexplored capabilities of supplying passengers in the ports with adequate e-services.

5. Spreading the e-market applications

An e-market is a system that allows market participants to exchange information about service (product) offers and prices electronically and conduct business transactions online. The presence of multiple service providers leads to the expansion of the geographically concentrated, mutually related, individuals, business units, associations and public-private organisations that are centered on a port complex (forming certain type of clusters). The port governance demands managing of numerous (internal, external, public policy and community) stakeholders' relations. Thus, the contemporary market increasingly expects (passenger) ports to be sophisticated at handling data [1].

The e-market model has to shift the demand-pull to the supply-led strategies in general and in the domain of passenger port service offering. This might be achieved through more extensive exploitation of the following e-business activities:

Collaborative fulfilment networks (CFNs) enabling rational coordination among multiple participants at different stages of passenger port service (product) realization. Collaborative fulfilment networks can help alleviate concerns related to coordination, shorten delays, and so forth.

Electronic marketplaces (using business-to-business Internet-based technologies) allow passenger ports to identify upstream passenger needs. Electronic marketplaces provide more efficient resource allocation within the port and between the ports, better information flow and dissemination on services they offer, as well as better managing the risk. Electronic data interchange (EDI) is a communication standard that enables the electronic transfer of the routine documents, such as invoices in the domain of passenger port operating. EDI serves as a catalyst and stimulus to improve the standard of information that flows between the ports. Other EDI benefits are reduced processing time, enhanced passengers services, minimized paper usage and storage, and finally increased cash flow.

Electronic ordering and funds transfer (EOFT) is also an important component in e-business in general and in realization of some passenger ports e-services using tools such as XML, Web Services, EDI, etc. (see [2], pp. 375, Tutorial 6, for some more detail).

E-market has to enable more intensive communication and coordination between different stakeholders in the sphere of the contemporary passenger ports offering, that otherwise usually ignore the objectives of other members in the community. It can be used as a supportive

tool in enabling passenger ports to sustain competitiveness in the contemporary hyperdynamic world.

6. Upon the Obtained Results

The main results of this paper imply identification of some relevant Web based e-services in the most frequent EU passenger ports* [4;5;6;7-16] and their classification as core and value added ones, and as informational and/or transactional ones (Table 1). Additionally, an author's attempt toward these ports positioning at the e-market of passenger ships' supply, i.e. the particular procedure of their benchmarking in the e-marketing sense, has been done by some logical, binary and weight indexation based calculus in Excel (Tables 2 and 3), while the obtained results are presented graphically (Figures 1 and 2).

7. Conclusions

The digital revolution has been responsible for changing business and consumer trends, in general. Though, it has some consequences to the passenger ports and accordingly to the passengers' needs and/or requirements. The passenger ports became digital enterprises using convergent communication and computing technology to improve their business processes and performances. The digital economy conditions enable flow of information by stimulating e-commerce, online transactions, and organizational changes. In such economy, wired and wireless networking and communication infrastructures provide the platform over which passengers and ports devise strategies, interact, communicate, collaborate and search information [2]. With such advent of ICT enable smart networking business models and the passenger ports services are nowadays considered as "augmented" procedures, since their traditional physical nature is on the road to be overlaid with informational and electronic transactions components.

But, it is not to be forgotten, the cruising is still a physical act and all passenger ports still need passengers (cruise) terminals and all required, following, real - physical capacities and features. Thus, the ICT capacities are the tip of the ice berg, requiring adequate passenger ports infra and supra-structural capacities, adequate organizational, strategically development and numerous other structural, financial, organizational and environmental issues which in fact form the core base of the ICT virtual superstructures. The modern passenger ports have necessarily to combine physical and electronic modes of operation and sustainable development. Furthermore, a new, unique taxonomy for systematic identification, assessment and selection of individual passenger port e-services is to be adopted and it is to be based on additional, more extensive research and evaluation efforts in the domain. This is indispensable in achieving greater passenger ports competitiveness and performance enhancement at the related global passenger ports physical and e-market.

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