

Бухгалтерию стадиона необходимо автоматизировать с помощью программы «1С:Бухгалтерия», структура и возможности которой соответствуют динамичному законодательству Украины и специфике деятельности организации. Специализированное ПО «Ticket Soft» является лучшим и наиболее надежным в своём сегменте (продажа билетов). С помощью этого ПО автоматизирован процесс продажи билетов на таких стадионах, как ФК «Локомотив» (Москва), ПФК «ЦСКА» (Москва), ФК «Металлист» (Харьков) и др.

Исходя из проведенных исследований можно сделать следующие выводы:

1. Обзор литературных источников показал, что реинжиниринг является актуальным и востребованным средством управления организацией в современной конкурентной среде.
2. Инструменты бизнес-аналитики способствуют быстрому получению и обработке больших объемов текущей информации, как внешней, так и внутренней, и оформлению их в виде отчетов, которые используются руководством организации при принятии решений.
3. Анализ бизнес-процессов позволяет путем моделирования деятельности организации определить основные проблемы, «узкие места» и оптимизировать их с учетом новых требований.
4. В результате исследования бизнес-процессов ООО «Донбасс Арена» предложен вариант проведения реинжиниринга основных процессов с помощью специальных ПП, внедрение которых будет способствовать повышению эффективности деятельности организации.

СПИСОК ЛИТЕРАТУРЫ

1. Корпорация IBM. [Электронный ресурс] // Официальный сайт. – Режим доступа: http://www.ibm.com/smarterplanet/ru/business_analytics/article/it_business_intelligence.html
2. Хаммер, Майкл. Реинжиниринг корпорации: Манифест революции в бизнесе / М. Хаммер, Д. Чампи. – СПб. : Изд-во С.–Петербург. ун-та, 1997. – 330 с.
3. Паклин Н.Б., Орешков В.И. Бизнес-аналитика: от данных к знаниям(+CD)/ Н.Б. Паклин, В.И. Орешков; СПб.: Питер , 2013. – 706 с.
4. Барсегян А. Анализ данных и процессов./А. Барсегян, М.Куприянов. и др.; СПб.: БХВ-Петербург, 2009. – 384 с.
5. Косоруков О. А. Методы количественного анализа в бизнесе : Учебник / О. А. Косоруков ; Ин-т экономики и финансов "Синергетика". – М. : ИНФРА–М, 2005. – 367 с.
6. Корпорация Microsoft. [Электронный ресурс] // Официальный сайт. – Режим доступа: <http://office.microsoft.com/ru-ru/sharepoint-help/HA102772214.aspx>

УДК 004.896

THE ROAD FOR TRANSPORTATION IMPROVEMENT OF DONETSK

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Summary. In the research the situation in the transport sector of Donetsk was described within the Concept of development urban passenger transport in Donetsk for 2007-2020. The result of the research put into the general roadmap for development framework of transport system in Donetsk that based on introduction of Intelligent Transport System that includes a range of innovative information technologies for urban smart transportation environment.

Keywords: transport, transportation policy, Intelligent Transport Systems, information technologies, roadmap for development.

Introduction

Today, road transport is the victim of its own success and faces considerable challenges. Over the next 10 to 15 years, the transport system must support economic growth, a bigger

population, higher expectations and more diverse lifestyles. Donetsk is car-centric society that is beginning to be reformed from the perspective of traffic congestions and environmental problems. Furthermore, the future maintenance of deteriorating infrastructures is starting to become a major issue.

The topic about transport efficiency of Donetsk discussed in a number of documents such as: the Concept of development urban passenger transport in Donetsk for 2007-2020, the report of Donetsk mayor before the community, research works of Zaporozhchenko E., Yakovenko K., Englezou I. and the several articles in municipal newspapers. The analysis of these documents has revealed the lack of information about the use of information technologies and their effect on improvement and optimization transport system of Donetsk.

So the main goal for this research is to make up a roadmap for developing the transport system of Donetsk that will be based on ubiquitous implementation of the advantages of information technologies and systems.

Consequently the tasks are:

1. To identify the key challenges of transport infrastructure in Donetsk;
2. To point out the main goals of changes and improvements;
3. To offer complete solutions that will use information technologies and systems.

The main part

Daily on the routes of Donetsk 1174 motor vehicles move, including 132 large buses, 647 buses and 395 medium-capacity minibuses, 75 trolley buses (of 265) and 150 trams (of 182). They go on predefined route scheme and are coordinated by the 14 control services [1]. Since 2010 in Donetsk the transport reform has been introduced. It includes the following steps:

1. The replacement large vans to high capacity buses for urban public routes;
2. The change duplicate routes and added new transport schemes;
3. The implementation of satellite navigation system to monitor transport on the line (GPS) in 2010-2013, in order to control and regulate the movement of urban passenger transport. To date, this system has been installed in 152 buses and 46 communal transports of "Donelektroavtotrans".

Despite the active policy in urban transportation as described above the next problems are still relevant [2].

1) Congestion problem is caused by dense concentrations of the population and a lack of infrastructure maintenance, and is defined as the state whereby the total number of travelers to a certain final destination and the vehicles carrying them exceed the transportation capabilities of a city. The research of Harvard Center for Risk Analysis and Harvard School of Public on the topic "The public health costs of Traffic congestion" [3], that include information about 83 cities in the USA, shows traffic congestion-related PM2.5, NOx and SO2 emissions caused approximately 4,000 premature deaths in the year 2000, with a monetized value of approximately \$31 billion (in 2007 dollars). Also this indicators compares to the estimated \$60 billion congested-related cost of wasted time and fuel in these communities during the same year. Moreover, the fuel and time loss is expected to continue its annually growing over the next 20 years.

2) Vulnerable road user problem are defined as vulnerable road users (such as the elderly, tourists, the handicapped, and others), or people who cannot travel smoothly due to various difficulties.

3) Eco problems are defined as resource protection problems, such as the loss of land, generation of waste, and wasteful consumption of limited energy involved in the development of urban environments, as well as regional environmental problems, such as the air pollution, noise, vibrations, and other problems caused by operating cars, trains, and other vehicles.

4) Deterioration problem is defined as the problems related to infrastructure maintenance costs incurred due to the deterioration of the infrastructures that support urban transportation.

5) Transportation company efficiency improvement problem that is the transportation companies must be able to provide stable transportation services to users without strained finances, while running efficiently at the same time.

Therefore improving transportation infrastructure and services is a high priority for our city. Under the Concept of development urban passenger transport in Donetsk for 2007-2020 [4] seven main tasks are necessary to solve for its implementation:

1. The development and improvement of the route network and the structure of the rolling stock;
2. The insurance of the passengers' safety;
3. The development and improvement of economic relations and the market of passenger transport services;
4. Organization of transport complex management;
5. Organization of the passengers' carriage of by taxis;
6. Human and Social Policy in passenger transport;
7. Improvement of the environmental situation in the city.

In conditions of limited financial resources the range of described above tasks of the Concept need a smart transportation environment that should cover the following requirements: reducing the mobility needs for both individuals and goods; optimising trip planning and management, transport mode selection and allowing seamless multimodality; increasing the vehicles passenger and goods capacity; and enabling more efficient transport networks.

For a more practical side, targets specifically pertaining to the improvement transportation policy, put into the checklist below (fig.1) that shows universal targets and stages for their achieving [5].

Figure 1

Targets for improvement transportation policy

	Enabler	Transportation Targets How smart cities deploy and use ICT to enhance their transportation networks	Implementation Progress			
			None	Partial	Over 50%	Complete
TECHNOLOGY	Instrumentation and Control	Implement optimal instrumentation Supplement: for all transportation modes				
	Connectivity	Connect devices with citywide, multi-service communications				
	Interoperability	Adhere to open standards Use open integration architectures and loosely coupled interfaces Prioritize use of legacy investments Enable multi-channel access to an integrated customer transportation account				
	Security and Privacy	Publish privacy rules Create a security framework Implement cybersecurity				
	Data management	Create a citywide data management, transparency and sharing policy				

Analytics	Achieve full situational awareness Achieve operational optimization Pursue predictive analytics Supplement: integrate all transport modes for multi-modal transportation optimization Achieve asset optimization Enable dynamic, demand-based pricing				
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Fortunately, there are a lot of ways cities can fix transportation problems by deploying smart ICT to improve the cities’ sustainability and efficiency. But it is necessary to highlight a “system” approach that address the below challenges and uses information, management and control work in synergy to optimize the use of infrastructures, vehicles and logistic platforms for a multimodal perspective.

Intelligent Transport Systems (ITS) play such a crucial role in this strategic approach. ITS are advanced applications which aim to provide innovative services relating to different modes of transport and traffic management and enable various users to be better informed and make safer, more coordinated, and “smarter” use of transport networks. Although under EU Directive 2010/40/EU on 7 of July 2010 ITS can be defined as systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for interfaces with other modes of transport [6].

ITS include a various range of information technologies: from basic management systems such as car navigation; traffic signal control systems; automatic number plate recognition or speed cameras to monitor applications, such as security CCTV systems; and to more advanced applications that integrate live data and feedback from a number of other sources, such as parking guidance and information systems; weather information; bridge deicing systems; and the like. Additionally, predictive techniques are being developed to allow advanced modeling and comparison with historical baseline data. Some of these technologies are described in the following part [6].

1. *Wireless (including Bluetooth) communications*

Various forms of wireless communications technologies have been proposed for intelligent transportation systems. Radio modem communication on UHF and VHF frequencies are widely used for short and long range communication within ITS. Particularly, Bluetooth is a wireless standard that is used to communicate between electronic devices like mobile/smart phones, headsets, navigation systems, computers etc. Bluetooth road sensors are able to detect Bluetooth MAC addresses from Bluetooth devices in passing vehicles.

2. *Computational technologies*

Recent advances in vehicle electronics have led to more capable computer processors on a vehicle. The current trend is costly microprocessor modules with hardware memory management and Real-Time Operating Systems. The new embedded system platforms allow for more sophisticated software applications to be implemented, including model-based process control, artificial intelligence, and ubiquitous computing. Perhaps the most important of these for ITS is artificial intelligence.

3. *Floating car data/floating cellular data*

“Floating car” or “probe” data collection is a set of relatively low-cost methods for obtaining travel time and speed data for vehicles traveling along streets, highways, freeways, and other transportation routes. There are three methods to obtain the raw data:

3.1. Triangulation Method. In developed countries a high proportion of cars contain one or more mobile phones. The phones periodically transmit their presence information to the mobile phone network, even when no voice connection is established. By measuring and analyzing network data using triangulation, pattern matching or cell-sector statistics (in an

anonymous format), the data is converted into traffic flow information. An advantage of this method is that no infrastructure needs to be built along the road; only the mobile phone network is leveraged. But in practice the triangulation method can be complicated, especially in areas where the same mobile phone towers serve two or more parallel routes (such as a freeway with a frontage road, a freeway and a commuter rail line, two or more parallel streets, or a street that is also a bus line).

3.2. *Vehicle Re-Identification.* Vehicle re-identification methods require sets of detectors mounted along the road. In this technique, a unique serial number for a device in the vehicle is detected at one location and then detected again (re-identified) further down the road. Travel times and speed are calculated by comparing the time at which a specific device is detected by pairs of sensors. This can be done using the MAC (Machine Access Control) addresses from Bluetooth devices, or using the RFID serial numbers from Electronic Toll Collection (ETC) transponders (also called “toll tags”).

3.3. *GPS Based Methods.* An increasing number of vehicles are equipped with in-vehicle GPS (satellite navigation) systems that have two-way communication with a traffic data provider. Position readings from these vehicles are used to compute vehicle speeds. Modern methods may not use dedicated hardware but instead Smartphone based solutions using so called Telematics 2.0 approaches.

Floating car data technology provides advantages over other methods of traffic measurement:

- Less expensive than sensors or cameras;
- More coverage (potentially including all locations and streets);
- Faster to set up and less maintenance;
- Works in all weather conditions, including heavy rain;

4. *Sensing technologies*

Sensing systems for ITS are vehicle- and infrastructure-based networked systems, i.e., intelligent vehicle technologies. Infrastructure sensors are indestructible (such as in-road reflectors) devices that are installed or embedded in the road or surrounding the road (e.g., on buildings, posts, and signs), as required, and may be manually disseminated during preventive road construction maintenance or by sensor injection machinery for rapid deployment.

5. *Video vehicle detection*

Traffic flow measurement and automatic incident detection using video cameras that are typically mounted on poles or structures above or adjacent to the roadway. Video from black-and-white or color cameras is fed into processors that analyze the changing characteristics of the video image as vehicles pass. Since video detection systems such as those used in automatic number plate recognition do not involve installing any components directly into the road surface or roadbed, this type of system is known as a “non-intrusive” method of traffic detection.

Thanks to its Intelligent Transport System, Singapore is one of the least congested major cities, with an average car speed on main roads of 27 km/h (17 miles per hour), compared to an average speed of 16 km/h in London, 11 km/h in Tokyo, and 5 km/h in Jakarta. This is an impressive feat considering that the population has more than doubled since 1990. The city has pioneered the introduction of a variety of technologies to the system, including one of the world’s first Electronic Road Pricing systems (ERP – tolls that vary according to traffic flows, and work as a congestion charge). The ERP uses a short-range radio communication system to deduct charges from smart cards inserted in the vehicles. Other Intelligent elements include an Expressway Monitoring and Advisory System, alerting motorists to traffic accidents on major roads and a GPS system installed on the city taxis, which monitors and reports on traffic conditions around the city. All information from the

systems feed into the Intelligent Transport System’s Operations Control Centre, which consolidates the data and provides real-time traffic information to the public [7].

The example described above shows the “Intelligence” of transport system is also a way how the public, private stakeholders, and other government agencies are brought together and discuss many issues that city faces in its transport policy. In that reason a number of innovative approaches aiming to engage citizens can be used, including focused group discussions, online feedback on the portal of the city, etc. Consequently, the Department of Transport and Communications of the Donetsk Council should shift the focus to place the commuter at the center of transport policy and take a holistic approach in planning the transportation network.

Meanwhile, cities can rarely afford the complete overhaul of their transportation systems, it is necessary to highlight some of ways they can make decisions that will be outright efficient in the future.

Firstly, insist on open standards that will allow a wide choice and decrease costs, as products can be mixed and matched from different vendors. For example, the broad transportation strategy can be guided by the provisions of the “Transit-Oriented Development (TOD) Standard”, created by the Institute for Transportation and Development Policy (ITDP) in 2013, and the “Roadmap to a single European transport area” of Directorate-General for Mobility and Transport in European Commission.

Secondly, use open integration architectures and loosely coupled interfaces will make sharing data between applications and users much easier and simpler.

Thirdly, enable multi-channel access to an integrated customer transportation account will encourage people to use it. A couple ways smart cities can do in this area: 1) payment for all city transportation services with a single account; 2) enable access to this account through multiple channels – integrated fare cards, cell phones, websites, etc.

Although it is unlikely that Donetsk can integrate all information technologies in transport infrastructure at once, but the general roadmap [8] for development framework of transport system in Donetsk have been composed and presented on the chart below (image 1).

APPLICATION	ENABLING TECHNOLOGY
Driver Assistance	Integration and consolidation of sensors, actuators and functionalities
Safety	Highly automated driving: autonomous parking, automatic following, guided driving Adaptive and Personalized Safety: driving Workload Management incl. Driving Monitoring and Situation-Adaptivity
Convenience	Permanent information (“Always on”) wireless communication, personalized in-car multimedia, technological convergence Secondary and supporting functionalities, adaptive passenger compartment

Image 1. General roadmap for development framework of transport system in Donetsk

Conclusion

1. In the research the situation in the transport sector of Donetsk was described. The main focus was pointed on current relevant issues in urban transport.

2. Further, the basic tasks for improving the situation in transport infrastructure of Donetsk within the Concept of development urban passenger transport in Donetsk for 2007-2020 were overviewed. Upwards these tasks were put into a checklist for the capability of its practical use by members of authority in transport sector.

3. The analysis showed wide range opportunities for Donetsk in the “system” transport management approach that provides innovative services of Intelligent Transport Systems. It includes the list of information technologies that should encompass different technical

requirements and as the result give an impressive effect of smart transportation environment. To confirm such claims the example of Intelligent Transport System of Singapore that is one of the least congested major cities was considered.

4. Moreover, the work consist the precision about necessity of community engagement for creating the people-centered transportation policy.

5. The result of the research put into the general roadmap for development framework of transport system in Donetsk.

References

1. Report Donetsk mayor before the enormity of Donetsk [Electronic resource] / Official site of the mayor and city council of Donetsk. – 22 of February 2013. – Available from Internet : http://www.lukyanchenko.donetsk.ua/news_echo.php?id_news=8060 (5 of November 2013). – Title from the screen.
2. Smart Mobility for Smart Cities [Electronic resource] : Six problems that must be Resolved by Smart Mobility / Hitachi. – Available from Internet : <http://www.hitachi.com/products/smartcity/smart-infrastructure/mobility/index.html> (3 of November 2013). – Title from the screen.
3. The public health costs of Traffic congestion [Electronic resource] : research / Harvard Center for Risk Analysis ; Harvard School of Public on the topic. – 2010. – Available from Internet : http://smartcitiescouncil.com/system/tdf/public_resources/Congestion%20impact%20on%20public%20health.pdf?file=1&type=node&id=380 (3 of November 2013). – Title from the screen.
4. The concept of development urban passenger transport in Donetsk until 2020 [Electronic resource] / Approved by the City Council. – 2 of November 2007. – № 14/1. – Available from Internet : <http://passtrans.dn.ua/concepcia.php> (5 of November 2013). – Title from the screen.
5. Transportation [Electronic resource] : Smart Cities readiness guide : The planning manual for building tomorrow's cities today / Smart Cities Council. – 2013. – Available from Internet : http://smartcitiescouncil.com/system/files/premium_resources/SmartCitiesCouncil-ReadinessGuide-11.18.13.pdf?file=1&type=node&id=615 (5 of November 2013). – Title from the screen.
6. Intelligent transportation system [Electronic resource] // Wikipedia : the free encyclopedia : [site] / Wikimedia Foundation, Inc. – Available from Internet: http://en.wikipedia.org/wiki/Intelligent_Transportation_Systems (4 of November 2013). – Title from the screen.
7. LTMasterPlan [Electronic resource] : A People-Centred Land Transport System / Land Transport Authority. – 18 of February 2008. – Available from Internet : <http://www.lta.gov.sg/content/dam/ltaweb/corp/PublicationsResearch/files/ReportNewsletter/LTMP-Report.pdf> (3 of November 2013). – Title from the screen.
8. Smart Cities – Intelligent Transportation Systems [Electronic resource] : Smart Cities Applications and Requirements : White Paper / Net!Works European Technology Platform. – 20 of May 2011. – Available from Internet : http://www.networks-etc.eu/fileadmin/user_upload/Publications/Position_White_Papers/White_Paper_Smart_Cities_Applications.pdf (5 of November 2013). – Title from the screen.

УДК 004.415:347.942

УДОСКОНАЛЕННЯ ІНФОРМАЦІЙНОЇ СИСТЕМИ РОБОТИ ЗІ ЗВЕРНЕННЯМИ ГРОМАДЯН.

М. В. Сердюченко, М. П. Аровіна

Резюме. У даному дослідженні проаналізовано інформаційну систему діяльності зі зверненнями громадян сектору документального забезпечення МУ ГУМВС України в Донецькій області. Встановлено основні проблеми, такі як постійне зростання кількості звернень, незадоволеність громадян інформаційною діяльністю регіональних органів МВС. Запропоновано напрямок удосконалення інформаційної системи – її автоматизація.

Ключові слова: інформаційна система, звернення громадян, контроль, автоматизація.

Актуальність теми полягає у тому, що звернення громадян є необхідним елементом побудови демократичного громадянського суспільства, тобто такого яке брало би активну участь в управлінні державними справами, шляхом звернень з порадами, рекомендаціями щодо вдосконалення правової основи та організації