VÁROSI KÖZLEKEDÉS FIZIKAI ÉS INFO-KOMMUNIKÁCIÓS AKADÁLYMENTESÍTÉSI RENDSZERÉNEK IDENTIFIKÁCIÓJA

THE IDENTIFICATION OF THE PHYSICAL AND INFO-COMMUNICATIONAL ACCESIBILITY SYSTEMS OF URBAN TRANSPORTATION SYSTEMS

Adam Titrik[*]*, Dr. Nagy Vince*[**]

ABSTRACT

Society must provide the opportunity for the independent and safe accessibility of transportation accessibility tofor every available means of transport,, passenger traffic establishment and services from start to end to people living with disabilities. Since we Hungary joined the EU, the problem of accessibility isn't only national interest, but also a regulation imposed by of the EU. The comprehensive remodelling of public building according to the EU standards has started. However, the reforming process of the transportation starts at the definition of need and ends at satisfying the need. According to the EU standards it is was impossible to improve the accessibility level to the same level as the level of theany other traffic related services over the past years, sotherefore the development of we have to develop suchan optimised adaptation, identification method became necessary that could reduce the traffic difficulty of people living with disabilities.

ÖSSZEFOGLALÁS

Minden eltérő képességekkel rendelkező közlekedő számára biztosítani kell az önálló és biztonságos közlekedés lehetőségét. Az indulási helytől a célállomásig igénybe veendő közlekedési eszközöknek, utasforgalmi létesítményeknek és kapcsolódó szolgáltatásoknak egyenlően hozzáférhetőnek és akadálymentesnek kell lenniük. Hazánk EU-hoz való csatlakozása óta az akadálymentesítési feladatok megoldása nem csak hazai érdek, hanem EU-s előírás is, amelynek megfelelően megkezdődött az épületek komplex akadálymentesítése, azonban az utazás folyamata az igény meghatározásától kezdődik és az igény teljesítésének eléréséig, majd a hazaérésig tart. Az elmúlt évek során az akadálymentességi szintet a különböző szolgáltatásokban nem lehetett azonosan magasabb szintre emelni, így a közlekedők számára olyan optimalizáló alkalmazást kell feltárni, amely alkalmazásával a hátrányos helyzetűek utazás során felmerülő közlekedési nehézségei nagyságrendekkel csökkennek.

INTRODUCTION

By the Equal Opportunity Act, society must provide the same services to the people living with disabilities [1].

The complete utilisation of a transportation system can generate difficulties, problems. Obstacles can be encountered in the course of transportation among these groups:

- Physical difficulties
  - Boarding vehicle (difference in height, demand of place, access height)
  - Accessibility and utility of the station and its functions
- Informational difficulties
  - Incomplete information
  - Understanding of complex information
- Mistrust difficulties
  - Mistrust in connection with the operation of the transportation sequence and the availability of staff assistance
- Financial difficulties
  - Is the cost of the use of transport services affordable?
  - Is the pricing competitive?
- Temporal difficulties
  - Can we book in time?
  - Can we catch the train in time?
  - Is the timetable suitable?

The physical, informational and mistrust difficulties prevent the people living with disabilities, who account for 13% of the population. At the same time, transportation can be difficult for people with reduced motoring and sensing abilities such us elderly people or people that travel with heavy luggages or children. They come out at 40% of the society.

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In Europe there are 63 million people who live with disabilities [1.]. Furthermore, the portion of the aged is very important and increased. Their portion nowadays is 21%, but it would grow to 31% by 2020. 35-40% of the passengers are restricted in their mobility. For example people participate in transportation with wheelchair or passenger travelling with strollers or heavy luggage.

2. RELATIONSHIP BETWEEN THE PASSENGER AND THE SERVICE PROVIDER

A four-vector model was chosen to illustrate the measures of the examined service development and for modelling the procedure. *(Figure 1).* The model contains the requirements of the developing service, which is the adaptation of the user requirement system for the provider, namely the positioning of the elements of the claim vector and the real value vector. The technological and cost vector determine the co-domain of the real value vector. For filling in the values of the four-vector model, the performance survey provides the inputs.

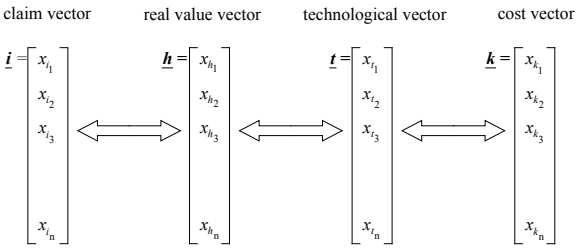

Figure 1.: Value analise four-vector model

In the course of operating, planning and developing of the public transport surface the complex handling claims of individual (user), procurer (social) and provider (operator) expectations.

The passengers formulated their requirements for the comfort of the travelling process, so it needs to define the characteristic of the service quality. For the explanation of the quality of public utilities – such as public transport – the quality cycle was used. *(Figure 2).* This model demonstrates the mutual interaction effect of the user and the supplier [2.].

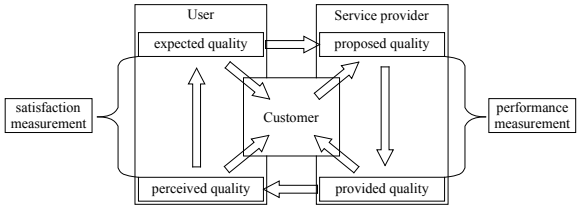

Figure 2.: The quality cycle

In the quality cycle the harmony in the traffic system, the quality of the supplier services and the user's requirements were kept balanced in the model. For the development of the model harmony, system approach was applied so that the development of the elements of the travelling chain can be in harmony. *(Figure 3).* The figure demonstrates the physical attributes of the passenger accessibility from the start to the end.

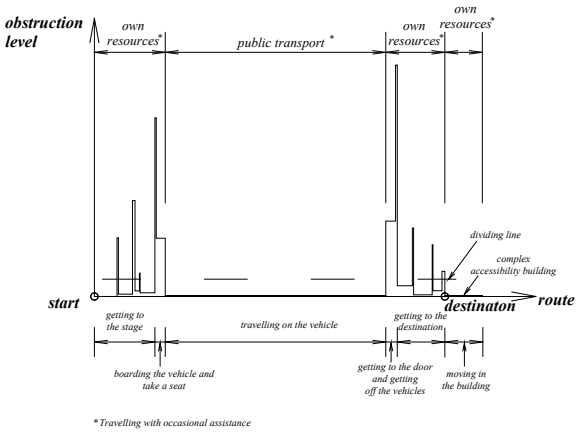

Figure 3.: The level of inaccessibility during the travel

While travelling, the optimal route for people living with disabilities is defined using weighted values of the elements of the transportation sequence. The precision of the data collection and the weighing factors of the obstructions are key issues to formulate the optimal route for the user.

3. INCREASING THE ACCESIBILITY LEVEL

The goal of the evaluation method was to determine the accessibility level with the help of the analysis and evaluation of the elements of the determining aspects. Goal is to discover the opportunities of improvement.

The determining aspects of accessibility, such as system parameters with their weighted values characterize the whole traffic system: traffic route, passenger servicing establishment, accessibility of vehicles. Weighted values are used to recognize the scale in comparison with the other parameters.

The level of accessibility forms a basis for practical solutions, required by Equal Opportunity Act.

4. THE OPTIMALIZATION OF THE TRANSPORTATION SEQUENCE

The process of the transportation sequence and its details are demonstrated on Figure 4. It is important to formulate a reliable route with the weighted values of this system, that offers more alternatives to the people living with disabilities. This offers the optimal route for the person. The weighted importance and precision of

the elements are significant for the user in the optional route planning process.

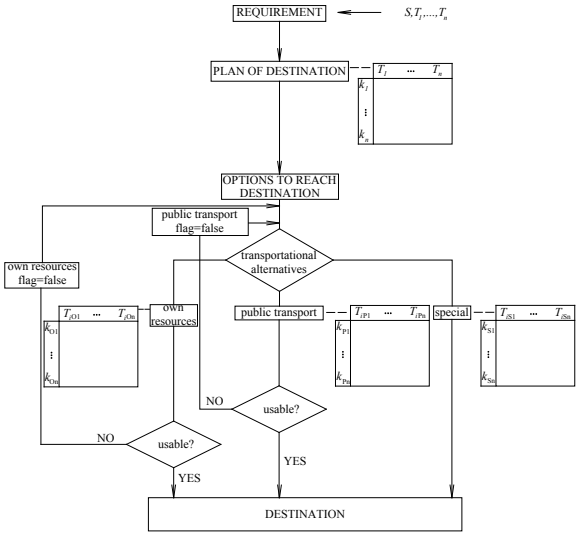

Figure 4.: The transportation sequence

With a suitable mathematical algorithm, it would be possible to formulate the optimal route. The present transportation system can be improved according to the target with this help.

5. CONCLUSION

The comprehensive accessibility reform of buildings targets the increased transportation convenience of people living with disabilities. Applying the reform, their needs during transportation can be better satisfied similarly to conventional passengers. The complete reform however, does not apply only to the building but also to the complete way to and from the buildings. To meet the requirements of the Equal Opportunity Act the accessibility of different locations varies so the passengers have to overcome objects with different levels of difficulty. To define the optimal rout for people living with disabilities, a rout optimisation process is needed that takes into account the requirements of the individual. Further studies are necessary to give an opportunity to qualitatively define the difficulty levels of the obstacles. A higher level of accessibility can be reached with the foundation of a system approach of the general accessibility system of the urban traffic. The quality of transportation for people living with disabilities can improve significantly using optimal route planning.

6. BIBLIOGRAPHY

[1.] DR. NAGY V., DR. LAKATOS I.: Az akadálymentesség és egyetemes tervezés járműgépészeti-járműtervezői szempontjai, műszaki követelményei, felsőoktatási jegyzet SZE- FSZE közalapítvány 2008

[2.] KORMÁNYOS L.: Az integrált vasúti személyszállítási szolgáltatásrendszer feltételeinek kidolgozása, Ph.D. doktori értekezés, 2009

[3.] Az esélyegyenlőségi törvény előírásainak való megfelelés vizsgálata a közösségi közlekedésben, tanulmány BME 2005

[4.] M. MOLLAOĜLU, F. Ö. TUNCAY, T. K. FERTELLI: Mobility disability and life satisfaction in elderly people, Archives of Gerontology and Geriatrics, pp 1-5 (2010)

[5.] MATTHEW KWAI-SANG YAU, BOB MCKERCHER, TANYA L. PACKER: Traveling with a disability, Annals of Tourism Research, Vol. 31, No. 4, pp. 946–960, (2004)

[6.] P. CLARKE, J. A. AILSHIRE, P. LANTZ: Urban built environments and trajectories of mobility disability: Findings from a national sample of community-dwelling American adults (1986–2001), Social Science & Medicine 69, pp. 964–970 (2009)

[7.] K. PETRY, B. MAES, C. VLASKAMP: Psychometric evaluation of a questionnaire to measure the quality of life of people with profound multiple disabilities (QOL-PMD), Research in Developmental Disabilities 30, pp:1326–1336 (2009)

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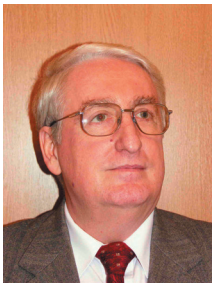

Prof. László Keviczky
Head of the Doctoral School

SZÉCHENY ISTVÁN UNIVERSITY, FACULTY OF ENGINEERING SCIENCES INTERDISCIPLINARY DOCTORAL SCHOOL OF ENGINEERING: 'MODELLING AND DEVELOPMENT OF INFRASTRUCTURAL SYSTEMS'

László Kóczy T.
DSc

Széchenyi István University was founded in 2002. Direct predecessor of the Faculty of Engineering Sciences was one of the largest polytechnic institutes of Hungary which had wide education palette (civil and architectural engineer, mechanical engineer, environmental engineer, transport engineer, informatics engineer, engineer-teacher, management engineer, electric engineer) and multiple industrial connection system. Due to the multi-decade long and tight collaboration of different scientific fields, on the basis of proposal of the MAB (Hungarian Accreditation Board) a uniform engineering faculty was founded with name 'Faculty of Engineering Sciences'.

Following the logic of process, on the engineering area an only one multidisciplinary doctoral school was established, named as Interdisciplinary Doctoral School of Engineering: 'Modelling and Development of Infrastructural Systems'. Head of doctoral school is Prof. László Keviczky, full member of Hungarian Academy of Sciences.

According to the structure and tradition of the Faculty, as well as the measurable demands against it the Doctoral School is primarily active in the scientific fields as follows:

- Civil Engineering (head: László Gáspár, DSc),
- Informatics (head: László Kóczy T., DSc),
- Transportation (head: András Bakó, DSc).

The School admitted the first students in autumn of 2005. The number of admitted students changed between 20 and 30 year by year. The most significant group of these students comes from the MSc level education, which indicates that our young university actively works on all education levels.

Practice showed, that multidisciplinary character is the way not only of the past but of the future as well: however all students belong to one of the three fields, but according to the latest survey nearly half of the investigated topics are definitively connected at least to the one of the other two ones.

Up to now five successful PhD defends happened and further 16 doctoral acts are running, thus according to our expectations the number of obtained degree stabilises around ten per a year in an early date.

Among the tasks of next years – beyond continuation of the normal operating order – the principal ones are the slight and well thought-out widening of the system of professional areas (for example in the field of mechanical and electric engineering), broadening the international connection system and the launching of education in foreign language.

Managing Editor: Dr. Kálmán András. Editor's address: 3529 Miskolc, Budai József u. 46.
Postage-address: 3501. Pf. 55. Phone/fax: (46) 325-504, 20/9358-812. E-mail: kaestsa@axelero.hu
Published by the Scientific Society of Mechanical Engineering, 1027 Budapest, Fő u. 68.
Postage-address: 1371, Bp, Pf. 433
Phone: 202-0656, Fax: 202-0252, E-mail: a.gaby@gteportal.eu, Internet: www.gte.mtesz.hu
http://members.chello.hu/cokom
Responsible Publishere: Dr. Igaz Jenő Managing Director
Printed by Gazdász Nyomda Kft. 3534 Miskolc, Szervezet u. 67. Managing Director: Vesza József
Price per month: 900 Ft; Subscriptions 2.700 Ft per a quarter, 5.400 Ft per an half a year, 10.800 Ft per year.
Distribution in foreign countries by Kultúra Könyv és Hírlap Külkereskedelmi Vállalat H–1389
Budapest, Pf. 149. and Magyar Média H–1392 Budapest, Pf. 272.

INDEX: 25 343 ISSN 0016-8572

All articles are peer reviewed.