ALFA BK UNIVERSITY
FACULTY OF INFORMATION AND COMMUNICATION TECHNOLOGY
FACULTY O F COMPUTER SCIENCE
ALFATECH
Proceedings of Conference
Alfa BK Univerzitet

UDK: 004.451.5
COBISS.SR-ID 148859401
DOI: 10.5281/zenodo.12615233
Professional paper

PARADIGMS OF APPLICATION OF BUSINESS DATA ANALYSIS AND BUSINESS INTELLIGENCE IN PUBLIC ADMINISTRATION AND LOCAL SELF-GOVERNMENT

Kostadinka Stojanović[90], *Nebojsa Denić*[91], *Jelena Stojanović*[92]

Abstract

This research paper will present the concept of data collection that provides the possibility of applying analytical methods, including business intelligence and methods, techniques and tools for processing large amounts of business data. The importance and amount of data in all areas, including municipalities, is growing year by year. In the past, municipalities have lagged behind the private sector in the area of business intelligence, but in recent years progress has been felt in this area. Currently, municipalities are still exploring and learning what solutions are available for smart cities and communities. As determined by European and national strategies in this area, education in the field of data will be key, because as the work shows, there is still a lot of room for improvement. In any case, the work will contribute to a better understanding of the importance of smart cities and municipalities and business intelligence, because it was presented to all holders of the municipal budget and will be used as a basis for further activities of the Municipality. municipality in this area. Last, but not least, policies in this area, both European and Slovenian, aim at increasing digitization. We are in a period when so-called smart cities, smart villages, smart municipalities are being born. Business intelligence is also key in this light, as it enables smart communities to make better decisions and thus achieve their goals more easily. It could be said that business intelligence gives intelligence to smart municipalities. I estimate that in the future, despite the current lack of knowledge in the field of data, municipalities will increasingly be digitized, digitally transformed and that there will be more and more solutions and good practices in this area. The municipality will follow the goals of digital transformation and the goals of the Digital EU Agenda and will definitely achieve them by 2030, which means that with the help of business intelligence, it could be transformed into a smart municipality. However, it is difficult for me to estimate what the level of transformation will be, which I could explore in further analyses.

[90] Kostadinka Stojanović, 1997, Faculty of Mathematics and Computer Science, ALFA BK University, Palmira Toljatija 3, 11070 Belgrade, Serbia kostadinka.stojanovic@alfa.edu.rs https://orcid.org/0009-0008-5796-312X
[91] Nebojša Denić, 1965, Faculty of Sciences and Mathematics - University of Priština, Kosovska Mitrovica, Serbia, e-mail: nebojsa.denic@pr.ac.rs, https://orcid.org/0000-0003-2584-259X
[92] Jelena Stojanović, 1991, Faculty of Mathematics and Computer Science, ALFA BK University, Palmira Toljatija 3, 11070 Belgrade, Serbia jelena.stojanovic@alfa.edu.rs https://orcid.org/0009-0004-6729-2746

ISBN: 978-86-6461-074-2

Keywords: *Data analysis, business intelligence, digitization*

THEORETICAL BACKGROUND

Today, state administration and municipalities are considered one of the largest creators and collectors of data available to the public worldwide in various fields. One of the main advantages of this type of data is that it has already been collected by governments for specific purposes and paid for by taxpayers, thus reducing the economic costs for private individuals to collect it. Due to the extraordinary amount and centrality of data collected by governments, this data is particularly important for greater transparency of the public sector (Ubaldi, 2013).

Business intelligence is certainly one of the basic building blocks of a smart city and municipality, as it gives "smartness" to smart cities and municipalities, as noted by Brooks, Claps and Yesner Clark (2015). In smart cities we encounter the interaction between people, technologies and data (Anthony Jnr, 2021), which is also common in the field of business intelligence. There are many areas of application of business intelligence in smart cities, but it is certainly more appropriate to introduce it in areas where data is structured and where the state of preparedness is at a higher level according to the findings of Williams and Williams (2007).). Currently, municipalities together with the public sector are a large generator of data. These data can, as noted by Ubaldi (2013), represent an important source of economic growth and the introduction of new forms of entrepreneurship.

On the other hand, the data show (table 1) that there is little knowledge in the field of data in our municipalities, which will be improved within the Digital Serbia 2030 strategy.

Table 1: Indicators of Serbia's digital strategy in 2030

Indicators	2022	2025	2030
Number of municipal officials who completed at least one course in the field of data, artificial intelligence.	100	3.000	10.000
Number of municipalities using smart city technology.	10	100	300
Number of data administrators, persons responsible for artificial intelligence.	6	100	300

Source: Government of RS (2023b).

As noted in the Organization for Economic Co-operation and Development (OECD) report (Ubaldi, 2013), in addition to increasing government transparency and public awareness of government programs and activities, openness data can also help improve government performance. Greater transparency of data is the basis for public participation and cooperation in the creation of innovative services with added value. In addition, data openness is expected to improve decision-making by both governments and individuals. In particular, the public is expected to be able to use open data to make better decisions and improve the quality of their lives. Open data portals allow easy access to certain databases, for example through dedicated mobile applications users can be better informed in their decisions; while governments are expected to be able to more easily access a wider range of data to drive fact-based decision-making. Finally, open data is also considered an important source of economic growth, new forms of entrepreneurship and innovation. However, the biggest obstacle to the use of open data appears to be the lack of knowledge among private sector organizations about the availability of open data and insight into its benefits (Ubaldi, 2013).

The Ministry of Public Administration established the national open data portal of Slovenia (hereinafter OPSI), which was built on open-source software. The OPSI portal is a unique national online point for the publication of open data for the entire public sector. Before the establishment of OPSI, certain open collections were published on the NIO (National Interoperability Framework) portal. Due to the specific structure of publications and, above all, user orientation, Slovenia, following the example of most countries, established a dedicated open data portal, where metadata descriptions of all public sector collections and open data collections are available (Ministry of Public Administration, 2019).

ISBN: 978-86-6461-074-2

2.1 Business intelligence and municipalities

According to Brooks, Claps and Yesner Clarke (2015), business intelligence and analytics are key initiatives for smart cities and municipalities. It could be said that business intelligence solutions add "smartness" to smart cities and municipalities.

The business intelligence market continues to expand significantly and reach higher and higher levels. Annual growth is estimated at almost 8%. It is expected to reach $33 billion in 2025. Growth is primarily generated by digital transformation. Among the main growth generators is primarily increased demand for data visualization dashboards (MarketsandMarkets, 2020).

Business intelligence on the example of companies increases efficiency in decision-making and therefore increases the added value and profit of companies. Smart city initiatives also focus on the need for more efficient decision-making, which can be achieved by introducing business intelligence. On the example of the use of business intelligence software in Swedish municipalities, the authors note that municipalities are late in introducing business intelligence compared to the private sector. When analyzing the added value of business intelligence, however, there is no noticeable difference between municipalities and the private sector (Anderson & Fatih, 2016).

Municipalities face various challenges such as budget planning, space management, traffic planning, waste management, providing services to residents and much more. Business intelligence enables municipalities to acquire, combine and analyze data from various sources, such as population registers, statistical data, spatial data, energy consumption data, budget data, etc. By using business intelligence, data is thus transformed into information that helps in making decisions, achieving set goals, improving services and thereby making municipalities more efficient.

Based on research in the field of smart municipalities and cities, digital transformation and business intelligence, I conclude that with the help of business intelligence tools and technologies, municipalities can:

- ✓ analyze demographic data and identify patterns and trends in the population, which allows them to better plan services and infrastructure,
- ✓ manages the budget and funds more effectively and monitors the use of public funds,
- ✓ performs traffic analysis and plans traffic solutions to reduce congestion and improve mobility,
- ✓ manages spatial data and plans the spatial development of the municipality,
- ✓ analyzes waste and plans strategies for sustainable waste management,
- ✓ monitor residents' satisfaction and conduct surveys and analyze feedback to improve the quality of services.

Highly suitable areas for implementation are generally those where the data is well structured (Aberdeen Group, 2010). The introduction is justified from an economic and social point of view. Every successful example of getting to know each other is definitely a good incentive and a step forward. In the case of introduction in the area of the budget, it would be reasonable for the municipalities to consider or propose to the ministry responsible for financial affairs to prescribe an additional attribute of the location of the expenditure in the form of a coordinate for investment. costs. Thus, with the help of maps, dashboards could gain an additional dimension and therefore even better information for decision-making.

The importance and amount of data in all areas, including municipalities, is growing year by year. In the past, municipalities have lagged behind the private sector in the area of business intelligence, but in recent years progress has been felt in this area. Last, but not least, policies in this area, both European and Slovenian, aim at increasing digitization. We are in a period when so-called smart cities, smart villages, smart municipalities are being born. Business intelligence is also key in this light, as it enables smart communities to make better decisions and thus achieve their goals more easily. Municipalities and companies differ in many ways, but we can also find common points in both. Business intelligence enables better and more efficient decision-making both in the case of companies and in the case of municipalities. Services that are of vital importance in

ISBN: 978-86-6461-074-2

municipalities are being improved. In recent decades, municipalities have moved from digitization and digitization to digital transformation, thus becoming increasingly "smarter". The ability of business intelligence to transform data into information for the needs of better decision-making, and therefore more efficient operations, is also crucial in the case of smart cities and municipalities. It could be said that business intelligence gives intelligence to smart municipalities.

LITERATURA

1) Aberdeen Group. (2010). *Business Intelligence in the Public Sector: The value of efficient resource utilization*. Pristupljeno 12 Januara 2024 na adresi https://www.novis.cl/wp-content/uploads/2011/04/BI_in_the_Public_Sector_TheValue_of_Efficient_Resources _Utilization_White_Paper.pdf
2) Andersson, T. & Fatih, A. H. (2016). The use of BI software in Swedish municipalities . Lund: University School of Economics and Management.
3) Brooks, A., Claps, M. & Yesner Clarke, R. (2015). IDC Market Scape: Worldwide Smart City Business Analytics Software 2015 Vendor Assessment. Pristupljeno 12 Januara 2024 na adresi https://smartcitiescouncil.com/system/tdf/main/public_resources/SASIDC.pdf?file= 1&type=node&id=3348&force=
4) Markets and Markets. (2020). Business Intelligence Market by Type (Platform, Software, Service), Data Type (Unstructured, Semi-structured, Structured), Business Application, Organization Size, Deployment Model, Industry Vertical, and Region-Global Forecast to 2025. Pristupljeno 12 Januara 2024 na adresi https://www.marketsandmarkets.com/ PressReleases/social-business-intelligence-bi.asp
5) Ubaldi, B. (2013). Open Government Data: Towards Empirical Analysis of Open Government Data Initiatives. Paris: OECD.

ISBN: 978-86-6461-074-2