

ACCEPTANCE OF NEW OPEN DATA TECHNOLOGIES IN PUBLIC SERVICES

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Abstract

Open government data (OGD) contributes to increasing the quality of public services provided by local public administration to citizens. These data create the necessary framework to be able to determine the opportunity of certain public policies or decisions for the life of the local community. The OGD is still being adopted in public sector organizations. Considering that the digitalization of the public services of a city is a topic that occupies an important place on the public agenda, this article presents a review of the literature, a proposed research model and a case study from the city of Iași, Romania. The Local Public Transport Company makes open data available to all interested parties and allows the development of solutions that support urban mobility and the quality of life of citizens.

Keywords

open (government) data, urban mobility, public transport, digitalization, public services

JEL Classification

O18, O35, R41

Introduction

With the technological progress, the concept of Smart City is more and more present in the development visions of the city and in the public services offered by the local public administration to the citizens. The extensive process of digitization and digitalization in the major cities of the world is observable, a process that comes to the aid of citizens by optimizing time, financial and other resources.

In order to be able to find optimal solutions for the implementation of this concept, the appropriate framework for public-private partnerships is created. Collaboration between the public and private sectors is a complementary use of resources, so that citizens can benefit from the right solutions to their needs. Also, an important example of what can be achieved under the auspices of the Smart City concept in public-private partnerships are projects that use open data. Public institutions can make available all data from their activity (for example, in the case of public transport, data on the movement of means of

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transport). Using solutions such as an API (Application Programming Interface), developers can create applications that support both an institution and its beneficiaries. We will use two terms: digitalization and digitization. Digitization involves transposing current data into a digital environment, and digitalization uses this data and other technologies to make decisions easier and better. In this context, digitization also means easier access to public services. In this article, we will review the literature, propose a research model and present the open data portal of the Romanian Government, as well as two open data solutions created through a public-private partnership.

1. Review of the scientific literature

Today, more than half of the world's population lives in urban areas (Gurcan and Dogan, 2017). Cities are real data resources, which can be processed so that solutions can be developed to increase the quality of life. In the last two decades, the concept of Smart City has been increasingly present in local government processes (Voorwinden, 2021). The urban environment is facing problems such as pollution, health problems, energy management, traffic congestion, and so on. (Gurcan and Dogan, 2017). To meet them, Smart City solutions come to propose effective ways to fix it. This concept can be viewed through the prism of two components: "smart" technologies and partnerships with private sector actors. In fact, "smart" technologies are those technologies that have the ability to collect data and information, manage to transfer it, store it for a certain period of time and, at the same time, analyze and process it (Voorwinden, 2021). Moreover, once these data sets are available, it is important that these technologies can create automations (Berardi and Belizario, 2019). For example, in this case, we are talking about data sets such as the number of pedestrians, energy consumption, air quality, traffic, etc. (Voorwinden, 2021). Given that more than 70% of the world's population is expected to live in urban areas by 2050, this acceleration poses many challenges for local governments in terms of resource efficiency and medium-term sustainability. All of these issues have a development vision to improve an accessible, economically viable and livable environment, all from a sustainability perspective. (Gurcan and Dogan, 2017).

Thus, a solution that offers this vision of development mentioned above is represented by public-private partnerships. Although in the past there was no legislative framework to facilitate such partnerships, the need to accept new technologies has accelerated the regulation of this concept and all its subsequent components. Interconnecting the smart technologies needed in the public sector with the resources provided by the private sector has proven to be a suitable and efficient solution for urban development (Voorwinden, 2021). Public-private partnerships (PPPs) have succeeded in proposing mechanisms under the auspices of Smart City solutions to facilitate the development of relevant public policies or to facilitate the entire decision-making process (Berardi and Belizario, 2019).

One way in which the openness of local or central public administrations can be measured is the level at which they make open (governmental or non-governmental) data available to those concerned, say Janssen, Charalabidis and Zuiderwijk (2012).

This openness to provide open data facilitates the understanding of a city's activity by analyzing and modeling data from different areas of urban activity (Naphade et al., 2011).

Lately, public administrations and public companies have focused their attention on this data (OGD), managing to create web portals that make it easy to access. Thus, civic involvement, civic initiatives, innovation in the business segment, but also scientific discoveries are encouraged. However, the term open does not have the same meaning for all actors involved. The Open Knowledge Foundation provides an "open definition" that emphasizes that data must be "open to anyone and free to access, use, modify or distribute [...]". An example of government openness in this regard is President Obama's Open Government Data Act, which was enacted in 2013. It mandated federal government agencies to publish data that could be read by computers and other devices in an open format. (Zhu, Thomas, Moore and Allen, 2021). All this data can be easily processed through an API (Application Programming Interface), which allows another application to connect to data provided by a particular public institution.

2. Research methodology

The proposed research model is a model adapted from the Technology Acceptance Model (TAM). The Technology Acceptance Model (TAM) was developed by Davis (1986), [Davis et al. (1989) and is often cited as the most stable model for adopting and using technologies [Alshare et al., 2004]. But while TRA is a general theory of human behavior, TAM was primarily designed to model user acceptance of computer systems [Mathieson et al., 2001]. Similar to previous theories, it is assumed that users may choose to use a specific technology, based on individual cost-benefit considerations [Compeau et al., 1999]. The technology acceptance model assumes that two special constructs determine the user's acceptance of a technology: Perceived Ease of Use (UUP) and Perceived Utility (UP). According to the definitions of Davis et al. (1989), UUP refers to the degree to which the user expects the target system to be used effortlessly, while UP describes the subjective probability that the use of a specific application system will enhance performance in the workplace in an organizational context.

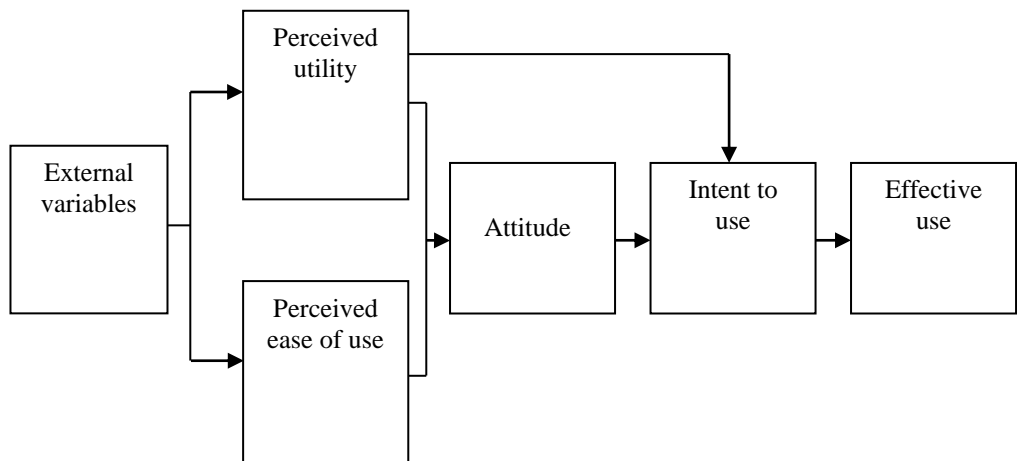


Figure 1. Original technology acceptance model [Davis et al. (1989)]

Davis et al. (1989) argue that external variables (such as individual abilities or situational constraints) indirectly influence the use of technology through their impact on UUP and UP. Both UUP and UP influence the user's attitude towards technology, which in turn influences the intention to use the technology [Mathieson et al., 2001].

As shown in Figure 1, there is also a direct impact of perceived utility on the user's behavioral intent to use the technology. When individuals have a negative attitude towards a specific technology, this could be offset by a positive belief about the usefulness of the system, which should ultimately lead to a positive intention to use [Mao and Palvia, 2006].

Over time, the original TAM model has been slightly modified to incorporate new discoveries. Testing the original TAM model, several studies have found that attitude does not fully mediate the effect of UP on Intent to Use [Burton and Hubona, 2005]. Therefore, the TAM model no longer includes the user's attitude towards technology [Venkatesh, 1999; Venkatesh et al., 2003].

The technology acceptance model has been tested by numerous authors, including Adams et al., (1992), Hendrickson et al. (1993), Igarria et al. (1997) Riemenschneider et al. (2003), Subramanian (1994), Szajna (1994), Taylor and Todd (1995), Chin and Todd (1995).

3. Results and discussion

The acceptance of open data technologies in public services is also observable in Romania. The big urban centers made open data information available to those interested. So far, however, the Romanian Government has published a web portal that serves as a "central access point for open data sets", which are provided by the public administration and its institutions. In this way, they can be easily found, downloaded and used, thus facilitating access to "information generated and held by administrative

structures". To facilitate the access and use of this data, the portal presents examples of API (Application Programming Interface) type calls and ways of calling this data in JSON format (JavaScript Object Notation - a way of representing data for computer applications), dialing by Python language, accompanied by an example code and so on.

Also, the Romanian Government portal allows the extraction of open data in a broken down way, on areas such as: economy, justice, agriculture, population, cities, environment, health, energy, etc. In a centralized way, the operations of cities, selected and financed, can also be accessed through various funding lines, such as the Operational Program Administrative Capacity (POCA).



Figure 2. Main page of DATA.GOV.RO portal

A relevant example of an urban center that provided open data to those interested and, through a public-private partnership (PPP), managed to achieve a deliverable designed to support citizens from the perspective of urban mobility is the city of Iași. The Iași Public Transport Company (CTP Iași), a company subordinated to the Local Council of Iași Municipality, has published data on the use of public transport, in partnership with Orange Business Services. As part of the Open Government Partnership (OGP), the Municipality of Iași, through CTP Iași, in order to support urban mobility, published the data mentioned above so that they can be used by third parties through the Orange Business Services' infrastructure. Thus, two independent solutions have been developed, which allow passengers to check in real time where a means of public transport is and how long it will take to get to the station. A first application that can be used on the mobile phone developed for this purpose is Tranzy. It is described as smart and modern, which "uses real-time data provided by the GPS system of public transport" and is synchronized with the smart devices of passengers so that the waiting time at the station can be calculated. The interface is user-friendly and easy to use, available on both iOS and Android.[†]

[†] More details on <https://tranzy.ro/>

Thus, it is noticeable that, through open data and public-private partnerships (PPPs), resources can be put together in the same place in order to support various segments of a city's life, especially as a component subsumed by the concept of Smart City. The research model proposed in the previous point can be applied in further research to identify the level of acceptance of open data technologies in public services throughout the country, depending on the variables presented.

Conclusions

Technologies that use open data are the future in the process of digitizing local public administrations. The interconnection of smart technologies and the resources available to the private sector can make a substantial contribution to urban development and to create a medium and long-term development vision. In the present case, we have two relevant examples of public-private partnerships, which support the local public administration to improve sustainable urban mobility services. Equally, such ways of encouraging the use of public transport are nature-friendly, especially in the context of a problem specific to large cities - traffic congestion, which inherently leads to an increased level of pollution. The problems facing an urban center are interconnected, but a high level of acceptance of open data technologies can support the decision-making mechanism, but also the development of public policies. The proposed research model can be used in a further research that, based on the variables presented, will analyze the major cities in Romania and the open data technologies used, developed through a public-private partnership.

This article can be a starting point in a future research, when a database can be created with all digitalization and open data solutions in Romanian cities. Applying the proposed research model to the existing solutions in this database, we can have a national record of the digitalization and acceptance of open data solutions in public services. Once we have this data, we can make comparisons with other countries and their level of digitalization so that we can see what the impact of these decisions is and whether it can be correlated with an increase in the quality of life.

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