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A multi-method analysis of the accessibility of the Izmir ferry system

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Abstract

This paper reports the results of a multi-method study of the accessibility of the ferry system in service in Izmir, the third largest metropolis in Turkey. Mobility is a precondition for social inclusion and quality of life; starting from this premise, the Izmir Municipality has been developing a strategic plan aimed at improving the physical accessibility of the city, including its urban transit network. Izmir fleet of ferries is composed by a mix of vessels with different characteristics – single hull or multi-hull, passenger ships and car ferries, old and new units. Thus, it is an interesting subject of research. The study was developed through the integration of three methods: (1) unstructured field observation conducted on all the different types of vessels, (2) survey on 233 passengers, and (3) key-informant interviewing to delegates of the service operator and to expert members of associations for persons with disabilities. The study was carried out in the last quarter of 2014, and it is part of a wider study aimed at assessing and improving the usability of short-route ferries for all passengers.

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1. Introduction

This paper presents the planning and the results of a multi-method research aimed at understanding critical and positive aspects of current designs of the Izmir ferry system in terms of accessibility for all users, encompassing people with temporary or permanent disabilities, pregnant women, elderly people, and children.

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The Association of European Metropolitan Transport Authorities (EMTA) estimates that 12% and growing of the European population have a disability [1]. This is mostly due to the aging of population, because of declining birth rates and increasing longevity. Disability is strongly connected to age: 80% of people with disabilities is 65 years old or more. Within Europe, Asia, and North America, the current percentage of the population over age 65 ranges from 6% to 22%. By 2030, these percentages are estimated to range from 17% to 29%. The fastest growing subgroup represents those over 80 years of age. Thus, an inclusive approach is becoming an urgent need in design. Universal Design of transport projects brings benefits in excess of investment costs [2], benefiting not only the impaired, but all users of a facility. Marine transport system suffers of high manufacture costs, long design process and red tape problems, therefore it is usually slow in adopting innovations, but inclusion issues can no longer be neglected.

The urban ferry system in service in Izmir was considered as a case-study to assess users' opinions and expectations. The results of the research will be used to compile a guide on accessibility issues and user needs, addressed to vessel builders and operators, to be used as an input set before constructing new vessels or before refitting the existing ones.

2. Research problem

The research aimed at offering an answer to the following questions: (1) who are the users in trouble with accessibility? (2) Which design elements cause accessibility problems, and to which users?

3. Context and theoretical premises

3.1. Izmir and İzdeniz A.Ş

Izmir is the third largest metropolis of Turkey, with a population of 4 million people. It spreads at the head of a long gulf with its same name. The city center and the most of the offices are located in the metropolitan districts of Konak, Pasaport and Alsancak. Karşıyaka, on the opposite side of the Bay, is instead a favorite place for dwelling. Thus, a great mass of people commutes from the north side of the Bay to the south. Due to the layout of the city around the Bay, to the size of the city itself, to road congestion, and to limited land public transport, public marine transit service is very used in İzmir, with 125 million passengers in 2012 and 130 million in 2013.

The public marine transit service is operated by İzdeniz A.Ş. (Izdeniz), a company which is majority-owned by the Metropolitan Municipality of Izmir. Currently Izdeniz operates 18 passenger boats, 2 passenger ships, 3 catamarans and 3 car ferries (data updated to October 2014). The company is currently under the biggest renovation of the fleet in its history: it is acquiring 15 new passenger ferries, of which three are already in service and the others will be supplied by 2017.

Starting from 2013, the Izmir Municipality has been developing a five-year strategic plan – EngelsIzmir, 'Izmir without obstacles' – aimed at improving the physical accessibility of the city, including its urban transit network. In this context, the Municipality established the Red Flag Committee (KirmiziBayrak) with the purpose of inspecting and encouraging the improvement of accessibility. The design of the new passenger ferries was supervised and endorsed by this Committee.

The fleet is operated through 8 stopovers. All the routes lay in internal waters. The transit service is integrated with the urban land network of public transport, sharing the same ticket system and fare. Travel times range approximately from ten minutes to half an hour, depending on the routes.

3.2. The seamless journey

Instead than focusing on ferries only, the research considered the system of water public transport in its whole. What is around the ferry, as piers and berthing facilities, has the same importance in providing a smooth, seamless journey for the passenger. The hardest obstacles for accessibility are likely to be at the interfaces of the components of the transit system, i.e. where the gangway touches the deck of the vessel.

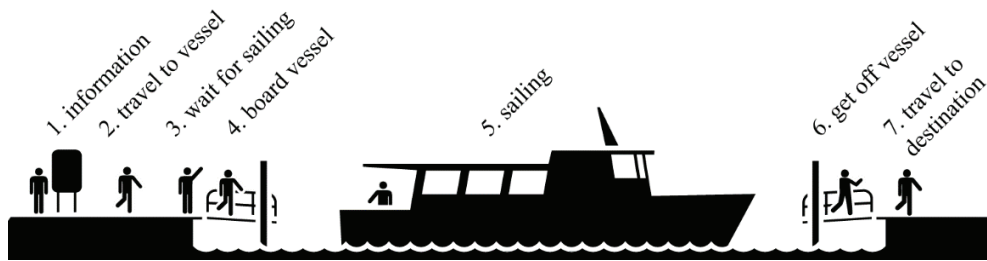


Fig. 1. Adopted model of travel phases of a marine journey.

An interesting model of ferry travel is described by the Department of Transport of Ireland [3]. In this model (fig. 1), a single journey is divided in seven phases. Specific studies have already been carried out on the different aspects of the journey, as pre-trip information needed by people with disabilities [4, 5], boarding, sailing and getting off vessels [6-8] and terminal infrastructures [9]. Other studies encompass all the phases [10]. The Authors adopted this model to plan field observations, survey and interviews, and to organize findings.

3.3. Addressing the needs of real users

Life expectancy is increasing all over the world, and the numbers of people with disabilities are rising too. In fact, disabilities are strongly related to age, especially in most developed Countries. All sectors need to consider the shift of the user base and marine industry is no exception. This is why in 2010 the European regulation on the rights of passengers traveling by sea and internal waters (EU Regulation No. 1177/2010, articles 6 and 7) stated that “in deciding on the design of new ports and terminals, and as part of major refurbishments, the bodies responsible for those facilities should take into account the needs of disabled persons and persons with reduced mobility, in particular with regard to accessibility, paying particular consideration to ‘design for all’ requirements. Carriers should take such needs into account when deciding on the design of new and newly refurbished passenger ships”.

In 2010, a guideline based on IMO’s “Recommendation on design and operation of passenger ships to elderly and disabled person’s needs” dated 24th June 1996 and referred MSC/735 has been published by the ministry to regulate the related fleet in Turkey.

In the near past, the main way to address the issues of accessibility was through add-ons which were not connected with the main design, but which were thought as a posteriori corrections. Disabilities were seldom considered in the first phase of the project, thus corrections were necessary in the last phase. An example is the use of stair-lifts to allow people on wheelchair to overcome a flight of stairs, instead of designing a building without architectural barriers. In this approach, people with disabilities were considered as ‘special’ users who needed ‘special’ solutions. This dedicated, segregated solutions are often expensive, and usually unappealing. Designers and architects soon understood that many of the changes, needed for people with disabilities, benefited everyone, and that it is more convenient to consider them at the beginning of the design process. Recognition that such features could be commonly provided and thus less expensive, unlabeled, attractive, and even marketable, laid the foundation for the Universal Design movement [11].

Moreover, in that period the social model of disability was developed: disabilities were not to be considered as intrinsic characteristics of the individual. In opposition of that, they are the conditions determined by society through the construction of social and environmental barriers which isolate and exclude people with impairments from full participation in society.

The first principle of Universal Design [12] seeks to consider the breadth of human diversity across the lifespan to create design solutions that work for all users. In order to evaluate the needs of the variety of users, a classification system is needed.

EU Regulation No. 1177/2010 establishes rules for the non-discrimination of ‘disabled person’ and ‘person with reduced mobility’, meaning any person whose mobility when using transport is reduced as a result of any physical disability (sensory or locomotor, permanent or temporary), intellectual disability or impairment, or any other cause

of disability, or as a result of age, and whose situation needs appropriate attention and adaptation to his particular needs of the service made available to all passengers;

This classification is not usable for designers, because categories are too wide. Instead than a minority model, which classifies people according to their impairments, a positive universal model which considers functional abilities seems more appropriate [13]:

- mental functions
- sensory functions and pain
- voice and speech functions
- functions of the cardiovascular, haematological, immunological and respiratory systems
- functions of the digestive, metabolic and endocrine systems
- genitourinary and reproductive functions
- neuromusculoskeletal and movement related functions
- functions of the skin and related structures
- any other body functions

The International Classification of Functioning (ICF) splits each body functions in sub-functions; e.g. sensory functions are divided in Seeing, Hearing, Vestibular (incl. Balance functions), and Pain. Functions and sub-functions can be used as an outline for organizing the content of the final report, matching them with journey phases. In each phase, some functions are more important than others; e.g. in the information phase, mental and sensory functions are the most important; while getting on and off vessel requires neuromusculoskeletal and movement related functions; and so forth. Data gathering will help to understand, for each phase, which are the most critical aspects of accessibility in relation to each function.

3.4. Disabled population in Izmir

In Turkey, elderly population, which is the population at 65 years of age and over, was 5.7 million in 2012 with a proportion of 7.5% [14]. By 2023, this segment is expected to grow to 8.6 million, with a proportion of 10.2%.

According to figures of the Statistics Institute of Turkey, the Country has about 8.5 million people with different physical and mental disabilities, which count approximately 12.29 % of the total population [15]. Though official data are not available for the Izmir municipality, a simple proportion with its population permits to estimate that disabled persons should be about 400000.

4. Research methodology

The Authors adopted a mix of qualitative and quantitative methods in order to compare and validate the findings. In particular, the implemented methods were: (1) unstructured field observation conducted on all the different types of vessels, (2) survey on 233 passengers, and (3) key-informant interviewing to delegates of the service operator and to expert members of associations for persons with disabilities.

In the first phase (October 2014), unstructured field observation was used to highlight the main issues and problems. The observations were used to develop a survey which was then conducted on Izdeniz passengers (from October to December 2014). The survey, consisting in a questionnaire composed by a mix of closed-ended and open-ended questions, was developed on a random sample, respecting the criteria of administering it to passengers during their use of the service. Interviews to key informants – operators and representatives of associations for disabled people – were conducted in December 2014.

All the data resulting from the three methods has been collected in a MS Access database and classified according to tags and journey phases. By using queries, it is possible to inspect the results according to multiple criteria, both in connection with the profile of passengers (i.e. age, sex, profession) and with journey phases (i.e. buying tickets, sailing etc.).

4.1. Field observation

In the discipline of design, field observation is employed to determine explicit and tacit user needs. The Authors adopted this method in the early phase of the project, to have a first image of the problem that could help in the design of the survey. The observation of passengers during the different phases of the trip contributed to the identification of the most critical issues in regards of accessibility.

Covert, non-participant observation was chosen in order to avoid language barrier problems, though the method may cause confirmation bias. Observations were recorded in structured forms, organized according to the seven phases of the adopted journey model. 15 journeys, encompassing all the stopovers and the different types of vessels, were recorded.

4.2. Survey

Survey, allowing to gather direct data about passengers and their opinions, had a primary role in the research. In accordance to the idea of Design for All, the hypothesis of this research is that accessibility problems are not related only to disabled people, but may be experienced by everyone. Thus, it was decided to develop the survey on a genuine random sample, with the only choice of administering it to passengers over the age of 14 and during their use of the transit service. The waiting phase resulted as the best moment to deliver the questionnaire, while doing it during the sailing phase resulted as not efficient, mainly because of the short sailing times.

In order to increase response rate, the survey was planned to require a relatively short time to be completed. Close-ended questions can provide precise answers to specific topics; on the opposite, open-ended questions encourage full, meaningful answers using the subject's own knowledge, and thus could provide unexpected insights on user needs and expectations. Thus, the balance between the two types of questions was an important issue in the design of the questionnaire. In its final version, the form was designed to have a filling time of 5-10 minutes and to fit in a single A4 page (see Fig. 2 for the English translation of the form).

Four project assistants, all native Turkish speakers, had the role of individually interviewing the passengers and filling the forms, after quickly explaining the purpose of the project. This approach was preferred to self-filling for velocity, and because assistants could explain the meaning of questions, avoiding cultural or education barriers.

The first part of the form (questions 1-9) provides demographic data about the passenger and his/her route. The second part (questions 10-23) explores the passenger's opinions about all the phases of the journey.

In total, 233 surveys were collected in 12 sessions. The survey was administered in different times of the day, in different days of the week, and in different stopovers, in order to randomize the sample.

4.3. Key informant interviewing

Key informants are a valuable sources of information, having specialized knowledge about other people, processes or happenings, from a particular or privileged point of view, they can help in understanding the user needs and expectations in the specific field. Key informants joined a semi-structured interview. In the first part, a series of prearranged questions was asked. The second part consisted in open-ended questions, allowing to explore the topic and to discover unexpected information.

Two separate interviews were organized:

- with delegates of the Operator, in the persons of Mr. Caner Pense, DPA Assistant and ISM Office Responsible, Mr. Gökhan Atılğan, General Deputy Director, and Mr. Çağdaş Uzgur, Master Deck Superintendent
- with Mr. Mahmut Akkin, Director of the unit of the Municipality which deals with disabled people and which is responsible for the project EngelsIzmir

Ferry Accessibility Survey [face to face]

Hello! This survey is part of a PhD research project developed at Izmir University of Economics and Politecnico di Milano, with the purpose of understanding the main issues concerning the accessibility of Izdeniz ferries, and eventually improving it. Thank you for helping us with your opinion. The survey will take you about 5 minutes.

1. Day: _____ month: _____ year: _____

2. Journey departure (1) and destination (2):
 ___ Bostanlı ___ Bayraklı ___ Pasaport ___ Göztepe
 ___ Karşıyaka ___ Alsancak ___ Konak ___ Üçkuyular

3. Sex: male female

4. How old are you? _____

5. Select your status:
 Student Freelance Unemployed
 Employee Homemaker Retired

6. How often do you use ferries?
 Less than once a month Once or twice a month Once or twice a week 3-5 times a week More than 6 times per week

7. Today, are you travelling with someone?
 Friends, colleagues or relatives
 Child(-ren) in pram or stroller
 Walking child(-ren) younger than 5 years old
 Other person(-s) needing my assistance (i.e. elderly)

8. Why do you use ferries mostly?
 Arriving to work Tourism
 Shopping Other
 Going to school _____

9. Please check the boxes which are appropriate for you, if any:
 I use a wheelchair I use hearing aid
 I use a walking stick I use other mobility aids:
 I am blind _____
 I have low vision _____

10. Which kind of ferry do you prefer?
 Passenger ship Catamaran Ro-ro ferry

11. Why? _____

12. Consider your sea journey. Which phases are the most tiring for you?
 Finding information and buying tickets Board vessel
 Travel to vessel Sailing
 Wait for sailing Get off vessel
 Travel to destination

13. Why? _____

14. And which are the most relaxing phases?
 Information/buying ticket Sailing
 Travel to vessel Get off vessel
 Wait for sailing Travel to destination
 Board vessel

15. Why? _____

16. What disappoints you the most about your current ferry journeys?

17. Do you think signage within terminals is well designed?
 Extremely Very Moderately Slightly Not at all

18. And what about signage inside ferries?
 Extremely Very Moderately Slightly Not at all

19. Would you like to have more information through loudspeakers?
 No, I'm fine with it
 Yes, I would like the name of the stopover to be announced
 I'd like to have more info _____

20. Please evaluate how difficult is for you to get on/off the vessel from the quay:
 Extremely Very Moderately Slightly Not at all

21. Have you ever asked the help of Izdeniz staff to get onboard of the ferry?
 Never Once More than once

22. In case you demanded for help to Izdeniz staff, please describe shortly your experience:

23. Would you add anything to this interview?

Fig. 2. Questionnaire (English translation).

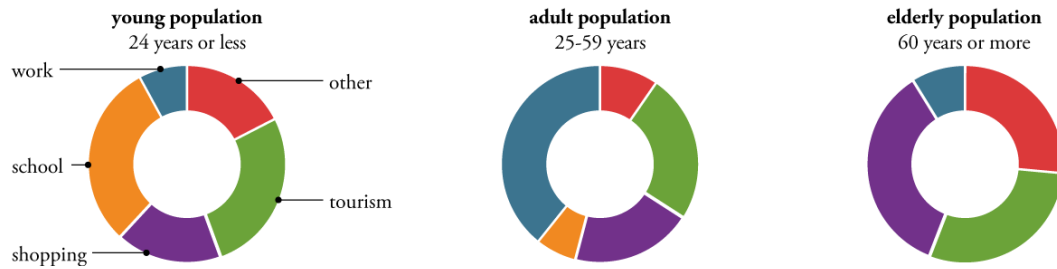


Fig. 3. Reasons for travelling according to age.

5. Findings

The sample of passengers was composed by 51% women and 49% men. In proportion with the population structure of Turkey, passengers in the age range 20-29 were the double; male passengers in the range 70-74 were three times more represented; and female passengers in the age range 50-64 were only 20-30%. All the other age ranges show a smaller difference, in order of $\pm 30\%$. The high number of young passengers corresponds to the use of the ferry by University students. The other differences may be due to the little sample size or may be due to cultural reasons (married women stay more at home); more surveys are needed for the purpose of clarifying this point.

40% of the passengers declared to be employees, 27% students, 17% retired, 9% homemakers.

Fig. 3 shows the main reason for travelling according to the age of the passenger: the young population uses ferries for going to school or for tourism, the adult population is made mainly by commuters, and the most of the elderly population use ferries to go shopping or to go and meet family and friends.

According to gender, male passengers use ferries mainly for arriving to work or tourism (59%), while female population mainly for shopping or arriving to work (46%).

During covert observation, a little number of people using a wheelchair was spotted. Special electric platforms, which need to be operated by Izdeniz staff, allow them to get on and off passenger vessels, while car ferries can be accessed autonomously through their drawbridges. Current car ferry designs are not equipped with elevators, so these persons cannot shelter in the passenger areas, which are located on the upper deck. All the ships, except for the new catamarans, do not have accessible toilets. Passengers using a wheelchair were not present in the survey sample, but other passengers with mobility impairments were mostly disappointed by getting on and off the ferry and by traveling to the ferry terminal. All the passengers with mobility impairments declared to need the help of Izdeniz staff at some points of the journey.

The majority of passengers with vision impairment declared that the most tiring phase of the journey is waiting for the ferry, as did the most of the passengers with good vision.

Almost all the passengers agreed on the lack of signage both in terminals and in ferries, and on the need of more information through loudspeakers. Toilets received a very low evaluation too and surely need to be improved.

According to age groups, the most tiring phase was different. For passengers under 60 it is the waiting time, while for elderly people is getting on and off board. The majority of elderly people declared that this phase is 'very' tiring, while the rest of the passengers answered mainly 'slightly' or 'moderately'. For all the passengers aged more than 75, sailing is the most relaxing phase, because they do not need additional help and they can enjoy the sight. This is the favorite journey phase for all passenger groups.

6. Conclusions

The paper explains the methodology of the research and shows the first results that could be extracted from the collected data, but other interesting pieces of information could emerge querying the database with different criteria. Furthermore, the Authors plan to expand the sample of the survey to obtain more reliable data.

All the findings are in the process of being reported in a guide, structured according to journey phases. Such a guide would be useful for designers, boat builders and operators, because it may allow to easily check the accessibility issues for the different components of short-route marine transit systems.

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