On the Role of E-Technology Innovations in Agile and Interactive Policymaking

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Abstract. The main goal of the article is to present a theoretical analysis of the current state and prospects of the "digital government", to identify the most priority aspects of its interpretation in political theory. It is also important to outline the new opportunities that are provided by the e-technologies and new information potential for connecting citizens to the Internet and promoting actively both the principles of "digital democracy" and a new vision of the tasks of public policy. Particular attention is paid to the problem of implementation of e-technology innovations in the different levels of public policymaking. We demonstrate and problematize the role of four digital technologies in ensuring transactive institutional mechanisms in the policy process: block-chain technology, Issue-Based Information System, General Morphological Analysis, and Information System Integration. We regard these technologies and techniques as complementary ones.

Keywords: policymaking, digital government, e-technologies, information, design rationality, public policy, blockchain technology, political discourse, globalization, democratic governance.

Introduction

In modern scientific literature, the terms "digital management" and "digital government" refer to the use of information and communication technologies (ICT), in particular the Internet, to transform relations between government and society positively. At the state level, this implies the development and active implementation of standards for interaction between administrative services so that they can exchange data and integrate their actions while respecting the principle of confidentiality. Citizens of many states share the belief that digital governance can be used to increase overall confidence in public institutions in public policy and to create an atmosphere of goodwill, competence, honesty and predictability of government at the level of everyday political processes. At the same time, up to the present, specific features and difficulties of organizing the public management sector contribute to the emergence and implementation of poorly integrated and difficult to maintain applications. For example, individual administrative structures support various heterogeneous

applications for open databases to ensure transparency in public services, which leads to duplication of effort and waste of resources.

The costs associated with maintaining such poorly integrated systems may limit the use of resources attracted for future management projects and innovations. Meanwhile, the following fundamental question is still very urgent: how can information and digital technologies influence the management processes and transformation of leading political institutions? To answer this question, scientists often have to refute a very common point of view, according to which the new era in governance is nothing more than a continuation of the paradigm of "electronic government" and, therefore, it is simply a matter of pouring "old wine into new wine-bag". One of the goals of the article is to present a comprehensive analysis of two co-existing and mutually complementary managerial paradigms - the participation paradigm and the management paradigm. Besides, the article will develop general theoretical contours and parameters of a model aimed at explaining and predicting the most promising forms and methods of public administration at the federal, regional and municipal levels.

The immediate purpose of our review article is to explore core dilemmas which modern democratic governance have faced due to the inability to respond effectively to basic challenges of welfare state crisis from the 1980s onwards. The first failure was the inability of traditional governance machine to provide individualised public services of high quality in reasonable economic terms. Different policy innovation generalized under the doctrine of new public management was able to accomplish only an “icebreaker” role and trigger the service provision which could combine the strength of public-private-third sectors in partnership-like networks. Applications of e-technologies and programs in public sector service provision have concerned mainly responses to these challenges as well as the other complicated problems, especially in public policymaking

Secondly, the emergence of different type of organisations, in particular, the networks type structures between them causes huge questions of coordination because of extremely complex, uncertain and ambiguous institutional/organisational environments. The overall re-design of the public sector into nested hierarchies and networks type heterarchies as well as the high contingency of governments task environments should rely on the considerably higher capacity of information systems design and processing capacity.

Third, in this institutional context failed classical Eastonian policy input-output model of modern liberal democracies to ensure its legitimacy. This deficit of democracy was revealed in serious impasses in representation of public interests, in lack of accountability and the absence of enough legitimate policy outputs. The first response to this failure was the trend of depolitization of the policy process in which new public management and public choice theory played a central role. Thus a need to build up the policy process as highly open and interactive one presumes also the governing mechanisms in which policy and politics become intermingled. Hence, the policymakers faced with enormous complexity and volatility of policy process which traditionally has been built up as on the standardized elitist and formalized legislative procedures. In many countries, they refrained to meet this challenge and turned back

to the traditional style of governing which draws on the policy vs. politics dichotomy. However, at the same time, the innovative approaches of agile and iterative logic software development have become a benchmark experience for future innovations and should be used in the design in the policy process.

The latter trend indicates that the application of crucial innovations in e-technologies and instruments as an input of policy innovations would enable to respond to those challenges of democratic development in a longer perspective. Those innovations demonstrated in the current article are only selected examples. We intend to demonstrate first of all possibilities of joint innovations in two rather different sectors and to learn how such symbiosis would be developed in multiple other dimensions and in longer time perspective.

In the first chapter, we give an overview of recent developments in the research agenda on e-governance. The second chapter indicates the nature of shifts in interactive policymaking in the last decades. In the third to fifth chapters, we explore main responses to the need of interactive government and e-technologies and software development which have a great potential for the development of integrated responses to those challenges.

1 Theoretical Frameworks of Modern Scientific Debates

Over the past two decades, one can state with confidence a significant increase in the interest in the problems of digitalization and digital management. The attention of political scientists, sociologists, specialists in the field of strategic management, management theory, public policy, mass communications, etc. is concentrated on the current state, prospects and foundations of the “digital government”. To coordinate scientific and expert activities in this direction, joint international projects are being created. Combining examples and cases from administrative practices, they strive to cover all important aspects related to digitalization of management processes, first of all, to study strategies, principles and practices of digital management, the importance of the Internet for government and society, to achieve a deeper understanding of the concept and possibilities of “digital democracy” as well as problems associated with the translocation of public services on the Internet. For example, the Organization for Economic Co-operation and Development (OECD) is financing a special series - OECD digital government studies, dedicated to the introduction of digital technologies in public administration in various regions of the world [1, 2, 3, 4, 5]. In different countries of the world, many studies devoted to the above problems is constantly growing [see, for example, 6, 7, 8, 9, 10, 11]. The works of specialists in the field of mass media and political communications deal with the diverse problems associated with the analysis of the importance of digital and social marketing for management processes, the dynamics of emerging markets, forms and methods of social policy, in particular, how digital media and wireless communications, especially mobile phones and social networking platforms provide specific opportunities for transforming various sectors of public policy, economics and culture. One of the main research topics is the impact of social media

on consumer behaviour through the use of digital marketing methods [12, 13, 14, 15, 16, 17].

The fact that the study of the role of digital technologies in the structure of modern mass communications is not limited to purely pragmatic aspects is evidenced, for example, by Alberto Romele's recently published work Digital Hermeneutics: Philosophical Investigations in New Media and Technologies (2020). It undertakes an "ontological understanding" of digital technologies as "creative machines". In particular, Romele notes that today the boundaries between real and virtual, of course, are becoming more transparent. The human imagination has its analogue in the digital dynamics of articulation between databases and algorithms [18, cf.: 19].

Particular attention is paid to the implementation of digital governance principles in local government structures. For example, traditional urban planning has advanced significantly due to technological developments. New technological advances have created a new form of urban planning called e-planning, which combines the traditional elements of urban planning with information and communication technologies. However, as Carl Nunez Silva's Handbook of Research on E-Planning emphasizes, despite rapid progress in the professional world, the research on the use of ICT in urban planning remains extremely scarce and minimal [20]. This circumstance is also noted in a comprehensive study by David Holdstock on the problems of strategic planning in local government systems [21]. To compensate for this gap at the theoretical level, scientists, using the method of comparative analysis of specific situations in different countries and regions, set an important task to solve the problem of bridging the gaps between the federal, regional and municipal levels of government and to offer practical political solutions to promote municipal "e-governments" [22, 23,24].

As noted above, despite the high costs, many initiatives and projects in the field of "e-government" do not live up to expectations and systematically fail. This is because, although such projects were mainly focused on technical aspects, quality of service, usability and theoretical developments aimed at transforming management using ICTs, they had a limited impact on practice. Here are still gaps in the scientific literature related to the analysis of the failures of digitalization management projects, the lack of a deeper understanding of the reasons for the decline in citizens' trust in the government and scientifically developed hypotheses explaining how the state can solve this problem using digital technologies. A key study by the Organization for Economic Co-operation and Development (OECD) confirms that in industrialized countries, public confidence in governments has continued to decline over the past few decades [25]. Other studies show that a similar phenomenon can be observed in many other regions of the world, including the countries of the Middle East, North Africa, East Asia and Latin America. Although there is currently extensive literature on the analysis of declining confidence in governments in various regions of the world, several scholars insist on the need for further research to better understand this phenomenon [26, 27, 28, 29, 30]. Besides, there is no agreement on a common set of factors that contribute to lowering the trust and confidence of people in their governments.

For example, one of the factors that were identified as the reason is the decrease in the efficiency of their work. Another factor is growing inequality among the population [31].

Similar results are often found in studies on the effectiveness of new digital technologies and management. Although digital governance initiatives have long been implemented in most parts of the world and are already at a fairly "advanced stage", citizen confidence in governments remains a challenge. Moreover, several works cite numerous facts indicating that only a few of the implemented initiatives have achieved a real transformation of management (that is, fundamental changes in the way the government performs the basic functions in terms of achieving a marked increase in productivity and efficiency) [32, 33, 34, 35, 36, 37].

Studying the processes of the impact of digital technologies on power structures, some scientists emphasize that in the scientific literature there is no single definition of the term "power transformation" [38]. In many works, this term refers to increasing operational efficiency and changes in the process, structure, lines of power, focus, power, etc. [38, 39, 40, 41]. Some researchers consider the transformation of power to be the most important stage in the development of digital management [42]. M. Janssen and W. Shu define "transformational management" as "transparent, accountable, efficient and flexible" [43]. Transformation of management is often studied exclusively in terms of public services that stimulate confidence in the authorities and is much less focused on what role ICT plays in transformational processes.

2 The shift towards interactive policy process

In our recent article in Politex "Policy Analysis in uncertain and ambiguous context: agenda for methodological pluralism" [44] the main conclusion was: the focus of policymaking has shifted from the analytical design of policy content (policy program and deliberate intervention's plan) to the design and steering of policymaking arenas. This was a deeply practical shift at the end of the XX century. Theories of the policy process are generalisations of real practices of policymaking [45, 46, 47].

The science of policymaking largely refrained the presumption that policy is an enterprise of creating order, achieving intended aims and re-engineering the activity of social actors from the top and by elites assigned with powers. The latter could expect that they can engineer processes if they command substantial powers as sovereign holders of resources and means of compulsion. This remains today increasingly at the level of rhetoric, which would be convincing because of high capacity of mediatisation.

On the one hand, the policy becomes faced with high contingency because of increasing complexity and fostered tempo of changes. It becomes obvious that social substance and especially social transactions between individuals and between individual's networks and institutions have its own spontaneous (and largely unpredictable, also in sense of positive surprises) logic of unfolding. This awareness that maximum that we would hope to do is the adapt and harness changes means not

the diminishing of the capacity of social actors. Rather reverse, because of the successful solution of simple or brute social problems in advanced democracies policy become increasingly faced with wicked issues, which are not possible to define and solve because those are endless and eternal. We could at best to harness them, to trigger and nudge [49] actors. Foucault defined this level of policy development as the normalisation [48], i.e. as a state of affairs in a domain (let say traffic or community safety) which consist of huge number interdependent and intermingled issues and variables. For this reason, we cannot cause the expected change via direct interventions and to reshape the domain at our will, but only to give triggers to the largely spontaneous re-arrangements.

On the other hand, not only the complexity and globalization were the main reason for the emergence of wicked issues, but a changing role of individual actors in a democratic society. Basic technologies and motivational factors (vs hygiene factors) become to support individual-specific (instead of average mass) needs which presume constitutive forms of social relations, i.e. active citizenship and everyday involvement in determining policy inputs, as well as the responsive state. The very idea of constitutive institutions would date back to Vico and Hegel. The Marxian concept of capital was truly constitutive pattern of social relations. As an example would be the social constructivist conception of learning and pedagogy, in which Piaget, Vygodsky and Dewey played a central role in Europe and the US at the eve of XX century [50,51]. We cannot by-pass also the relational-constitutive concept of power. However, the Foucault conception of power relations [48] as the constitutive mechanism of transactions (visavis exchange) was even in the 1980s a shadow. Today the understanding of power as a productive constitutive mechanism (similarly to capital) becomes the presumption of new avenues of democratic governance.

Further, we would focus on three blocks or dimensions of innovation in the modern policy process where there is already provided certain digital solutions (digital info, methods, an analytical requirement to software and methods). Those solutions functionality could overlap and mutually complement specific hard- and software infrastructure.

3 Contingency governance as normality

In Mary Douglas classical group-grid theory the hierarchy, market (exchange) and community were presented as archetypical patterns of modern governance [52]. However, the fourth quadrant of cross-tabulation – the pattern of fatalism or social insulation - has remained largely unexplained. This was interpreted as the pattern in which individuals are atomized, surrounded by chaos, but governed by the intensive set of rules – like the prison, monastery or organisation in the crisis [52, 53]. However, the grid in post-modern society could be based also in norms, meanings or digital networks and through the constructivist prism, those are presented as continuously negotiated patterns. Digital infrastructure in this quadrant can diminish the weakness of asymmetrical relations (domination or negative-sum games) and increase their strength – providing scope for action that corresponds to the capacities

and incentives of an actor. I.e. digital technologies would enable the maximal "inclusion" of individual capacities and contribution of the networks, and hence, a new type of solidarity, which is based on sustainable long-term wins. Thus, in our time of digital technology, this pattern could be perceived as topological space which could be integrated through voluntary transactions between individuals as well as individuals and institutions. See upper left quadrant in figure 1. [Images from 51:96])

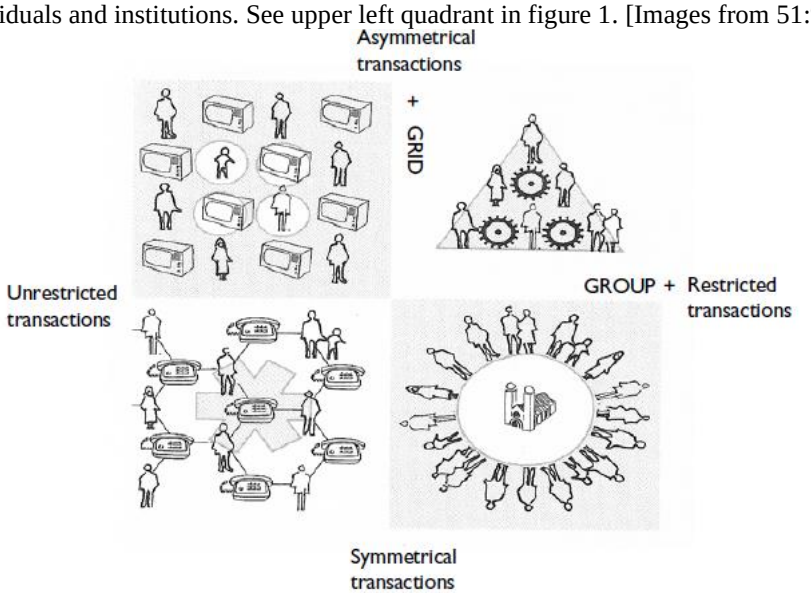

Fig. 1. Patters of transactions in different social space

This reminds our immediate past during CIOVID19, when we were "imprisoned" into our homes, but were able to be integrated into high-level communication via the internet and even carrying out regular lectures and seminars. Needless to say, I am signing my bills and documents at home to trigger numerous transactions, events, temporary action patterns with highly various partners. Topological space is organized differently but could be easily constructed by digital technologies. I.e. this is actually our social and political space in the XXI century. Government and governance are not exceptions.

To act, we should explore and organise this space differently. As Prigogine and Stengers demonstrated [54], this space should be conceived through the prism of contingency, not order. Order is emerging out of chaos as a largely self-organising process. So, we are living firstly in the context of market failures. New institutional economics teaches us how to achieve positive-sum transactions and how to institutionalise our transactions [55]. We cannon in this context to conceive and operate government as a completely organised hierarchy, but we should develop a vision on governance that considers government failure as normality and as criteria of normalisation (Foucault) [48]. Not only in the market but also the public sphere we should conceive contingency (uncertainty, ambiguity, volatility) not as a disaster but as an opportunity to constitute ourselves and our resources.

In XVI century Hobbes explored the government as sovereign force to pacify (even violently) or ramify chaos, to defend an individual's freedom or better to say – their lives. At the end of XX century, we had government and politics which were targeted to overcome the market and government failures. In the XXI century – we should become to master the contingency or failures' governance.

This means the emergence of the model of network-patterned social space or heterarchies. It is a highly contingent pattern, but at the same time, it enables a maximum of self-organisation and mobilisation of individuals to constitute via transactions their capacities. The organisational learning is such kind of transactive relational pattern, and we could live with contingency as soon as in all our transactions we are ready to learn. It's an opportunity of renewable resource generation, like weak ties or images (prestige); but these patterns highly probably fail. Digital technology enables us to build up this topological space, to predict and recognize those failures.

Governance in these conditions is steering via networks as heterarchies, i.e. metagovernance without direct domination. As Foucault says "the conduct of the conduct", or steering the big game which is assisted voluntarily by our small games in which we see our individual interests. Risks of failure increases, what is needed is a shadow of hierarchy (Scharpf) [56] as a warrant of possible dissolution in the context of failure. Network pattern has extreme complexity and unpredictability. The institutionalisation of networks presumes mechanism of negotiated rules (orders) and meanings or cognitive frames [57] In this context the focus of policymaking is not targeted so much on the development plan or program, although we as actors should have the action scenarios in any way; central focus of policymaking becomes the communication or dialogical construction of joint understanding through adequate communication. The communication is understood here not as an exchange of information but as the construction of joint meaning. Reflective communication could harness the extremely high-level conflicts and incompatibilities of people, who would not like to be any more the mass of similar pieces. This is also the new content of politics – to make those conflicts predictable.

Hence, the second role of governance (as meta-governor, as director of the big game) is to "switch on" networks and to switch back hierarchies (or strict disciplinary powers) in case of failure. The art of governance is the capacity of balancing between those ends. A completely new phenomenon like the COVID-19 pandemic and hybrid war presumes this capacity already. Northern Europe has managed to develop such capacity already.

Policymaking in this context is not the intervention (and politicians as creators) and even not as the solution of problems. This could be a case for simple issues. You cannot prevent or even reduce immigration by the high wall at state borders! At best you could start to know what is going on and what we should do at that moment collectively if we do not will to lose and crumble. I.e. the primary task of policymaker is the mediation of continuous dialogue between actors who should develop ad hoc responses. Policy actors could promote the unfolding the problem situation to identify and define interactively possibilities to adapt or to respond to the context or to trigger or harness of processes. This is summarised in Checkland's soft systems theory [58]

and Schön and Rein design rationality and learning in the policymaking [57]. Or, as Ch. Winship [59] said: „You don't' know where you are going, you might actually get there".

The case of digital innovation in managing this contingency. What would be the digital support for networks governance and metagovernance? Our first hypothesis is that blockchain technology would solve the same set of issues of transactions in networks as it is presumed by the new institutionalism and networks theories. Several important everyday transactions are ensured by this technology or its analogues (voting, ID certifying, real estate reliable databases, health services provision ect.) [60, 61]

This is the technology that makes possible individual's direct transactions with all constituencies of the network whereas metagovernor would be a guarantee that transactions are correct and safe; when at the same time autonomy and openness and impersonality (for others) of individual will be ensured. We expect also that based on this technology it's possible to reduce the miscommunication and legitimise the transaction context between constituents, and in case of increasing trust the transaction costs in networks could be lowered and reciprocity increased. Thus the application of this technology would support the long term rationality of calculations based on cooperative games and Pareto optimum without central intervention [62]. I.e. stable agreement or institutional patterns are not any more mediated, only warranted by the governor. Those aspects are summarized in table 1 below.

Table 1. BCT as enabling governance mechanism

Governing dimension	Tools	BCT opportunities
Access	Identify actors	Free access, only technical capacity needed
	Connect actors	Decentralized: dispersed nodes, but the central store of info
	Grant decision rights	Decision right embedded in the network, irreversible but openly revisable transactions Transparency for all
Control	Shared rules	Transactions transparent via central consensus ledger rules openly shared Smart contracts: algorithms of rules and penalties for transactions, automatic enforcement
	Collaboration/ competitors	Info encrypted: opportunity of decentralized transactions Transparency: through central ledger visible, restraints to opportunism
	Consensus vs. conflict	Irreversible: initial transaction fixed, all changes visible
Incentives	Motivate participation	Transparency and decentralisation motivate to participate
	Motivate specific actions	Smart contracts which are ensured by general rules and sanctions that are enforced automatically
	Facilitate innovative outputs	General rules as preconditions for trust promotes interest in interaction and cooperation

Source: adapted from [61]

The other hypothesis is that BCT would support the holographic principles of organizing. Holographic structuring is characteristic for open learning organisations and widely used currently in the policy analysis [63]. It is the other angle of the topologic or relational organisation of a networks' space. This conceptual issues would be subject to further discussion.

4 Agile and iterative policy design

Principles of the agile and iterative process come from the world of technology innovations, especially from software development. [64] In the policy sciences (as well as in art sciences) it is known as design rationality in handling wicked problems [57, 65] It means that the policy development is similar to software development or sculpture design: as the dialogue between the designer and its product or between provider and client in which the formation of product's format is simultaneously practical innovation and cognition of own needs and contextual possibilities. Already Rittel and Webber [66] pictured this as a solution of wicked problems. I.e. policy design is simultaneously multi-actor reflective communication, cognition and action-based innovation. This is a profoundly iterative process in all in all dimensions, levels and time points, and is a never-ending process (as complete mess). This pattern is demonstrated in a very simple form in figure 2. [60 pg.15] which is the result of the empirical study of car's door design. Usually, the policy dialogue is much complex and multidimensional - in one arena there could be dozens of "designers" and in one domain there could be a few arenas in different tiers of governance [67].

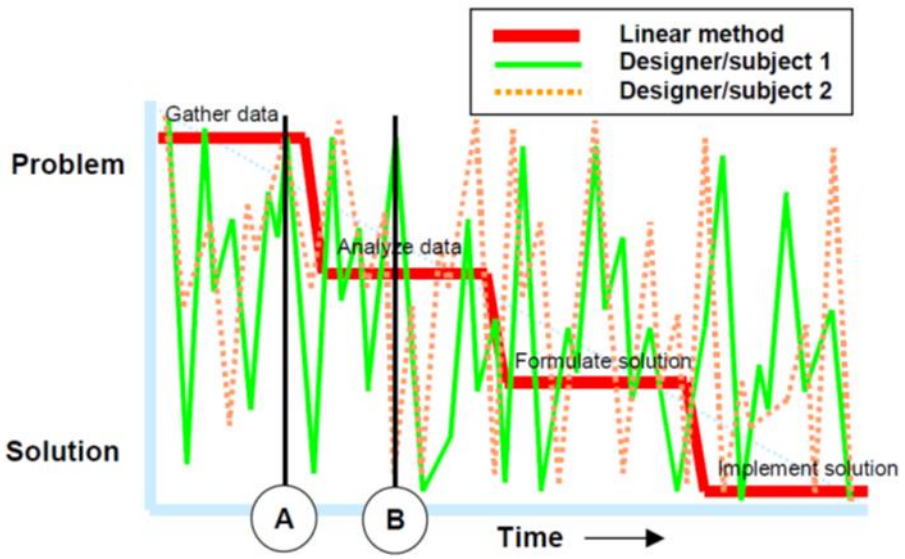

Fig. 2. The pattern of the iterative innovation process

Policy analysts have elaborated rather sophisticate conception of such critical or better to say unfolding and practice-based dialogue [68,69], which contains three stages: dialogue (learning of mutual listening or hearing others), debate (learning of argumentation) and negotiation (reaching ad hoc patterns of compatible interest). All those capacities of policymaking are practical. Policymaking becomes similar to the process where small kid, who cannot still speak, is learning via trials and errors to handle the e-tablet to listen video-clips. True, modern politicians are as a rule not yet so clever in a practical sense.

The theory of critical dialogue [see overview: 70] dates back to Dewey [50] and Mead/ Bulmer) symbolic interactionism, Gadamer's theory of fusion of horizon's, and on Bateson/ Goffman concept of cognitive frames, which was first formulated in the policy analysis by Schön, Rein [57] concept of action-framing. This understanding explores the policymaking process as practical communication of meanings between actors which command different "languages".

The case of digital innovation in policy design (1). Such a complicated process of critical dialogue is not possible to organise sustainably without sophisticated methods and software support. This method was developed by German engineer Horst Rittel [71] which later was adapted into digital format (64, 72). It is the Issue-Based Information System which principles have become a basis for different other development of digital support to social innovation [73]. We applied this method in the development of education steering network in Rapla county in Estonia in 2019-20 [74].

This is a sophisticated web-based instrument and method of steering of critical or reflective dialogue, which enable firstly, to develop the context of critical listening, secondly, to direct the argumentation towards well-structured logic of reasoning (argumentation culture and logic), and thirdly to save into collective memory and to reproduce in integrated form all the semiotic chain (Pierce) of debate. This enables to make the discourse into transactive and reflective: it enables us to observe yourself via the eyes of the audience and to observe one's actual performance in the context. This enables also mutually to learn and to discover new dimensions of actors as well as a context which initially was out of reach of all participants. Participants could figuratively to say "unpack" the initial problem situation into components which are unfolding and revealing, and enable to reach the points of compatibility or mutual fit[1]. This process and its outcomes Winship [59] compares with the puzzling game.

The case of digital innovation in policy design (2). The use of general morphological analysis method in the policy analysis and harnessing wicked problems in the context of high contingency. General Morphological Analysis [75] is the non-quantified problem structuring method (PSM) and an inference model which strives to represent the total problem space, and as many of the potential solution to the given problem as possible.

[1] About compatibility logic: If you can tell me why you say that plan A is great, and I understand your judgments, you have succeeded in objectifying your space of judgment to me. And although I might not share your judgment and might not be convinced, I understand you now. (Horst Rittel 1972)

A morphological field is constructed by setting the parameters against each other, in parallel columns, representing an n-dimensional configuration space. “Solution space” is synthesized by a process of internal cross-consistency assessment (CCA), and through pair-wise comparisons a cross-impact matrix forms. Such an inference model ensures that any parameter (or multiple parameters) can be selected as "input", and any others as "output". This is not a kind of causal matrix but a framework matrix to select and focus any pattern of variables. “With computer support, the field can be turned into a virtual laboratory with which one can designate initial conditions and examine alternative solutions, or conversely, designate alternative solutions to find the conditions that could generate such solutions.” [76 p. 6).

5 The Institutionalisation of Policy Networks

How it’s possible to the institutionalisation of transactions in networks which are in the process of unfolding and constitution? Already Karl Weick spoke not about the organisation as a noun but about organizing as the verb. In institutional terms, this means a question: how to support mutual constitutive relations between citizens and institutions to ensure the positive-sum game of outputs. Here we should expect that Easton’s classical input-output model and of formal/ official representational politics would work only in a very general or symbolic terms [78].

Foucault’s biopolitics or policy which is targeted to the capacity-building of (productive) citizens should be supplemented with relational (and at least disciplinary) power (and policy) mechanisms. This mechanism must ensure continuous feedback mechanisms between citizens and institutions. Institutions should not only enforce policies but also should be able to trigger incentives of policy responsive behaviour of citizens (in environmental, health promotion, SME business, career development etc. policies). Foucault sees here the governmentality trend [48], i.e. institutionalisation of politics in everyday patterns of individual behaviour. Colin Hay [79] provides a new-institutional explanation to patterned contingency and demonstrates the new ontology of institutions. We demonstrated [44] that interactive policy process, which presumes merely citizens’ participation is not sufficient for the institutionalisation of network patterns under contingency. The policy should become transactive: input-output mechanisms should be continuous along all the policy cycle, from the stage of problem definition up to implementation and output evaluation. I.e. to ensure the quality of our social space we should be continuously involved into politics and policymaking, like already today in many countries in the health promotion, in transaction cost reduction, community safety development, and giving feedback as consumers of public goods in the framework of relational contracting etc.

The case of digital innovation. To ensure such continuous citizens – institutions transactions the - ISI - Information systems integration should be designed and build up [80]. Currently, ISI is already applied in some areas of public service, like health services. ISI could connect continuously all constituents of a network pattern and can integrate their hard and software developments and integrate a huge variety

of individual-level transactions [81]. In building up ISI one should give solutions to the following problems:

- To bound together with various autonomous organisation's inputs, outputs and throughputs and at the same time to retain their technical specific and autonomy;
- Technical solutions are needed to balance the networks units' autonomy needs, their heterogeneity and smooth distribution for end-users;
- To ensure direct communication (contacts) in the topological space to make transactions between them possible, but without their physical proximity and catch in a topographic space. This is a case for glocalisation of public services.
- To mobilise information and resource input from individual users (i.e. taxes) but also to combine different capacities of units to solve ad hoc individual (patient, student, family, consumer group etc.) issues, especially in a crisis.
- To make contacts with citizens available in case of crisis and to certify every transaction (paying taxes, receiving service).
- Technical solutions are capable to ensure a full picture of a domain from the access point of the individual user. This is a step towards holographic principles of organizing.

In Conclusion

Three main challenges have been analysed in our article. Firstly, it is a need for governing in a highly uncertain institutional and social environment. Secondly, a need to develop agile and interactive policy style to harness wicked policy problems. Thirdly, to develop reliable modes of institutionalisation of governing networks. In our analysis, we tried to find out what innovations in the IT sector would support responses to those specific challenges and how these IT and software solutions would meet concrete innovations in the public policy. We revealed extensive affinities of IT solutions and needs of public policy innovations identified in the article. We focused on the one hand on two ongoing innovations streams in IT development: opportunities provided by Block-chain technology and Information System Integrations which contain huge possibilities to contribute to the "flattening" the topological space of governance and providing a technological framework for social as well as institution-building transactions to make them increasingly constitutive. On the other hand, we identified and analysed opportunities provided by two software solutions - Issue-Based Information System and General Morphological Analysis – which are already largely applied can contribute to the process of policy design. We consider those cases as an intermingling of IT solutions and governance needs at the level of institutional and policy design. However, opportunities for their application in governance innovation practices are still waiting for further studies

In the article, we proceeded from the premise that a "transcendental" growth of information and communication technologies (ICT) around has triggered a fundamentally new stage in the restructuring of governing mechanisms and processes aimed at a radical replacement of traditional ways of governing with a new *modus operandi* both at the level of intellectual potential and in the field of purely technical

means. With the penetration of the Internet into all spheres of public life, the need for digitalization and electronic control is constantly growing. New technologies offer the possibility of significant changes in the provision of public services as part of public administration. In order to ensure that all the advantages of digitalization are revealed is the combination of strategic initiatives with the ability to provide results that indicate the effectiveness of the governance. The sustainable nature of this process will largely depend on the coherence of political incentives and initiatives across the entire spectrum of public policy and administration. We tried also to explore which new opportunities are provided by the "digital government" for connecting citizens to the Internet and to modernize the sphere of public services?

However even more important issue is the active promotion of the principles of "digital democracy" and a new vision of the tasks of public policy. This implies a need for theoretical solution to the following fundamental problem: how the processes of digitalization and digital governance ensure the effectiveness of representative democracies in terms of new opportunities of the central government policymaking and citizen participation in decision-making at all tiers of governance.

Discourses on post-democracy [82] and anti-politics and de-politicisation of governance [78] on the one hand, and between the right wing conservatism versus liberalism, on the other hand, have indicated obviously the failure of classical Eastonian policy input-output model in modern liberal democracies to ensure its legitimacy. Recent COVID crisis in Europe indicated that government has either extremely limited capacity to govern in the context of high fragmentation of social space when everyday institutional patterns are broken down. This is because enhancing the sphere of collective choice and self-organized actions supported by different means of e-transactions in networks weakly fits with the official layer of modern representative democracy. It means that governance institutions should enhance the dispersion of power centres and draw on relational-constitutive power mechanisms in which network organisations and transactions prevail. As we demonstrated governance may extensively rely on different innovation in digital technology and software development.

Our main message was that today the *relativist* liberal democracy, as well as conservative rigidity, are both highly normative and highly politicised responses to rather untraditional and messy societal problems to be solved in order to retain already achieved quality of life across different borders. We expect that at the moments of high uncertainty and unpredictability those normative lighthouses could direct us to endless and incompatible rhetoric [79]. Instead, we expect that in such a context, the most reliable way is to draw on *critical pragmatist angle*, which could integrate different research and innovation strategies in different domains of activities, first of all in promoting jointly agile and interactive policymaking in different institutional-cultural contexts [44].

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