

**THE ANALYSIS OF HIDDEN FACTORS OF
ARCHITECTURAL BARRIERS IN SOSNOWIEC
MUNICIPAL OFFICE FROM DISABLED PERSON POINT
OF VIEW AS IMPORTANT FACTOR OF SUSTAINABLE
ARCHITECTURE**

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ABSTRACT

Sustainable architecture is important to minimize negative impact of building. In this paper we concentrate on the problem from people with disability point of view. For them one of most important factors of sustainable architecture in public space is the problem connected with architectural barriers. In presented paper we conducted an analysis of hidden factors of architectural barriers on example of municipal office in Sosnowiec in southern part of Poland. During the research we analyzed the needs of persons with disabilities (perceived quality) and their assessment in terms of the level of quality of services provided by the municipal offices. We analyzed twenty fourth variables connected with architectural barriers in the municipal office and its neighborhood. We analyzed following variables: office location (easy to reach), a sufficient number of parking spaces, Z3 - parking spaces for the disabled near the entrance of the office, a clear marking of parking spaces for the disabled, watch for unauthorized persons occupying seats for the disabled, facilities for disabled people in the office, elevators for disabled guests, toilets suitable for disabled guests, handrails of the stairs, a system of ramps and ramps for the disabled, the doors have a width that allows entry wheelchair, anti-slip floor, equal level thresholds and floors, pavement and curbs around the office adapted for the disabled, website provides information for people with disabilities, website readable for people with visual disabilities, officials are turning to people with hearing difficulties by means of a suitable device, officials are talking with a person of hearing in a separate room, the office's employee who knew sign language, officials can serve the customers with guide dog, the office is equipped with a special frame to allow signing a document, the visually handicapped person allows the presence of a trusted person who acquainted her with the content of signed documents, the city council does not contain architectural barriers hindering the movement of physically disabled person, an overall assessment of architectural barriers at the office. Next we conducted factor analysis to identify main hidden factors of architectural barriers.

Keywords: *sustainable architecture architectural barriers, disability, municipal office, public space, smart city*

INTRODUCTION

Problems connected with good municipal space planning are nowadays very important from people with disability point of view [2], [5], [6], [8], [10]. They are a part of sustainable architecture which should not only seek to minimize the negative impact of buildings by efficiency and moderation in the use of materials, energy and development space but minimize negative social impact of public architecture especially from the peoples with disability point of view.

Issues concerning the investigation of the needs of people with disabilities and incorporate these needs into practice management administration in smart city (as well as businesses) are increasingly present in modern management. The concept take into account the specific needs of people with disabilities in managing organizations, among others occur in the concept of sustainable architecture [11], [12], [13], [14].

One of the major factors hindering the functioning of persons with disabilities in the public space are all kinds of architectural barriers impede their movement and current operation. In terms of measuring the level of customer satisfaction regarding this issue, you can use a variety of methods, among other things, such as Servqual or CSI. Initially, these methods have been used as a universal independently from the test type of service, but now increasingly emphasizes the need to maintain an appropriate approach depending on the type of service. In addition, a special approach also requires an examination of the quality of service as perceived by people with disabilities, because in many cases, such people believe to be important factors that are ignored or unnoticed by those in full working order [1], [3], [4], [7], [9], [15].

There are two main aims of the paper:

- to identify hidden factors of service quality connected with architectural barriers on example of municipal office,
- to analyse what are differences between identified factors and classical SERQUAL model.

We are interested if in the case problems connected with architectural barriers we can use classical SERVQUAL factors if we want to identify the service quality or we should to conduct our own analysis to do the hidden factors identifications by ourselves.

MATERIAL AND METHODS

During the research we analyzed the needs of persons with disabilities (perceived quality) and their assessment in terms of the level of quality of services provided by the city hall. This publication focuses on issues concerning architectural barriers occurring in the city office in Sosnowiec. In addition, also included issues related to designing a website in such a way as to match the needs of people with disabilities.

The study was conducted on a sample of 80 people with disabilities using the services of the municipal authority in Sosnowiec. In the research process were taken

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into account 25 the following variables connected with problems concerning architectural barriers:

- Z1 - office location (easy to reach),
- Z2 - a sufficient number of parking spaces,
- Z3 - parking spaces for the disabled near the entrance of the office,
- Z4 - a clear marking of parking spaces for the disabled,
- Z5 - watch for unauthorized persons occupying parking places for the disabled,
- Z6 - facilities for disabled people in the office,
- Z7 - elevators for disabled guests,
- Z8 - toilets suitable for disabled guests,
- Z9 - handrails of the stairs,
- Z10 - a system of ramps for the disabled,
- Z11 - the doors have a width that allows entry wheelchair,
- Z12 - anti-slip floor,
- Z13 - equal level thresholds and floors,
- Z14 - pavement and curbs around the office adapted for the disabled,
- Z15 - website provides information for people with disabilities,
- Z16 - website readable for people with visual disabilities,
- Z17 - officials are turning to people with hearing difficulties by means of a suitable device,
- Z18 - officials are talking with a person of hearing in a separate room,
- Z19 - the office's employee who knew sign language,
- Z20 - officials can serve the customers with guide dog,
- Z21 - the office is equipped with a special frame to allow signing a document,
- Z22 - the visually handicapped person allows the presence of a trusted person who acquainted her with the content of signed documents,
- Z23 - the city council does not contain architectural barriers hindering the movement of physically disabled person,
- Z24 - an overall assessment of architectural barriers at the office.

RESULTS

Taking into consideration the classic assumptions for conducting a factorial analysis the data fulfils Bartlett's sphericity test, Kaiser-Meyer-Olkin criterion and Cronbach's alpha test.

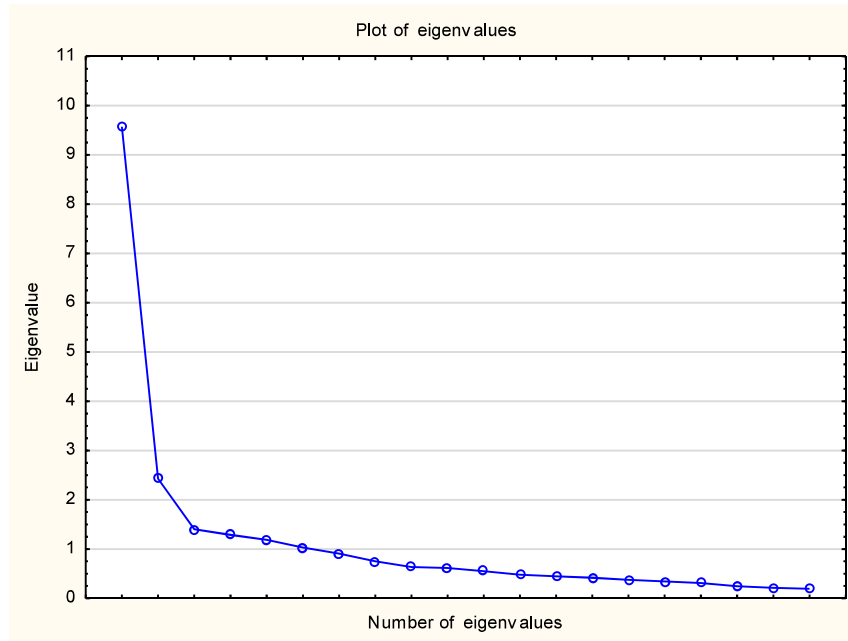


Figure 1. Cattle scree plot – architectural barriers – City Office in Świętochłowice

Source: Author's own research.

Fulfilment of the tests provides a basis for applying a factorial analysis. For this purpose, Kaiser's criterion and Cattell's scree test have been used (Figure 1). Application of both above mentioned criteria suggests that maximally four factors are left. The identified hidden factors explain the total of 68% of variability. Table 1 presents the matrix of factor loadings (factors were subjected to rotation by harmonized Varimax method). Factor loadings assigned to a particular factor have been bolded.

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Table 1. Identification of hidden factors for architectural barriers perceived quality – City Office in Sosnowiec

Variables	Factor 1	Factor 2	Factor 3	Factor 4
Z1	0,39	0,37	0,03	0,30
Z2	0,21	0,75	0,14	0,06
Z3	0,22	0,79	0,14	0,15
Z4	0,07	0,57	0,18	0,43
Z5	0,14	0,73	0,19	0,11
Z6	0,12	0,17	0,18	0,75
Z7	0,38	0,44	-0,07	0,45
Z8	0,59	0,39	-0,09	0,37
Z9	0,57	0,03	0,22	0,39
Z10	0,67	0,07	0,17	0,25
Z11	0,68	0,13	0,10	0,30
Z12	0,68	0,26	0,29	-0,11
Z13	0,72	0,27	0,21	0,02
Z14	0,44	0,39	0,45	0,03
Z15	0,31	0,27	0,61	0,21
Z16	0,09	0,12	0,81	0,17
Z17	0,22	0,10	0,17	0,67
Z18	0,15	0,19	0,19	0,68
Z19	0,12	0,27	0,18	0,57
Z20	0,25	0,25	0,14	0,46
Z21	0,17	0,15	0,15	0,49
Z22	0,06	0,05	0,08	0,42
Z23	0,05	0,05	0,04	0,52
Z24	0,55	0,31	-0,08	0,40
Variance explained	3,65	3,07	1,64	2,20
Percentage share	0,27	0,21	0,08	0,12

Source: Author's own research.

DISCUSSION

The sustainable architecture needs rules implementation needs to careful planning of municipal office and its surroundings to achieve easy access to it for persons with disabilities. Identified factors can be useful to measure the level of implementation sustainable development policy in the case of ensuring equal opportunity in access to public administration services. Identifying factors we could to know what is important from this point of view for clients with disability.

On the basis of research result we can distinguish following hidden factors connected with architectural barriers perception by people with disability:

- **Main architectural facilities** – the first factor account for 27% of variability and contains following eight variables: office location, toilets suitable for disable guests, handrails of the stairs, a system of ramps for the disabled, the doors have a width that allows entry

- wheelchair, anti slip floor, equal level thresholds and floors, an overall assessment of architectural barriers at the office.
- **Parking places for the disables** – the factor accounts for 21% of variability and consist of four variables. It includes variables related to the number of parking places in the vicinity of the office, the location of parking spaces near the office entrance, clear marking of parking places for the disabled and making sure that parking places for the disabled are not occupied by unauthorised persons.
 - **The surrounding of the office and the website** – the third factors explains 8% of variability and consist of three variables. There are among them: pavements and curbs abound office adapted for the disabled, website provides information for people with disabilities, website readable for people with visual disabilities
 - **Other facilities for the disables** – factors consist of night variables and accounts for 12% of variability. The factor consist of following variables: facilities for disables people in the office, elevators for disables guests, officials are turning to people with hearing difficulties by means of suitable device, officials can serve the customers with guide dog, the office is equipped with special frame to allow signing a document, the visually handicapped person allows the presence of a trusted person who acquainted her with the content of signed documents, the city council does not contain architectural barriers hindering the movement of physically disabled person.

In the figure 2 there is an illustration of four hidden factors consisting on architectural barriers perception by customers with disability in municipal office.

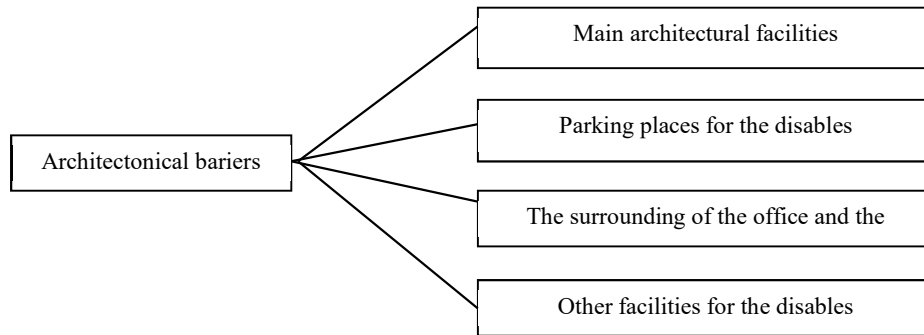


Figure. 2. The factors for the architectural barriers perception by people with disability in municipal office.

Source: Author’s own research.

Factors identified in our research suggest that they ate not the same as in typical SERVQUAL conception. In the figure 3 we described interlinks between identified factors in the case of the architectural perception by people with disability in municipal office and the classical conception of five service quality factors: reliability, assurance, tangibles, empathy, responsiveness.

The analysis of the mentioned relations suggest that is not possible to use classical SERVQUAL concept to analyse so specific problem as perceived quality service connected with architectural barriers in municipal office perceived by people with disability. There are so many interlinks between factors that in some cases: (parking spaces for disables and other facilities for the disables) particular factor connects with all classical SERVQUAL factor. We think that in so specific problem that is a need to do special factor analysis to identify hidden factors for particular problem and next to measure all variables connected with it. It's not wise to use classical factors to measure quality service level in such a case.

In our analysis we found many specific factors. Especially interesting is that problems connected with parking spaces for disabled formed own independent factor. Problem is very important especially for persons with

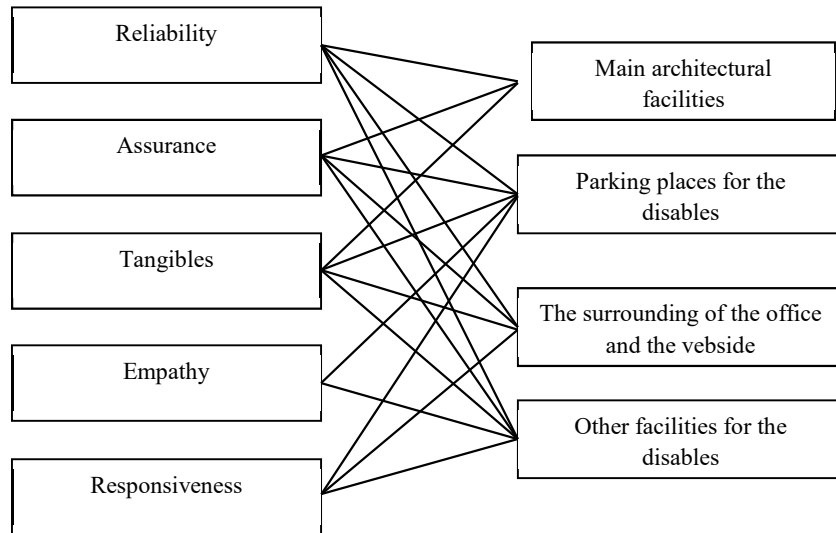


Figure. 3. Links between the factors for the architectural barriers perception by people with disability in municipal office and classical five SERVQUAL quality of service factors.

Source: Author's own research

CONCLUSION

On the basis of the research conducted on the example of municipal office in Sosnowiec we identify four hidden factors connected with architectural barriers aspects of quality of service in municipal offices. According our analysis we can distinguish following factors of architectural barriers of perception by peoples with disability: main architectural facilities, parking spaces for the disables, the surrounding of the office and the website, other facilities for the disables.

Comparing those factors with classical SERVQUAL quality of service factors (reliability, assurance, tangibles, empathy and responsiveness) we can say that in so

specific problems as described in the paper connected with architectural barriers the classical SERVQUAL factor division is not useful. When we want to measure service quality we should first conduct our own analysis to identify factors occurring in particular problem. Basing on these identified factors next we can conduct measurement of service quality.

Presented conception and hidden factor identification can be useful in sustainable architecture planning process which is used in widespread conception of smart city. When we want to project smart city municipal space we should remember to adjust it to the people with disability needs. To do it we should use identified factors to measure the people with disability needs and then include results of the analysis into architectural projects.

The main limitation of the paper is that analysis was conducted on example of only one municipal office – Sosnowiec. In the future we can conduct analysis on the bigger sample to achieve better identification of hidden factors.

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