

Smart comprehension – Comparing three smart cities from three Middle-European countries

Marcell László TÓTH

PhD student, Széchenyi István University, Győr

E-mail address: toth.marcell@sze.hu

Abstract

The topic of smart city is very actual and popular today. This is an urban development and management mode, what using the infocommunication technologies and smart devices and solutions, to made the city more effective, more environmental-friendly and more liveable for the citizens. However, there are big differences in smart city point of view between counties, regions and cities. In this study the chosen cities was compared across their smart city situation. These three are the following: Bratislava (Slovakia), Graz (Austria) and Győr (Hungary). The author analyze the strategic document, look at the working smart solutions from the cities, and find results about the three analyzed cities. The conclusion is that Graz is smarter than the other two cities, but Bratislava and Győr have good opportunities to catch up the European average. Graz could be a good pattern for this cities, both of them can learn from Austrian cities, if they want to reach their goal, and become the smartest city from their own country.

Keywords: smart city, urban development, sharing economy, comprehension.

1. Introduction

At our age the achievements of modern technology become the integral part of our everyday life. We often call these petterns for smart solutions. This innovation affect our utility object (for example smart phone, smart watch), our living spaces (for example smart home) and of course our settlements too (smart village, smart city).

The smart city in an urban development and management mode, which is very actual and current topic in nowadays, because a key aspect of this model is using the infocommunication technologies, to made the city more effective, more environmental-friendly and more liveable for the citizens.

However. the phrase of smart city is mainly from the American and West European (and Scandinavian) countries, this method already have arrived to Middle-Eastern-Eurpe too. There are some good project in these countries for smart city too, and some cities want to become smart for the next decade. This decicion is quite joyful, but these cities could learn from their neighbour countries, and they have to.

The topic of this study is a comprehension. The author would like to compare two Middle-European potential smart cities with a city from the same area who is already smart. Győr is one of the most dinamically developing cities from Hungary. Bratislava is the capital city of Slovakia. The Graz is the second biggest city from Austria, and can called himself a smart city. Which things are similar and which things are diffirent in these cities? It is the main question of this article.

2. Comprehension

In the road the distance between Győr and Bratislava is about 85 kms, it is around 1 hour with car. The distance between Győr and Graz is 230 kms. The distance between Bratislava

and Graz is around 250 kms. These ways are around 3 hours by car. And of course, there are railway connection among the three cities. In spite of the little distances there are similarities and differences too. This study would like to present them.

2.1. General informations

Table 1. General comprehension of Graz, Bratislava and Győr

	Graz	Pozsony	Győr
Country	Austria	Slovakia	Hungary
Rang	statutory city	capital city	city with county rights
Hivatalos nyelv	German	Slovak	Hungarian
Population	280 200 inhabitants	425 923 inhabitants	129 301 inhabitants
Area	127,56 km ²	367,9 km ²	174,62 km ²
Density	2200 /km ²	907 /km ²	742 /km ²

Source: On editing

At the Table 1 you can see the general demographic and geographic indicators of the three cities. Before reaching the present situation these cities had to make a harsh way. Bratislava is the capital of Slovakia, but in the past it was a Hungarian city (its name was „Pozsony”), after then it was a part of Czechoslovakia. Bratislava’s population three times higher than Győr’s, and almost twice of Graz. The city-size of Bratislava is equally missing from the Austrian and Hungarian city network. (The biggest Austrian city is Vienna, the biggest Hungarian city is Budapest. Both of them have around 2 million inhabitants and both are the capital of their country.)

2.2. Strategies

There is a good way to comprehend the smart city status is analyze the strategic documents of the cities. All of the three cities can you find popular slogans and solutions, but in the practice it is not appears every time enough pronounced.

The author analyzes the actual strategic development documents of the cities. In Győr there is the Integrated Spatial Development Strategy (ITS) [1], what was made in 2014. In Bratislava there is the Spatial Development Plan. It was made in 2014 too. The newest actual document is from Graz. The City Development Concept was made in 2018, it is the 4.0 version of this strategy [2]. The goal of this analysis is examine the keywords from this document.

Table 2. Keywords from strategic documents

	Graz City Development Concept	Bratislava Spatial Development Plan	Integrated Spatial Development Strategy of Győr
		(2014)	(2014)

Industry	54	150	106
Economy	40	77	190
Innovation	2	5	60
Transport	95	14	189
Smart city	4	0	15
Sustainable development	0	8	7
Higher education	0	1	12
Number of pages	104	294	152

Source: Own editing

According to the table the word „industry” is quite frequent. This word appears every second page in average. The „economy” is the most common in Győr’s document. This is true for the „innovation” too. The other strategies contains it barely. However the word „traffic” is the most frequented in the Győr strategy, Graz has a best traffic system of the three cities. The keyword „smart city” appears 15 times in Győr’s strategy, but all of these mentions connected to just one project. In Graz’s strategy you can find only four „smart city”, but there is an own chapter for this topic in this document. This word is missing from Bratislava’s strategy. The frequency of words „sustainable development” and „higher education” are not dominant at this documents.

Of course, not just these document are about smart city. In Győr the cooperation between Price water house Coopers and ABUD a Smart City Document was made. Unfortunately, this strategy is not public. In Bratislava four years later, in 2018 was made Smart City Strategy to 2030 [3]. The disadvantage of this document that there is only in Slovak language. Graz already have smart city strategy for years. And like the City Development Concept, it was renewed several times.

2.3. Smart solutions

In the previous subchapter there were describe, what role the smart city approach has in the strategic document of this three cities. However, the actions are more important than the words. Luckily, all of the analyzed cities have smart solutions and good projects too.

In Győr the first project was the placing of intelligent leds. According to the cooperation between the local government and the E-ON (the electricity provider company in Hungary) in 2013, 150 intelligent leds was placed in different points of the city, what takes consider to the consumer demands, and optimize their own work. The data service and the energy efficiency are realized at the same time. There are not similar systems in Bratislava and Graz yet.

The City Service Application also is a popular smart solution in Győr. This is a smartphone application, and actually an online error reporting system. If someone walk on the street, and see that something is wrong (for example: some public utility doesn't works, potholes, damaged public bench or trash can, bumps, etc.), she can take a photo, mark the location with GPS, and send this information with the app to the competent city service company. The company get a notification about the problem, and they hopefully take action. Unfortunately, the city doesn't have enough budget for this solution, so it can't spread widely. There are not similar systems in Bratislava and Graz yet.

The real time traffic-schedule is working in Graz, Bratislava and Győr too. If someone need some type of information about the local buses or trams (In Győr there aren't tram, but the other two cities has), she can find it at the internet, in the mobile application, and, naturally, in the bus stops and stations. In the imaginary race of the smartphone apps Győr is in arrears, because the local app is not too user-friendly. Nevertheless, there are some special bus stops in the Hungarian city what not just write the information on the display, but also say it. The citizens likes this solution, and called them „speaking bus stations”.

The public bike sharing systems are very popular smart solutions in a whole World. All of the three analyzed cities have own bike sharing system. In Graz the first system was the GrazBike, and nowadays there is a bike sharing system called BikeCitizen. In Győr there is a GyőrBike bike sharing schame [4]. In Bratislava there are two systems. The Up! City, and the Slovnaft BAjk (what started the service in the autumn of 2018). The Slovnaft BAjk is similar than the Hungarian bike sharing sytem MOL BuBi in Budapest [5]. Every systems have normal and electrical bikes too. And the BikeCitizen and the UP! City includes cargo bikes too.

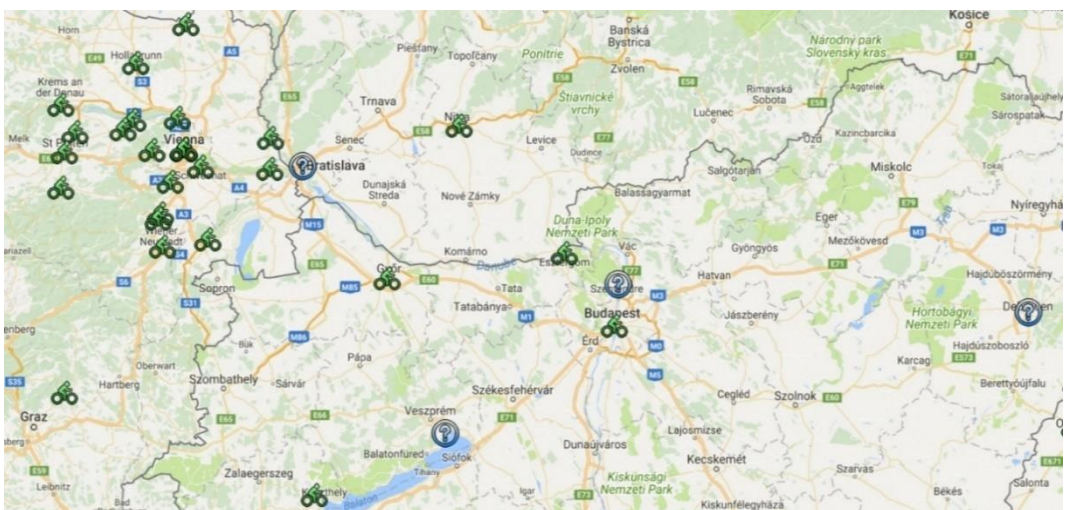


Fig.1 Public bike sharing systems
Source: www.bikesharingmap.com

Beside the bike sharing system Graz give the citizens a lot of opportunity to travel with bike. The city has a lot of good bike path. And in Graz there are a huge amount of bicycle storages throughout the city. Near the railway thation there are hundreds os storage. In contrast of Graz in Bratislava this number is almost zero. In Győr, there are 16 GyőrBox (a metal boxes when you can lock just one bike), and 1-2 dozens of normal storages.

The UP! city also have carsharing too. The similar way than the bikes you can rent cars from them. They have the same e-Golf cars like the Hungarian company GreenGo [6] in Budapest. In Graz and in Győr there are not public car sharing systems. (The CEO of the GreenGo from Budapest said that cities with the same size like Győr didn't have enough demand for this services.) In Hungary only in Budapest, in Austria only in Vienna would be this model viable. Bratislava is a borderline case.

The new type of smart solutions is the city card systems. They are tourist destination cards what helping you get to know and experience the best that the city and it's region too. If someone buy the card she get discounts of museaums and transports too. There is a city card in Bratislava called Bratislava Card, and in Győr called Győr Card. Graz don't have city card yet.

3. Results

However the number of smart solutions are increasing in all of the three analized cities, the measuring of the smartness is not an easy way. What makes the city smart? How can measure it? There are no unified methodology, but lot of researcher tried it already.

Ther Mercer Quality of Living Index [6] examine the liveability of cities and the liveing quality of the citizens. Graz and Győr – according to their size – didn't released in the list. In 2017 and in 2018 Bratislava was in the 80. rank, there were more than 200 cities in the list.

There were a research in Hungary what examined eight Hungarian big cities (Debrecen, Győr, Miskolc, Pécs, Szeged, Székesfehérvár, Tatabánya, Veszprém) and one little city (Kőszeg). The Hungarian Academy of Sciences Institute for Regional Studies led by Dr. Mihály Lados in 2011 [7], analyzed the cities inseven cetegories: people, business sphere, traffic, city services, energy management, water management and communication. Based on the final results Győr was in the front of the midfield.

Fortunately there is a good opportunity to compare the three cities. You can find a very interested project at www.smart-cities.eu site. This webpage is operated by the Vienna University of Technology Department of Spatial Planning. This institute led by Rudolf Giffinger did their EuropeanSmartCities research four times at the 2010s. First of all they examine the cities betwee 100 000 and 500 000 inhabitants, the change the sized between 300 000 and 1 000 000 inhabitants.

Our three cities was examined two consecutive years. Graz and Győr was analyzed in 2014, and Bratislava was analyzed in 2015.

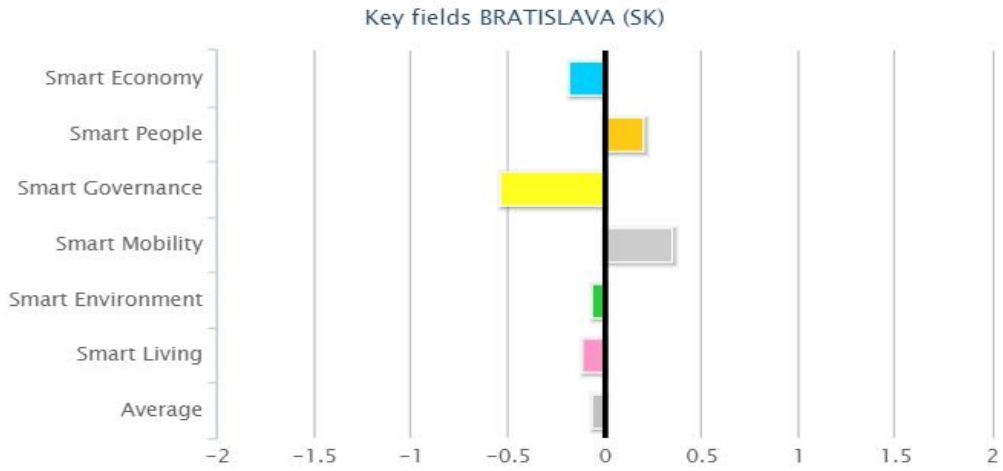


Fig.2 Smart City key fields - Pozsony
 Source: www.smart-cities.eu

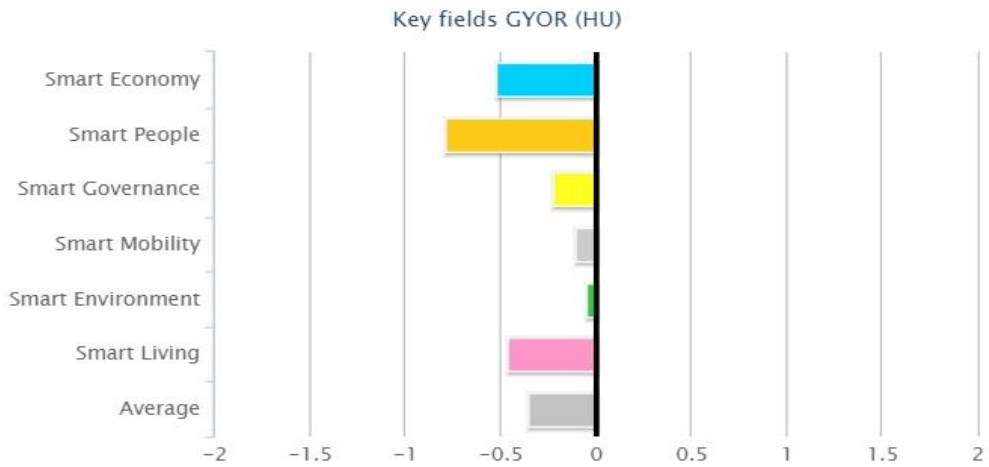


Fig. 3 Smart City key fields - Győr
 Source: www.smart-cities.eu

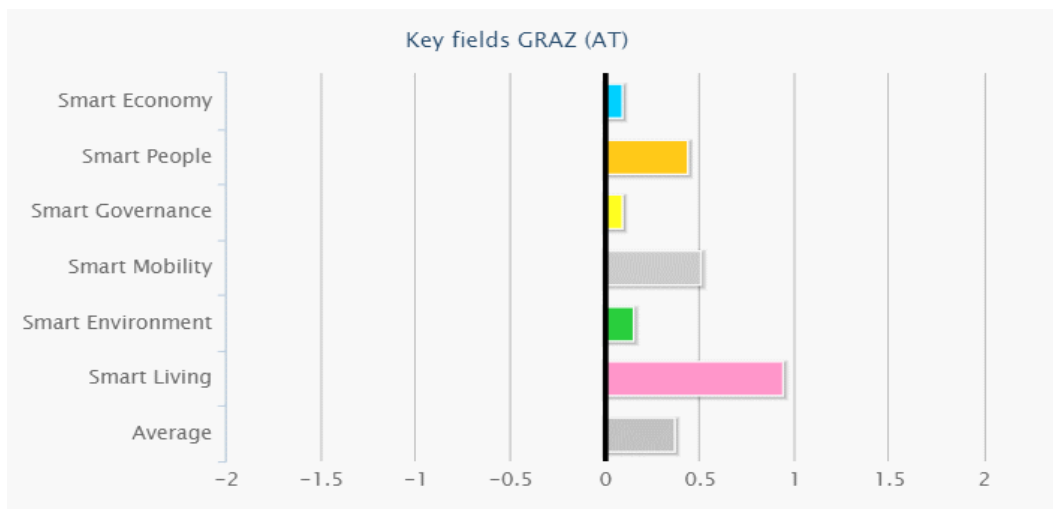


Fig.4 Smart City key fields - Graz
 Source: www.smart-cities.eu

The Figure 2, 3 and 4 show what the difference with the city and the European average according to the indicators. Bratislava is better than average in the mobility and the people category, the other five values are lower than average. Győr could be less happy, because the city is under the average in every categories. And as we thought, Graz is the best, all values is better than the average. The highest difference is in the category of living.

4. Summary

In this study three cities from Middle-Europe was compared according to their smart city situations and positions. The chosen cities was Győr from Hungary, Bratislava from Slovakia and Graz from Austria.

In the first part of the article the author analyze the keywords from the strategics document from this three cities.

The second step was the introduction of their smart solutions. Every city has public bike sharing systems and real time trafic-schedule too. But there are significant differences in city cars, car sharing intelligent leds and bike storages.

The three cities was competed in the European field. Owing to the EuropeanSmartCities research led by Rudolf Giffinger you can find information about the differences between your city and the European average. Bratislava and Győr performed weaker than the norm, but Graz is better the the continental average in every indicators.

The conclusion is that Graz is smarter than the other two cities, but Bratislava and Győr have good opportunities to catch up the European average. Graz could be a good pattern for this cities, both of them can learn from Austrian cities, if they want to reach their goal, and become the smartest city from their own country.

References

- [1] Győr Megyei, Jogú Város Önkormányzata (2014), Integrált településfejlesztési stratégiája.
- [2] Graz (2018), 4.0 Stadtentwicklungskonzept Graz.
- [3] Bratislava (2014), Bratislava rozumné mesto 2030 – Koncepcia smart city.
- [4] Jóna, László (2016), Terítéken a GyőrBike, GazMag, VI. 10. , p. 10.
- [5] Yezhova, Anastasiia (2018), Budapest public transport transportation towards the smart city concept, Svéhlik, Csaba (2018), Gazdálkodástudományi kihívások a 21. században – Best of KHEOPS V., pp. 8-14.
- [6] Tóth, Marcell (2017), A GreenGo projekt, GazMag VII. 11., p. 6.
- [7] Lados, Mihály (2011), Smart cities tanulmány, Magyar Tudományos Akadémia Regionális Kutatások Központja Nyugat-magyarországi Tudományos Intézet, Győr (http://www-05.ibm.com/hu/download/IBM_SmarterCity_20110721.pdf) .