Digital transformation as a prerequisite for region`s convergence

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Abstract. The aim of this publication is to present key results of an empirical study conducted, affecting the processes of digital transformation of the municipal administration as part of the public sector in Bulgaria. The research section is by planning areas, using methods of analysis such as expert assessment, GAP analysis, induction and deduction. The main results of the study outline challenges to the transformation of the public sector such as the need to change the organizational culture of those employed in the administrations, as well as to increase bilateral interaction with citizens in order to reach a level of personalization of public services.

1 Introduction

In the 1990s, we witnessed the beginning of a qualitative revolution in all aspects of social life because of the transition to the design phase of digital networks [1], and to the final engineering model known as the electronic neural systems industry. A comprehensive digital transformation of the entire world and related national economies is underway, including a change in the public sector. From this point of view, efforts are needed in the direction of both the protection of the environment and the promotion of social development [2]. In both directions, digital transformation has an essential role. In this connection, a fundamentally new type of competition is emerging - international innovative hyper-competition. At the same time, advanced breakthroughs in artificial intelligence and neural networks have provided an unprecedented opportunity to apply the super-competitive advantages of leading nations in the digital age [3].

In general, digital tools make it possible to increase the development capacity of an organization in the following aspects:

- Environmental protection by regulating the use of scarce resources and controlling the pollution and waste associated with their use [4,5,6];
- Ensuring access to basic services for all by reducing inequalities and expanding people's well-being, and at all stages of the production of various basic goods [7];
- Generating revenue as a result of increased productivity;
- Supply chain innovation based on data analytics [8].

In the considered international context of a rapidly developing digitization of processes, the public administration needs to adapt quickly in view of the fact that digital technologies significantly increase the level of awareness of users and at the same time shape their

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The fundamental essence of the public sector to guarantee equal access of the public to services largely predetermines the way of managing the processes towards digital transition in it. A number of authors direct their research interest precisely in the direction of identifying the main challenges facing the public administration in the conditions of digital transformation [10][11][12]. In their works on the subject, the general line is traced for the need not only to implement technological solutions, but also for the importance of achieving effective organizational and cultural change. It is understood that the development of e-government is entering a phase of the so-called Personalized digital government, namely personalization of the provided public services and the creation of a two-way relationship with citizens in order to adapt policies to specific needs of society [13]. In some countries such as Bulgaria, however, it is difficult to speak of such a degree of development. Researchers outline complex regulatory coordination and subordination, as well as consumer attitudes as some of the main problems facing digital transformation in the country's public sector [14]. In this regard, this publication analyzes some of the specifics of the digital transformation process at the level of planning regions in Bulgaria, with a view to outlining key moments and challenges.

2 Materials and methods

The research is based on a standard scientific approach. The survey method was used to generate primary empirical data. The scope of the respondent group to which the inquiry was sent is all 265 municipalities on the territory of the Republic of Bulgaria. On the basis of the respondents, 86 completed survey cards were accumulated, which is about 33% relative share of the general population. For the purposes of the study, the data were grouped by planning area (NUTS 2), thus with the highest rate of return emerging Severozapaden and Severen Tsentralen regions. The questions are of closed and open type and are grouped in the categories: Personal information, User, Regulations, Technological environment, Processes Digitization, Organizational culture. Their selection and orientation in terms of content are largely justified by the Model for assessing digital maturity of public bodies adapted by the author's team, the scope of which has been expanded according to the specifics of digital transformation in the public sector established by content analysis. Empirical research can tentatively be considered in three stages. The first is preparatory and is related to the accumulation of secondary data by the method of desk research and the literature review of publications on the topic in publications with an impact factor. The second stage is aimed at structuring the questionnaire by using the methods of synthesis and analysis of the information from the preliminary survey. In the final stage, methods of expert assessment, GAP analysis, induction and deduction were used, which allow for scientific interpretation of the collected primary data and the respective derivation of discussion points and scientific results.

3 Results and discussion

The analysis of the results of the empirical research includes a comparison of the five main groups of questions - Users, Regulations, Technological Environment, Processes Digitization and Organizational Culture. Each of the questions in the groups includes three possible answers, which are quantified in a numerical value between 0 and 1. The responses of the respondents at the municipal level were aggregated by planning region to derive key challenges for managing the digital transformation of the public sector in each of them, as part of the convergence of the regions. In Fig. 1 you can see a comparison between the regions by question categories.
The obtained results give reason to claim that there is a relative similarity between the regions on the categories of issues under consideration. The best overall result is reported for the Severen tsentralen region, and the lowest for the Severoiztochen, although there the technological environment is the most developed. For each of the regions, the highest result was reported in terms of the availability and applicability of the internal regulations of the municipalities for the provision of electronic administrative services. The reported result is expected, in view of the availability of well-written normative documents at the central level for the development of e-government. At the same time, however, it was found that in all regions the lowest values were reported for the group of questions related to users of electronic services. In this regard, it can be argued that the attitude of citizens to request and consume electronic public services, as well as to give feedback on them, is not at the required level. This is a serious obstacle to the process of digital transformation in the public sector. Citizens and businesses should be the driving force for expanding the portfolio of offered electronic services. To some extent, the reason for this is rooted in the lack of digital skills, with half of the respondents (51%) sharing that only a small proportion of citizens possess the necessary digital skills.

Figure 2 presents the obtained correlation coefficients when comparing the results on individual questions, common to all regions. No dependencies with a very strong degree of influence were found. However, from the point of view of the results, some statistically significant dependencies with a moderate degree of influence can be noted. They are the following:

- **D_2 and N_2** ($r = 0.55$) – the provision of electronic public services is directly linked to the existence of a well-developed legal framework for the implementation of electronic governance
- **T_1 and T_4** ($r = 0.51$) – the presence of a well-built technological environment in the organization is a prerequisite for a timely and successful reaction in the presence of a cyber-attack, which is of particular importance for public sector organizations when processing a large base of personal data and sensitive information regarding the social status of citizens

![Comparison between the regions by question categories](image)
Fig. 2. Correlation matrix for the questions from the empirical study.

- D_2 and T_3 (r = 0.48) – reaching a more mature level of electronic service provision is a prerequisite for offering better quality services in terms of ease of use, accessibility and general view.

- D_1 and O_2 (r = 0.47) - increasing the motivation of employees to work in a digital environment through various trainings, seminars and even financial incentives, implies a higher level of digitization of internal processes in the organization.

On the other hand, the data shows that access to e-government services through mobile applications is still not sufficiently well represented. The reason for this may lie in the lagging pace of application of modern technologies in the state administration, compared to private business.

4 Conclusions

In conclusion, it can be summarized that the process of digital transformation in the public sector in Bulgaria has its specifics. On the one hand due to the main function of public services, and on the other hand due to the peculiarities of society related to the consumption of such services. From the point of view of the degree of development of individual planning regions in this area, relatively close results are observed, as the presence of a regulatory framework plays a key role. Organizational culture is not sufficiently well recognized as an essential element of the process, at the expense of the transformation of internal and external digitalization processes. The assessment of technological security among experts from different areas shows a satisfactory level, while the relationship with users and their willingness to engage in digital transformation processes still face a number of challenges.
5 Acknowledgments

This research was supported by the Project № KП-06-M55 / 1 of 15.11.2021 "Convergence or Divergence in the EU: Assessment of Integrated Territorial Investment in European Regional Development Policy", funded by The National Science Fund at the Bulgarian Ministry of Education and Science.

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