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Servicescape Navigation: A Customer Typology based on the Wayfinding Ability of Italian Hospital Visitors

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Abstract

Purpose - This paper aims to profile wayfinders into homogeneous sub-groups according to their wayfinding ability, and to investigate the differences between the clusters identified and their evaluations of satisfaction.

Design/methodology/approach - This study uses survey data collected in a hospital in the Northern part of Italy. The survey questionnaire assessed the participants' self-estimation of wayfinding ability in terms of wayfinding competence, wayfinding strategy and wayfinding anxiety, as well as the wayfinder's satisfaction.

Findings - The findings propose that three factors, namely, (i) individual orientation skills, (ii) confidence in servicescape elements, and (iii) anxiety control, contribute to defining wayfinding ability. Based on these factors, cluster analysis reveals three profiles of wayfinders, as follows: (1) the Easy Goings, (2) the Do-it-yourselves (DIYs) and (3) the Insecures. Group differentiation comes from wayfinding ability and customer satisfaction levels.

Research implications - The results of this study advance the segmentation literature by analyzing different types of wayfinding ability that can lead to different satisfaction levels.

Practical implications - These findings will help service managers improve servicescape design and help them formulate effective targeting strategies.

Originality/value - While previous research outlined the importance of some factors such as gender differences, familiarity with the service environment and cognitive approaches, this study recommends the examination of the profile of visitors to the service setting to allow them to find their way more effectively.

Keywords service environment; customer satisfaction; signage management; orientation strategy; sense of direction; spatial anxiety; hospital.

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1. Introduction

The servicescape is the physical surrounding in which service delivery occurs (Bitner, 1992). It includes many atmospheric elements such as ambient conditions (temperature, air quality, noise, music, scent, color and lighting), space/function (layout, equipment and furnishing), and signs, symbols and artifacts (signage, style and décor). The more the servicescape occupies large-scale space and is dispersed and unknown, the more people (e.g., users/customers, employees and other stakeholders) can waste time reaching a desired destination. As a result, their anxiety levels increase during navigation. In order to avoid user/customer dissatisfaction, service organizations have to pay great attention to servicescape design, by both orienting people in the servicescape and making navigation easier. In other words, they have to improve (human) wayfinding. Wayfinding can be defined as the process of finding in the shortest time possible the way to reach a certain destination in a familiar or unfamiliar setting using any cues given by the physical surrounding (e.g., Farr et al., 2012; Algase et al., 2007; Fewings, 2001). Accordingly, all spatial information that people can acquire in the physical environment is indispensable in helping them to find their way, given that wayfinding is a "purposeful, directed, and motivated movement from a current to a desired destination, which cannot be directly perceived by the wayfinder" (Raubal and Winter, 2002, p. 244 mentioning Allen, 1999).

The importance of providing customers with a wayfinding-based service environment is exemplified in a number of service settings where people are typically on foot. This includes airports (Fewings, 2001; Churchill et al., 2008; Pantouvakis and Renzi, 2016), railway stations (Gupta and Datta, 2016), libraries (Li and Klippel, 2012; Wakimoto, 2015), shopping malls (Dogu and Erkip, 2000; Chebat et al., 2005, 2008; Otterbring et al., 2014; Bagdare and Roy, 2017), and hospitals (Cooper, 2010; Rousek and Hallbeck, 2011; Ugolini et al., 2014; Schuster et al., 2017). In an airport, for example, wayfinding is considered be the third most important factor in terms of service quality (de Barros et al., 2007; Churchill et al., 2008; Correia et al., 2008). In the shopping environment, if wayfinding is neglected, the likelihood of buying the items sought is reduced (d'Astous, 2000). In some cases, stores deliberately make it difficult to find the way by continually changing layout and moving products around in order to increase impulse purchase decisions (Aruna and Santhi, 2015). However, this is

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not the norm and lack of attention to wayfinding by service providers can generate uncertainty and adverse emotions among customers. Therefore, organizations should not overlook the importance of designing a wayfinding-based servicescape to improve customers' experiences within the servicescape, regardless of type of wayfinding chosen. The extant literature identified the following three types of wayfinding (Fewings, 2001, p. 179):

(a) **recreational** - whose purpose is "to solve problems (where to go next, for instance) that itself can be a source of satisfaction and enjoyment" as time is not an issue, for example, in the airport this happens when passengers access retail stores for pleasure;

(b) **resolute** - whose purpose is "to find one's way in the most efficient manner", for example in a complex environment such as an airport getting to the correct boarding gate on time;

(c) **emergency** - whose purpose is "reaching the destination as quickly and as easily as possible", for example finding an emergency exit or a toilet.

Service organizations that invest in wayfinding can make people satisfied if there is no (or limited) difference between expected and perceived wayfinding (Bonfanti, 2013). This happens when cognitive-rational and psychological-emotional needs affecting expected wayfinding meet user's interactions with servicescape components that impact on perceived wayfinding. However, only few service management scholars have conceptually examined (Findlay and Southwell, 2004; Apelt, 2008) and empirically explored (Chebat et al., 2005, 2008) how people use their spatial, cognitive and behavioural abilities to find their way (Allen, 1999), i.e. wayfinding ability (Prestopnik and Roskos Ewaldson, 2000). To the best of our knowledge, within the extant literature there is no classification of wayfinders according to their wayfinding ability based on a wayfinders' satisfaction perspective.

This paper aims to fill this research gap by reporting on an empirical study about resolute wayfinding in a hospital in Northern Italy. More particularly, the aims of this paper are twofold: 1) to empirically profile wayfinders into homogeneous sub-groups according to their wayfinding ability; and 2) to investigate the differences between the clusters identified and their evaluations of satisfaction.

The results of this study have theoretical and practical implications. Firstly, they advance the segmentation literature by analyzing different types of wayfinding ability that can lead to different satisfaction levels; and secondly these findings can help service managers to improve servicescape design and formulate effective targeting strategies.

The remainder of the paper is as follows: the next section provides a review of available studies about conceptualizing and measuring wayfinding as both a process and an ability, as

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well as its impact on wayfinder's satisfaction. In the research methodology section, an outline of the approach is given and the empirical results presented. The paper culminates in a discussion of the results to derive useful managerial and social implications, along with limitations and areas for future research.

2. Literature review

2.1 Conceptualizing wayfinding between process and ability

The wayfinding concept is certainly not new in literature. It was defined over fifty years ago (Lynch, 1960) and studied as spatial orientation in the 1990s in architecture (Arthur and Passini, 1992; Connell et al., 1997; Passini, 1998) and explored in a management perspective since 2004 (Findlay and Southwell, 2004; Chebat et al., 2005, 2008; Farr et al., 2012; Bonfanti, 2013). Analysis of the Scopus database, limited to articles only, shows that between 2010 and 2017 this topic has been covered in many social sciences and humanities research areas with the top ten including: 1) social sciences (17 per cent), 2) psychology (13,29 per cent), 3) computer science (12,15 per cent), 4) medicine (10,86 per cent), 5) engineering (9,65 per cent), 6) environmental science (6,14 per cent), 7) neuroscience (5,2 per cent), 8) earth and planetary sciences (5,06 per cent), 9) arts and humanities (10,4 per cent), and 10) business, management and accounting (4,12 per cent).

Take in Table 1 about here

Because of the numerous research fields that deal with this topic, providing a unique definition of wayfinding is difficult. It is usually examined in terms of process and ability. As Table 1 above shows, wayfinding is a process that includes 3-4 different stages or steps through which people move themselves in a space from their starting location towards a successful arrival at their destination. Wayfinding involves a set of abilities that allow wayfinders to acquire, code, store, recall, and manipulate information about their spatial environment, by recognizing surroundings, using landmarks, and maintaining orientation for the duration of the wayfinding process (Dudchenko, 2010). In other words, wayfinders have to develop some abilities to locate themselves and decide which direction to take to reach their destination. Collecting information and creating spatial knowledge about the environment can help them to navigate successfully through the servicescape.

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As Table 2 above proposes, wayfinding can essentially be defined in terms of cognitive, spatial and behavioural abilities. Human and behavioural factors and environmental factors, affect wayfinding abilities (Table 3 below presents these factors in more detail).

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2.2 Measuring wayfinding ability

While the wayfinding process is fundamentally examined in engineering studies (Churchill et al., 2008) that adopt a quantitative approach aimed at validating measurable quantities obtained by means of mathematical models, wayfinding ability is mainly measured in environmental psychology research that, instead, adopts self-assessment/estimation or behavioural methods (Prestopnik and Roskos Ewaldson, 2000).

More specifically, the first method consists of asking people to report their wayfinding ability. In this case, the most frequently used variables are:

1) Sense of orientation (Davies and Peebles, 2010) or sense of direction (Prestopnik and Roskos Ewaldson, 2000; Hegarty et al., 2002) or orientation strategy (Lawton, 1996) is, essentially, to know where people are in relation to the location and decide which direction they can take to reach the desired destination.

2) Self-localization (Kiefer et al., 2014) is the ability of people to identify their position in a space

3) Cognitive mapping (Arthur and Passini, 1992; Kitchin, 1994; Golledge and Görling, 2004) is a set of abilities that includes both spatial cognition, i.e. the internalized reflection of space, and environmental cognition, i.e. awareness about environment. Hence, it can be argued that sense of orientation, self-localization and cognitive mapping represent an individual's wayfinding competence (Schmitz, 1999).

4) Wayfinding strategies (Lawton, 1994; 1996; Prestopnik and Roskos Ewaldson, 2000. Lawton and Kallai, 2002) include orientation and route strategies for finding one's way in a building or large complex. In more detail, orientation strategy is the mental ability of a wayfinder to find the way by accessing a fixed set of reference points to establish his or her position, despite being in a relatively unfamiliar setting. Route strategy focuses on information or instructions about a route to be followed.

Scholars using behavioural methods examine wayfinding ability by assessing behavioural tasks of people in terms of distances estimation, use of verbal or written directions, and the pin-pointing of unseen objects or locations (landmarks) in the environment.

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Wayfinding ability has often been measured in environmental psychology in association with wayfinding anxiety (Lawton, 1996; Schmitz, 1999; Lawton and Kallai, 2002; Schug, 2016), because people with low levels of spatial competence are afraid of getting lost and become anxious when they navigate in a new environmental setting.

2.3 Wayfinding as a source of customer satisfaction

Even though wayfinding ability has been addressed more frequently in environmental psychology studies than in services marketing/management studies, it represents a crucial factor from a service management perspective because it influences customer satisfaction. Specifically, when a servicescape is designed based on wayfinding, a number of advantages for people and businesses can be created in terms of service quality (Callan and Kyndt, 2001; De Barros et al., 2007; Fodness and Murray, 2007; Correia et al., 2008; Bonfanti, 2013) overall customer satisfaction (Caves and Pickard, 2001; Findlay and Southwell, 2004; Farr et al., 2012) and ultimately the associated overall impression an individual has about an organization (Zeithaml and Bitner, 1996). Firstly, people can move more freely and with confidence and familiarity in the servicescape thus reducing uncertainty, anxiety and information asymmetry, emotional tensions, sensations of confusion and frustration, loss of control and waste of time by limiting the number of wrong turns and requests for direction information. Secondly, staff can improve the quality of the service provided and strengthen the corporate image by avoiding wasted time and effort having to give information about directions. People are satisfied when the discrepancy between wayfinding expectations in terms of cognitive-rational and psychological-emotional needs and perceptions of wayfinding in terms of people interactions with the servicescape is absent or, at least, limited (Bonfanti, 2013).

3. Method

3.1 Methodological approach

This paper adopts the self-assessment method used in environmental psychology research. Measuring wayfinding ability is a crucial activity for service organisations that want to enhance wayfinders' satisfaction.

3.2 Data collection

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After obtaining permission from top management, the data were collected in a hospital in the Northern part of Italy. Local media had reported that this hospital had been recently renovated great attention was paid to improving wayfinding systems such as signage, maps, colours, and landmarks. The preliminary structured questionnaire, which was prepared in English, was translated into Italian and then back-checked for accuracy. The questionnaire was piloted with a convenience sample of 30 individuals (15 males and 15 females aged 18-72) intercepted at the hospital in October 2015. Based on the feedback provided by respondents, minor modifications were made to ensure clarity. The final questionnaire was administered with the help of a research assistant who had previously been briefed on the research study and trained on how to answer potential questions from respondents. Respondents were intercepted on their way out of the hospital between November 2015 and January 2016 and were purposefully selected in order to ensure a wide age range and to have an approximately equal number of respondents in terms of gender. All respondents aged 18+ who volunteered to participate signed an informed consent form, which contained the themes of the survey, the information confidentiality guarantee and the right to refuse participation. The questionnaire was completed *in situ* there and then by respondents while the research assistant remained available to handle any questions or give any necessary explanations. Overall, 12 data collection days were organized and 351 questionnaires were returned, out of which 330 usable questionnaires were obtained.

3.3 Measures and questionnaire

There is no consensus in the literature about which factors may be most important for measuring wayfinding ability (Prestopnik and Roskos Ewaldson, 2000). In this paper the chosen measures for wayfinding were based on peoples' current location and their decision on which direction they can take to reach their desired destination by limiting their anxiety levels. Therefore the three following constructs were measured: 1) wayfinding competence, 2) wayfinding strategy, and 3) wayfinding anxiety. In addition, the differences between the clusters identified and their evaluations of satisfaction were also investigated.

Accordingly, the questionnaire was developed to assess the participants' self-estimation of wayfinding ability in terms of wayfinding competence, wayfinding strategy and wayfinding anxiety, as well as their customer satisfaction levels. It consisted of three sections that had been developed based on previous environmental psychology studies. The first section explored respondents' wayfinding ability using a 7-point scale ranging from - 3 (not at all) to +3 (very much) by means of 7 items adapted by Schmitz's (1999) and Lawton and Kallai's

(2002) scales, with some modifications to the wording in order to be more appropriate for this study. More specifically, "wayfinding competence" includes the 3 items proposed by Schmitz (1999) with a word changed from "city" to "service setting". "Wayfinding strategy" is examined by means of the 2 items derived from Lawton and Kallai's (2002) scale, which have been modified in the following way: the first has been shortened while the second has been adapted with a word changed from "receptionist" to "staff/employees". The other 2 items that are included in the Lawton and Kallai's (2002) scale explain "wayfinding anxiety". Only the first has been adapted by changing the following words "area of a city or town" into "building".

The second section measured customer satisfaction through three items ($\alpha = 0.970$) derived from a study about customer satisfaction with hospital services (Choi and Kim, 2013). Responses for satisfaction were measured on a 7-point Likert scale sliding from 1 (totally disagree) to 7 (totally agree). The measures used in the questionnaire are reported in Table 4 below. Finally, the participants were asked to provide socio-demographic data such as gender and age.

Take in Table 4 about here

To minimize the risk of common method bias, several *a priori* procedural steps were undertaken (Chang et al., 2010; Fuller et al., 2015). First, to reduce evaluation apprehension, respondents were assured anonymity and confidentiality. Second, items were formulated in order to ensure conciseness and clarity, ambiguous terms and technical jargon were avoided. For example, the term "servicescape" was paraphrased with physical environment including structural and human elements such as signage and staff. Third, different scales endpoints were used in order to measure constructs and the order of questions was randomized. Also multiple-items were used to measure constructs (Fuller et al., 2015). In addition, the Harman single-factor post-hoc test was used to assess Common Method Variance (CMV). This test consisted of performing an Exploratory Factor Analysis (EFA) of all variables used in the study. CMV is assumed if either a single factor emerges from EFA or one single factor explains the majority of variance. In this study, EFA revealed the existence of a multi-factor structure with the first factor (wayfinding ability) accounting for 30% of the total variance. Based on the *a priori* procedures undertaken and the results of the Harman-test, CMV is not a pervasive issue in this study.

4. Results

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4.1 Sample profile

The sample consisted of 40 per cent males and 60 per cent females. Respondents' ages ranged from 18 to 77 years old. The majority of the participants (53.6 per cent) had visited the service setting more than five times, followed by those who had been there from two to five times (29.1 per cent) and those who were there for the first time at the time of the interview (17.3 per cent).

4.2 Typology development

The Statistical Package for the Social Sciences (SPSS) v 19.0 was used to analyze the results. First, an exploratory factor analysis with Varimax rotation was performed on the items describing respondents' wayfinding ability. The latent root criterion of 1.0 was used for factor extraction (Hair et al., 2006). Three items that were highly loaded on more than one factor were excluded from the analysis (Stevens, 2009). All factor loadings were higher than the minimum acceptable level of 0.50 (Hair et al., 2006). The Kaiser-Meyer-Olkin (KMO) test and the Bartlett test for sphericity yielded satisfying results, indicating that factor analysis was appropriate for the data. As shown in Table 5 below, the final solution comprised three factors that accounted for 67.3 per cent of the total variance explained:

1) Wayfinding competence, which develops when people feel confident about their ability to move in physical surroundings and use an acquired sense of orientation;

2) Wayfinding strategy, which develops when people can move within the servicescape to reach their destination by using signage, maps and landmarks allocated by service organization inside the physical environment or ask staff for information about direction; and

3) Wayfinding anxiety, which develops when people have little knowledge of the environmental setting.

Cronbach's alpha test was used to measure the internal consistency of each construct and all had values above 0.7 thus ensuring internal consistency.

Take in Table 5 about here

The three dimensions of wayfinding ability that emerged from the factor analysis were used as clustering variables. Specifically, a two-stage method of cluster analysis was adopted (Punj and Stewart, 1983) by combining Ward's hierarchical clustering method and K-means non-hierarchical method. In the first step, Ward's (1963) method was used to determine the number of clusters and the initial cluster centers, suggesting the existence of three clusters. Next, K-means clustering method with a fixed cluster number and initial cluster centers was

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employed. Based on the results of the squared Euclidean distance method, three final clusters emerged.

Take in Table 6 about here

As shown in Table 6 above, cases were not distributed equally across the clusters, but each cluster met Hair et al.'s (2006) recommendation of 30 cases as the minimum accepted size. The first cluster (n= 69), labeled *The Easy Goings*, includes respondents with the lowest scores for individual orientation skills and anxiety control. Hence, even though they are not confident about their wayfinding ability, they are not anxious and rely on spatial resources to move within the servicescape. The second cluster (n= 141), labeled *The Do-it-yourselves (DIYs)*, exhibit the highest level of individual orientation skills. This group relies on servicescape elements and reports quite low levels of anxiety control, thus not being worried about wayfinding ability. Individuals in the third cluster (n= 120), labeled *The Insecures*, show the highest level of anxiety control, thus being very worried about their wayfinding ability, and the highest level of confidence in servicescape elements, thus relying heavily on external resources to find their way. They also report low individual orientation skills.

To further profile clusters, a chi-square test was performed to explore differences in gender between the groups. The results show a significantly higher proportion (Pearson chi-square= 43.543; $p< 0.001$) of women in cluster 1 (56%) and cluster 3 (82.5%), and a higher proportion of men in cluster 2 (42.5%). In addition, a one-way Analysis of Variance ANOVA test showed that no significant differences emerged between clusters in terms of age ($F= 0.037$, $p> 0.1$) and familiarity with the servicescape ($F= 1.367$, $p> 0.1$).

4.3 Linking wayfinding ability to customer satisfaction

To explore differences between clusters in relation to the satisfaction construct, one-way ANOVA tests were performed, as reported in Table 7 below.

Take in Table 7 about here

Based on Post hoc Scheffe tests, both the Easy Goings and the DIYs expressed significantly higher satisfaction than the Insecures while no significant differences emerged between the Easy Goings and the DIYs. Besides providing insights into the relationship between wayfinding ability and perception of satisfaction, these findings further support the external validity of the cluster solution.

5. Discussion and implications

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5.1 Contribution to literature

Even though the importance of wayfinding has been outlined in the management literature (Dogu and Erkip, 2000; Chebat et al., 2005, 2008; Bonfanti, 2013), to the best of our knowledge no specific study exists linking customer satisfaction to the wayfinding ability of people. This study aimed to fill this research gap in three ways:

1) It brought to the attention of service management scholars three dimensions of wayfinding ability that are fundamentally used in environmental psychology research;

2) It identified three clusters based on these three dimensions of wayfinding ability, and

3) It examined the relationship between customers' profiles and perceptions regarding their satisfaction.

Each of these is discussed in detail below.

First, this research highlight those factors that can contribute to wayfinding ability by taking into account previous environmental psychology research whose results are useful to better understand customers' perceptions and manage their behaviours in a satisfaction perspective. While psychology scholars have mainly studied wayfinding ability in reference to internal factors such as sense of direction, familiarity with environment and gender (Prestopnik and Roskos Ewaldson, 2000), this paper confirms that external and internal variables measure wayfinding ability (Gärling et al., 1986; Kitchin, 1994) and supports the view that wayfinding is an interplay between human and environmental elements (Farr et al., 2012). In particular, wayfinding competence and wayfinding anxiety can be considered internalized wayfinding ability, whereas wayfinding strategy can be interpreted as an "allocentric" (or external) ability which focuses in a relational manner on the surrounding environment (i.e. mainly signage and servicescape personnel) (Ribordy et al., 2013).

Second, this study addresses the literature on wayfinding segmentation by proposing three clusters: 1) the Easy Goings, 2) the DIYs and 3) the Insecures. The first cluster (the Easy Goings) highlights the profile of people that are not anxious despite their poor individual orientation skills. These individuals seem to lack the internal resources to learn spatial orientation and therefore base their wayfinding on their ability to analyze and interpret external resources (i.e. servicescape elements). The second cluster (the DIYs) represents the largest group. These people have good individual orientation skills, are not anxious and use environmental elements to increase their wayfinding ability. Individuals in this profile recall the cognitive mapping intended as spatial and environmental cognition ability for their ability to process external information and internalise it for future use. Individuals in the third cluster (the Insecures) have poor individual orientation skills and are very anxious about their

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wayfinding ability, hence they try to control this feeling by arriving early at the service setting and relying on other people. In addition, they base their wayfinding ability on environmental elements more than the other two groups.

Thirdly, this research explored the relationship between customers' profiles and perceptions regarding their satisfaction. The findings show that the three groups of respondents are differentiated by their satisfaction levels. In particular, the Easy-Goings, who are the individuals with the lowest wayfinding competence and anxiety levels, show the highest scores for satisfaction. Tsoukas and Chia (2002) claimed that perceiving is more important than conceiving. Building on this consideration, it can be argued that for the Easy Goings perceiving external sources (i.e. the servicescape elements) is more important than elaborating wayfinding competences. The Insecures, who show the highest wayfinding anxiety score between the clusters, also report the lowest level of satisfaction. As a matter of fact, even though the DIYs present medium levels of wayfinding anxiety, they are more satisfied than the Insecures probably because of their good wayfinding competence. Therefore, our results are in line with Hund and Minarik (2006), who found that as spatial anxiety increases, wayfinders' satisfaction tend to decrease.

5.2 Managerial implications

This study has several implications for service managers who want to make wayfinding easy in order to improve wayfinders' satisfaction. When a person visits unfamiliar service environments such as hospitals, airports or shopping malls, the user/customer/shopper is constantly involved in a wayfinding process, can experience wayfinding difficulties and, accordingly, must make decisions to solve wayfinding problems. Service managers have to design the servicescape along with interiors designers and architects in such a way that service environments are both aesthetically pleasant and, in some settings, attractive and efficient in terms of wayfinding.

While previous research outlined the importance of some factors such as gender differences, familiarity and cognitive approaches, this study recommends the examination of the profile of actual and potential visitors to the service setting. Surveys about how people find their way would be able to show if the servicescape's elements provided by service organization meet individuals' characteristics and needs.

If people who mostly visit the servicescape belong to the Easy Goings profile, service managers have to carefully design each service environment element in order to allow them to find their way without increasing people's anxiety, given that they rely most on servicescape

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elements rather than their wayfinding competence. Therefore, physical factors such as signs, maps, shapes, colours, paths, and information desks should not be neglected or, worse, left to chance. All these factors can be successfully manipulated by management (Newman, 2007). In addition, servicescape elements affect satisfaction (Dogu and Erkip, 2000; Kalakou and Moura, 2014) and can contribute to form a distinct and instantaneous association about the organization's image (Zeithaml and Bitner, 1996).

If the servicescape's visitors belong to the second profile, the DIYs, high levels of self-confidence in their wayfinding competence and wayfinding strategy with low anxiety levels can lead these people to prefer approximations based on landmarks (Anacta and Schwering, 2010) because they need to find reference points along their path in a gradual manner in accordance to their information needs (Bonfanti, 2013). In this regard, service managers have to pay particular attention to the location of landmarks in the service environment. According to Klippel and Winter (2005) landmarks have to cognitively or linguistically be allocated easily to be conceptualized in route directions.

If people present the characteristics identified in the third group, the Insecures, service managers must strive to keep down those individuals' anxiety because higher anxiety has a negative impact on wayfinding ability (Gabriel et al., 2011; Farr et al., 2012). Given that when a person does not directly know the direction to be taken, he/she relies on external assistance in wayfinding (Lawton, 1996). Managers must carefully and periodically control the quality of communication (Ugolini, 2009) about wayfinding and servicescape structure. The information can be delivered by means of written communication including leaflets, website, and business magazines. No less important is the role played by the front line staff during the service information delivery process. These staff can reduce information asymmetry by generating a feeling of assurance and contributing to low anxiety levels.

In addition to servicescape elements, complimentary measures to make wayfinding easier are mobile devices, smart phones and downloadable apps (Farr et al., 2012) whose use and availability has increased with recent technological developments. As Montello et al.'s (1999) study argued, people can be educated to enhance their wayfinding ability by acquiring and employing spatial information.

5.3 Social implications

This study highlights the importance of wayfinding because of its impact on society. In service contexts as well as in daily life activities, people are all involved actively or passively in the wayfinding process, for example, when they seek a specific destination or when they

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explain to a passerby how he/she can get to a certain place. The signage, for example, is everywhere and is made to, and from, a multitude of subjects.

Architects and designers should not only invest in the aesthetics of architectural design but also help people to develop their wayfinding ability. As some management scholars argue, they may educate people to increase their perceived value (Bonfanti and Brunetti, 2015). Fundamentally, today's society underestimates wayfinding ability: most people are induced to rely on technology, e.g. using the browser on your smartphone to navigate the servicescape, but when the browser does not work effectively, people tend to get lost and lose time, as well as becoming confused. In other words, people can lose the opportunity to develop their wayfinding ability.

In a servicescape design perspective, it is very important that cultural and social aspects of individuals are included in the service environment design. For example, when designing or reorganizing the servicescape, English signals and pictograms (i.e. images that can be universally recognized) could be used along with the local language to overcome possible communication barriers. In addition, special needs requirements, for example of visually impaired persons, should be considered in the servicescape design. Each cue contributes to making people feel either accepted or discriminated by the service provider. After all, wayfinding ability is important in all social environments that are frequented by different types of people, whether for physical or cultural activities.

6. Limitations and further research directions

The findings of this study should be considered with caution because of some limitations. Firstly, the research used a convenience sampling method, it was conducted in one single location and within a specific service context setting (i.e. a hospital) where resolute wayfinding is prevalent. Future research is needed to validate the proposed typology within the same country and across different countries and service contexts with low familiarity. Further clusters may emerge in accordance to different types of wayfinding (recreational, resolute or emergency). In addition, it would be interesting to investigate the existence of these typologies in more complex service settings such as tourism destinations.

Secondly, wayfinding ability and satisfaction were measured in terms of self-assessment method. Even though Hund and Padgitt (2010) in their experimental study found a robust relationship between self-reported and behavioural measures of sense of direction, further research should try to combine self-reported with factual/behavioural measures of wayfinding.

Thirdly, other variables that are relevant in service contexts were not considered in this study. For example, an individual's emotions within the servicescape/during the service experience might have a direct influence on wayfinding satisfaction, or moderate the relationship between wayfinding ability and satisfaction. Although some scholars investigated the effect of emotions on wayfinding (Balaban et al., 2014), future studies can address emotions triggered by wayfinding experience more in-depth.

Finally, another research aspect that it would be interesting to examine in future management studies is how wayfinding ability varies with physical disabilities such as blindness or deafness. Recent advances have been carried out from a variety of perspectives and disciplines (Davis et al., 2014; Schinazi et al., 2016) in neuroscience and the technological devices field. In-depth analysis about this specific topic will allow service managers to design servicescapes able to eliminate or, at least, reduce wayfinding problems and improve the navigation abilities of these customers/users.

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Table 1 Main definitions about wayfinding as process

Author/s	Subject area of the study	Main findings
Lynch (1960)	Architecture	Wayfinding is based on "a consistent use and organization of definite sensory cues from the external environment" (p. 3)
Downs and Stea (1973)	Geography	Wayfinding process includes the four following stages: a) orientation, to indicate when a person recognizes where he/she is with respect to nearby landmarks and the desired destination; b) route selection, when a person chooses a way to reach the desired destination; c) route control, to constantly monitor and confirm that the person is following the correct direction; and d) recognition of destination, to realize that he/she has reached the desired destination.
Passini (1987)	Architecture	Wayfinding is "spatial problem solving that comprises three major processes: information processing, decision making, and decision execution or initiation of movement in space comprising a behavioral and (spatial) environmental component" (p. 64)
Chown et al., (1995)	Psychology	Wayfinding is process encompassing four tasks: landmark identification, direction selection, path selection, and environmental abstraction.
Algase et al., (2007)	Psychology	"Wayfinding is a cognitive process that requires information from the physical environment and from the knowledge base (cognitive map) of the wayfinder" (p. 1017)
Apelt (2008)	Management	Wayfinding includes the following three interrelated processes: a) decision making or development of action plan; b) decision execution or transformation of decision (or action plan) into behaviors, and c) information processing or perception and cognition of environment.
Farr et al., (2012)	Social science	"Wayfinding is the process of finding your way to a destination in a familiar or unfamiliar setting using any cues given by the environment" (p. 716)
Montello and Raubal (2012)	Geography	Wayfinding process includes the following three steps: a) to create and choose a route; b) to establish and maintain orientation with respect to one's starting location, external features or places; and c) to recognize landmarks in the environment.

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Table 2 Main definitions about wayfinding as ability

Author/s	Subject area of the study	Main findings
Passini (1984)	Architecture	Wayfinding is the "cognitive ability to assimilate spatial information, make maps to find one's way, make decisions and execute these decisions" (p. 46).
Prestopnik and Roskos Ewaldson (2000)	Psychology	"Wayfinding is the ability to identify one's location and arrive at destinations (or navigate) in the environment, both cognitively and behaviorally" (p. 177).
Al-Homoud (2003)	Architecture	"Way-finding is the ability to reach a particular destination without delay or anxiety" (p. 140)
Nori and Giusberti (2006)	Psychology	"Wayfinding is the ability to move successfully through the environment. More specifically, wayfinding is the ability to identify one's location and arrive at unseen destinations in the surrounding environment. Successful wayfinding behavior includes the act of avoiding obstacles while moving through the environment" (p. 67)
Montello and Raubal (2012)	Geography	People need to develop the process of learning space by using their cognitive and spatial abilities.
Kiefer et. (2014)	Geography	"People must utilize various cognitive and spatial abilities in order to accomplish the specific tasks included in wayfinding" p. 660)

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Table 3 Factors affecting wayfinding abilities

Factors category	Factors	Author/s (year)
human and behavioral factors	age	Willis et al. (2004) de Bruin and Schmidt (2010) Meneghetti et al. (2016)
	biological factors (e.g., personal psychology, state of health, fitness conditions)	Costa (2010) Moussaïd et al. (2010) Farr et al. (2012)
	culture	Chattaraj et al. (2009) Farr et al. (2012)
	familiarity with the environment	Prestopnik and Roskos Ewaldson (2000) Chebat et al. (2003) Nori and Giusberti (2006) Woollett and Maguire (2010)
	gender	Schmitz (1999) Prestopnik and Roskos Ewaldson (2000) Lawton and Kallai (2002) Nori and Giusberti (2006) Barkley and Dye (2007) Chebat et al. (2008) Lawton (2010) Contreras et al. (2012) Farr et al. (2012)
	language	Farr et al. (2012) Touchstone et al. (2017)
	personality and walking preferences (e.g. comfortable walking speed) and their habits (e.g. the continuous use of the same route to reach the same destination	Koh and Zhou (2011)
environment factors	color	Farr et al. (2012)
	landmarks	Prestopnik and Roskos Ewaldson (2000) Nori and Giusberti (2006) Farr et al. (2012)
	layout of the setting such as spatial content, form, organization and circulation	Peponis et al. (1990) Passini (1998) Dogu and Erkip (2000)
	light	Farr et al. (2012)
	maps	Farr et al. (2012)
	quality of the environmental information in terms of architectural and graphic expression of information (or legibility)	Passini (1998) Dogu and Erkip (2000) Newman (2007)
	Signage and digital signage	Peponis et al. (1990) O'Neill (1991) Farr et al. (2012) Bonfanti (2013) Dennis et al. (2014) Vilar et al. (2015) Bae et al. (2016)

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Table 4 Measures and items used in the questionnaire

Measures	Items	Source
Wayfinding ability	WAYFINDING COMPETENCE When someone gives me a route instruction, I will find my destination easily When I give others a route instruction, they will find their destination easily I will find my way well even in an unfamiliar service setting WAYFINDING STRATEGY Clearly visible signs were important to me to find my way I appreciated the availability of someone (e.g., staff/employees) who could give me directions WAYFINDING ANXIETY Finding my way to an appointment in an unfamiliar building Finding my way out of a complex arrangement of offices that I have visited for the first time	Adapted from Schmitz (1999) and Lawton and Kallai (2002)
Customer satisfaction	Overall, I would say that I am satisfied about the experience with this physical environment I think that moving around in this physical environment satisfies my expectation I am satisfied with physical environment's design on comparison with other hospitals	Derived from Choi and Kim (2013)

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Table 5 Factor analysis of wayfinding ability

	Factors		
	Wayfinding competence	Wayfinding strategy	Wayfinding anxiety
When someone gives me a route instruction, I will find my destination easily	.861		
When I give others a route instruction, they will find their destination easily	.830		
I will find my way well even in an unfamiliar service setting	.698		
Clearly visible signs were important to me to find my way		.855	
I appreciated the availability of someone (e.g., staff/employees) who could give me directions		.753	
Finding my way to an appointment in an unfamiliar building			.797
Finding my way out of a complex arrangement of offices that I have visited for the first time			.678
Eigen values	2.109	1.416	1.189
Variance explained	30.1	20.2	16.9
Cronbach's alpha	0.726	0.729	0.712

KMO: 0.682

Bartlett's Test of Sphericity: χ^2= 387.815 (df= 21; p< 0.000)

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization

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Table 6 Clusters description

Final Cluster Centers			
Wayfinding ability dimensions*	Clusters		
	1. The Easy Goings n= 69	*2. The DIYs* n= 141	*3. The Insecures* n= 120
Wayfinding competence	-1.84	0.70	-1.63
Wayfinding strategy	2.02	1.87	2.29
Wayfinding anxiety	-1.67	-0.40	1.31

* Measured on a 7-point scale ranging from -3 to +3

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Table 7 Summary of one-way ANOVA statistics

Construct	Clusters	Mean	F
Customer satisfaction	1. The Easy Goings	4.29	4,100*
	2. The DIYs	4.26	
	3. The Insecures	3.68	
* p<0.01			

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Table 8 Significant differences based on Post-hoc Scheffe tests

Dependent Variable	Clusters	Clusters
Customer satisfaction	1. The Easy Goings	2. The DIYs
		3. The Insecures **
	2. The DIYs	1. The Easy Goings
		3. The Insecures *
	3. The Insecures	1. The Easy Goings **
		2. The DIYs *
* p<0.01; **p<0.05		

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