

**NATIONAL SCHOOL OF POLITICAL AND
ADMINISTRATIVE STUDIES
DOCTORAL SCHOOL IN "ADMINISTRATIVE SCIENCES"**

**SUMMARY
DOCTORAL THESIS**

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PhD:

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Bucharest 2021

**NATIONAL SCHOOL OF POLITICAL AND
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**Adaptive management in public administration.
Adaptation of public institutions in crisis
situations**

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Introduction

The doctoral thesis “Adaptive management in public administration. Adaptation of public institutions in crisis situations” is included in the priority theme “Adaptive management in the context of increasing administrative complexity. Models and strategies in public administration systems” and is a component part of the field of Administrative Sciences. The thesis approaches, from a theoretical and practical point of view, the adaptation of public institutions to the turbulences that appear more and more often, lately, both in society and in the environment.

The thematic area of the thesis includes interdisciplinary notions from management, public administration, legislation, informatics, pandemics, etc.

The eco-social context, in which the subject of the thesis is included, respectively the adaptation of public institutions, is represented by climate change, nuclear accidents, accidents with dangerous substances, earthquakes, epidemics, pandemics, fires, zoonoses, wars, etc. Events, such as those listed above, have a high degree of uncertainty and create situations in which information is incomplete or completely missing and cause a state of insecurity about how to combat the negative effects. The risk that public institutions will not adapt, quickly or not at all, to such situations is very high. In the doctoral thesis, only one case is studied, which affected Romania, namely, the COVID-19 pandemic. The catastrophic events, listed above that affects both citizens and public institutions, are characterized by an unclear problematic structure, as well as by disputed knowledge, norms and values¹, they are difficult to define because they are complex, intractable, open and unpredictable² and, cannot be solved with the same tools and procedures as in the case of a normal event. The way in which these types of problems are solved are neither right nor wrong, but they are better or worse and depend, to a large extent, on the lessons learned from previous events of the same type³. Romania, as a post-communist country, is characterized by rigid bureaucracy, with responsibility and little or not at all transparency, with weak institutions and strict control of information⁴, Romania is like “a black box that has not yet been opened”⁵.

¹ C. Termeer, A. Dewulf și G. Breeman, ”Governance of wicked climate adaptation problems,” în *Climate change governance*, ed. Jörg Knieling și Walter Leal Filho (Elveția: Springer, 2013), p. 27-39.

² J. Alford și B. Head, ”Wicked and less wicked problems: A typology and a contingency framework,” *Policy and Society* 36 (2017), p. 397-413.

³ T. H. P. Le, *Developing Adaptive Capacity in Times of Climate Change in Central Rural Vietnam: Exploring smallholders’ learning and governance* (Netherlands Wageningen of Social Sciences (WASS), PhD thesis (Wageningen University, Wageningen, 2017), p. 6-7.

⁴ S. J. Cooper și T. Wheeler, ”Adaptive governance: livelihood innovation for climate resilience in Uganda,” *Geoforum* 65 (2015), p. 96-107.

1. The structure of the doctoral thesis

The doctoral thesis was structured as follows:

- Introduction;
- Objectives, questions, hypotheses, purpose and methodology of the research;
- Motivation, challenges and topicality of the doctoral thesis;
- The structure of the doctoral thesis, own contribution and steps to follow, in order to continue the research;
- Chapter 1 - Adaptive public administration;
- Chapter 2 - The role of law and administrative decisions in the adaptive transformation of the public administration;
- Chapter 3 - Information technology, a determining factor in the adaptive transformation of public institutions;
- Chapter 4 - Case study: Adaptive management of public institutions during the COVID-19 pandemic;
- Conclusions.

In Chapter 1 “Adaptive Public Administration” the following were analyzed:

- authors, currents and pre-adaptive and adaptive theories;
- two fundamental scientific papers, in the field of adaptive, namely: “Adaptive Environmental Assessment and Management” and “Adaptive administration, Practice strategies for dealing with constant change in public administration and policy”. The works were analyzed synthetically, statistically and comparatively, as well as from the point of view of the concepts used, but also the positive and negative aspects were evaluated and highlighted.
- the contribution of Romanian researchers to the development of adaptive theory and practice.

Chapter II ”The role of law and administrative decisions in the adaptive transformation of the public administration”, on the one hand, highlights the theoretical aspects of the adaptive law and analyzes the influence of legislation on the adaptive capacity of public institutions, and on the other hand, investigates the role of administrative decision

⁵ T. H. P. Le, *op. cit.*, p. 10.

and of the decision of the civil servant in implementing the adaptability in the public administration.

Chapter III “Information technology, a determining factor in the adaptive transformation of public institutions” contains two subchapters, the first examines how adaptive transformation of public institutions takes place by introducing adaptive software and the second analyzes e-government adapted to uncertain situations.

The last chapter, a case study, analyzes how public institutions were managed during the COVID-19 pandemic and, in this sense, studies the impact of pandemics on society and its reaction, how they adapted, both international institutions / organizations (World Health Organization and the European Union), as well as the Romanian public administration.

2. What the doctoral dissertation aims at

The research aims to establish the place of adaptive management in the history of management, to define a system of projection, evaluation and adaptive administration for public institutions, to analyze both the blocking factors that constrain (the law), as well as those that favor the introduction of adaptability (information technology) and to examine the reaction of public institutions in Romania to the COVID-19 pandemic.

3. Research challenges

The challenges for the research undertaken in the field of adaptive management are the following:

- the implementation of adaptive management is not always successful, there is also “implementation failure”⁶;
- establishing the place of the theory of adaptive management, in the history of management;
- joining inside the same system, both from a theoretical and practical perspective, the adaptive management related to ecosystems (Holling) and the adaptive management of public institutions (Mitchell). The translation of adaptive concepts, from ecosystems to public institutions, is possible, because the former, in Holling's view, behave almost identically as public institutions;

⁶ C. S. Holling și S. M. Sundstrom, ”Adaptive Management, a Personal History în Adaptive Management of Social-Ecological Systems,” în *Adaptive Management of Social-Ecological Systems*, ed. C. Allen și A. Garmestani (Dordrecht: Springer, 2015).

- analyzing the administrative law as a blocking factor of the implementation of adaptive management;
- the introduction of adaptive informatics, of high-performance information systems, Big Data, theory generators and knowledge bases inside public institutions. Public institutions currently operate with outdated equipment due to the very high costs imposed by such equipment, as well as the lack of staff training;
- analyzing the actions of public institutions during the COVID-19 pandemic, due to the fact that the pandemic disrupted the functioning of the institutions, which did not adapt quickly to the new circumstances and, due to this, the population no longer trusts the administration.

4. Working hypotheses

The research hypotheses substantiate the objectives of the doctoral thesis and confirm the need for an interdisciplinary approach, specific to administrative sciences. The hypotheses from which the research starts are the following: (1) in the current period, period marked by the COVID-19 pandemic, under certain conditions, public institutions in Romania can implement adaptability in their activity and (2) during a pandemic adaptive public institutions / bodies may be established.

5. Research objectives

The fundamental objectives of the research are the following: (1) to analyze, systematically, the theories, issued over time, in the field of management and to reveal the place and role of adaptive management, (2) to analyze two fundamental researches in the adaptive field (3) to highlight the role of administrative law as a blocking factor and (4) IT as an auxiliary factor in the transformation of public administration into an adaptive administration; and (5) to analyze the COVID-19 pandemic; and, the reaction of public institutions. Each chapter, depending on the topic analyzed, sets specific research objectives, which detail the fundamental objectives.

6. Research methodology

The research requires three stages, namely: in the first stage takes place the documentation, which involves researching the literature and analyzing theories on

management, adaptive management and adaptive public administration, at international and national level, administrative legislation and information technology achievements, in the second stage the research is deepened, the structure of the paper is elaborated, the chapters of the paper are written and, in the third stage the case study is elaborated, by researching the history of pandemics and by applying the theoretical knowledge, accumulated in the first stages, to the situation of public institutions in combating the COVID-19 pandemic.

In order to obtain a pertinent answer to the fundamental question and to verify the hypotheses, it is necessary to use the prospective method. The need to implement adaptive management in public administration must be "documented in a period of time prior to the emergence of the studied state"⁷, so it is necessary to study the history of management and the most important scientific papers in adaptive management and adaptive administration, in order to develop the chapter on adaptive public administration, it is also necessary to analyze previous pandemics in order to be able to write the case study on the COVID-19 pandemic. The prospective method used in the paper is experimental, on the one hand, because it tries to explain how to implement adaptive management given that future crises have not yet occurred, being uncertain and, on the other hand, it is holistic because it integrates in the framework of the public administration interdependencies in different areas such as legislation, information technology, etc. At the same time, the prospective method involves analyzing actions, events, laws, software, judgments, etc., which do not send visible signals, because the emergence of a major crisis in the future, such as the COVID-19 pandemic, may be indicated at present by less relevant factors.

The doctoral thesis can be best achieved by adopting a research perspective that allows a combination of pragmatism and eclecticism. Pragmatism recognizes that there are many different ways of interpreting the world and undertaking research, that no single point of view can describe the whole picture, and that there can be multiple realities⁸, at the same time, pragmatism "emphasizes the value of theoretical eclecticism. and methodologically, in other words, there is no predefined and rigid approach"⁹. The research starts from a general objective and adopts the most appropriate theories and methods to answer the question¹⁰. The combination of pragmatism, with an exploratory approach, which allows the research to project, adaptively, in a direction that is the most significant and relevant. Exploratory

⁷ N. J. Salkind, *Encyclopedia of research design* (Thousand Oaks, CA: SAGE Publications, Inc., 2010), p.1130.

⁸ M. Saunders, P. Lewis și A. Thornhill, *Research Methods for Business Students*, a 6-a ediție (Harlow: Pearson Education Limited, 2012).

⁹ T. H. P. Le, *op. cit.*, p. 16.

¹⁰ K. Moon, D. Blackman, "A guide to understanding social science research for natural scientists," *Conservation Biology* 28, Nr. 5 (2014), p. 1167-1177.

research is applied in cases where there is no or only rare systematic knowledge¹¹ and can be used successfully in the analysis of adaptive management and administration, where the subject is not yet clear or well developed.

A multi-method approach is suitable for the doctoral thesis, which combines different ways of researching a particular problem¹². The multi-method research project involves the collection and analysis of quantitative and qualitative data in a single study, in an attempt to investigate more comprehensively a research problem¹³.

Chapters 2 and 3 will use specific research methods, for example:

- Chapter 2 will use the classical heuristic research method of concept transfer¹⁴, which is based on concepts used in another field, such as the field of adaptive law applied in ecosystems, notions that translate into the field of law. Exploratory research, which will be used as a working methodology, will examine legislation and public administration separately, but also the connections between them, in order to determine whether these systems can be transformed into adaptive systems, as well as the dependence of public administration on administrative law. Chapter 2 will also use the method of comparing classical and adaptive law to understand the shortcomings of each other, given that no system is perfect. The analysis of the specialized academic literature in the field of law and public administration can contribute to revealing the tendencies towards orientation towards adaptive methods and the causes that cause rigidity in the functioning of public administration.

- in Chapter 3, multiple research methods will be used to obtain an appropriate result, as follows: (a) qualitative research method, (b) exploratory research, (c) heuristic method, (d) comparative analysis, and (e) triangulation method.

a) The qualitative research method to be used in Chapter 3 is based on a comprehensive description of public administration, adaptive informatics, an institution, a computer program and a web portal. It is based on the interaction between public administration and IT, portal and users, uncertainty and public administration, uncertainty and IT. The qualitative research methodology is inductive, the reasonings start from particular to general, from cause to effect, the uncertainty being the cause, the effect being the adaptive computer program or the adaptive institution. The reasonings concern the factors that

¹¹ R. Kummar, *Research methodology: A step-by-step guide for beginners* (Los Angeles: SAGE, 2011).

¹² J. H. McKendrick, "Multi-Method Research: An Introduction to Its Application in Population Geography," *The Professional Geographer* 51, nr. 1 (1999).

¹³ J. W. Creswell, *Research Design: Qualitative, Quantitative, and Mixed Methods* (London: SAGE Publications, Inc., 2014).

¹⁴ C. Crăciun, *Metode și tehnici de cercetare* (București: Editura Universitară, 2015), p. 32.

influence each other (institution - informatics, uncertainty - public administration, uncertainty - informatics), the way of presentation is built along the way, as new information appears¹⁵.

b) The exploratory research is to examine, on the one hand, informatics and public administration, separately, as well as the connections between them, on the other hand, it analyzes the dependence of the public administration on informatics. The research will not be used to make a decision, but to clarify, define and identify aspects of adaptive informatics and public administration, in order to determine whether adaptive informatics can transform public administration into adaptive administration.

c) The heuristic, classical research method of the transfer of concepts¹⁶ is based on the implementation of the concepts used by adaptive informatics within the public administration.

d) With the help of comparative analysis, the distinct features of one web portal will be compared to another portal, similar to the first, to understand the shortcomings of each other, given that no portal is perfect.

e) In Chapter 3 the triangulation method will be used, through the combination of the research methods used (comparative analysis, heuristic method, exploratory research, qualitative research method) in the study of the impact of adaptive informatics on public administration, practically triangulation will be used due to the fact that social-human and environmental phenomena and processes are dynamic and evolutionary, and the use of a single method does not contribute to obtaining correct results.

The steps to be followed in this paper, the research tools and the details pursued were chosen and applied according to the general objective and the specific objectives pursued, respectively.

7. Synthesis of the doctoral thesis

7.1 Chapter 1 “Adaptive Public Administration”

The objectives of Chapter 1 are the following: highlighting the fact that adaptive management has naturally emerged as a necessity in the evolution of mankind, to analyze the research of the parents of adaptive management and adaptive administration and to highlight the contribution of Romanian researchers to the development of the adaptive theory and practice.

¹⁵ S. D. Șandor, *Metode și tehnici de cercetare în științele sociale* (București: Tritonic, 2013), p. 293.

¹⁶ C. Crăciun, *op. cit.*, p. 32.

The number of researchers who have published scientific papers in the adaptive field is very high, this number has increased exponentially recently, the authors are professionals in various fields, such as: management, ecology, law, psychology, administration, etc., papers published and reviewed are valuable for the purpose set for this chapter, as they provide guidance on the extent of the adaptive phenomenon, as well as on the fact that the number of sectors in which adaptive theory can be applied has expanded. In the scientific papers presented in the doctoral thesis, the authors find that adaptive management has emerged, as a continuation of classical management, in the relationship of man with the environment, an environment considered as a complex system. About this environment, full of uncertainty, what we know is incomplete and, much of what we think we know is wrong, so there is a need to incorporate learning in the decision-making process of management. Trial and error are seen as a source of learning for future management activities. Risky choices are, in fact, opportunities to learn more about the potential of the system and to reduce the uncertainty that future decision-makers will face. Adaptive management does not only consist in sticking the term adaptive to management, it makes the policy of natural resources better than it has been so far, it contributes to balancing the balance between people's needs and nature. The development of adaptive management has led research stakeholders to consider the development of adaptive policy as a threat to existing research programs and management regimes, rather than as an opportunity to improve activity. The process of transitioning from the theoretical concept of adaptive management to its practice is considered intimidating for managers, as they need a clear understanding of this new type of management before they can start using it. With the application of adaptive management in practice, it has been found that administrative law and public administration must in turn adapt to new realities. Researchers in the legal field have found that current legal requirements make it difficult, if not impossible, to provide the support and institutional flexibility needed to implement adaptive management. At the same time, current problems in the economic, social, political environment (such as the economic and financial crisis, population aging, etc.) cause significant changes in the environment of public organizations and exert pressure on public managers, which aim to reshape the management of public institutions, but also of the institution as a whole. Building on existing adaptive theories, Ferd H. Mitchell and Cheryl C. Mitchell address the critical issues facing public administration today, they describe how theory and practice can restructure public administration, and provide new strategies for understanding and adapting to change, constants, which take place today in public administration. Starting with the paper "Adaptive Administration: Practical Strategies for

Dealing with Constant Change in Public Administration and Policy”¹⁷ we can talk about Adaptive Public Administration, both theoretically and practically.

The analysis and evaluation of the book “Adaptive Environmental Assessment and Management”. The book “Adaptive Environmental Assessment and Management” is written by C.S. Holling (ed.), Alexander Bazykin, Pille Bunnell, William C. Clark, Gilberto C. Gallopin, Jack Gross, Ray Hilborn, Dixon C. Jones, Randall M. Peterman, Jorge E. Rabinovikh, John H. Steele, and Carl J. Walters. The main theme is the assessment and adaptive management of ecosystems. All unresolved environmental issues refer, in one way or another, to uncertainty, because, firstly, uncertainty is real and, secondly, because environmental issues need continuous attention, a creative conceptualization and an active research¹⁸. The way in which the chosen topic was presented in the book, from a theoretical and practical point of view, is relevant and convincing.

The assumptions, developed by the authors in the book, are legitimate and valid, such assumptions are presented, in part, as follows: (1) a model is not validated, it must be invalidated by exploring all its implications and assumptions and testing all its predictions related to reality¹⁹, (2) the search for a solution must not replace trial and error as methods of eliminating uncertainty and the unknown²⁰, (3) a workshop only involves scientists when the aim is to critically examine essential assumptions²¹, (4) the largest spatial effects are in the immediate vicinity, the effects are decreasing as we move away from the location where the event that produced the change took place. This assumption is called by the authors as the paradigm of diluting the impact²², (5) no hypothesis is valid in a world that has more than one region of equilibrium or stability, in which there can be accentuated changes, rather than gradual ones. The changes, in this case, cannot be monitored and detected in time to be fixed²³.

The arguments put forward in the paper are logical, well-supported and convincing, for example:

(1) The book provides, as an alternative, an adaptive environmental management process and a policy-making process that integrates the environment with the economic and

¹⁷ F. H. Mitchell și C. C. Mitchell, *Adaptive administration, Practice strategies for dealing with constant change in public administration and policy* (New York: CRC Press, 2016).

¹⁸ C. S. Holling, ed., *Adaptive Environmental Assessment and Management*, International Institute for Applied Systems Analysis (Chichester-New York-Brisbane-Toronto: John Wiley & Sons, 1978), p. 132.

¹⁹ *Ibidem*, p. xi.

²⁰ *Ibidem*, p. 8.

²¹ *Ibidem*, p. 13.

²² *Ibidem*, p. 28.

²³ *Ibidem*, p. 36.

social field from the very beginning of the design process. This argument is addressed to administrators and decision-makers, responsible for designing mechanisms and with the way of addressing development issues²⁴, (2) Frequent droughts in Africa are a characteristic that establishes the remarkable diversity of animals and plants, the periodic destruction of trees, by fire and elephants, involves two dynamic forces that maintain a savannah and not a forest, probably a savannah is needed in Africa and not a forest²⁵.

In order to support the theoretical concepts treated in the first part of the book, the authors bring as evidence a number of 5 case studies, each study documents one of the specific problems theoretically presented in the first part of the paper.

The value of the book is given by the practical application of the principle of continuous adaptation, a principle that contributes to the choice of the wisest path for the environment. The case studies, an integral part of this book, provide the scientific, supporting information on which the general thesis is based and illustrate how to use the arguments in the introductory chapters. The conclusion of this book is that, practically, it is not a cookbook, it does not offer a model, of answer, to the numerous environmental problems of the world, but, it shows, only, how the adaptive management process works²⁶.

The uniqueness of the book is given by the fact that it is fundamental for the assessment and adaptive management in the field of ecosystems and, at the same time, it is the first scientific paper in this field of activity.

The negative aspects of the book are the following: (1) the authors do not deal at all with the issue of legislation, which constitutes a barrier to the practice of adaptive management, and (2) there is no analysis of public administration as a whole, which has a rigid behavior in front of the teams that implement adaptive management, (3) in the existing analyzes in the book no detailed expertise of public institutions is made, although there are criticisms that identify institutional problems as central problems for adaptive management²⁷ and that, concerns can only be adequately addressed by changing institutional constraints²⁸. The authors believe that there are institutional barriers²⁹ and recognize that institutions, such as biological systems, learn to manage change by experiencing change³⁰.

²⁴ C. S. Holling, ed., *op. cit.*, p. 1.

²⁵ *Ibidem*, p. 33.

²⁶ *Ibidem*, p. xii.

²⁷ *Ibidem*, p. xvi.

²⁸ *Ibidem*, p. 3.

²⁹ *Ibidem*, p. 135

³⁰ *Ibidem*, p. 135.

Analysis and evaluation of the book “Adaptive administration, Practice strategies for dealing with constant change in public administration and policy”. The authors of the book “Adaptive administration, Practice strategies for dealing with constant change in public administration and policy” are Ferd H. Mitchell, Cheryl C. Mitchell. The book is fundamental to the field of public administration because it describes in detail how to move from a rigid to an adaptive administration.

The strategies seen by the authors for accepting³¹ adaptive administration consist in: (1) clearly explaining the proposed changes, including providing detailed descriptions, of the changes that will take place, to all affected people, (2) giving lectures to demonstrate the performance of the new system, (3) providing practice opportunities to gain experience, whenever possible, (4) paying particular attention at the time of implementation so that the rate of change that will take place is manageable so as not to overwhelm the ability of individuals to adapt to new ideas and operations, (5) open discussions with all stakeholders when stressful situations arise, (6) providing personal explanations, by the heads of institutions, to all stakeholders, about changes that take place and the importance of these changes, (7) the involvement of change management and the provision of support by them in implementing the changes that will take place, (8) providing opportunities for the institution's staff to participate in the change and control how it will be implemented; and (9) brainstorming to stimulate staff creativity³².

In the last chapter entitled “Towards the future” the authors mention that organizational measures (organizational performance, cooperation and conflict, rigidity and flexibility, planning, staffing, budgeting, financial and reporting strategies, effective management, operational trade-offs, physical adaptations, uses of technology, alienation as an effect of change, risk and risk management) can be taken by the public administration as a starting point for the development of personal knowledge bases, after which, they must be incorporated into Big Data systems. The next step is the transfer of knowledge to a network of public administration practitioners. As a general conclusion it is shown that the implementation of adaptive administration must be done gradually and that this introduction involves continuous learning and constant adaptation³³.

A positive thing about the book is that, in order to use the theory generators in the administrative practice, the authors reevaluate the theory of scientific management, thus

³¹ F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 169.

³² *Ibidem*, p. 172.

³³ *Ibidem.*, p. 217.

seeking to improve performance in the performance of duties by civil servants. A theory generator can track the performance of the staff in the performance of work tasks, by combining Taylor's concepts³⁴, of working time and movement of workers when performing an operation, with new concepts regarding individual performance, such as the impact of management interventions on performance duties, the sensitivity of the civil servant and his reaction to other interventions. The analysis that the theory generator must make must include the following: (1) the way of fulfilling the required tasks, (2) the listing of the environmental and historical factors, which are relevant in the fulfillment of the service tasks, (3) the association of environmental and historical factors with a qualitative scale of contribution typologies on each factor, (4) the search tables must estimate the probable performance of fulfilling the tasks according to each factor that may have an impact on the performance of the tasks; and rules should be introduced to combine the effects of the various factors on the performance of duties, (5) rules should be introduced for combining the effects of the various factors on the performance of the work tasks.

Taylor's scientific management has promoted four principles regarding the application of knowledge to the study of work, these principles, adapted to the theory generator, are the following:

- developing the theory generator by gathering and systematizing the knowledge held by civil servants in performing their duties and transforming them into rules and formulas;
- the scientific selection of civil servants and the gradual development of their skills;
- the closeness, between the theory and the civil servant, by inducing the desire of the civil servant to be trained and to improve in the activity he carries out;
- constant cooperation between heads of institutions and civil servants.

The negative aspects of the book are: (1) the non-introduction in the analysis of the environmental aspects known being the fact that the environment can have a major impact on the good functioning of the public administration, which must adapt quickly to crises (example: coronavirus SARS-CoV-2 has unbalanced public administration around the world), (2) the authors of the book did not take into account the adaptive management applied in ecosystems, although it can also be applied to public institutions, (3) although administrative law is the main blocking factor of the adaptability of public administration, however, the authors do not analyze a way to turn law into a permissive factor. In the book there are few mentions of legislation on the importance of this topic and (4) the authors propose essential

³⁴ F. W. Taylor, *The Principles of Scientific Management* (New York: Cosimo Classics, 2006), p. 76.

mechanisms for adaptive management, such as the theory generator and Big Data, but do not analyze whether informatics can put these concepts into practice.

The contribution of Romanian researchers to the development of adaptive theory and practice. In Romania, the adaptive theory appeared later, so that we can speak of a school, in the adaptive field, starting with 2011, the date from which the research had a sustained developed. The research and application in practice of adaptive theory is grouped around the following universities: National School of Political and Administrative Studies, Academy of Economic Studies, University of Bucharest, as well as public institutions or associations, such as the Romanian Danube Delta Biosphere Association and Bucegi Natural Park administration or private companies, such as UTI.

Within the National School of Political and Administrative Studies, research in the adaptive field has coagulated around teachers, such as, for example: Ani Matei, Corina-Georgiana Antonovici, Carmen Săvulescu, Cătălina Antonie and some PhD students under the coordination of prof. univ. Dr. Ani Matei.

Within the Academy of Economic Studies in Bucharest, the Faculty of Cybernetics, Statistics and Economic Informatics, the course “Basics of Cybernetics”³⁵, is taught by Emil Scarlat and Dorin Mitruț, this course, in addition to notions about cybernetics, has chapters with adaptive topics.

In the field of ecosystems, with the support of the University of Bucharest, a series of scientific papers have appeared and several adaptive projects have been implemented. Thus, within the Bucegi Natural Park, a protected area in Romania, during 2005-2007, a project entitled “Adaptive management of changes induced by climate change, on the diversity of habitats in protected areas”³⁶, was implemented and developed by the Park Administration together with Prof. Dr. Anca Sârbu from the University of Bucharest.

The Danube Delta Biosphere Reserve Administration, together with Danube Carpathian Program Romania, Danube Biosphere Reserve Ukraine, Center for Regional Studies Ukraine and NGO Ecospectr Moldova, have implemented a project entitled “Adaptive

³⁵ E. Scarlat și D. Mitruț, *Sistemul adaptiv complex în economie*, capitolul 3 în *Bazele ciberneticii*, ASE. Facultatea de Cibernetica, Statistica și Informatica Economică, Curs online.

³⁶ A. Sârbu, manager de proiect, *Managementul adaptativ al modificărilor induse de schimbările climatice, asupra diversității habitatelor din ariile protejate*, Administrația Parcului Natural Bucegi, Universitatea din București, Habit Change, Programul Europa Centrală, 2005-2007.

Management to Climate Change-Induced Habitat Diversity protected”³⁷, project completed in 2012, by the Romanian Association of the Danube Delta Biosphere.

The application in practice of the adaptive theory was also made in other fields, not only within the ecosystems, as for example, in the cities of Bucharest and Iași, by the UTI Company, adaptive traffic management systems were implemented.

7.2 Chapter 2 „The role of law and administrative decisions in the adaptive transformation of the public administration”

Legislation and administrative decisions, in the view of the parents of adaptive management applied in ecosystems³⁸ and adaptive public administration³⁹, are essential for the adaptive management because they can constrain its application in practice, as follows:

- the institutions aim to maintain stability, to exclude disruptions and risks from their activity and to react, when problems and opportunities arise, through institutional crises⁴⁰. The law governing these institutions does not allow the implementation of adaptive management;
- institutions must be designed to deal with large, impossible-to-eliminate disasters, prevent failures and and to ensure institutional survival when a failure occurs⁴¹. The design of such institutions requires the permission granted by law for the implementation of adaptive management;
- the public administration must constantly adapt as a field to remain relevant, but, public institutions are considered bastions of stability, in which there are limited changes that do not affect existing stability, theories are stable providing a constant reference, administrators implement only established practices and the society is based on stable values and operations⁴²;
- the plans made by the heads of the institutions, for solving various situations, plans that come into conflict with the legal requirements, are not approved. Public administration has a

³⁷ M. Neubert și A. Sârbu, manageri de proiect, *Management adaptativ la modificările induse de schimbările climatice, asupra diversității habitatelor din ariile protejate*, Danube Delta Biosphere Reserve. EU Interreg IV B Central, Project Habit-Change, 5th Partner Meeting, 7-11. May 2012, Tulcea, România.

³⁸ C. S. Holling, ed., *Adaptive environmental assessment and management. Institute for Applied Systems Analysis*. (Chichester-New York-Brisbane-Toronto: John Wiley & Sons, 1978).

³⁹ F. H. Mitchell și C. C. Mitchell, *op. cit.*.

⁴⁰ C. S. Holling, ed., *op. cit.*, p. 35-37.

⁴¹ *Ibidem*, p. 138-139.

⁴² F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 15-16.

wide range of legal constraints, even the option to introduce adaptive administration in the work of an institution is restricted by legal issues⁴³.

The behavioral reaction of the public administration to the rights and freedoms of citizens is reduced, and can be characterized as rigid, due to the exercise of “social control by law”⁴⁴, while witnessing the “ossification”⁴⁵ of the legislation “which becomes a serious impediment”⁴⁶ for adapting activities to rapid changes in technology. The regulations in force “quickly become obsolete and are not reviewed in a timely and efficient manner in response to changing technologies and circumstances”⁴⁷ that led to legislation.

The general objective of Chapter 2 is to analyze the causes of the rigidity of public institutions, legislation and judicial practice, the capacity to adapt within the legal system, the influence of legislation on the adaptive capacity of public institutions, and to study the decision-making process in public administration.

The relationship, seen from an adaptive point of view, between law and public institutions, was analyzed, from several points of view, by a series of researchers, they established that:

- administrative law must allow the application of adaptive management. A number of changes are proposed which, in the opinion of the authors⁴⁸, will contribute to removing the current situation from a standstill;
- there are major differences between ecological and social systems, which are dynamic, complex and, at the same time, subject to abrupt and unpredictable changes, and administrative law, which assumes that nature is relatively stable and predictable⁴⁹;
- the regulatory process is ossified, it has become an impediment to new technologies, which, unlike the law, are constantly in motion. Procedures, evidence, judicial review and other legal obligations contribute to widening the gap between technology and regulation⁵⁰;

⁴³ F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 58-60.

⁴⁴ A. Matei, “Analiza Sistemelor Administrației Publice” – descriere carte, Editura Economică, www.edecon.ro/carte/807/analiza-sistemelor-administratiei-publice-ani-matei/ (accesat 15.12.2019).

⁴⁵ T. O. McGarity, “Some Thoughts on Deossifying the Rulemaking Process”, *Duke Law Journal* 41, Nr. 6 (1992), p. 1385-1462.

⁴⁶ L. M. Gaudet și G. E. Marchant, “Administrative Law Tools for More Adaptive and Responsive Government Regulation,” în *The Growing Gap Between Emerging Technologies and Legal-Ethical Oversight: The Pacing Problem*, ed. Gary Marchant, Braden Allenby și Joseph Herkert (Germania: Springer, 2011), p. 167.

⁴⁷ *Ibidem*, p. 167.

⁴⁸ R. K. Craig et al., “A proposal for amending administrative law to facilitate adaptive management,” *Environmental Robin Research Letters* 12, nr. 7 (2017).

⁴⁹ C. A. (Tony) Arnold și L. H. Gunderson, “Adaptive Law and Resilience,” *Environmental Law Reporter* 43, (2013).

⁵⁰ L. M. Gaudet și G. E. Marchant, *op. cit.*

- while lawyers for administrative institutions focused on the judicial perspective and legal responsibilities in order to achieve results, public attention was drawn to organizational processes and the results obtained by institutions⁵¹;
- the degree of adaptation of an institution to climate change⁵², which is increasingly frequent and uncertain, is influenced by the legal capacity to adapt included in an approved program, by the variability of the objectives pursued and, within the legally authorized limits;
- legal and institutional structures fundamentally shape opportunities for adaptive resource management, both ecologically and socially⁵³;
- administrative law⁵⁴ determines the way in which societies adapt and transform in response to socio-ecological changes;
- research on the resilience of cities and legal institutions suggests that laws and legal systems may become more adaptive to nonlinear changes that take place in complex and interconnected systems⁵⁵;
- the right is seen as a barrier to adaptive management to move from theory to practice⁵⁶;
- the law dictates the structure, limits, rules and processes within which government actions take place⁵⁷. This is one of the focal points for analyzing barriers to adaptation as the effects of climate change are felt.

Projects to implement adaptive management, both in ecosystems and in social systems, have, over time, encountered a number of legal barriers “related to one or more of the following legal values: (i) stationarity, (ii) certainty, and (iii) purpose”⁵⁸. In the current administrative system, the future of the law shows that its past (stationary), there is the certainty that the law is made, interpreted and applied in the same way, in time and space, the purpose of the law being to establish standards, maintain order and solve litigation and protect freedoms and rights. Changes, uncertainties and iterations are accepted in the adaptive system, so the introduction of adaptive administration depends on how “institutions are designed to

⁵¹ D. C. Dragoş şi P. M. Langbrock, “Law and Public Administration: A love-Hate Relationship?,” în *The Palgrave Handbook of Public Administration and Management in Europe*, ed. E. Ongaro şi S. van Thiel, (United Kingdom: Palgrave Macmillan, 2018), p. 1057-1085.

⁵² A. E. Camacho şi R. L. Glicksman, “Legal Adaptive Capacity: How Program Goals and Processes Shape Federal Land Adaptation to Climate Change,” *University of Colorado Law Review* 87, (2016).

⁵³ D. A. DeCaro et al., “Legal and institutional foundation of adaptive environmental governance,” *Ecology and Society* 22, nr. 1 (2017), p. 1-32.

⁵⁴ D. Armitage, “Resilience and Administrative Law,” *Ecology and Society* 18, nr. 2, articol 11 (2013).

⁵⁵ C. A. (Toni) Arnold, “Resilient Cities and Adaptive Law,” *Idaho Law Review* 50, (2014), p. 245-264.

⁵⁶ M. F. Frohlich et al., “The relationship between adaptive management of social-ecological systems and law: a systematic review,” *Ecology and Society* 23, nr. 2 (2018), p. 23.

⁵⁷ Barbara A. Cosens et al., “The role of law in adaptive governance,” *Ecology and Society* 22, nr. 1 (2017), p. 2.

⁵⁸ M. F. Frohlich et al., *op. cit.*, p. 23.

function, for example, political structure, sets of norms, social values and standards of behavior that shape human interactions"⁵⁹. The interaction between political structure, legal norms, values and standards of behavior is usually too conservative to allow public institutions to adapt to changes in both ecosystems and socio-systems.

Adaptive administrative law is based on the dynamics of a complex system, interconnected, both with society and the environment, this system is not static, but undergoes transformations, influenced by disturbances, feedback and the ability of systems to adapt to these actions.

Adaptive law has a framework, objectives, structure, methods and actions. The framework for the development of adaptive law "places legal reform in the empirical context of how social and natural forces interact with each other"⁶⁰. The objectives of adaptive law "encourage the management of resilience: the resilience of ecosystems and the adaptability of social and environmental systems, including constituent subsystems, such as institutions and communities"⁶¹. The structure of adaptive law "is polycentric, using multimodal and multiscale responses to issues that are freely integrated"⁶². The adaptive law method "facilitates social and environmental resilience through a moderate / evolutionary adaptation to changing conditions, in terms of context, standards, tolerance to uncertainty and flexible discretionary decision-making"⁶³. Actions under adaptive law "recognize and encompass iterative actions with feedback loops between several participants, at the limits of human and organizational rationality, the effects of social and environmental forces on ordering and management of human affairs and the mechanism of accountability for conserving capital"⁶⁴.

The adaptive legal system is differentiated⁶⁵ from the non-adaptive one by the number of objectives, by the structure, by the flexibility of the applied methods and by the processes that take place within the system, as follows:

- the adaptive legal system has multiple specific objectives, as opposed to the limited number of objectives in the non-adaptive case;
- the adaptive system has a multi-center, multimodal and integrationist structure, while the non-adaptive system has a single-center structure that directs authorities to solve problems, uses unique and uniform models as solutions to problems;

⁵⁹ M. F. Frohlich et al., *op. cit.*, p. 23.

⁶⁰ C. A. (Tony) Arnold și L. H. Gunderson, *op. cit.*, p. 428.

⁶¹ *Ibidem*, p. 428.

⁶² *Ibidem*, p. 436.

⁶³ *Ibidem*, p. 436.

⁶⁴ *Ibidem*, p. 438.

⁶⁵ *Ibidem*, p. 4.

- adaptive methods are based on standards, flexibility, discretion and respect as opposed to inflexible methods, in the case of non-adaptive methods, which use rules, legal abstractions and which promote resistance to change;
- the adaptive system uses iterative, pluralistic legal processes, based on learning and responsibility and with feedback loops. In the case of non-adaptive legal systems we are dealing with rational, linear, legal-centralist processes that do not take into account the uncertainty in their functioning.

7.3 Chapter 3 "Information technology, a determining factor in the adaptive transformation of public institutions"

Chapter 3 examines the mechanism of operation of the adaptive information system in order to make the activity more flexible and to transform public institutions into institutions capable of processing information in uncertain, complex and dynamic work environments, as foreseen in the near future, to process data with limited resources and with incomplete information.

Information technology, according to the parents of adaptive management applied in ecosystems⁶⁶ and adaptive public administration⁶⁷, is extremely important for adaptive management because it helps to make quick and correct decisions, as follows:

- the data are incomplete and the uncertainty is very high;
- the data should not be collected en masse⁶⁸, but only the relevant ones;
- - many data collected are useless for building an adaptive management model⁶⁹;
- the analyst, after completing the studies, finds that he has a very large volume of information to be submitted to the decision-making structure for approval, decision makers can not go through them all for evaluation, it is necessary to summarize the studies, the information must be sorted and presented in a credible language for the decision maker;
- the information must be presented in the form of slides, graphic presentations, briefly and illustrated⁷⁰;
- there is a need to create a knowledge base that can help identify problems and solve the problems faced by the administrators of public institutions⁷¹;

⁶⁶ C. S. Holling, ed., *op. cit.*.

⁶⁷ F. H. Mitchell și C. C. Mitchell, *op. cit.*.

⁶⁸ C. S. Holling, ed., *op. cit.*, p. 19.

⁶⁹ *Ibidem*, p. 62

⁷⁰ *Ibidem*, p. 120-131.

⁷¹ F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 4.

- analysis of the data from the knowledge bases involves a combination of typological scales and search tables to create representations of the interactions between concepts that may vary over time⁷²;
- a theory generator is needed, which produces new versions of theory⁷³;
- the use of Big Data, to pre-process information, new types of computer processing to transform and post-process information⁷⁴.

The first objective of Chapter 3 is to analyze adaptive software and its use in public institutions, and the second objective is to present adaptive e-government of public health.

Adaptive software programs. In public institutions computer programs are used within each department, these programs are independent of each other and are designed according to the needs of that department there is no computer program at the institution level that includes all the programs used, with modules on compartments. A citizen requesting information or documents from several compartments within the same institution must submit the same type of documents and information (such as documents and identifying information) to all compartments, instead of the request and the identification of the citizen to be done only once, “at the moment, in almost all situations, the public service applicant has to go to a counter (or more), wait in line, submit a series of documents in person and then wait a few days (if necessary, even weeks) to get in possession of another document with which he has to go to another counter, where he will stand at another queue ... and so on until the matter is resolved”⁷⁵.

Existing software must be constantly modified, mainly due to legislative changes. The updating of software is currently a problem, due to the refusal of computer scientists employed by public institutions or sellers of such programs, who refuse to work hard to maintain the coherence of programs and comply with the regulatory framework, as well as the high cost, a cost that the public institution cannot cover. Inadequacy is a fundamental problem of computer programs of public institutions because these systems have been designed to support a specific set of instructions in a rigid legal framework. Extending these software programs to support new legal provisions is cumbersome. The complexity increases with

⁷² F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 4.

⁷³ *Ibidem*, p. 47-49.

⁷⁴ *Ibidem*, p. 51-53.

⁷⁵ C. Vrabie, “Posibile efecte ale crizei mondiale asupra adoptării sistemelor de e-Guvernare,” *SNSPA. Administrație publică*, <http://www.apas.admpubl.snsa.ro/bitstream/handle/2010/513/POSSIBILE%20EFECTE%20ALE%20CRIZEI%20MONDIALE%20ASUPRA%20ADOPTARII%20SISTEMELOR%20DE%20E-GUVERNARE.pdf?sequence=1> (accesat 02 martie 2020).

each new change, so that after a few years, even small changes become difficult to make without affecting the rest of the program.

In this context, of the inflexible software programs and the high costs, the need is felt for the development of digital ecosystems which “consists in the construction of artificial systems meant to manage the dynamics of the operational mechanisms”⁷⁶. Adaptive systems fall into the category of digital ecosystems, which work according to two basic principles: self-adjustment and self-organization. “In the first case, in accordance with the changes in the external environment, the way the system works changes, and in the second case, the structure, the organization of the system changes”⁷⁷. A computer program is adaptive if it “automatically changes its operating algorithm and (sometimes) its structure in order to maintain or achieve optimal condition when external conditions change”⁷⁸, the program must adapt to current and future situations programs that solve a problem, even if they solve it perfectly, have no value. Adaptive software uses “available information about changes in its environment to improve its behaviour”⁷⁹.

The characteristics of adaptive software are the following:

- the basic elements of an adaptive program are the following: the adaptive computer program is three-dimensional, the high degree of uncertainty contributes to the development of this type of programs, the emergence of XML (Extensible Markup Language) has contributed to the development of adaptive programs, adaptive software can also have adaptive engines;
- adaptive software is adaptive: adaptive software itself has adaptive capacity, the adaptive software is reconfigurable, reprogrammable, extensible, can be specialized, and some parts of the program can be removed, relationships can be established between parts of the program, or between several adaptive programs in the same category, the adaptive computer program must not be independent of the external environment, the adaptive computer program may store several versions of the program;
- the adjustment of adaptive programs can be made easily: the adaptive software can be easily modified to meet existing requirements as well as those that will appear in the future, the authorized user can easily adjust and extend an adaptive program;

⁷⁶ A. Matei, L. Matei și C. Săvulescu, “Digital Ecosystems for Public Affairs,” *Procedia Information Technology & Computer Science* 3 (2013), p. 5.

⁷⁷ V. Ciobu, “Aplicații adaptive pentru cercetarea sistemelor fizice și managementul resurselor,” *Conferința Științifică Națională cu participare internațională “Integrare prin cercetare și inovare,”* Universitatea de Stat din Moldova, Chișinău, (2014), p. 121.

⁷⁸ *Ibidem*, p. 121.

⁷⁹ P. Norvig și D. Cohn, “Adaptive Software,” *Harlequin Incorporated*, <http://norvig.com/adapaper-pcai.html> (accesat 04 martie 2020).

- the role of adaptive programs is to produce information, they must: allow the definition of other administrative units, to be able to use the actual data and the data of processing, to collect also context-based information, to deal with a large number of rules, the parts from a matching program or similar programs can be removed. Adaptive software may make changes if the applicable law changes and allows the recording and processing of data outside the accepted limits.

E-government adapted to uncertain situations. e^a-Governance (adaptive e-government) represents the future of public administrative, this new way of administration consists in moving public institutions on the Internet, where, departments, services, offices and copartments will become IT modules, civil servants will be able to work, from anywhere, no from a fixed place. Adaptive e-government is based on working in uncertain conditions, on computer systems and adaptive information technology, on collecting data automatically, transforming data into information and information into knowledge and their feedback to users. Citizens will be able to become, whenever necessary, “civil servants” and will contribute to the smooth running of society.

The citizen, in the old type of Government, searched for the necessary information, in archives, in legislation or asks at the information office of the public institution, structures the information, classifies it as important or less important, wastes time and makes mistakes, overwhelmed by the multitude of information. The same citizen, in e-Government, searches for information on the official portal of the institution, reads the law applicable at the date of its issuance, reads all changes published on the portal, completes the basic law with newly introduced articles, reads the guide that accompanies the necessary form, completes the form type made available to him by the institution after downloading it from the site, submitting it to the online Registry of the institution, after completing the questionnaire that he has completed on other occasions. In the case of the e^a-Government, the same user is recognized by the interface of the portal due to the fact that he has used the services of the institution, is guided to the required legislation and is provided with only the articles of the law necessary in his case, articles containing all changes the relevant law, national case law, ECHR, CCR, possibly, if requested, the texts in law journals regarding his application, etc., the standard form is automatically filled in with his identification data, as well as the Registry's questionnaire, and an IT assistant helps him not to make mistakes in completing the application.

A portal of a public institution, such as the Ministry of Health, can be improved, in an adaptive sense, by introducing the radar of web portals and by introducing computer buttons.

The first proposal aims to introduce the radar of web portals. As it results from the analysis of the portal <http://www.ms.ro>, it was found that, in its design, construction and operation, no adaptive information technology was used. Until its adaptive transformation, it is proposed to use a computer radar, embedded in the portal and displayed on the first page, to help the heads of the institution to detect existing problems within the ministry, but especially in the relationship between the ministry and citizens. The proposal aims only at the radar concept, the computer tools to put this concept into practice will be built by specialists in the field.

The radar, figure 1, represents a virtual, visual installation, which detects with the help of user clicks the existence of problems, the proximity of the ministry to the citizens and the area where the difficulties come from. It consists of a click receiver composed of 5 (five) concentric circles, which evaluates, from serious, in the middle, to, without problems, towards the edge of the receiver and a number of 7 (seven) distinct groups of indicators. The pronounced directivity of clicks in the radar dial contributes to the formation of a polygon whose perimeter indicates the existence, size and type of problems by its position.

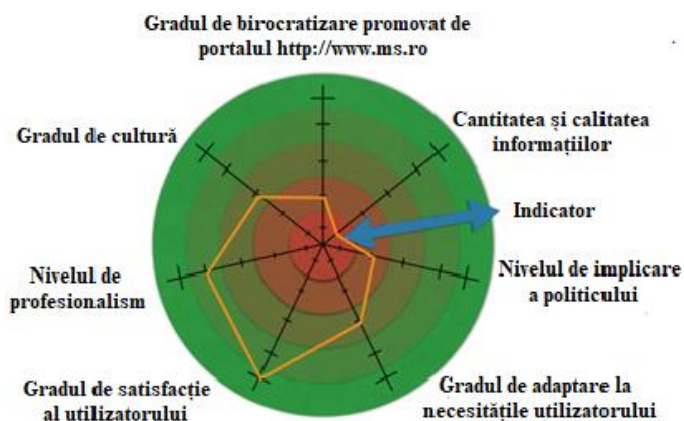


Figure 1 Radar of the portal of the Ministry of Health⁸⁰

The indicators followed by the radar of the sites, figure no. 1, are the following: the degree of bureaucratization, the quantity and quality of information, the level of policy involvement, the degree of adaptation, the degree of satisfaction, the level of professionalism and the degree of culture.

The second proposal aims to introduce, on each page of the portal <http://www.ms.ro>, at every normative act, in the category of decisional transparency, two buttons⁸¹, which

⁸⁰ Kafka Brigade, *De Kafkathermometer uw wapen tegen bureaucratisch onbehagen*, Olanda.

⁸¹ Department of Health and Social Care, Gov.uk, United Kingdom, <https://www.gov.uk/government/organisations/department-of-health-and-social-care> (accesat 28 martie 2020).

express the agreement or disagreement of the users with the decisions taken or in progress of approval, on the pages: normative acts in transparency⁸², public debates⁸³, normative acts in progress⁸⁴ as well as at approved normative acts⁸⁵.

7.4 Chapter 4 "Case Study: Adaptive Management of Public Institutions during the COVID-19 Pandemic"

There are currently few approaches in assessing the adaptability of public institutions to the COVID-19 pandemic, which would analyze the relationships between various factors, such as: the COVID-19 pandemic, public institutions, legislation, informatics, theories of management and adaptive administration.

From a conceptual point of view, adaptive management, adjusted to the situation of the COVID-19 pandemic, can help to make quick and correct decisions, as follows:

- Spatial behavior, when returning to the country, due to the pandemic, of potentially infected Romanian citizens with the Sars-Cov-2 virus, which were going to work abroad, can have dramatic social and medical consequences, both on the localities of residence and on the space through which they pass, much stronger consequences than the benefits brought by the influx of capital with which they return to the country⁸⁶;
- There is a dynamic variability in social systems, a group of citizens who believe in the existence of the virus can gain ascendancy for a period of time, at the same time their numerical increase can trigger counter forces that reverse this process⁸⁷;
- Workshops are the essence of adaptive assessments. Issues related to pandemic management can be discussed in a series of television workshops, intense, short-lived and with clear objectives, where a small group of citizens can interact with a larger number of experts from several fields to transfer knowledge about the real problems caused by the pandemic⁸⁸;
- the uncertainty created by the pandemic is a concept that includes: (1) events that can be predefined because they have direct, known effects and have known probabilities of occurrence, (2) those events that are imaginable and partially descriptive for which the

⁸² Ministerul Sănătății, *Acte normative în transparență*, <http://www.ms.ro/acte-normative-in-transparenta/> (accesat 02 februarie 2020).

⁸³ Ministerul Sănătății, *Dezbateri publice*, <http://www.ms.ro/dezbateri-publice/> (accesat 02 februarie 2020).

⁸⁴ Ministerul Sănătății, *Acte normative în lucru*, <http://www.ms.ro/proiecte-in-circuitul-intern-de-avizare/> (accesat 06 iulie 2020).

⁸⁵ Ministerul Sănătății, *Acte normative aprobate*, <http://www.ms.ro/acte-normative-aprobate/> (accesat 06 iulie 2020).

⁸⁶ C. S. Holling, ed., *op. cit.*, p. 28-30.

⁸⁷ *Ibidem*, p. 33-35.

⁸⁸ *Ibidem*, p. 48-56.

outcome or the probability of occurrence is unknown, and (3) the most dangerous are the disturbances transmitted rapidly on a global scale, disturbances due to modern technological and industrial capacity, for which we have no experience, and the events that take place involve unknown processes and forms⁸⁹;

- Adaptive management means the creation of mechanisms that allow the assessment to continue throughout the pandemic, as well as mechanisms that allow adaptation to be a response to the evolution of the pandemic⁹⁰;

- Decisions that are made at a given time change the environment in which future decisions are made, decision-making from which there is no option of withdrawal in the future are the most dangerous⁹¹;

- Institutions that exclude disruptions and risks from their work react to the problems created by the pandemic through institutional crises, blocking any attempt to enter its system by factors that may disrupt normal activities⁹²;

- Public administration is, at the same time, an area under constant stress (it does not have methods, tools and ideas to function efficiently), but it is also an area that creates, in turn, stress (among citizens, of example)⁹³, it must constantly adapt as a field in order to remain relevant⁹⁴;

- A knowledge base within the public administration needs to be created, providing comprehensive and accessible information on the pandemic, on administrative problems and how to solve the problems faced by the administrators of public institutions⁹⁵;

- Alienation exists during the pandemic in the case of citizens, they no longer feel helped by public institutions and they alienate themselves from the government⁹⁶;

- In the event that the external environment of an institution changes due to the existence of the pandemic, cooperation becomes difficult, in this case an adaptive conflict resolution procedure is needed (conflicts are considered normal and accepted in the adaptive administrative framework)⁹⁷;

- Frustration and stress during the pandemic. Institutional leaders and civil servants will feel threatened by the wave of criticism, both external and internal, and in this case will no longer

⁸⁹ C. S. Holling, ed., *op. cit.*, p. 133-135.

⁹⁰ *Ibidem*, p. 136-137.

⁹¹ *Ibidem*, p. 137-138.

⁹² *Ibidem*, p. 35-37.

⁹³ F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 7.

⁹⁴ *Ibidem*, p. 15-16.

⁹⁵ *Ibidem*, p. 4.

⁹⁶ *Ibidem*, p. 56-58.

⁹⁷ *Ibidem*, p. 32-35.

take risks to improve their activity, preferring to act rigidly, according to a strict legal framework⁹⁸.

The research hypotheses are the following:

- Public institutions may, in certain situations, become adaptive institutions.
- Adaptive public institutions / bodies can be set up during a pandemic.

The case study has the following structure: the first subchapter is an analysis of the impact of pandemics on humanity, the second subchapter investigates how the World Health Organization and the European Union adapt to the COVID-19 pandemic and the last subchapter examines ways to adapt public administration from Romania to the crisis created by the COVID-19 pandemic.

The lessons learned by the World Health Organization during the COVID-19 pandemic in European countries concern the following indicators: health systems and essential health services⁹⁹, investments¹⁰⁰, activity centers where specific public health emergency activities take place¹⁰¹, support teams for incident management¹⁰², innovation, artificial intelligence and big data¹⁰³, social values¹⁰⁴, leadership¹⁰⁵, saving lives and livelihoods¹⁰⁶ and global health governance¹⁰⁷.

From the lessons learned by the World Health Organization, it follows that only robust, people-centered health systems can adapt quickly to threats, and that initial plans and recommendations must be constantly thought out, rethought, and reworked based on uncertain data.

The European Union has been slow to take immediate action to protect Member States and their citizens, so it was necessary to use the adaptive instrument of lessons learned from the mistakes made during the COVID-19 pandemic, lessons used to propose measures¹⁰⁸ to remedy the situation created. The proposed measures cover the following aspects: (1) the implementation of the coordinated response at European Union level, (2) medical

⁹⁸ F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 18-19.

⁹⁹ World Health Organization, Regional Office for Europe, "The COVID-19 pandemic: lessons learned for the WHO European Region," version 1.0, 15 septembrie 2020, nr. document: WHO/EURO:2020-1121-40867-55292, 2.

¹⁰⁰ *Ibidem*, p. 3.

¹⁰¹ *Ibidem*, p. 3.

¹⁰² *Ibidem*, p. 4.

¹⁰³ *Ibidem*, p. 4.

¹⁰⁴ *Ibidem*, p. 4.

¹⁰⁵ *Ibidem*, p. 5.

¹⁰⁶ *Ibidem*, p. 5.

¹⁰⁷ *Ibidem*, p. 6.

¹⁰⁸ European Commission, "Building a European Health Union: Reinforcing the EU's resilience for cross-border health threats. Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions," Brussels, 11.11.2020 COM(2020) 724 final.

countermeasures, (3) the preparation, planning and reporting of epidemiological surveillance responses, (4) laboratory findings, testing and contact detection, (5) the ability to warn and assess risks, (6) international cooperation and coordination, (7) the preparation of emergency medicine within the European Union and the response of the authorities.

In order for Romania to adapt to the situation created by the COVID-19 pandemic, very quickly was created a network of public organizations / institutions, in addition to the existing one, in order to ensure the health of the citizens. The health crisis has a multisectoral character, therefore the intersectoral links have a very high priority and, for this reason, inter-institutional bodies have been set up, such as: the Technical-Scientific Support Group on the management of highly contagious diseases in Romania, the Strategic Communication Group, Interinstitutional Working Party and the National Coordinating Committee for SARS-CoV-2 Vaccination Activities. Adaptation was also used in the case of hospitals, namely, ensuring medical care for patients tested positive with the SARS-CoV-2 virus “was achieved through the staged involvement of hospitals”¹⁰⁹. The aim was to prevent the spread of COVID-19 infection and to ensure that patients had access to treatment immediately and also in conditions of isolation.

During the COVID-19 pandemic, public institutions applied a “design adaptation”¹¹⁰, which represents actions that, from the outset, are known to undergo changes and adapt as knowledge about the pandemic increases, and to ease the process there will be outlined “clear processes for collecting, interpreting and taking evidence-based action.”¹¹¹ Thus, the basis of each decision taken during the pandemic were: the recommendations of the World Health Organization, the decisions of the European Union, the collaboration with the states of the world affected by the pandemic, the analyzes and studies of specialists.

A key factor in the adaptability of public institutions during the pandemic was “the sense of responsibility in the face of the constraints imposed by limited knowledge in the field”¹¹². Public institutions had to implement immediate measures, depending on the new “discoveries in the medical field”¹¹³, to “interpret, quickly, different forms of evidence and

¹⁰⁹ Ministerul Sănătății, *Ordinul nr. 555 din 3 aprilie 2020 privind aprobarea Planului de măsuri pentru pregătirea spitalelor în contextul epidemiei de coronavirus COVID-19, a Listei spitalelor care asigură asistența medicală pacienților testați pozitiv cu virusul SARS-CoV-2 în faza I și în faza a II-a și a Listei cu spitalele de suport pentru pacienții testați pozitiv sau suspecți cu virusul SARS-CoV-2*, Cap. II, Monitorul Oficial nr. 290 din 07.04.2020.

¹¹⁰ B. Ramalingam, L. Wild și M. Ferrari, “Adaptive leadership in the coronavirus response Bridging science, policy and practice,” *ODI, Coronavirus Briefing note*, aprilie 2020.

¹¹¹ *Ibidem*.

¹¹² *Ibidem*.

¹¹³ *Ibidem*.

data. All these adaptive actions of public institutions must be implemented in real time and at the same time achieve a “minimization of the impact of the pandemic”¹¹⁴. Another key factor in the adaptability of public institutions has been the establishment of inter-ministerial public bodies, such as the National Coordinating Committee for SARS-CoV-2 Vaccination Activities. The Committee functioned as an adaptive institution / body according to the assessment made, based on the concept of adaptive management, as follows:

- Organization of the Committee. The removal of the Committee, at the end of the purpose for which it was set up, does not destroy the entire administrative system, due to the minimum connections existing, the other public institutions and bodies can survive long enough to recover. New interinstitutional structures are rapidly adapting to change¹¹⁵. The purpose for which the Committee was set up is to organize and coordinate activities on SARS-CoV-2 vaccination¹¹⁶;

- Spatial behavior. The local impact on the institutional environment of a project for the installation by the Committee of a vaccination flow can be identified and improved, the vaccination flows are installed in the temporarily available spaces, where no activities take place. No new buildings are being built and the need for human resources, without being employed with a work card, necessary for the vaccination teams is being identified¹¹⁷. The construction of new buildings and hiring of specialized personnel would have dramatic consequences on the evolution of the pandemic, due to the time required for the construction of buildings and employment, as well as for the evolution of the revenue and expenditure budget¹¹⁸, given that vaccination is free and construction of spaces specially designed would massively affect costs;

- Stability and resilience. Uncertainty is at the heart of the pandemic, as is the case with citizens, for example, the number of citizens wishing to be vaccinated may suddenly change to a radically different state, in which case the Committee may open or close centers or vaccination flows according to citizens' requests¹¹⁹;

- Dynamic variability. Citizens' beliefs and desires about vaccination are not static, but they are constantly changing. This dynamic variability is induced by internal mechanisms, for

¹¹⁴ B. Ramalingam, L. Wild și M. Ferrari, *op. cit.*

¹¹⁵ C. S. Holling, ed., *op. cit.*, p. 26-28.

¹¹⁶ Prim-ministrul, *Decizia nr. 385 din 20 noiembrie 2020 privind înființarea Comitetului național de coordonare a activităților privind vaccinarea împotriva SARS-CoV-2*, Monitorul Oficial nr. 1110 din 20.11.2020, art. 2, alin. 1.

¹¹⁷ *Ibidem*, art. 2, alin. 1.

¹¹⁸ C. S. Holling, ed., *op. cit.*, p. 28-30.

¹¹⁹ *Ibidem*, p. 30-33.

example, an anti-vaccination group can gain ascendancy for a period of time, but, the numerical increase of this group, can trigger counteracting forces that reverse this process¹²⁰;

- Workshops can be the essence of adaptive assessments on the situation of the pandemic and vaccinations, they are an effective way to analyze, make alternative models or predictions and, were alternative management, knowledge transfer and implementation of results schemes can be evaluated¹²¹. The Committee did not hold any workshops, which affected the object of activity, namely mass vaccination;

- Complexity. The pandemic has a very large number of variables needed to adequately describe the dynamic conditions of the system at any given time, for example, problems do not occur in a single area or at a specific time, it must also be taken into account the deeds of citizens, deeds that take place on different time scales (days, weeks, months, years, etc.) or the time intervals between events may be different¹²²;

- Regardless of the quantity and quality of the data collected, the knowledge about the COVID-19 pandemic is very small, in relation to human ignorance¹²³. A mental or mathematical model of the COVID-19 pandemic may not be true, it may or may not be credible. Once a pandemic and vaccination model has been constructed, such as the “SARS-CoV-2 vaccination strategy”¹²⁴, its degree of credibility must be calculated, the correct calculation being made, first of all, by invalidating the model¹²⁵. For the construction of a pandemic model, only the relevant data must be collected, under no circumstance a massive collection of data will be made¹²⁶;

- In order to understand the behavior of the COVID-19 pandemic, but also of the population related to both the pandemic and the vaccination, it is necessary to study the specialized literature that deals with the experimental research carried out in laboratories or directly from reality¹²⁷;

- The adaptive vaccination management model must respond to the permanent, existing disturbances in the society. The answer to these disturbances has, in it, a dose of uncertainty.

¹²⁰ C. S. Holling, ed., *op. cit.*, p. 33-35.

¹²¹ *Ibidem*, p. 48-56.

¹²² *Ibidem*, p. 60-61.

¹²³ *Ibidem*, p. 7.

¹²⁴ Prim-ministrul, *Decizia nr. 385 din 20 noiembrie 2020 privind înființarea Comitetului național de coordonare a activităților privind vaccinarea împotriva SARS-CoV-2*, Monitorul Oficial nr. 1110 din 20.11.2020, art. 3.

¹²⁵ C. S. Holling, ed., *op. cit.*, p. 15.

¹²⁶ *Ibidem*, p. 19.

¹²⁷ *Ibidem*, p. 64.

The model must have a logical causal structure, new elements can be incorporated much faster as the disturbances appear and are understood¹²⁸;

- Uncertainty of vaccine evaluation. There are three types of uncertainties, namely: there is uncertainty in determining the right vaccine for one person or another, there is also uncertainty about the vaccine, whether it is safe or not, and finally there is uncertainty created by side effects. The solution to this problem lies in answering the question: how significant are these deviations?¹²⁹;

- Communication is a priority area¹³⁰. The Committee must inform and communicate with the medical staff and the public, taking into account the existing crisis situation^{131,132};

- Imperfection of prediction. An assessment of a situation, at a given time, for a locality is not an accurate prediction, because unmeasured situations, influenced by human interventions, can spread where it was measured. Adaptive evaluation is not a prediction of what will happen, evaluation is an ongoing process¹³³;

- Living with uncertainty. The most dangerous uncertainties are those that are rapidly transmitted on a global scale, due to modern technological and industrial capabilities, for example the spread of the SARS-CoV-2 virus, but also the spread of misleading information¹³⁴, for which we have no experience, and the events that take place involve processes and unknown shapes¹³⁵;

- Adaptive management of vaccination against COVID-19. Adaptive management of anti-COVID vaccinations calls for a reorientation of the perspective, from one in which an assumed certainty operates, to one in a state of prepared response to any unforeseen event, for example: non-authorization of vaccines; non-delivery on time by suppliers of the vaccines, non-scheduling of citizens for vaccination, giving up on scheduling, etc.;

- Restoration and future flexibility. Anti-COVID vaccination does not contribute to a complete return to the starting situation, sequelae remain in infected people, at the same time people can still be infected with SARS-CoV-2 virus, with lower intensity, new strains of the

¹²⁸ C. S. Holling, ed., *op. cit.*, p. 66-67.

¹²⁹ *Ibidem*, p. 116-117.

¹³⁰ Prim-ministrul, *Decizia nr. 385 din 20 noiembrie 2020 privind înființarea Comitetului național de coordonare a activităților privind vaccinarea împotriva SARS-CoV-2*, Monitorul Oficial nr. 1110 din 20.11.2020, art. 2, alin. 2.

¹³¹ *Ibidem*, art. 2, alin. 1.

¹³² C. S. Holling, ed., *op. cit.*, p. 120-131.

¹³³ *Ibidem*, p. 133.

¹³⁴ Comitetul Național de Coordonare a Activităților privind Vaccinarea împotriva COVID-19, *Top 10 informații înșelătoare*, <https://vaccinare-covid.gov.ro/vaccinarea-sars-cov-2/top-10-informatii-inselatoare/> (accesat 25 martie 2021).

¹³⁵ C. S. Holling, ed., *op. cit.*, p. 133-135.

virus also appear, much more dangerous, for which it is not known whether humans can be protected by vaccination. The decision of a citizen to be or not to be vaccinated, changes the environment in which he can make decisions in the future, dangerous situations can arise from which there can be no withdrawal¹³⁶;

- Behavior of institutions. Institutions were subjected to a sustained pace of change during the pandemic, and either had a flexible and adaptive response, or some of them aimed to maintain stability, exclude disruption and risk in their work and to respond by institutional crises¹³⁷. The emergence of interinstitutional public bodies, such as the Committee, an adaptive body, can also contribute to the introduction of adaptive management in the institutions with which it collaborates;

- Designing institutions for uncertainty. Public institutions must be designed, as in the case of the Committee, or re-designed, as in the case of the Ministry of Health, to cope with the occurrence of large-scale disasters, impossible to eliminate, so as to prevent failures and ensure institutional survival when a failure occurs¹³⁸.

During the COVID-19 pandemic, institutions face a constantly changing environment, due to: (1) financial pressures, caused by much lower revenues from taxes and fees; (2) the perceptions of members of government, named politically, which must secure the necessary number of votes in order to continue to govern; (3) the growing influence of mass-media and of false news; (4) the complexity of newly introduced programs aimed at eradicating SARS-CoV-2 infections and keeping the economy afloat; (5) the expectations of the citizens, during the pandemic, for the state to support them financially; (6) change, due to globalization, of social values; (7) how institutions perceive themselves; (8) the institutions' understanding of their outside world; and (9) the rigid response to the uncertain situations they face during the pandemic. During the pandemic, although there are permanent changes, public institutions believe that there should still be bastions of stability, in which there should be no change¹³⁹. The emergence of inter-ministerial bodies, such as the Committee, seeks to avoid a rigid response to adaptive measures taken to stem the pandemic.

Theory and practice, in the case of the National Coordinating Committee for SARS-CoV-2 Vaccination Activities, an inter-ministerial public body, are not separate and distinct, they are linked and co-dependent¹⁴⁰. The relationships between the theory, what is known

¹³⁶ C. S. Holling, ed., *op. cit.*, p. 137-138.

¹³⁷ *Ibidem*, p. 35-37.

¹³⁸ *Ibidem*, p. 138-139.

¹³⁹ F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 15-16.

¹⁴⁰ *Ibidem*, p. 3.

about the SARS-CoV-2 virus, pandemics in general, the anti-COVID vaccine, the point at which mass immunization is reached, etc. and practice, for example, on how vaccination is organized, is unique to the Committee and must constantly evolve together. Knowledge, in the case of the Committee, is a reflection of practices around the world, if practices change and prove useful for immunizing the population, the theory of pandemic control and mass vaccination must change in order to remain relevant. The term administrative-practical theory (a-p) indicates that theory, in the case of the Committee, as a public organization, comes from administrative practice and is not an independent set of concepts. Administrative-practical theory (AP), in the case of the Committee, changes the way in which the practice of vaccination is perceived, so that vaccination against COVID, as a practice, becomes part of the concepts that are used, as mass vaccination, takes place, theories about vaccination must evolve and, once theories are presented or published, practices must change¹⁴¹.

8. The main conclusions of the doctoral thesis

The main conclusions of the doctoral thesis are the following:

- conceptele folosite în cadrul managementului adaptiv al evaluării și proiectării ecosistemelor, pot fi utilizate și în domeniul instituțiilor publice datorită unui comportament asemănător¹⁴²;
- institutions need to be re-designed, those that exist and those that are projected, those being set up, to deal with large-scale disasters, impossible to eliminate. The design must aim at both failure prevention and survival when failure occurs, public institutions need to be more adaptable and have a greater capacity to react, than to operate on the basis of prediction and closely monitor achieving the planned prediction. Institutions must actively view uncertainty as a fundamental facet of life, rather than make a disastrous transition to achievable certainty¹⁴³;
- the public administration must constantly adapt as a field in order to remain relevant. The current situation is represented by institutions - bastions of stability, in which limited changes take place, public administrators implement only established practices, and society is based on values and stable operations¹⁴⁴;

¹⁴¹ F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 9-11.

¹⁴² C. S. Holling, ed., *op. cit.*, p. 35-37.

¹⁴³ *Ibidem*, p. 138-139.

¹⁴⁴ F. H. Mitchell și C. C. Mitchell, *op. cit.*, p. 15-16.

- administrative-practical theory (ap) changes the way practice is perceived, so that actions become part of the concepts that are used, as practical actions take place, theories must evolve and at the same time as theories are presented, practices need to change. Public institutions involved in combating the COVID-19 pandemic have applied a theory that has developed from practice (lessons learned from past pandemics) and which, in turn, has improved practical activity in the COVID-19 pandemic (wearing a face mask, social distancing, isolation, quarantine, etc.), at the same time, the activity of observing the patients, the treatments performed, etc. improved vaccine theory (Pfizer / BioNTech and Moderna COVID-19 vaccines were developed using a new vaccine technology - messenger RNA). Administrative-practical theory (a-p) has proven its viability;
- Big Data and Databases are essential tools for managers of public institutions, so they can ask, in real time, receive assistance, in real time and can quickly, make decisions based on reality. The implementation of the Big Data system in public institutions in Romania was made by the National Institute of Public Health and the National Coordinating Committee for COVID-19 Vaccination Activities, through the applications of the National Electronic Register of Vaccinations (<https://renv.ro/renv/login.php>) and Vaccination COVID-19 (<https://vaccinare-covid.gov.ro/platforma-programare/>), in these platforms are daily, electronically registered people who want to be vaccinated or register on waiting lists, vaccination appointments are made, the appointment date is communicated and the citizens who have been vaccinated are registered, also the exact situation of vaccinations is also communicated, daily, to the population, daily updated situation (<https://vaccinare-covid.gov.ro/raportari/>). The Big Data system is the basis of decisions made by governments;
- normative acts were issued and were adapted, adaptively, depending on the concrete situation of the pandemic. The errors made, in ordinances and laws, were notified by the People's Advocate, sanctioned by the Constitutional Court and remedied by the issuer;
- the public institutions, involved in combating the COVID-19 pandemic, were equipped with systems, such as tablets and computer programs, by the Special Telecommunications Service, in order to operatively report the existing situation in order to take decisions adapted to the real situation;
- administrative law is the main cause of the rigidity of public institutions;
- the court panel, at the moment of taking a decision, can adapt the legislation to the reality subject to trial, for example there is a jurisprudential solution provided by the Timișoara Court

of Appeal, which by a court decision¹⁴⁵ established in Romanian law the substitution maternity, with the effect of modifying the filiation of children thus born, contrary to positive Romanian law;

- adaptive theory cannot be applied in all situations. There are circumstances in which adaptive theory cannot be applied, such as: when decisions need to be stable in the long run (eg. the Constitution), when adjustment of decisions cannot be easily made (eg. decisions, resolutions, provisions, judgments, directives, judgments, rules, ordinances, laws, etc., are essentially rigid, their adaptation requires a complicated amendment procedure or a period of time is provided in which they can be partially or fully adjusted) and when one institution has the right to veto the decisions taken in another institution (adaptation depends on the institution that has the right to veto);

- e^a-Government, adaptive e-government, consists in moving public institutions to the Internet, where departments, services, offices and compartments will become IT modules, civil servants will be able to work, from anywhere, not from a fixed place, it is based on work in uncertain conditions, on computer systems and adaptive information technology, on automatic data collection, transformation of data into information and information into knowledge and their feedback to users;

- During the COVID-19 pandemic, although permanent changes are taking place, public institutions consider that they should continue to be bastions of stability, as it is not necessary to adapt to the evolution of the situation created by the SARS-CoV-2 virus. The emergence of inter-ministerial bodies, such as the the National Coordinating Committee for SARS-CoV-2 Vaccination Activities, seeks to avoid a rigid response to adaptive measures taken to stem the pandemic. The Committee is an adaptive inter-ministerial body / institution.

Public institutions / bodies may be adaptive, under conditions of uncertainty (eg. COVID-19 pandemic), if:

- are evaluated and designed for this purpose;
- whether the legislation allows the use of adaptive management and administration in institutional practice;
- if it is equipped with high-performance computer systems and adaptive programs.

¹⁴⁵ Curtea de Apel Timișoara, *Decizia Civilă nr. 1196 din data de 26.09.2013*, citat în *Assisted Human Reproduction and The Best Interest of The Child, Communication, Context, Interdisciplinarity*, Maria Lavinia Tec., Vol III, Section Law (Târgu Mureș: Petru Maior University Press, 2014), p. 596.

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