SILESIAN UNIVERSITY OF TECHNOLOGYPUBLISHING HOUSE

SCIENTIFIC PAPERS OF SILESIAN UNIVERSITY OF TECHNOLOGY 2023
ORGANIZATION AND MANAGEMENT SERIESNO. 171

TECHNOLOGIES INTENSIFYING MODERN ECONOMY IN THE PRIVACY ASPECT

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Purpose: The article deals with the development of information technology in terms of the competition of modern enterprises. The article defines dedicated servers, cloud computing, artificial intelligence and the Internet of Things as technologies affecting privacy. The aim of the article was to draw attention to the possibilities of building a competitive advantage by organizations using technology and to the threats to privacy in relation to these technologies.
Design/methodology/approach: The analysis of the subject matter made it possible to verify the capabilities of enterprises in relation to technology and to identify technologies that intensify the modern economy in terms of privacy. In addition, the article presents the results of the conducted research on activities carried out using technology.
Findings: The article presents the technologies necessary for the implementation of the most important activities in organizations. The article defines dedicated servers, hosting, VPS servers and cloud computing and recommends solutions for the possibility of storing data outside the organization.
Originality/value: The information contained in the article deals with the subject of technologies affecting both the functioning of the organization and privacy. In addition, the article discusses the organization's own servers and hosting packages.

Keywords: dedicated servers, cloud computing, artificial intelligence, privacy.

Category of the paper: research and review publication.

1. Introduction

The changes taking place in the modern world and the development of technology allow for the implementation of new, innovative services, which is conducive to improving the conditions for the functioning of the organization and increases the possibility of achieving the company's goals. In addition, technologies make organizations meet customer expectations, are able to acquire new recipients of their products or services, overcome existing difficulties and achieve the position of a leader in a given industry. However, it is very important to use technology correctly both in terms of privacy protection and the proper intensity of its development.

2. Dedicated servers and VPS servers

The Along with the huge increase in the development of information technology in conjunction with electronic communication, the area of competition of modern enterprises has changed. The source of competitive advantage is undoubtedly technology and access to the Internet (Talar et al., 2014). Implementation of basic services via the Internet is a great facilitation for the functioning of a person and an organization in general, and in the era of unexpected crises, the only possibility of communication and obtaining resources.

In many enterprises, huge profits are generated by e-commerce sales, i.e. Internet sales. It is not profitable to build or rent physical sales places and additionally pay sellers. Much better to get storage space and carry out Internet shipments, employing only the necessary employees. E-services can also be an additional source of income for these hybrid enterprises.

However, in order to fully develop e-services, enterprises are exposed to many barriers that completely prevent them from entering the on-line market or to some extent block access to this market. Many entrepreneurs, despite their great desire, cannot start their business on the Internet. There are many reasons for this phenomenon. The main problem faced by online entrepreneurs are the costs that exceed the budget for starting the business or result from it from incorrect estimation of working time (Flis et al., 2009). The increase in expenses is largely influenced by the costs of hardware and software, marketing and advertising, costs resulting from the employment of necessary employees, rental costs (if the entrepreneur does not have its own storage space), or costs resulting from the purchase of all kinds of machines (infrastructure) enabling, for example, sorting or packing specific packages if the company distributes shipments.

Business activity conducted on the Internet due to the specificity based on the use of the Internet and websites, in addition to the above-mentioned costs, faced by many enterprises, also involves costs related to permanent access to the network, hosting package, or registration of an Internet domain name.

Hosting packages are usually purchased by enterprises in the form of a monthly or annual subscription. Server services are the foundation of the functioning of Internet enterprises. Often, entrepreneurs try not to use their servers and use free hosting or buy the aforementioned subscription. The reluctance of the owners of the company directed against the use of their own servers is justified by the huge costs of purchasing the appropriate equipment, service, software, or the costs of suitably qualified personnel. In addition, legal and security issues are a major obstacle in using your own server (Flis et al., 2009). Of course, the larger the company, the higher all the costs and responsibilities for proper server management.

With the high demand for the lease of server resources, many companies are emerging that provide such services combined with other hosting services. The offers of such companies are often very extensive and differ in terms of parameters and configuration options (Dobrowolski,

2013). It is worth noting that often hosting offers are incomprehensible to an ordinary entrepreneur, so it is important to use only trusted hosting sources and not be fooled by deceptively attractive offers of free and little-known hosting.

Taking into account the uniqueness of providing hosting services for companies that engage in this activity, in order to facilitate their work, the so-called dedicated servers. These servers refer to the service of remote destination by a given enterprise of computers for use by a given user. A dedicated server is equipped with a complete hardware specification and all strictly defined services. All hardware and operating system is solely conditioned by the client's decision, is subordinate to the client and constitutes a private desktop server, providing an ideal solution for entrepreneurs who have strictly defined requirements and their main work is carried out on the network (Hosting365, 2021).

Dedicated servers are aimed at large enterprises due to the cost of their purchase, which does not mean that an individual cannot purchase such a server if it is necessary. Dedicated servers are by nature very advanced solutions and to manage and use them requires a huge amount of knowledge. Dedicated servers are also characterized by a lack of flexibility and configurability during use.

A VPS (Virtual Private Server) server is much easier to use than a dedicated server and is also much cheaper. Thanks to its ease of use, it can be aimed at both novice domain users and more advanced users. In addition, the VPS server, thanks to its affordability and service, is intended for both private and corporate websites that are characterized by a large volume and which are visited by a large number of Internet users. The advantage of this server is also that access to all hardware and server tools depends on the purchased package, therefore it can be adapted to the changing needs of the organization (RapidDC, 2021). If organization's needs for server access increase, organization can purchase an additional package. Each server may be tested within a period of time determined by the organization providing such services, in order to check it against specific requirements (Sprint Data Center, 2022).

Dedicated servers, like VPS servers, are an alternative to hosting in the era of website development. It happens that hosting itself is too unattractive, and the solutions it offers are currently insufficient for enterprises, which may result in inefficient and unstable work. Therefore, enterprises should use hosting that uses dedicated or VPS servers or purchase access to the described servers themselves.

The advantage of using dedicated servers and VPS servers is that in the event of any failure, improper work performed by the server, or during damage, the manager of this server, i.e. the company that provides the server, is responsible for the repair.

3. Cloud server

In addition to shared hosting, VPS server and dedicated server, entrepreneurs or individuals can also use the cloud (cloud server), i.e. a remote server that can be used in different places around the world. Cloud computing is a service of remote sharing of software resources, e.g. system software and hardware resources for disks, networks or servers for data storage and processing (Krok, 2017). The resources used are configurable and therefore used as needed. Access to all data and files is possible anywhere and at any time from any device that has access to the Internet. Due to the functionality of cloud computing, it is treated as the most promoted direction of development by the IT industry.

Cloud computing is also independence in relation to the replacement of equipment, no need to transfer data or reinstall. Cloud computing is able to guarantee unlimited resources because it has gigantic computing power with the ability to store huge amounts of data (Fulmański, Wojczyk, 2014a). Despite the many benefits from the use of cloud computing, in Poland, purchases of cloud services used via the Internet by enterprises employing 10 or more people (excluding from the financial sector) is a small percentage compared to, for example, the Scandinavian countries, which are leaders in this category (Figure 1).

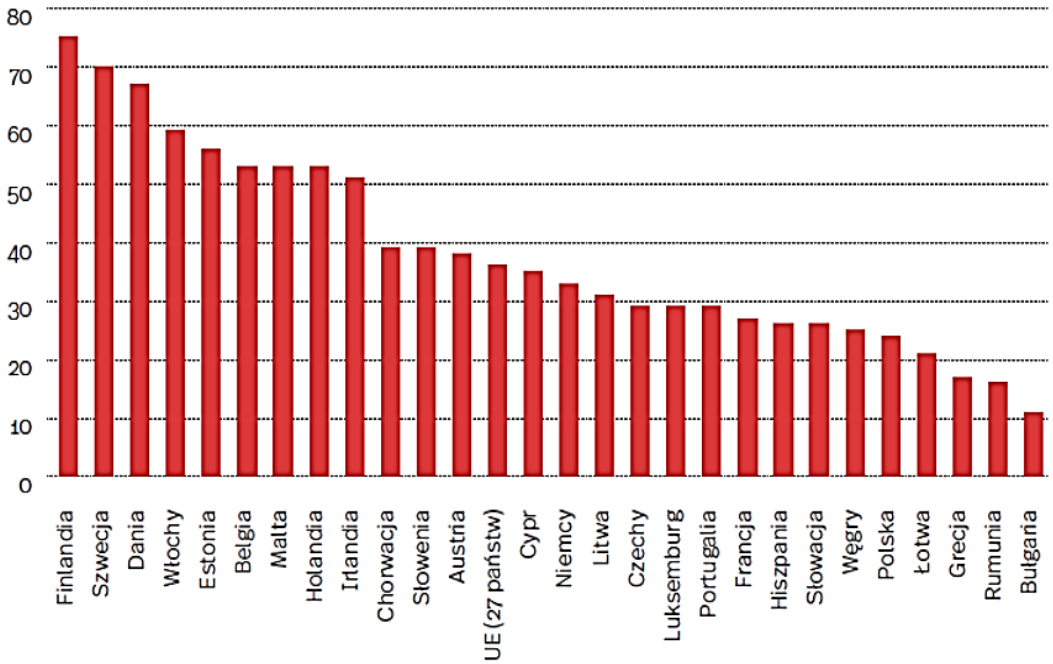

Figure 1. Percentage of enterprises that have purchased cloud computing services among companies employing 10 or more people (excluding the financial sector).

Source: https://300gospodarka.pl/news/chmura-si-big-data-europa-firmy-pie, 22.01.2023.

The situation is similar among Polish local government units (LGUs). Research conducted in 2021 for the purposes of the doctoral dissertation shows that these units currently use cloud computing in their daily activities in a very small percentage. Local government units are slowly

implementing the technology to the processes carried out in their structures. This requires time and commitment as well as the implementation of individual stages. Activities carried out by local government units using technology include:

- chmura obliczeniowa
- bramki biometryczne
- czytniki linii papilarnych
- urządzenia, aplikacje i platformy korzystające z Internetu Rzeczy
- czytniki linii papilarnych
- systemy profilowania
- karty dostępu
- weryfikacja tożsamości dla kontroli dostępu.

Some activities are carried out much more often than others, however, local government units more and more often make their functioning dependent on information technology (Figure 2).

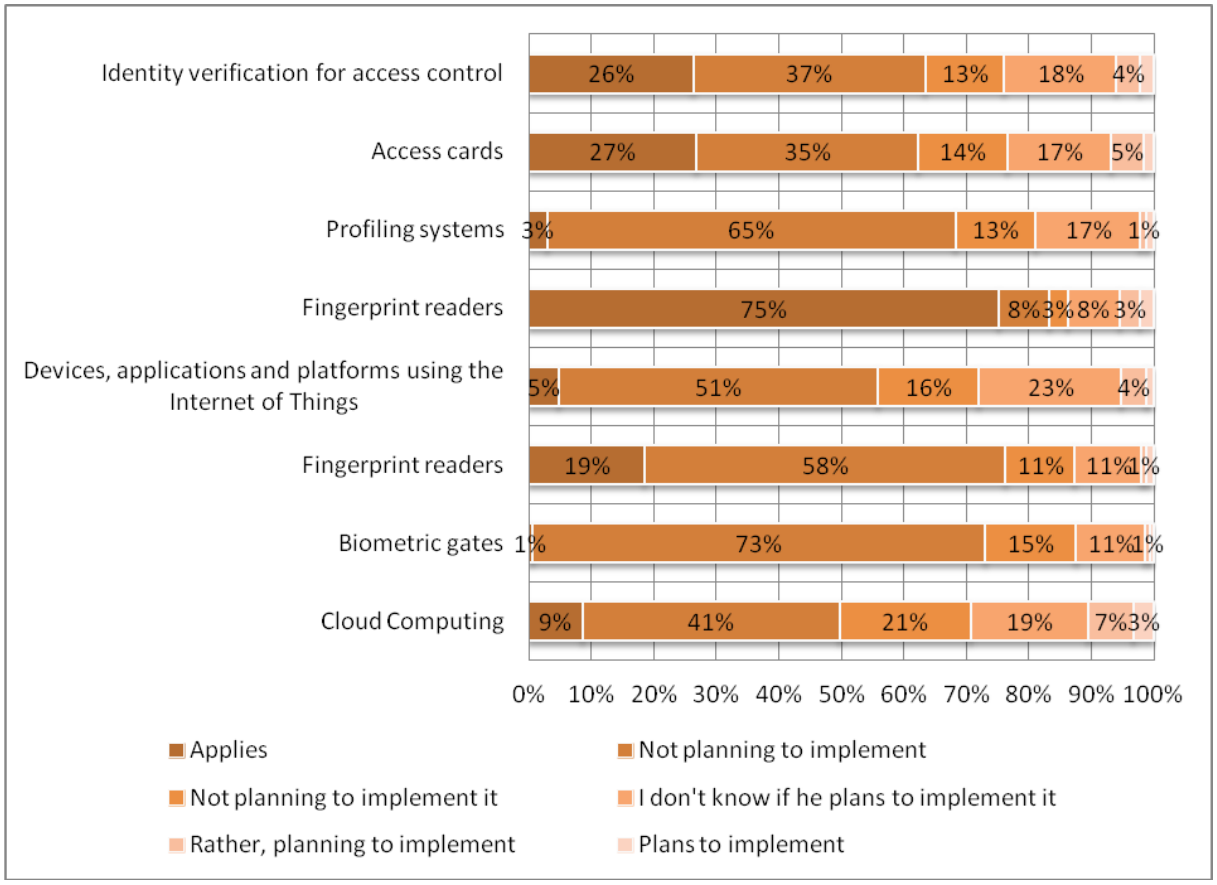

Figure 2. Technologies used by local government units or being in implementation plans.

Source: own study based on conducted research.

Only 9% of LGUs use cloud computing in their work, only 3% of units plan to implement and 7% rather plan to implement cloud computing. The situation is similar in the case of devices, applications and platforms using the Internet of Things. 5% of the surveyed LGUs use

the indicated IT technology, 1% plan to implement it, and 4% rather plan to implement it. Similar values were obtained by profiling systems (3% use, 1% plan to implement, and 17% rather plan to implement). Most of the surveyed local government units informed about the use of technology for Internet services, which include, among others. e-mail or social media. This was indicated by 75% of local government units, 27% use access cards and identity verification for access control (26% of surveyed local government units), as well as a fingerprint reader (19% of local government units). The non-use or moderate use of some technologies probably depends on the implementation costs or many disadvantages of the indicated technologies, e.g. associated with the emergence of threats to privacy (Figure 3).

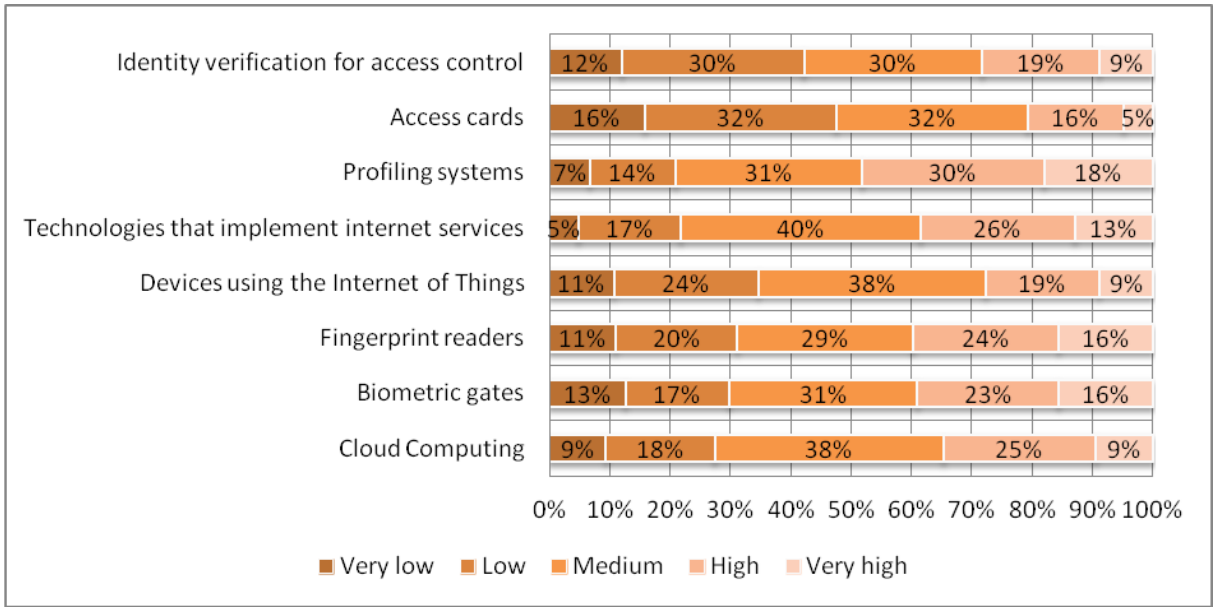

Figure 3. The risk of emerging threats to privacy as a result of the use of information technologies.

Source: own study based on conducted research.

Respondents of local government units recognized that the use of cloud computing carries a very low risk of data loss, as indicated by 9% of respondents. 18% considered it a low risk of the occurrence of a threat, and 38% considered it a medium-low risk. In turn, 9% considered cloud computing as a very high risk and 25% as a high risk. High risk was also recognized in the case of profiling systems (18% and 30%, respectively), and in the case of technologies that provide Internet services (13% and 26%). Devices using the Internet of Things described below in the article were considered a very high threat to data by 9% of the respondents and 19% of the surveyed LGUs considered a high risk.

Dedicated servers, VPS servers, hosting, computing clouds, or other information technology goods in the form of computer memory or external drives, in addition to many advantages for efficient functioning, also have disadvantages directed against the data stored in them. These devices are safe in their design and are only a convenience for users, but you can not always count on their stability and certain security limits. Failure of any of these tools may affect their functionality. In cloud computing, all data is outside the organization's headquarters, and their exact location is unknown. There are also no uniform legal regulations for clouds.

There are no clear rights and obligations of the suppliers of this tool (Fulmański, Wojczyk, 2014b).

Dedicated servers, VPS or hosting are provided by other organizations, which are taken care of by the guardian of a given server, i.e. the company providing such services. Your computer's memory can be exploited by cybercriminals and your external drive can be completely damaged or stolen. In addition, any data is also exposed to disclosure or falsification, it can also be damaged or completely lost. No data is completely safe anywhere. In addition, when it comes to servers provided by other organizations, there is a concern about confidentiality and privacy of data and the risk of dependence on the provider. There is also no certainty what will happen to the data after the end of cooperation with the service provider.

The lack of full responsibility of suppliers for data is another disadvantage of information technologies used to store them. Bankruptcy or breakdown regulations indicate that the service provider is not at fault for what happens with data. In addition, the United States has a better developed infrastructure of servers for data storage, which in turn may result in a high risk of dependence on non-European suppliers (Jeffery, Neidecker-Lutz, 2010). It turns out that there are also many doubts related to the guarantee of complete security and privacy of data on external servers and drives. The risk of theft, destruction or misuse largely depends on technology, and thus also on the growing knowledge of all the possibilities of obtaining this data by unauthorized persons, i.e. on the growing knowledge of security breaches. It should also be remembered that people who have access to this data and are able to commit certain offenses in this aspect for their own benefit are also dangerous in terms of data management.

4. Artificial intelligence

Artificial intelligence, as another aspect of modern reality that plays an important role in the functioning of the economy, affects the privacy and security of processed data. Technology supported by artificial intelligence gives new opportunities to organizations that use it. It facilitates the implementation of undertaken activities, supports the processes taking place in organizations, proves a competitive advantage and enables faster exchange of information. Artificial intelligence is able to collect and analyze all acquired data in a very short time, combine them, personalize information and make personalization. Artificial intelligence (AI) has been and is often used by science fiction writers. Science fiction is something that can be identified with a certain indicative plan for the future. By imagining what the future might look like, humanity somehow drives and sets the course of action in order to realize the dreams of modern economies. Artificial intelligence that humanity knows today was named and defined in 1955 by the American computer scientist John McCarthy, and then propagated. The Universal Encyclopaedia defines artificial intelligence as a field of science that is

responsible for studying the mental behavior of people, as well as the mechanisms of their formation, and then, using computer systems and programs, reproduces the examined behavior and thus maps human thinking. Artificial intelligence's scope of activity includes robotics and artificial life using fuzzy logic, evolutionary calculations and neural networks (PWN, 1996a). Artificial intelligence creates models of intelligent behavior and programs that simulate these models (Figure 4).

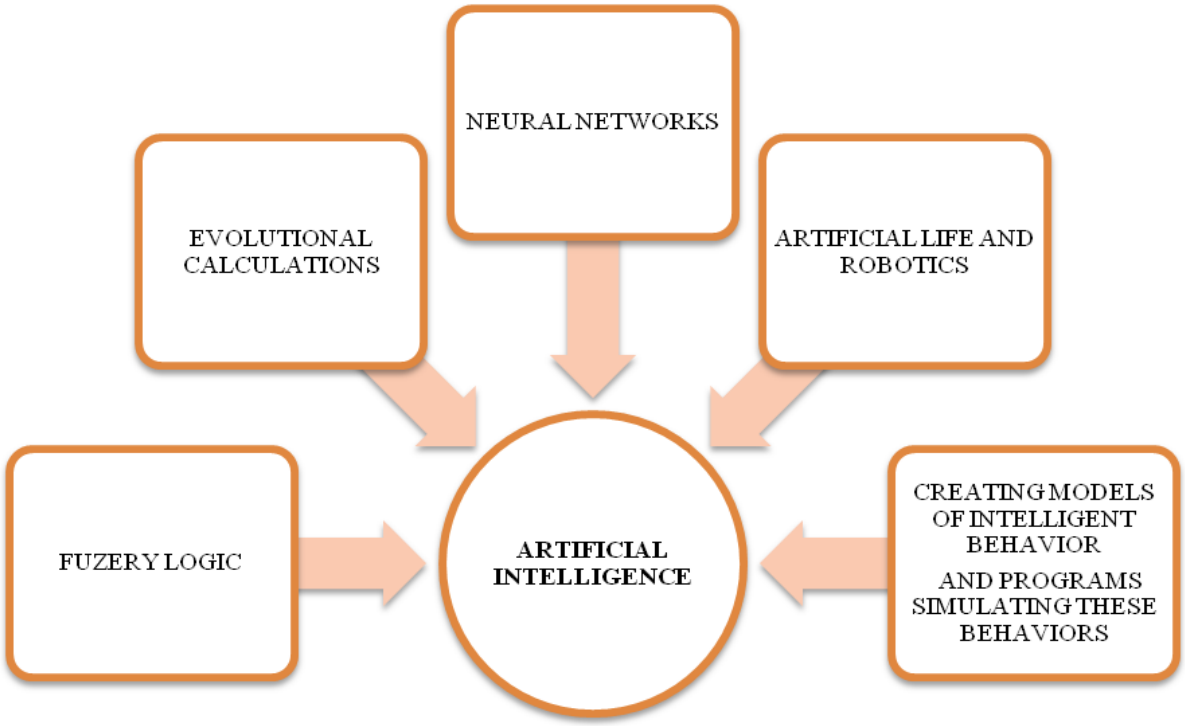

Figure 4. The essence of artificial intelligence.

Source: own study based on Mała encyklopedia PWN (1996). Warszawa: PWN, p. 344.

In the past, man was considered the only thinking being, and intelligence as a feature proper to humans and animals, but more often to humans. The PWN Encyclopaedia creates intelligence as the sum of psychological mental skills that enable a person to effectively use the acquired knowledge in the face of emerging tasks and situations (PWN, 1996b).

The escalation of information technology and the Internet is undoubtedly responsible for the development of artificial intelligence. Thanks to its functionality, AI has found application in many aspects of human life. In addition to practical use, it is also used in many branches of the economy, e.g. in logistics and transport, and in some fields of science, mainly medicine, security or economics. The task of artificial intelligence is to reduce human work, limit it or replace it completely in some duties. It is also about increasing human comfort and helping in everyday activities.

There are many ways to use artificial intelligence and information technology in organizations. Also, local government units in many aspects use the opportunities offered by digital reality.

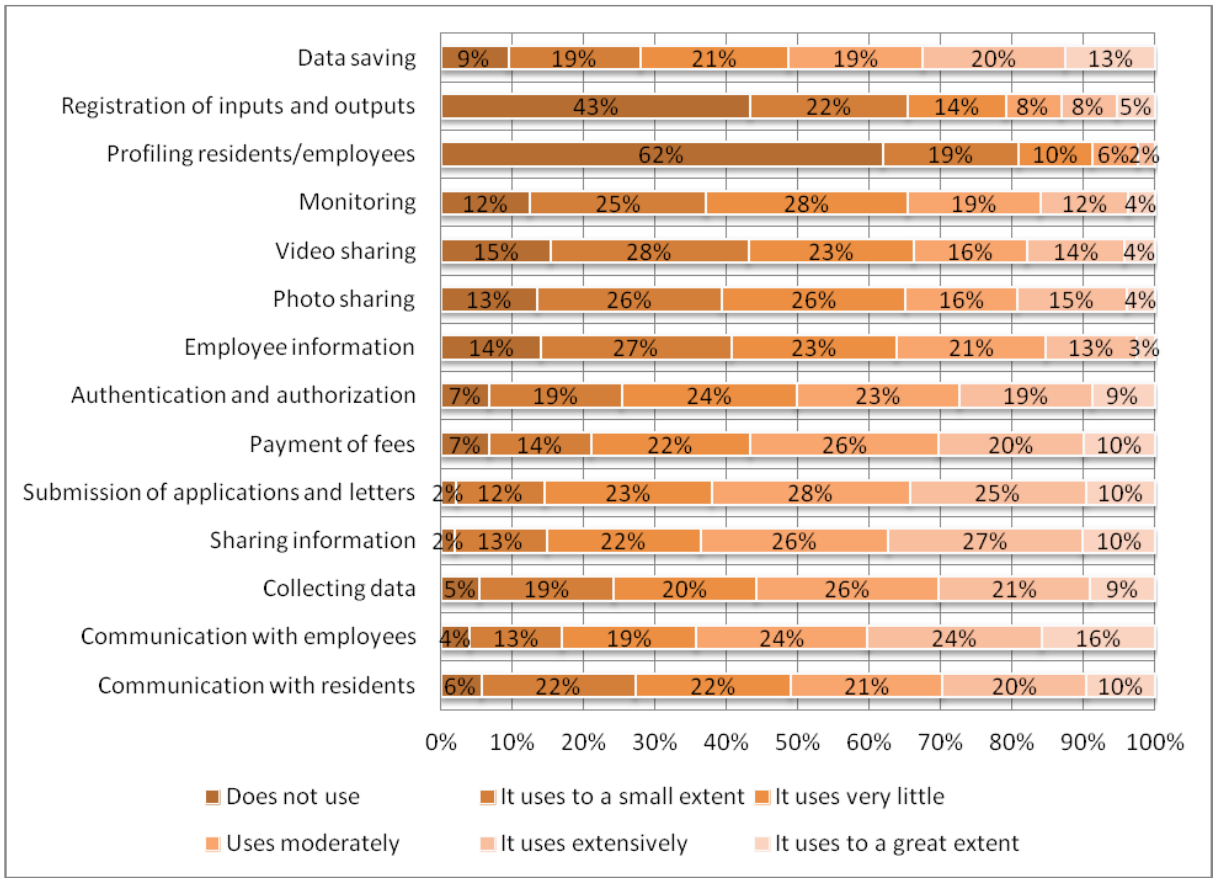

Figure 5. The use of information technology in the implementation of processes in local government units.

Source: own study based on conducted research.

Research shows that local government units use information technology and artificial intelligence to communicate with employees. 16% of the respondents use technological novelties to a large extent, and 24% to a large extent. Similar indicators were obtained for communication with residents, activities related to data collection, information sharing, submission of applications and letters, payment of fees, or authentication and authorization. In addition, LGUs use technology for monitoring (4% of LGUs in a very large scope, 12% in a large scope and 19% in a moderate scope). Profiling of employees and residents is not used on a large scale among LGUs, but already 6% of LGUs use profiling to a moderate extent, and 2% to a large extent, which may raise concerns in connection with further development of technology.

5. Internet of Things

Most information technologies that combine with artificial intelligence are focused around the Internet of Things (IoT). Iot is a technology that affects most devices through sensors and

connecting devices to one computer network. Thanks to this, all devices can communicate with each other using a common language, collect, process and exchange data. Typically, such devices are controlled using a smartphone via Bluetooth. The Internet of Things is used in the main sectors of the national economy in industry, transport, trade, health, care, science, education, administration and other services (Atzori et al, 2010).

IoT enables remote control of devices to improve comfort, but a huge number of devices is an area of activity that is related to the issue of with IoT security. Devices operating as part of the Internet of Things pose a risk of hacking and using devices in a cyberattack, e.g. to cause property damage or steal data, both in private life and in modern organizations. In a broader scope, IoT can also contribute to attacks on industrial infrastructure related to hybrid warfare, attacks on automation or activism regarding, for example, environmental pollution.

Modern technology also means smart cities, unmanned aerial vehicles and modern monitoring systems used by enterprises and formations designed to protect the safety of people and property, and to maintain public safety and order.

Unmanned aerial vehicles were created to monitor and control and filming objects, although they are currently also used in agriculture, medicine or transport, as internal transport of organizations or as a means of transport for distributing parcels. Unmanned aerial vehicles are also to be an Intelligent Transport System to innovatively and seamlessly control cities. Drones will increasingly have the task of checking traffic volumes, controlling air quality and weather, and supervising whether road users comply with the regulations. Unmanned aerial vehicles are also part of modern monitoring, which, in addition to maintaining security, consistently monitors and controls the public, including employees of organizations.

Information technology has also found application in face scanning at shop windows and sending offers of products according to interests, remembering products viewed, verifying any choices made on the Internet, locating and observing. Creating large sets of customer and market data and analyzing this data to obtain valuable insights undoubtedly helps to gain a competitive advantage.

Another product of technology and artificial intelligence that is unique to humanity are robots. It is thanks to AI that robots can behave and perform certain functions similarly to humans. Robots created on the basis of models of intelligent behavior are able to create their own artificial intelligence, make decisions and use their own language incomprehensible to humanity (Rocha, 2018). Artificial intelligence is many times superior to human intelligence, which is why its further development may cause many negative consequences. Robots answer questions and imitate humans. Currently, there are also humanoid robots that closely resemble humans, and one of them, Sophia, currently holds the citizenship of Saudi Arabia. However, there is a fear that robots will take the places of existing employees of the organization or limit their privacy.

Artificial intelligence is a very interesting field of science that exceeds the current cognitive boundaries and encourages the creation of artificial beings that are increasingly intelligent. The continuous development of this technology may cause a huge step forward towards the realization of the visualized future, but it may also turn out that it will lead to a certain revolt of machines, the disappearance of human intelligence resulting from not performing activities carried out so far, in which machines will replace people, and to the complete dependence of man from the use of technology. The dense number of connections between devices also makes it easier for cybercriminals and cyberspies. Devices powered by Internet networks are constantly collecting, transmitting and analyzing data, which consists of building a user profile (Zawierucha, 2021).

When analyzing the issues of artificial intelligence and technology development, it should be noted that the future is not and probably will not be a clear and specific extrapolation of current experiences related to information technologies. Nevertheless, it will increasingly make the functioning of a person and an organization dependent on technological possibilities and set the rules for the competition of enterprises.

6. Summary

Improper use of data by other people, intimidation, spying, constant monitoring can make people helpless in the face of technology and data managers, and consequently lead to all kinds of manipulation. The manipulation of the technology user is also based on the addiction of man to technology. Thanks to information technology, many aspects of life are changing dramatically. This also applies to the functioning of modern enterprises that are increasingly dependent on technology. Unfortunately, this is also a huge milestone for entry into virtual and augmented reality controlled by global corporations and governments.

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