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# Analysis of the city transport system's development strategy design principles with account of risks and specific features of spatial development

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## Abstract

© 2017, Silesian University of Technology. All rights reserved. Transport system is the key indicator of sustainable spatial development, because if it is ineffective it can render the economy, the environment, and society vulnerable. Despite the large number of already existing research, the city transportation system's development strategy design is still a relevant objective, because the existing ways and strategies of the transport development may not always be applicable in certain circumstances. This article presents the possible ways of improvement of sustainability of the city transportation systems adapted in accordance with the peculiarities of Russian cities. It is stated that when working out a city transportation system's development strategy it is necessary to take into account all possible risks. According to the case study of Naberezhnye Chelny city, all vulnerabilities of the system that today are typical almost for all Russian cities were analyzed, classification of risks was made, and means of their control were suggested. Solutions proposed as a result of the SWOT-analysis can be used when developing transport strategies for other cities with similar specificity.

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## Keywords

Non-motorized transport, Public transport, Risk analysis, Sustainable city transportation system

## References

- [1] The future we want. Rio de Janeiro: United Nations. 2012. Available at: <http://www.uncsd2012.org/content/documents/370The%20Future%20We%20Want%2010Jan%20clean%20no%20brackets.pdf>.
- [2] The Global Goals for Sustainable Development. Available at: <http://www.globalgoals.org/global-goals/sustainable-cities-and-communities>.
- [3] Paris Declaration. City in motion: People first. Geneva: United Nations Publications. 2015. Available at: <https://www.unece.org/fileadmin/DAM/thepep/Publications/2015/Paris-Declaration-in-English-Final.pdf>.
- [4] Global Green new Deal. Policy Brief. UNEP. March 2009. Available at: <http://www.unep.org/pdf/GGND-Final-Report.pdf>.
- [5] Smart Cities and Communities. The European Innovation Partnership on Smart Cities and Communities. Available at: <http://ec.europa.eu/eip/smartcities/>.
- [6] European Innovation Partnership on Smart Cities and Communities. Available at: <https://eu-smartcities.eu/sites/all/files/EI-SCC%20Brochure.pdf>.
- [7] Rajak, S. & Parthiban, P. & Dhanalakshmi, R. Sustainable transportation systems performance evaluation using fuzzy logic. Ecological Indicators. 2016. No. 71. P. 503-513.
- [8] Sustainable Mobility Project 2.0. Available at: <http://www.wbcsd.org/Projects/smp2>.

- [9] Integrated sustainable mobility in cities - a practical guide. Sustainable Mobility Project 2.0. World Business Council for Sustainable Development. 2016. Available at: <http://wbcspdpublications.org/project/smp2-0-final-report-integrated-sustainable-mobility-in-cities-a-practical-guide/>.
- [10] Larsen, J. & Patterson, Z. & El-Geneidy, A. Build It. But Where? The Use of Geographic Information Systems in Identifying Locations for New Cycling Infrastructure. *International Journal of Sustainable Transportation*. 2013. Vol. 7. P. 299-317.
- [11] Forsyth, A. & Krizek, K. Urban Design: Is there a Distinctive View from the Bicycle? *Journal of Urban Design*. 2011. Vol. 16. P. 531-549.
- [12] Heinen, E. & Handy, S. Similarities in Attitudes and Norms and the Effect on Bicycle Commuting: Evidence from the Bicycle Cities Davis and Delft. *International Journal of Sustainable Transportation*. 2012. Vol. 6. P. 257-281.
- [13] The path to a livable city. *Transportation for a Livable City*. 2002. Available at: <https://livablecity.org/wp-content/uploads/2013/08/tlc-path.pdf>.
- [14] Improving bus service. Modest investments to increase transit ridership. 2012. 68 p. Available at: <http://www.fcm.ca/Documents/tools/GMF/Transport-Canada/ImprovingBusService-EN.pdf>
- [15] Public Transport Plan. Transport @ 3.5 Million. Department of Transport. Western Australia. 2015. Available at: <http://www.transport.wa.gov.au/mediaFiles/projects/PROJ-P-Road-Network-Plan.pdf>
- [16] Vuchic, V.R. *Transportation for livable cities*. Center for Urban Policy Research. 1999. 352 p.
- [17] Medeiros, R. & Duarte, F. Policy to promote bicycle use or bicycle to promote politicians? Bicycles in the imagery of urban mobility in Brazil. *Urban, Planning and Transport Research: An Open Access Journal*. 2013. Vol. 1. No. 1. P. 28-39.
- [18] 4 Cities Developing the World's Best Sustainable Transport Systems. Available at: <http://www.fastcoexist.com/3025399/4-cities-developing-the-worlds-best-sustainable-transport-systems>.
- [19] Pardo, C.F. & Jieman, Y. & Hongyuan, Y. & Mohanty, Ch.R. *Shanghai Manual - A Guide for Sustainable Urban Development in the 21st Century*. 2012. Available at: <https://sustainabledevelopment.un.org/index.php?page=view&type=400&nr=633&menu=35>.
- [20] Ferbrache, F. & Knowles, R.D. Generating opportunities for city sustainability through investments in light rail systems: Introduction to the Special Section on light rail and urban sustainability. *Journal of Transport Geography*. 2016. Vol. 54. P. 369-372.
- [21] Steurer, N. & Bonilla, D. Building sustainable transport futures for the Mexico City Metropolitan Area. *Transport Policy*. 2016. Vol. 52. P. 121-133.
- [22] Sustainable transport in cities. Carbon trust. Available at: <https://www.carbontrust.com/news/2015/01/sustainable-transport-cities/>.
- [23] European Urban Roadmap 2030: on-line tool for the assessment of sustainable urban transport policies. International Energy Agency. Available at: <http://urban-transport-roadmaps.eu/>.
- [24] WHITE PAPER. Roadmap to a Single European Transport Area - Towards a competitive and resource efficient transport system. EUROPEAN COMMISSION. Brussels, 28.3.2011. Available at: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52011DC0144&from=EN>.
- [25] Allen, B. *Integrating Australia's Transport Systems: A Strategy for an Efficient Transport Future*. 2012. Infrastructure Partnerships Australia Available at: <http://infrastructure.org.au/>.
- [26] Introduction to Multi-Modal Transportation Planning: Principles and Practices. Victoria Transport Policy Institute. 22 May 2014. Available at: <http://www.vtpi.org/multimodal-planning.pdf>.
- [27] Sustainable Urban Transport: Avoid-Shift-Improve (A-S-I). Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). Available at: <http://www.sutp.org/files/contents/documents/resources/E-Fact-Sheets-and-Policy-Briefs/SUTP-GIZ-FS-Avoid-Shift-Improve-EN.pdf>.
- [28] A roadmap towards sustainable mobility in Breda. International Scientific Conference on Mobility and Transport. Mobil. TUM 2014. Available at: <http://www.mobil-tum.vt.bgu.tum.de/fileadmin/w00bqi/www/Session-3/Bos-Themme.pdf>.
- [29] Global Report on Human Settlements. UN-HABITAT. 2013. Available at: <http://unhabitat.org/books/planning-and-design-for-sustainable-urban-mobility-global-report-on-human-settlements-2013/>.
- [30] Dooley, T. A better deal for commuters. Fianna Fáil Spokesperson on Transport, Tourism & Sport. Ireland. February 2016. 15 p.
- [31] Global status report on road safety 2015. WHO Library Cataloguing-in-Publication Data. September 2015. Available at: <http://www.who.int/violence-injury-prevention/road-safety-status/2015/GSRRS2015-Summary-EN-final.pdf>.
- [32] Preparation of the Fourth High-level Meeting on Transport, Health and Environment. United Nations Publications. 2014. Available at: <https://www.unece.org/fileadmin/DAM/thepep/documents/2012/ECE.AC.21.SC.2012.3-E.pdf>.
- [33] Bredal, F. The Case of Copenhagen. In: *Changing urban traffic and the role of bicycles: Russian and International Experiences*. Friedrich-Ebert-Stiftung, Moscow. 2014. P. 24-28.
- [34] Tahkola, P. The Case of Oulu. In: *Changing urban traffic and the role of bicycles: Russian and International Experiences*. Friedrich-Ebert-Stiftung, Moscow. 2014. P. 29-43.
- [35] Appenzeller, M. Cycling - Past, Present and Future. In: *Changing urban traffic and the role of bicycles: Russian and International Experiences*. Friedrich-Ebert-Stiftung, Moscow. 2014. P. 11-18.
- [36] Public Transport Strategy. Available at: <http://www.eastriding.gov.uk/planning/pdf/chapter-7.pdf>.
- [37] Guidelines for Attractive Public Transport with a Focus on BRT. Stockholm. January 2015. Available at: [brt-guidelines-eng-0.pdf](http://brt-guidelines-eng-0.pdf).
- [38] Dublin Transport Map. Available at: <http://www.venetikidis.com/ArisV/DUBLIN-TRANSPORT-MAP.html>.
- [39] Public Transport - an Attractive Alternative. Ministry of Transport and Communications. Finland. 2002. Printed by Erweko, 2002 Available at: <http://www.mintc.fi/>.
- [40] Global reduction in CO emissions from cars: a consumer's perspective. Policy recommendations for decision makers. FIA Mobility, Paris, November 2015. 10 p.
- [41] Smart cities Preliminary Report. 2014. Available at: <http://www.iso.org/iso/smart-cities-report-jtc1.pdf>
- [42] Clean transport, Urban transport. European Commission. Programmes and projects. Available at: <https://ec.europa.eu/transport/themes/urban/programmes-projects-en>.

- [43] Mobility as a Service (MaaS). Available at: <http://maas.global/maas-as-a-concept/>.
- [44] Smart sustainable mobility. A user-friendly transport system is a combination of intelligence, low carbon energy, and adaptable services. VTT Technical Research Centre of Finland. 2014. Available at: <http://www.vtt.fi/inf/pdf/visions/2014/V5.pdf>.
- [45] Going Green: Nottingham's hi-tech transport becomes EU model. Available at: <https://phys.org/news/2015-07-green-nottingham-hi-tech-eu.html>.
- [46] Makarova, I. & Khabibullin, R. & Belyaev, E. & Mavrin, V. Intelligent Transportation Systems - Problems and Perspectives, Studies in Systems, Decision and Control. 2015. Vol. 32. P. 37-80. DOI: 10.1007/978-3-319-19150-8.
- [47] 2016. Available at: <http://nabchelny.ru/upload/files/user/20302.pdf> [In Russian: The Strategy of social and economic development of Naberezhnye Chelny city till 2030].
- [48] Kopyay, T. & Mitchell, B & Cohn, S. & Fekete, M. Risk profiles of emerging established value chains in dynamic markets. In: IFAC-PapersOnLine. 2015. P. 521-528.
- [49] J Hallikas, J. & Karvonen, I. & Pulkkinen, U. & Virolainen, V.M. & Tuominen, M. Risk management processes in supplier networks. International Journal of Production Economics. 2004. Vol. 90. P. 47-58.
- [50] Mussigmann, N. & Kersten, W. & Blecker, T. Mitigating Risk during Strategic Supply Network Modelling. Managing Risk in Supply Chains. 2006. Vol. 1. P. 213-226.
- [51] Tuncel, G. & Alpan, G. A high level Petri net based modeling approach for risk management in supply chain networks. In: Proceedings of the 21st European Simulation and Modeling Conference. Malta. 2007. P. 178-185.
- [52] Tuncel, G. How can risks be managed in logistics networks. In: Dangerous Materials: Control, Risk Prevention and Crisis Management. 2010. P. 93-100.
- [53] Kaddoussi, A. & Zoghalmi, N. & Zgaya, H. & Hammadi, S. & Bretaudeau, F. Disruption Management Optimization for Military Logistics. In: IFIP Advances in Information and Communication Technology. 2011. P. 61-66.