



TECHNICAL UNIVERSITY OF CLUJ-NAPOCA

ACTA TECHNICA NAPOCENSIS

Series: Applied Mathematics, Mechanics, and Engineering  
Vol. 67, Issue III, September, 2024

## CONTRIBUTIONS TO THE DESIGN OF SERVICE INDICATORS TO SUPPORT DIGITIZATION MANAGEMENT THE ACTIVITY OF SERVICE PROVIDERS OF INTEREST LOCAL AND AREA

Dorin-Vasile DEAC-ŞUTEU, Aurel-Mihail ȚÎȚU

*Abstract:* The Governance Programme 2020-2049 identifies the lack of precise planning of the digitisation process, instability in the responsible institutions as the main challenges that need to be addressed to accelerate the digitisation process. Although the digitisation process has become one of the main priorities, the digitisation of the economy has lagged behind, as the 2019 European analysis showed that almost a fifth of Romanians have never used the internet and less than a third of the population has access to high-speed internet. The article presents a concept of clustering indicators of area and local interest services to provide a potential approach to the possibilities offered by input digitization and migration to the e-business model.

*Key words:* public service providers, digitization, service management, improvement, e-business.

### 1. ORGANISATIONAL EFFECTIVENESS AND MANAGERIAL SUCCESS

The concept of "efficiency" vs. "effectiveness" has been the subject of much discussion and debate within the academic community. The distinction between the two is most eloquently made by C. Argyris and D. Schon [1]: efficiency refers to the achievement of predetermined objectives through the acceptable application of resources, while effectiveness refers to the achievement of predetermined objectives together with adaptability, with effective organisations having the ability to change their objectives if circumstances demand it.

Peter Drucker also draws another contrast between the two concepts, stating that effectiveness refers to "doing the right things", while efficiency refers to the amount of effort (human and organisational) involved in "doing the right things" [2]. Doing the right things with little or no effort is the epitome of maximum efficiency, and the fact that we are dealing with maximum effectiveness indicates that things are in fact being done right.

According to Laurie J. Mullins [3], organizational effectiveness is related to inputs, which refers to what the organization does (such as introducing market strategies, adopting tactics, producing goods or services, etc.), while it is related to outputs, which refers to what the organization actually achieves (such as performance, satisfaction, etc.) based on stakeholder expectations.

The definition of performance states that it is "the achievement of organisational objectives, regardless of the nature and variety of those objectives" [4]. In other words, performance can be characterised not only by results, but also by the specific behaviours that accompany these results.

There are several distinct categories of managerial performance, including decision-making performance, organisational performance, information performance and methodological performance. These types of managerial performance are related to the functions and positions that are associated with management.

### 2. GENERAL CONTEXT

## 2.1 Digital transformation

The scope of design of a "Digital Single Market" is one of the stated objectives of the European Union, and the European Commission is working to align all Member States to the same rules and standards [5]. We can see Romania's delay in all aspects of digitisation, from legislation to the actual digitisation process, but nowhere more clearly than here.

It is the European Commission that has historically been the organisation that has called for conditionality in funding based on strategic planning documents to ensure that funds are used appropriately. The European Commission has made a number of recommendations, including eliminating parallelism and expanding the role of the Technical and Economic Council, among others.

The needs of agencies and authorities are secondary to the real need for digitisation, which is to find solutions to the problems faced by citizens. The design of digital systems needs to be such that they can meet user requirements in an integrated and interconnected way [5]. The government cloud memorandum, which was first brought up in 2018, has the merit of determining the course things will take in terms of digitisation.

Our country has all the necessary components to ensure success, including documentation related to strategic planning, plans, money and projects [6]:

- Strategy for increasing public administration capacities 2014-2020;
- "National Digital Agenda Strategy for Romania" in 2020;
- "Action Plan for the implementation of the Strategy for Strengthening Public Administration for 2014-2020";
- Ongoing projects at ministry level.

Automation of procedures and activities within an organisation can be achieved through the use of technology and digital information. This is what is meant by 'digitisation'. It is established who should be in charge of the digital transformation effort, but the main question to be answered is whether or not there is an opportunity to invest in digital

transformation despite the cuts in CAPEX funding.

The answer is unequivocally yes, and it is now very clear that even after the pandemic ends, the home working model will still be one that organisations will continue to implement. And so the citizens' contract with technology is a matter of trust.

The work-from-home concept is not only beneficial to employers in terms of increasing employee retention rates and maintaining or even increasing productivity, but it is also financially sustainable for businesses as it eliminates the need for corporations to rent and maintain large office locations. The money saved on rent could be invested in improving the remote working model so that it is more productive, more participative and adds more value.

## 3. CONSIDERATIONS ON THE DIGITISATION OF SERVICES OF LOCAL AND REGIONAL INTEREST

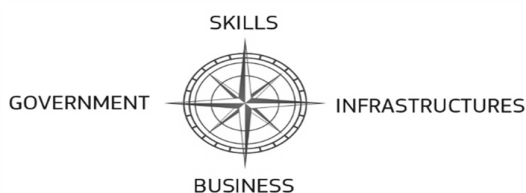
### 3.1 Artificial intelligence and data strategy¶¶

The application of Artificial Intelligence (AI) has the potential to provide users with more individualised service options. It helps to improve production processes and provide competitive benefits to administrative organisations, with similar results to those achieved in powerful industries such as automotive, agriculture and tourism.

Accelerating digitisation has many positive outcomes for society. To bring Europe into line with the demands of the digital age, instead of merely implementing the norms that have been established by other parties, the European Union (EU) plans to strengthen its digital sovereignty and establish its own standards..

The European Commission has presented the Digital Decade for Europe [9] with the intention of guiding the EU's digital transformation.

The program includes specific targets and objectives for the year 2030 in a range of domains, such as the development of skills, the establishment of digital infrastructures that are both secure and sustainable, the digital



**Fig. 2.** Concrete targets and objectives for 2030 [9]

transformation of businesses, and the digitization of public services.

The policy agenda for the Digital Decade will serve as a guide for Europe's digital transformation.

A list of specific goals and targets for 2030 is presented in Fig.1 [9]:

- Skills
  - \* A minimum of eighty percent of the population must possess fundamental digital abilities.
- Secure and sustainable digital infrastructures
  - \* Connectivity: A gigabit connection for everyone
  - \* 10,000 network nodes that are both highly secure and climate neutral, offering data edge and cloud services
- Businesses need to go through a digital transition:
  - \* Technology adoption: 75% of EU businesses should adopt cloud computing, embedded analytics and big data.
  - \* In terms of digital adoption, it is important to note that over ninety percent of small and medium-sized firms should strive to achieve at least a fundamental level of digital intensity.
- Digitisation of public services
  - \* Digital identity: everyone should have access to some form of electronic identification.

A report on the shape of Europe's digital future was accepted by MEPs in May 2021. In the study, members of the European Parliament (MEPs) urged the European Commission to take additional measures to overcome the difficulties associated with the transition to digital technology. In particular, they urged the Commission to make use of the opportunities

given by the digital single market and the use of artificial intelligence.

Both the economy and everyday life benefit significantly from the use of online platforms. As marketplaces, they have considerable potential and as communication channels they play a vital role. On the other hand, they also present substantial challenges. In an effort to boost both innovation and competitiveness, the European Union (EU) is currently working on new regulations governing digital services. At the same time, it aims to make the internet a safer place, combat the spread of illegal content and ensure democratic values such as freedom of expression, freedom of the press and democracy.

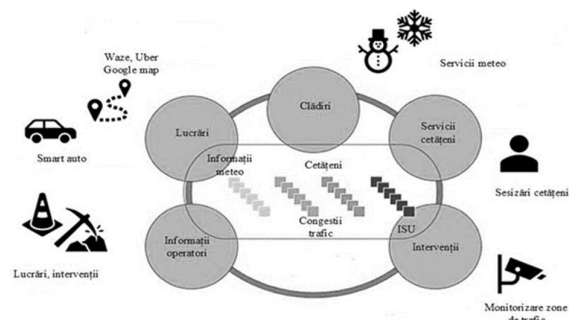
### 3.2 Enhancing online services for the public sector

The main objective of the Digital Agenda Strategy for Romania 2020 [10] is that, by 2030, all life events addressed in the Digital Agenda should reach level 4 of digital sophistication.

Forms that are automatically pre-filled with data taken from the registers of other public authorities or institutions (such as where the applicant only enters his/her personal number and his/her application is automatically filled in with data on address, dependants, higher education qualifications obtained, etc.) are an example of level 5 sophistication, as they demonstrate compliance with the "once only" principle.

### 3.3 Integrated Local and Area Service

The overall objective of the research is to familiarise citizens and representatives of public interest service providers with the EU White Charter [11] on services of general interest and



**Fig. 1** Elements for public service integration, Authors' contribution

its underlying institutional architecture and principles. In addition, the White Paper emphasizes the significance of ensuring that all citizens have access to services that are of general interest. This is done with the intention of enhancing Europe's economic competitiveness and preserving its social and geographical cohesion. The study has several specific objectives:

- it is important to inform both the general public and those who provide public services about the presence of professional standards and quality indicators for the provision of services that include the general interest;
- addressing the concerns of the general public regarding the effectiveness of crisis management;
- educating the public about the importance of engaging in activities that have an impact on the environment; and
- increasing public confidence in organisations.

According to the EU White Paper, services of general interest can have an economic or non-economic motivation. A key component of services of general interest is the idea of coordinated service provision at local and regional level [11].

Using this line of thinking, we can define an "integrated service of local and zonal interest", shown in Fig.2, as a part of the services provided for the common good, by service providers who can demonstrate their expertise and resources through documents, procurement files, etc. [12]. In the first phase, the researchers contacted service providers in Sibiu county; in the second phase, they will extend their survey to neighbouring regions to establish a zonal service structure. The authors' new concept, the Integrated Service of Local and Zonal Interest - SIILZ, provides for the consolidation of processes that are common identified within local and zonal interest service providers (see Fig. 3), according to the factors that were discussed earlier and the findings of the study that was conducted during the PhD internship. The following procedures make up the new idea, which is in line with the recommendations of the EU White Paper:



Fig. 3 Structure of indicators for SIILZ, authors' contribution

1. Emergency preparedness process;
2. Management process relevant information;
3. Process of execution of unplanned emergency works;
4. Process management activities required by specific regulations;
5. Monitoring and measurement process environmental aspects

### 3.4 Service indicators for the Integrated Local and Area Service

In most cases, the circumstances under which a public service must function are specified by the language of a statute or extra legislation.

Strict monitoring is necessary to ensure that quality standards are met. Quality management is a collection of activities that are developed as a result of this, which leads to the development of mechanisms to follow up on this monitoring (Fig.4.).

It would be of great assistance to the public administration organization that is responsible



Fig. 3 How to design indicators for each process, authors' contribution

for assuring the provision of a quality service if the legal requirements were transcribed into guidelines that described what has to be done in order to comply with the law [13]. The steps needed to comply with the legislation would be set out in detail here.

As a means of providing input to the Integrated Local and Area Service, lists of indicators have been incorporated into performance standards, local regulations, and other documents, shown in Fig. 4.

Key Performance Indicators for the integrated service have been developed using these documents as a basis. This is done so that local and regional service providers' objectives for integrating information systems can be reflected and tracked.

The purpose of using instant impact indicators is to measure and track the effects of an immediate action. One of the principles of the social economy, as set out in Law No 215/2014, as amended, on the social economy. The intention of the social economy became clearer with the inclusion of this idea in the law [14].

The full long-term benefits that will arise from the adoption of the activities carried out are revealed by the immediate impact indicators. These gains are an inevitable consequence of the implementation of existing plans [15].

3.3.1 Indicator on the number of joint interventions carried out by joint teams of 2 or more providers, reported to the unfavourable code:

$$IIM_3 = \frac{N_{intv.}}{N_f} \quad (1)$$

In the mathematical relation (1) the meaning of the terms is as follows:

$IIM_3$  = indicator on the number of interventions;

$N_{intv}$  = number of interventions;

$N_f$  = number of suppliers;

Status:

●  $\leq 1$  - excellent (in target or above);

■  $\geq 1$  - poor (with more than 1 tolerance to target).

3.3.2. Indicator on the number of multidisciplinary teams allocated per event, reported to the unfavourable code:

$$IIM_4 = \frac{N_{echipe}}{N_f} \quad (2)$$

In the mathematical relation (2) the meaning of the terms is as follows:

$IIM_4$  = indicator on the number of teams;

Team = number of teams;

$N_f$  = number of users affected;

Status:

● =1- excellent (on target or above);

■  $\leq 1$  - poor (with more than 1 tolerance to target).

3.3.3. Indicator on the number of substantiated written complaints on operator non-compliance with licence requirements:

$$IIM_5 = \frac{N_{ses}}{N_{u.a.}} \quad (3)$$

In the mathematical relation (3) the meaning of the terms is as follows:

$IIM_5$  = indicator of the number of unscheduled outages and curtailments;

$N_{ses}$  = number of referrals;

$N_{u.a.}$  = number of users affected;

Status:

● =0 - excellent (on target or above);

■  $\geq 1$  - poor (with more than 1 tolerance to target).

3.3.4. Indicator of the time taken to answer a call, using different calling methods:

$$IRTTI_1 = \frac{T_{notif}}{M.a.} \quad (4)$$

In the mathematical relation (4) the meaning of the terms is as follows:

$IRTTI_1$  = indicator of the time taken to answer a call;

$T_{notif}$  = team notification time;

$M.a.$  = how to call.

Status:

● =1- excellent (on target or above);

■  $\leq 1$  - poor (with more than 1 tolerance to target).

3.3.5 Correlation indicator between the number of multidisciplinary teams allocated, relative to the unfavourable code:

$$IME_1 = \frac{N_{echipe}}{N_{z.c.}} \quad (5)$$

In the mathematical relation (5) the meaning of the terms is as follows:

$IME_1$  = indicator for determining the correlation between the number of multidisciplinary teams allocated, in relation to the unfavourable code (code orange, code red);

$N_{Team}$  = number of teams/supplier;

$N_{z.c.}$  = number of days of unfavourable situation;

Status:

- =1- excellent (on target or above);
- ≤1 - poor (with more than 1 tolerance to target).

3.3.6 Indicator on the number of institutions involved in providing assistance according to the service requested:

$$IME_3 = \frac{N_{echipe}}{N_{intr.}} \quad (6)$$

In the mathematical relation (6) the meaning of the terms is as follows:

EMI<sub>3</sub> = indicator on the number of complaints on quality of service parameters, by type of user and type of activity

N<sub>team</sub>= number of teams/supplier;

N<sub>intr.</sub> = number of interruptions;

Status:

- =1 - excellent (on target or above);
- ≥1 - poor (with more than 1 tolerance to target).

3.3.7 Indicators for technical service performance

The activities being carried out are reflected in the indicators for the performance of the technical service, shown in Fig. 5. In general, they refer to the customers, population or entities that have benefited from the products or services that have been made available through the platform for the Integrated Service of Local and Area Interest.

3.3.8. Indicator on the response time to a request for resumption of services transmitted via SIILZ.

Status:

- =0 - excellent (on target or above);
- >0 - poor (more than 1 tolerance to target).

What are the benefits of digital transformation? The authors conducted a scientific survey, and the following are some of the responses received from respondents:

- Increasing the speed of operational operations through the use of automation results in faster and less error-prone data processing. In addition, the team is freed up to focus on activities that provide more value, rather than doing repetitive tasks such as entering invoice details;

- Improved decision making through access to excellent data. Companies that have gone through a digital transformation have access to real-time data 24 hours a day, allowing these companies to make more informed decisions about their business. Thanks to this, users can accurately monitor in real time compliance with the terms that have been agreed by contract;
- Transmission of data in digital format via a protected environment allowing the linking of different documents related to a single service; this linking facilitates the identification of real gaps, which are notoriously difficult to coordinate.
- Anytime, anywhere connectivity - The digital transformation that enables 21st century work provides a collaborative environment that can be accessed from anywhere in the world, as long as there is an internet connection [16].

And last but not least the chance to resume activities of common interest, to rebuild communities, but in a framework supported by the information and information system.

## 4. CONCLUSION

The declaration that was suggested by the Commission in January 2022 in accordance with the fundamental values and fundamental rights of the European Union emphasizes the EU's commitment to a digital transformation that is both secure and sustainable, with the priority being placed on people [17].

Citizens have the right to a safe and secure online environment, free from illegal and harmful material, and the means to engage with cutting-edge innovations such as artificial intelligence. Security and safety It is important that the online world is safe and secure. Protection and agency for all users, young and old alike [18].

Citizens should be united by technology, not further apart. There should be equal wages, benefits and internet access for all workers. Citizens should be allowed to access and control their personal information, and they should also

be able to participate in all elements of the democratic process [19].

On the other hand, we are of the opinion that all requirements that are now based on digitisation and that are linked to the component processes of SIIILZ should be combined into a Digital Platform that regulates in a unified and integrated way:

- Electronic administrative procedures include, among other things, the utilization of an electronic environment, the unambiguous identification of all parties involved in the procedure, the issuance of electronic documents by the local authority, the archiving of these documents, and the obligation for the authority to establish electronic communication.
- Romanian public policy on digitisation of public administration, including who should be involved and what should be done
- Identification, representation and digital signatures in electronic transactions
- Notification by digital means
- Mapping digital routes to administrative functions in the public sector. Electronic portal.

For companies where more than 50% of the workforce used computers connected to the internet for business purposes.

Using an organisation's resource planning system to facilitate communication between departments is the second point [20].

A wide variety of smart gadgets and computerised systems make it possible to collect data remotely and to monitor and control it. Those businesses in the manufacturing sector that can demonstrate that they have automated their processes are highly recommended.

Integrating multiple forms of artificial intelligence. One application of artificial intelligence in business is the use of software robots for automation; another is the use of business intelligence applications, which include data processing, behavioural analysis and prediction.

The focus of digital transformation should be on people, not robots. To realise the full potential of digital technologies, broad cultural changes must accompany their introduction.

This requires management-approved and employee-led organisational changes with a customer focus.

From what we have observed up to this point, it is imperative that the administration be the driving force for digital change. The successful completion of the project, on the other hand, necessitates close collaboration between the finance department and the legal, procurement, logistics, or information technology divisions of each organization in the public service chain. This is necessary in order to obtain a comprehensive and accurate picture of the data, as well as a comprehensive understanding of the guidelines and requirements of the system.

## 5. REFERENCES

- [1] Argyris, C., Schon, D. *Theory in Practice: Increasing Professional Effectiveness*, Jossey-Bass, ISBN:978-1-555-42446-6, 1992.
- [2] Drucker, P.F., *The Effective Executive and People and Performance*, HarperCollins, ISBN:0-06-051607-0, New York, 2004, <https://dtleadership.my/wp-content/uploads/2019/05/Drucker-2006-The-Effective-Executive-The-Definitive-Guide-to-Getting-the-Right-Things-Done.pdf>.
- [3] Mullins, J., L., *Management and Organisational Behaviour*, HarperCollins, ISBN:0-06-051607-0, New York, 2004, <https://dtleadership.my/wp-content/uploads/2019/05/Drucker-2006-The-Effective-Executive-The-Definitive-Guide-to-Getting-the-Right-Things-Done.pdf>.
- [4] Ministry of Regional Development and Public Administration, *Good Practice Guide in Project Management*, Operational Programme for Administrative Capacity Development, 2015, [https://www.mdipa.ro/userfiles/ghid\\_MP.pdf](https://www.mdipa.ro/userfiles/ghid_MP.pdf)
- [5] CEMR, *CEMR European Charter on Services of General Interest at local and regional level*, March, 2009, from EUR-Lex: [https://www.ccre.org/img/uploads/piecesjointe/filename/charter\\_sgi\\_RO.pdf](https://www.ccre.org/img/uploads/piecesjointe/filename/charter_sgi_RO.pdf),
- [6] Ministry of Regional Development and Public Administration, *Strategy for Strengthening Public Administration*,

- Operational Programme for Administrative Capacity Development, 2015, [https://www.mdlpa.ro/userfiles/ghid\\_MP.pdf](https://www.mdlpa.ro/userfiles/ghid_MP.pdf)
- [7] Ministry of Research, Innovation and Digitisation, *Digital transformation and the adoption of business process automation technology in public administration*, National Recovery and Resilience Programme, [https://oipsi.gov.ro/wp-content/uploads/2022/12/i18\\_ghidul-solicitantului-rpa.pdf](https://oipsi.gov.ro/wp-content/uploads/2022/12/i18_ghidul-solicitantului-rpa.pdf)
- [8] Barometer, A. R. *Global risks*, January 2020 <https://www.agcs.allianz.com/news-and-insights/reports/allianz-risk-barometer.html>,
- [9] European Commission, *Europe's Digital Decade: digital targets for 2030*, [https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030\\_ro](https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_ro)
- [10] Deac-Suteu, D.-V., Titu, M.-A., & Stanciu, A, *The Reference Architecture of an Integrated Service Middleware HUB in the environment of Knowledge-based organizations*, Ploiesti, ECAI 2021
- [11] Mitu, N., *Public sector performance*, Journal of Economics and Local Government, no 2, 2017, Bucharest, Romania.
- [12] Postelnicu, P. I. *Database of civil servants and civil servants*, 8, 2017 Journal of Economics and Local Administration no. 9.
- [13] Oroveanu, M., General theory of public service. Romanian law studies, 219-226, 1994
- [14] Mitu, N., *Public sector performance*. Journal of Economics and Local Government, no. 2, 8, 2017.
- [15] Donders, K., *Introduction, Aims and Methodology*. In: *Public Service Media and Policy in Europe*, Palgrave Macmillan, London, 2012.
- [16] Christiansen, B., *Cultural and Technological Influences on Global Business*. Berlin: IGI Global, 2016.
- [17] Gusan, V., Titu, A.M., Deac-Suteu, D. V., *Application of FMEA risk analysis in the context of organizations providing integral services of local and regional interest in Romania*. Iași: IManEE 2022, 2022
- [18] Matei, A., *Performance of public services: Static models and qualitative approaches*, 2001
- [19] OECD Governance, *Serving Citizens Measuring the Performance of Services for a Better User Experience*, 2022, <https://www.oecd.org/governance/>,
- [20] Josephson, Michael S. *Preserving the Public Trust: The Five Principles of Public Service Ethics*, The Josephson Institute and Unlimited, May 15, 2005, ISBN-13: 978-1588321343, 2005

### **Contribuții la proiectarea unor indicatori de serviciu pentru susținerea managementului digitalizării activității furnizorilor de servicii de interes local si zonal**

**Rezumat:** Programul de guvernare 2020-2049 identifică lipsa unei planificări precise a procesului de digitalizare, instabilitatea la nivelul instituțiilor responsabile drept principalele provocări care trebuie abordate pentru a accelera procesul de digitalizare. Deși procesul de digitalizare a devenit una dintre principalele priorități, digitalizarea economiei a rămas în urmă, în condițiile în care analiza europeană din 2019 a arătat că aproape o cincime dintre români nu au folosit niciodată internetul și mai puțin de o treime din populație are acces la internet de mare viteză. Articolul prezintă un concept de indicatori de clusterizare a serviciilor de zonă și de interes local pentru a oferi o potențială abordare a posibilităților oferite de digitalizarea inputurilor și migrarea către modelul e-business.

**Dorin-Vasile DEAC-SUTEU**, Sc.D. Student, National University of Science and Technology POLITEHNICA Bucharest, Faculty of Industrial Engineering and Robotics, 313 Splaiul Independenței, 6th District, Bucharest, Romania, [fam.deac@gmail.com](mailto:fam.deac@gmail.com)

**Aurel - Mihail ȚÎȚU**, Professor, Corresponding Author, Lucian Blaga University of Sibiu, 10 Victoriei Street, Sibiu, Romania; The Academy of Romanian Scientist, 3 Ilfov Street, Bucharest, Romania, e-mail: [mihail.titu@ulbsibiu.ro](mailto:mihail.titu@ulbsibiu.ro)