Babeș – Bolyai University

The College of Political, Administrative and Communication Sciences

The Doctoral School of Administration and Public Policies

Contemporary Technology and Artificial Intelligence in Governance. Assessments of Needs

Summary

Scientific Coordinator:

Associate Professor Raluca – Ioana ANTONIE PhD.

Doctoral Student:

Ioana – Cosmina CRĂCIUNESCU

Keywords:

needs assessment, need, public administration, public policy, artificial intelligence, digitalization, society, citizens, public officials, A experts, AI ethics

Table of contents:

Acknowledgements…….…….....6

List of abbreviations……..……..……....…....7

List of figures…….…….….8

Introduction……..1

SECTION ONE: THEORETICAL ASPECTS……...…….6

CHAPTER 1: ARTIFICIAL INTELLIGENCE AND ITS USE IN GOVERNANCE…….……..….6

1.1 General Data Concerning AI in Relation to Governance…….……..……...6

1.2 Validation of AI Models for Individuals and Communities: The Turing Tests……...……27

1.3 Roots, Mechanisms and Utility of Artificial Intelligence for Public Administration ..…...……..38

1.4 New Developments in Artificial Intelligence and their Impact over the Community…….……...46

CHAPTER 2: PUBLIC ADMINISTRATION – AN ECOSYSTEM FOR AI DEVELOPMENT…....57

2.1 E-government, Public Administration and Services……...…….57

2.2 The Digital Transformation of the Romanian Public Administration……..……....64

2.3 The Innovation of the Public Sector through Artificial Intelligence……..……...……..90

2.4 The Role of Artificial Intelligence in Collaborative Governance, Trust Building and Community Development…….……96

2.5 Artificial Intelligence in Sustainable Development and its policies……..110

CHAPTER 3:ETHICS OF ARTIFICIAL INTELLIGENCE AS A SPECIFIC NEED FOR THE DEVELOPMENT OF PUBLIC ADMINISTRATION……..…….……127

3.1 Ethics of Artificial Intelligence……..……....127

3.2. Theory on Ethics of Artificial Intelligence……...…129

SECTION TWO: PRACTICAL APPROACH……...…….148

CHAPTER 4: METODOLOGY….……148

4.1 Research Questions and Objectives…….……..148

4.2. Research Methodology……...……..149

The Paradigm……..……149

Research Techniques.……...151

Research Instruments……...…152

The Logic Behind Using Qualitative Methods……..……..152

The Research Limitations……154

4.3 The Evaluation Methodology……154

CHAPTER 5 DATA ANALYSIS AND INTERPRETATION…..…….……..156

5.1 The Context of Evaluation: Data Analysis from Structured Interviews ……..……....156

5.2 Presentation of Data: Analysis and Interpretation of Answers to Questions from the Interview Guides……..……...178

5.3 Ethical Perspectives as a Main Need of Integrating Artificial Intelligence in the Public System by the Main Stakeholders: The AI Experts, The Public Officials and The Citizens……212

5.4 Recent Perspectives……227

The Perspective of Experts and Specialists in Artificial Intelligence and Robotics……...…….227

The Perspective of Public Officials…….……241

The Citizens' Perspective…….256

5.5 Integration of All Perspectives: Experts, Public Officials and Citizens and Answering the Research Questions……..……282

Conclusions and Recommendations……...…….293

Annexes……...298

Annex 1. Interview Guides…..……298

Annex 2. Interview Transcripts: Citizens (2019)……..…….…..303

Annex 3 Interviews with Public Officials from Romania (2019)……....328

Annex 4 Interviews with AI Experts (2020)…….…...344

Annex 5 Interview Transcripts Experts and Specialists in AI (2023)…….……365

Annex 6 Interview Transcripts: Citizens (2023)……..…….……...376

Annex 7 Interview Transcripts – Public Officials (2023)……387

Annex 8 Coding and Analysis of Questions applied to Citizens, Public Officials and Experts in AI (2019-2020)……..……...398

Bibliography……..……..421

Index……438

List of captions……..…….439

Summary

The needs assessment is nowadays used within programs and projects that are funded by the European Union and other international institutions, or in specific countries, such as the United States, having a significant evaluation culture and capacity. It is a relatively new domain in Romania, being in a continuous process of development. Because there is little contribution on the topic of needs assessment, especially when it comes to integrating Artificial Intelligence and Digitalization, it was found appropriate to add to the knowledge of this subject in the present thesis. Coupled with the recent developments taking place in the field of automation, this work is intending to bring a new perspective on the subject of using the expert systems in ways in which they can benefit the citizens in the context of public services. Among the limited number of studies on needs assessment related to digitalization and Artificial Intelligence that were produced in 2023, is the one conducted by UNESCO, incorporating a survey for evaluation in relation to "policy initiatives in Africa for AI governance" (Berger, *et., al.,* 2023, p. 7).

Needs assessment is important both for the field of public administration and for the Artificial Intelligence domain. In the present work, the analysis of needs is regarded as a valuable tool for understanding the integration of knowledge engineering into the public system in a manner in which it could be enabled to directly serve the interests of the citizens. More specifically, when it comes to aspects related to automation, a needs assessment instrument can be efficient in providing extensive and clear information concerning the procurement and use of these innovative technologies. It can provide a logical and comprehensive explanation related to the introduction of assistive technologies and artificial brains, in an effort to illustrate the manner in which these changes brought about by the great wave of digitalization have the power to affect individuals coming from diverse backgrounds. Last but not least, it has the great potential of shedding a new light on the topic of governance and public administration, in particular when employing needs assessment methods.

The scope of the topic is that of addressing a gap in knowledge on the needs assessment front, especially when it comes to the integration of the expert systems in governance. The aims and objectives of the present thesis are those of identifying and assessing the needs of the citizens and those of the public officials from the institutions in relation to the use of Artificial Intelligence in Governance, and of the AI experts in connection to the interaction with the

public services and citizens. Another important objective is that of developing an extensive analysis of the main need tackled in the work, namely that of analyzing ethical issues in relation to the production, insertion and use of Artificial Intelligence as a main need of the respondents. The research is important because it presents a new perspective over the field of governance with the assistance of digitalization and knowledge engineering.

The literature review is comprised of topics that analyze theories of public administration and policy, as well as important aspects of Artificial Intelligence, automation and digitalization, these representing the state of the art of modern Governance. These topics were merged in 2017. The available literature on this specific field was rather limited. Other crucial ideas were tackled, such as evaluation and needs assessment theory, along with a significant emphasis placed on ethical AI, from which the need of understanding this aspect naturally followed. Last, but not least, information concerning the developments taking place in digitalization, knowledge engineering and the restructuring of the public administration is presented in a descriptive and explanatory manner.

The research questions gravitate towards the identification and assessment of the participants' needs, in an effort of gathering an understanding of the current ones, while learning about the possible ways of integrating knowledge engineering and digitalization for the purpose of identifying and solving present and future public concerns.

The Thesis' Structure

There are two main parts, the first touching upon the fusion between Governance and Artificial Intelligence with an accent on the use of digital devices and knowledge engineering to improve public administrative processes, as well as influencing policy. The second aspect is that of needs assessment, being presented from three perspectives, namely that of experts in AI, of the public officials and that of the citizens.

The research is structured in five chapters, touching upon the subject of integrating Artificial Intelligence for the public sector.

Chapter 1: Artificial Intelligence and its use in Governance

In the first chapter, a general view is presented on the fusion of Artificial Intelligence and Governance, in an effort to explain the manner in which both of these aspects work separately, as well as together for the purpose of serving the society. The main idea is that of accepting Artificial Intelligence in Governance as a new domain which plays an increasingly important role in the citizens' lives. It was found appropriate to elaborate on the works of Alan Turing, being the father of knowledge engineering, while gathering a better understanding on the topic. Some of the functionalities and mechanisms of AI were presented in order to illustrate a clear view on the this and to shed a new light on analyzing the use of emerging technologies from a sociological and policy perspective. New developments in the area of automation for the public services were presented and discussed for the purpose of keeping track with the most recent discoveries.

Chapter 2: Public Administration – An Ecosystem for AI's Development

The second chapter is elaborating on the theories of Public Administration, outlined by authors in the field, in an effort to connect with the area of digitalization, which added to a significant revolution in governance. The public administration and the connected services are briefly explained, in an effort to lay out the foundation for the needs assessment in the thesis. Next, the administrative structure of Romania is outlined, describing the territorial divisions which form the system of governance on a national, regional and local front. The digitalization levels are analyzed using the available data from the most recent reports, to create an overarching view on the topic and to bring into focus the theme of the thesis. The European average is discussed in an attempt to make a comparison to the national level, using data from Eurostat. Last, but not least, the specific legislation and policy of Romania is presented to achieve an all-encompassing view on the current structures of the Government. Various programs, policies and laws are discussed, as well as regulations which were researched are illustrated in chapter two, with the intention to provide insightful information regarding the administrative systems.

The innovation of the public system of administration and policy through digitalization and the use of technology is discussed in the next subchapter, to bring to light the array of positive and negative changes taking place along with the introduction of these elements in society. Finally, the role of artificial intelligence in collaborative governance is discussed, for

the purpose of linking two new concepts and outlining the importance of collaboration in leadership roles while considering the impact of trust building and community development along with integrating technology. A short analysis on the role of Artificial Intelligence in matters of sustainable development is introduced, showing two main ways to relate to this new field, as on the one hand, the use of digital devices may influence sustainability in a positive manner, while on the other, it can have predominantly negative effects, through accelerating pollution and contributing to rising temperatures.

Chapter 3: Ethics in Artificial Intelligence as a Specific Need for Further Developments in Public Administration

Chapter three presents a debate on the topic of ethical artificial intelligence, building a theoretical background rooted in the description and analysis of the available literature. The ethics of knowledge engineering represents the most significant debate that has been going on in recent years. This is the reason why it was chosen as the central theme of the present thesis. Along with matters of good governance assisted by the expert systems, and sustainability, which can be supported by these technologies, the legal and moral principles of using artificial intelligence have to be taken into careful consideration. This particular aspect of the technological world had become a need applicable to individuals, public bodies and enterprises, in an effort to ensure the safety of the people coming into contact with several devices. As for the field of Public Administration, ethics represents one of its horizontal principles, arising from a desire of the State to fulfil its duty of care toward citizens. Ensuring that the machines are safe represents a top priority for the experts and manufacturers of intelligent robots and digital devices. The goal is to protect human lives from potential dangers associated with the misuse and a lack of information regarding safe handling of devices.

Chapter 4: Methodology

Chapter four is dedicated to explaining the methodology used throughout the thesis. The scientific paradigm is qualitative, being based on the individual interview as a method of data collection and on the structured interview guides as the instruments. Consequently, the data is analysed qualitatively. Moreover, the evaluation methods are presented as the basis of the research, namely formative as a method and needs assessment as a sub-method and as a specific instrument from the perspective of evaluation, which is the spotlight of the work. It is important to emphasize the fact that needs assessment was used both as a research and as an evaluation method.

The objectives along with the research questions are:

Objective 1

Identifying and assessing needs of citizens and public officials from institutions in relation to the use of Artificial Intelligence in governance, and of the AI experts in connection to the interaction with the public services and citizens.

Research Question 1:

What are the specific needs of the citizens and users connected to the use of AI in governance?

Research Question 2:

What are the specific needs of the public officials as the interface between the AI experts and the citizens in the context of AI's use in Governance?

Research Question 3:

What is the perspective of the experts in Artificial Intelligence on the ecosystem of the application of the AI in Governance?

Objective 2

Analyzing ethical issues in relation to the production, insertion and use of Artificial Intelligence as a main need of the respondents.

Research Question 4:

What are some of the most important ethical issues to be considered as needs when it comes to Artificial Intelligence?

The paradigm is qualitative, based on the creation and application of structured interview guides as the instruments. These interviews were interpreted using qualitative analyses.

The evaluation type is formative and the method of evaluation used in the thesis is needs assessment.

Chapter 5: Data Analysis and Interpretation

Chapter five is structured into two main parts, namely the first representing the needs assessment conducted on three groups of subjects; the experts, the public officials and the citizens, who were questioned on the importance of using Artificial Intelligence and digitalization in present times, while providing an opportunity to assess the impact of technology over the public system. While the experts were contacted to provide insightful information on the topic, the most accurate perspective in relation to the production of AI for governance was retrieved. The logical framework of using AI for the public sector involves the production of these technologies by the experts, while analyzing the manner in which it is used and integrated by the public officials, along with assessing the benefits reaped directly by the citizens in terms of modernization, access to information and ease of communication between the individual and the institutions.

The second part is a qualitative analysis of ethical Artificial Intelligence, as its understanding represents a main need shared by the community. This was achieved on the basis of the information extracted through the application of structured interviews, using perspectives from experts in the field of knowledge engineering, automation and robotics. The analysis shows that while many are making sustained efforts to produce technologies in an ethical manner, there are aspects that go beyond the control of the engineers and developers, since the users may choose AI for all the wrong reasons.

The “2023 Update” section of the thesis is providing a fresh perspective on the main topics of research, namely the three points of view: those of experts in AI, of the officials and public administration figures, along with citizens, on the most recent changes taking place within the integration of AI and digitalization. It was done with the intention to shed light on

the changes exacerbated by the pandemic, taking into consideration the increasingly important role of technology and digitalization in the daily lives of citizens. The findings show that there were significant changes taking place, which provided multiple opportunities for learning and development, but also for adapting to a new style of working and collaborating with the assistance of technology. It also shows that the initial fears of the citizens had a tendency to dissipate, even though plenty of the answers provided illustrate that the subjects are still cautious in their use of gadgets, phones and other digital devices, as well as software.

Conclusions

The conclusions bring to light the importance of being aware of the ethical aspects of Artificial Intelligence, while integrating the use of devices for the benefit of the citizens on different layers of the administrative system. A call is made for the creation of a greater awareness connected to educating and protecting the public, as being the main duty of the institutions, coupled with having the citizens accept responsibility for their own lives and learn to adapt and understand both the benefits and the risks associated with the use of the expert systems and technology.

The main contribution is brought by the development of assessment models in the field of public administration, especially in the context of digitalization and the evolution of Artificial Intelligence. The ethical aspects of knowledge engineering play a significant role in the work, as their impact is more present than ever.

The results show an openness of the citizens toward the introduction of knowledge engineering in areas of public administration as well as in their daily activities. The responses extracted from the preliminary interviews did not show the fact that the respondents were acquainted with the insertion of the new technologies and the great wave of digitalization. However, the final analysis brought a new perspective into consideration, as the utilization of artificial intelligence from devices and gadgets, as well as adapting to digitalization has been a crucial step toward a new era.

The research is presenting the real needs of the participants through the careful selection of the most appropriate responses to support the idea of the thesis. The collection of data from multiple perspectives has succeeded in creating an all-encompassing view on the topic, in the light of the major changes taking place along with the pandemic and the use of technology to facilitate communication, training, learning and development, culminating with a great revolution in the way individuals work and relate to one another through their devices. The

recommendations following the research process are those of controlling the way in which digitalization affects our daily life while learning how to efficiently use it, in such a manner that we can protect ourselves from harm. In other words, digitalization and Artificial Intelligence are regarded as highly positive aspects of life, as long as the citizens will be able to control the use and production of these devices and become aware of their risks, while fighting to educate the next generations.

The main contribution of the research stands in presenting assessments of needs for three categories of participants, namely the experts in artificial intelligence, who are establishing the foundation in knowledge in the field. The second category are the public officials, who were able to provide relevant and valuable information about the governance system. Last but not least, the citizens' contribution was of utmost importance, bringing to light real experiences involving digitalization and knowledge engineering for the public system. Most importantly, the main need addressed in the thesis is that of understanding and integrating the ethical principles of automation, for the purpose of educating and protecting human lives, while efficiently working in the benefit of the citizens.

The recommendation is to attempt developing such a body of work, in order to build relevant statistics on the topic. Most importantly, because of the AI's nature, while taking into consideration the developments of the public administrative systems, a permanent, consistent assessment is required, in order to keep up with the technological evolution.