

DIGITAL COMPLEXITY AND WICKED PROBLEMS: RETHINKING PUBLIC MANAGEMENT AND POLICY RESPONSES

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Abstract

This paper explores the interplay between the proliferation of wicked problems and the rapid advancement of digitization, particularly in the western hemisphere. It addresses the challenges posed to politics and public administration by these dual developments. Highlighting key areas of action tied to current socio-technical changes, the study finds that digitization increases social complexity, diversity, and uncertainty, often exacerbating goal conflicts. As societies transition to digital information societies, both the emergence of new wicked problems and the intensification of existing ones are anticipated. These developments present significant challenges for political and administrative entities, necessitating cultural and institutional innovations to enhance societal problem-solving capacities. The study underscores the need for adaptive strategies and innovative frameworks to navigate the evolving landscape shaped by digitization and its associated complexities.

INTRODUCTION

Some of the most difficult problems for public policy and public management in countries all over the world, especially in the western hemisphere, are described as „wicked“. This essay shows that and for what reasons the transition to digital information society encourages the emergence of new and the intensification of already existing wicked problems. Further consideration deals with the challenges that this development poses to politics and public administration. Some fields of action, which are closely related to the current socio-technical changes, are exemplarily highlighted. The study follows a hermeneutic-dialectical approach (Gadamer, 1975: 307ff.; Rescher, 2013). In this way no results can be achieved as exact, structured and viable as gained in empirical-analytical research. But such an approach is suitable where new emerging developments and their interplay need to be explored from a generalist perspective in order to achieve a first overview, which is the case here. The investigation starts with an analysis of phenomena associated with the terms wicked problems and digitization. In further steps the insights gained in this way become related to each other in order to derive conclusions. The aim of this study is not to illuminate the problems addressed here on an empirically sound basis, but merely to develop theses as differentiated as possible that can create a frame of reference for further considerations and provide a basis for more detailed work on individual aspects of the topic.

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WICKED PROBLEMS

Wicked problems – the phenomenon

Wicked problems can be found, among others, where questions of technological progress, climate change, economic welfare, social segmentation, demographic development or international terrorism become virulent (Fischbacher-Smith, 2016; Hulme, 2009; Levin et al., 2012; Ritchey, 2013: 2; Spicker, 2016).

The concept of wicked problems goes back to planning-theoretical considerations of Horst Rittel (Rittel and Webber, 1973: 155ff.). It provides instruments for understanding and classifying new challenges arising for politics, administration and other players involved in fulfilling public tasks. To identify wicked problems, Rittel and Webber list the following characteristics (Rittel and Webber, 1973: 161ff.).

There is no definite formulation of a wicked problem. This has to be seen in connection with factors such as unclear cause-effect-relationships, the interlocking of problem description and anticipated problem resolution and the variety of possible points of view. A wicked problem has "no stopping rule" (Rittel and Webber, 1973: 162), that is, because it cannot be clearly defined, it does not provide any immanent clues as to when the efforts to its resolution should end.

Solutions to wicked problems are not true or false, but good or bad. Because objective evaluation criteria are lacking, solving strategies and their effects can be perceived and evaluated from different angles in different ways. The extent to which a wicked problem has been overcome cannot be checked. This is due, among other things, to the fact that the chosen measures can not only produce undesirable side effects, but also harmful aftereffects much later on, which outweigh the targeted effects.

Every solution to a wicked problem is an irreversible process. Therefore, learning according to the principle of trial and error is out of the question. For dealing with wicked problems, a myriad of possible concepts is conceivable, and the preference for a solution strategy largely depends on the image that observers form of the nature of the problem and of desirable development perspectives.

Every wicked problem is unique. This prohibits the transfer of solutions from one area to another. Every wicked problem can be seen as a symptom of another. The numerous interactions between relevant factors inside and outside the problem field also imply that the problem addresses a multitude of decision-makers located in different areas and at different levels. The way a problem is explained and the choice of a problemhandling strategy are mutually dependent. Because participants and affected persons perceive wicked problems differently and connect them to different values, diametrically opposed but nevertheless for themselves quite legitimate interests can meet here.

Given the fact that live worlds are irreversibly changed by appropriate measures, those responsible for dealing with wicked problems have no right to be wrong.

The features listed above also imply that wicked problems cannot be solved comprehensively, but only partially and temporarily defused. At a higher level of abstraction, "typical features" of wicked problems are outlined with the terms "complexity, diversity, and uncertainty" (Head and Alford, 2015: 716). Social constellations can be described as complex if they are determined by a variety of different and closely interacting factors (Byrne and Callaghan, 2014: 7ff.). Diversity stands for social heterogeneity, whereby age, ethnic origin, sexual identity, ideological preferences, religious affiliation, lifestyle, family situation, and economic status are among its central dimensions (Shapiro, 2000: 309). Increasing diversity also implies the fragmentation of the values, attitudes, and interests among society members (Head, 2008: 103). Many see this as the core of wicked problems. This is also reflected in the alternative use of the term "divergent problems" (Schumacher, 1995). Considered uncertain are social situations in which individuals are unable to gain a reliable picture of the future effects of their own and others' actions (Van Asselt, 2000: 75ff.).

Challenges arising from wicked problems

When wicked problems occur, conventional strategies, activities, and routines of politics and administration reach their limits (Head and Alford, 2015: 712f.; Levin et al., 2012; Watkins and Wilber, 2015: 53ff.). For dealing with problems of this kind, those responsible are recommended honesty in their assessment, thinking in systems, a cautious approach, creativity and openness in the search for solutions, an incrementalist approach that at the same time does not neglect the overall context, and the use of various tools to support planning and decision-making (AGPSC, 2007: 35ff.; Churchman, 1967: 142; Horn and Weber, 2007).

A broad collaboration that involves stakeholders with their different perceptions, values, and concrete interests in discourses and decision-making processes as far as possible, is considered as a central strategic starting point for defusing wicked problems (Goldsmith and Eggers, 2004; Head, 2008: 114f.; Weber and Khademian, 2008: 334ff.). This underscores the importance of governance networks, in which actors from a wide variety of social areas work together with representatives of politics and administration.

In this context, scientific institutions are assigned functions, which leave behind the "traditional science model" that limits their role largely to obtaining and disseminating relevant knowledge (Weber et al., 2017: 9). They should also serve as early warning systems and join the networks as "brokers and mediators" (Brugnach and Ingram, 2017: 38).

DIGITIZATION

Digitization – the phenomenon

Digitization is the conversion of analog data into a format that is more accessible to machine processing (Bounfour, 2016; Cantoni and Tardini, 2006; Fuchs, 2008). In doing so, large amounts of data are released from their special carriers and transferred to electronic networks. These networks were created by the merging of formerly independent technological lines that served the separate processing and transmission of data, texts, language, and images.

In the public perception, digitization is largely equated with the spread of the Internet, which provides a wide range of information offerings, forms of communication, and opportunities for cooperation. Terms such as Web 2.0 and social media are affiliated with blogs, wikis, and social networks, which emerged some years after first generation services such as websites and e-mail. The Internet is supplemented and expanded by intranets and extranets, by interfaces to traditional mass communication and by various variants of digital mobile communication, based not on landline but on radio networks.

The development of networks, services, applications, and terminal devices is embedded in a rapid technological change that is producing increasingly powerful and cost-effective hardware and software for the integrated generation, processing, storage, and transmission of information. Breakthroughs in the field of artificial intelligence have led to technical systems penetrating further areas of activity formerly reserved for humans. In this context, applications based on machine learning also open up the possibility of evaluating huge amounts of unstructured data, which is associated with the term Big Data. In addition, there are the Internet of things, that is, the independent interaction of largely autonomous technical devices, and advances in robotics, which are closely linked to developments in the field of artificial intelligence. To the extent conventional communication and cooperation processes are shifted to electronic networks and the convergence of the virtual and the real world increases, the features of virtual space become features of society itself.

To understand the social implications of digitization one has to take into account that it promotes developments as associated with the term's globalization, differentiation and acceleration. Globalization refers to developments in the course of which more and more players from business and society, independent of their governmental representatives, enter into cross-border cooperation relationships (Beck, 1999). Because information fed

somewhere in digital networks is in principle available anywhere in the world to anyone with Internet access, the transition from analog to digital causes strong surges towards globalization. Social differentiation, to be understood as the division of a social whole (Juteau, 2003: 3ff.), manifests itself in the increase of subcultures and the development of ever more colorful life worlds. The extent of the differentiation depends strongly on the interaction possibilities available. If they are low, differentiation processes are contained and life worlds stay uniform. If they are extensive, differentiation processes are promoted and life worlds become more diverse. Cross-border electronic networks, which create new spaces, where like-minded people can find each other, exchange ideas and organize their communication beyond the virtual world, too, are therefore among the central driving forces of social differentiation. From a sociological point of view, acceleration stands not only for the faster course of communication and cooperation processes, but also for increasingly rapid social change, to which the members of society must adapt (Rosa, 2015). At the same time, the acceleration of social change can be interpreted as a direct consequence of technical acceleration (Rosa, 2015: 97ff.), which is currently being shaped by digitization. Aside from the fact that digitization induces tendencies towards globalization, differentiation and acceleration, it is important to note here that the functionalities of electronic networks are determined less by hardware that follows a technical paradigm than by software that follows a social paradigm and therefore is open to political shaping. Hence according to the principle of "code is law" (Lessig, 1997), political goals, organizational structures, organizational procedures, and business models, among others, can be cast into software, so to speak, and thus made directly binding. For example, the fact that Google users have to pay for the benefits of an algorithm-based search by releasing all associated personal information is not due to a technical constraint, but to a human decision. Of course, a search engine can in principle also be designed in a way that the communication relationships and communication contents of the users remain confidential.

Challenges arising from digitization

The areas in which politics and administrations of western-oriented countries must take action to master the tasks arising from the transition to the digital information society are numerous (OECD, 2017; WEF, 2019). Among the central challenges directly related to this development are the expansion of digital technology infrastructures and the promotion of media competence. In addition, there are tasks such as the fostering of innovative business enterprises, the creation of framework conditions for the socially responsible organization of working life, the promotion of orientation as a counterbalance to the information overload, the preservation of the political public, the maintenance of public safety, and the defense of privacy.

Digital technology infrastructures

The landline, consisting of copper cable, copper coaxial cable and fiber optic cable, is regarded as the backbone of the information technology infrastructure. Equally important components today are radio networks; on the one hand, in the variant of cellular mobile communication, which all current mobile providers use, and on the other hand in the variant of satellite communication, without which geographic information systems are unthinkable. Also included in the central elements of the information technology infrastructure are the servers required for processing and storing data.

The greatest need for action exists in the areas of landline and cellular mobile communications (Digital Europe, 2018: 34ff.; OECD, 2019: 35ff.). In the field of landline communication priority is given to the expansion of the fiber optic network, because it offers the highest transmission capacity and the best transmission quality. In cellular mobile communication, the introduction of the 5G standard is envisaged, through which mobile communication is to achieve a performance comparable to the performance of landline communication.

Media competence

According to the theory of “cultural lag”, which goes back to William Ogburn, it can be assumed that the cultural adaptability of the society tends to be overtaken by technological change (Ogburn, 1957). From this perspective, it becomes clear that the citizens need support in adapting to the new technical conditions of the digital information society. It is therefore up to politics and administration to develop viable concepts for the broad promotion of media competence and pave the way for their implementation.

Promotion of the economy

In an economy-centered interpretation, the digital information society represents the societal development stage in which the resource information, together with information technology as a means of providing it, is overweighing the traditional production factors of labor, land, and capital (Castells, 2009: 83). In a national reading, this approach conveys an understanding that lets the data, information and knowledge available in a country, its digital infrastructures, and the skills in the population for developing and using hardware and software appear to be trump cards in a global location competition.

However, the creation, introduction, and application of digital systems can be blocked not only by technical obstacles, but also by financial, cultural, or legal obstructions. In order to improve the prospects for innovative companies, it is therefore necessary not only to expand information technology infrastructures, but also to review and, if necessary, adjust the conditions in many other fields in the light of the transformation to a digital information society. The issues to be addressed include access to data, information and knowledge, and the protection of intellectual property.

Shaping the work of tomorrow

In recent years, the voices that interpret digital innovations less as an opportunity to promote the societal prosperity than as a threat to the social standards achieved in the western world, have increased. Given the “constant accessibility” of the society members, resulting from the “blurring of former temporal and spatial boundaries between work and non-work spheres” (Flecker et al., 2017: 20), some see former protected life areas as connected with terms such as leisure time, weekend, or vacation endangered. Others warn against the replacement of operational production structures by

“crowdworking” or “clickworking”, in which pseudo selfemployed workers mutually underbid each other (Forde et al., 2017: 54ff.) And again others prophesy the disappearance of entire professions (Frey and Osborne, 2017: 254ff.). In particular, due to the advances in the fields of artificial intelligence and robotics, the functions of telephone sellers, cooks and packers, as well as of office employees, judges and pilots, could in future be met by technical systems. Therefore, politics and administration are not only faced with the task of creating work conditions that meet the claim of working people not to be reduced to their functions in the economic processes, but to be able to participate in social life in different roles. In addition, especially in countries oriented towards the model of the social market economy, there are calls for regulatory policy measures that advance a broad distribution of the productivity gains resulting from information technology progress.

Orientation and guidance

A loss of orientation can result not only from a lack of information, but also from an abundance of information. And this is precisely what happened in the course of the mass diffusion of Internet communication, which took place in the United States in the early 1990s and in Europe in the mid-1990s. Since then, demagogues of all kinds have tried to make a profit out of this development, among them militant Islamists, right-wing radicals, and other extremist groups.

In order to counteract the danger of people being manipulated and seduced via the Internet, in addition to imparting media competence, measures to promote new platforms that provide serious information and thus provide guidance seem appropriate. This can be done, for instance, following the example of the Belltower News

or the Disinformation Review, which are explicitly designed as a counterweight to fake news and hate speech (Gelber, 2011: 16ff; Oh, 2017: 69ff.). In countries of the western world, it is mostly assumed that government agencies should hold back here with own offers and essentially act as impulse generators and supporters in order not to expose themselves to the suspicion of wanting to exercise censorship.

Political public

The public can be characterized as a structure or sphere mediating between the political system and the private sector of the real world and functionally specified systems of action (Habermas, 1992: 452). In modern mass societies, the technology-based provision of the public sphere is an indispensable prerequisite for democratic decision making. However, there is no such thing as a single national, continental or even worldwide public sphere, but at best a viable “constellation” of many interwoven “communicative spaces” (Dahlgren, 2005: 148). Previously dominated by television, this constellation is increasingly shaped by the services and platforms of the Internet. The consequence is a further fragmentation of the public sphere. In particular, with the proliferation of Web 2.0 applications, there is a growing danger that members of society may get into “filter bubbles” (Pariser, 2011), that is, they limit their communication largely to the exchange with like-minded people and take note of almost only self-tailored information from personalized search engines. The need for action confronting politics, administration and the players interacting with them in this area appears urgent, because members of future generations in particular turn their backs on the offers of traditional mass media, which constituted the public sphere almost exclusively for decades.

Public safety

Maintaining public security implies the protection of critical infrastructures and the fight against new forms of crime. Infrastructures such as the energy sector, the traffic system, or the health service are „critical“ in two ways; firstly because they represent indispensable lifelines for modern societies, and secondly because they themselves are entirely dependent on reliable digital networks (Giannopoulos et al., 2012). Cybercrime covers a wide range of offenses, including data theft, identity theft, copyright infringement, insult, hate speech, fraud, extortion, trade in weapons or drugs, and distribution of child pornography (Wall, 2007).

Measures to safeguard critical infrastructures and combat cybercrime include monitoring potential sources of danger, gathering and analyzing the data thereby obtained, introducing and developing technical security tools, informing citizens about appropriate risks, and training staff working in security-critical areas (Wall, 2007: 157ff; Winkel, 2007a: 220ff.). Particularly in the United States, security politicians and security agencies are pursuing offensive strategies in the transition to the digital information society.

Privacy

Even if the sensitivity for this is less pronounced in the United States than in the European Union, western societies that see themselves committed to human rights are inconceivable without privacy (Diggelmann and Cleis, 2014: 441ff.; Heisenberg, 2005). And the maintenance of privacy, in turn, presupposes informational self-determination, which implies that the citizens must be conceded control over their personal data also in a digital information society.

However, privacy and informational self-determination are threatened from two sides at once; on the one hand by the activities of insufficiently controlled intelligence agencies, and on the other by Internet companies, exploiting their market power. Politicians and authorities are therefore not only required to bring their own actions into line with the citizens’ right to informational self-determination, but also to take measures to defend the privacy of the society members against attacks of third parties.

Electronic cryptography applications can serve as a means to prevent the spying of sensitive information and communication relationships (Stallings, 2017). In addition to digital signing, this technology also allows

confidential content-protecting encryption and supports methods for anonymous Internet communication, as known from the Darknet (Sui et al., 2015).

WICKED PROBLEMS AND DIGITIZATION

There are essentially two reasons why wicked problems are on the rise in the transition to digital information society. The first is that digitization, coupled with the tendencies of globalization, differentiation and acceleration, fuels an increase in complexity, diversity and uncertainty. The second reason is that digitization leads to an intensification of conflicts of goals.

Increasing complexity, diversity, and uncertainty

The interwoven developments of digitization, globalization, differentiation, and acceleration add complexity because they increase the number of parameters and interactions in social constellations and the velocity of their arising and changing as well. These developments also represent factors that boost social diversity, since a progressing formation of subcultures as the main feature of differentiation also means that the societal values, attitudes and interests fall apart ever more. This becomes particularly clear when one realizes that the terms differentiation and diversity refer to identical phenomena. While the first stands for the process of the fragmentation of formerly shared cultural beliefs, the latter stands for the outcome of this process.

The fact that uncertainty grows with increasing digitization, globalization, differentiation and acceleration cannot be denied because this is an unavoidable consequence of the technically induced increase in complexity and diversity. More and more complex life worlds are more and more difficult to grasp and to anticipate. In addition, as the pace of change increases, society members have less and less time to reflect and adapt to the transformations. In nearly all fields of action connected to the transition to the digital information society, complexity increases have been noted, mostly accompanied by the growth of diversity and uncertainty. This also applies with regard to the expansion of the information technology infrastructure and the promotion of media competence as areas addressed here by way of example.

Infrastructure expansion as a complex project

Prior to the emergence of digital network communication, the development of the information technology infrastructure concentrated on the creation of predominantly hardware-based landlines, primarily geared to serve as the basis of the telephone service and broadcasting. The planning, production and use of the infrastructure was dominated by a national focus.

Today, this is a question of expanding the fixed network and the mobile network simultaneously and interlinking both technologies in a way that encourages the development and spreading of virtual networks. This term refers to constructions such as the Internet, which are not physical but immaterial networks based on software standards and protocols. The national focus in the planning, production and use of the information technology infrastructure has long since given way to an international one. For example, the question now arises in European countries of whether the Chinese company, Huawei should be given the opportunity to participate in the upgrade of European mobile communications according to the 5G standard or not (Kaska et al., 2019). And for assessing this issue, not only the cost benefits of a participation of Huawei must be put in relation to the risks arising from the group's proximity to the Chinese government. Attention also needs to be paid to problems such as the current tensions between China and the United States and the expectations that the government in Washington is bringing to its European allies.

Promotion of media competence as a complex project

The understanding of media competence respectively media literacy has changed significantly in recent years (Hobbs and Jensen, 2009; Park, 2017). Not so long ago, this term was used primarily to describe the ability especially of younger people to classify content delivered via mass media, and especially television as valuable

or inferior, and on that basis to select information conducive to the own development. With the advent of the computer in the world of work and in more and more areas of private life a view gained of importance that understands media competence mainly as ability to use information technology tools effectively and to assess the benefits and risks associated with it properly.

Today, however, a reading dominates, which interprets this term far wider. Media competence now appears as a crucial element of a comprehensive life competence, that is, as the capability to act self-determined and socially responsible in the personal sphere, in working life and in the political community also under the changed conditions of a digitized society. The more extensive the term is interpreted, the more complex, multi-layered and urgent the need for action associated with the promotion of media competence appears to be.

Intensification of conflicts of goals

Social conditions can be much more effectively influenced by the design of algorithms than by the conventional method of setting rules, checking the compliance with them, and sanctioning deviant behavior. But if an objective that is in competition with another can, so to speak, be written into the software and thus be pursued much more effectively than in the past, this also means that with regard to the other goal, significant steps backwards must be accepted. Therefore, the transition from analog to digital is accompanied by a tendency to intensify conflicts of goals (Winkel, 2007b: 171f.; Winkel,

2016: 111). The „as well as“ becomes replaced by the „either or“ as the predominant social principle.

This significantly reduces the understanding for dissenting values, perceptions, and interests of other people, because opposing positions appear increasingly threatening. Moreover, even for those who are of goodwill, it becomes more and more difficult to agree on and implement compromises. However, this is precisely where the focus of concepts rests, which trust in collaboration as “the holy grail” (AGPSC, 2007: 27), or at least as the “widely recommended strategy” (Head, 2008: 114) for dealing with wicked problems.

In the transition to the digital information society therefore one must expect not only an increase in conflicts of interest due to growing diversity, but also the emergence of conditions that make their settlement by means of compromise more difficult. How strongly politics and administration are confronted with antagonistic imperatives in the transition to the digital information society can be seen in the conflicts between matters of economic development and a humane shaping of working life, between issues of open data and the protection of intellectual property, between efforts to convey orientation and to maintain a political public sphere or between the requirements of privacy protection and the guarantee of public security.

Economic promotion versus humane design of the working world

The task of bringing economic success and social solidarity onto a common denominator has always been one of the greatest challenges facing politics and administration in countries of the western world. This applies in particular to the welfare-states of Central Europe. With the transition to the digital information society, this endeavor becomes even more difficult. If, for example, one takes action to put the progress in productivity, which results from the breakthroughs in the fields of artificial intelligence and robotics, at the service of the general welfare, this can, given the special features of a digitized and globalized economy, lead to an exodus of companies and to an outflow of investor capital in no time. On the other hand, if one concentrates on dismantling barriers that hinder the development, trading, and application of such technologies, in order to improve the conditions for resident industries and to expand the national position in the international location competition, it threatens not only the intrusion of economic constraints into formerly protected areas of life, but even the dissolution of the traditional world of work along with its social achievements.

Opening information access versus intellectual property protection

Because the socio-technical change is taking place more and more rapidly, the ability to innovate is regarded as a prerequisite for economic success and social prosperity. Given the fact that something new generally emerges from the combination of familiar things, it seems sensible in the transition to the digital information society to ensure broad access to existing stocks of data, information, and knowledge as “the most valuable resource” (Neale, 2017: 7). This is achievable to an unprecedented extent today, because digitization detaches content from its carriers and the constant expansion of electronic networks opens up new access channels.

If, however, private property rights are affected, schemes to foster innovation capacity by granting access can quickly become counterproductive. For vigorous innovation activities also presuppose, in addition to access to suitable sources, that the efforts associated with the development of new products, services, and business models pay off economically. However, this is all the less guaranteed as more strategies to collectivize individually generated data, information, and knowledge are pursued. Under this aspect, measures aiming in the opposite direction seem appropriate, such as improving copyright protection or extending the protection of trade secrets.

Promotion of orientation versus preservation of the political public

A rational democratic decision-making requires on the part of the citizenry, the ability to unmask and reject manipulation attempts by populists and demagogues. The prerequisite for this is, again, a minimum of orientation and the prerequisite of orientation is, in turn, a minimum of reliable information. It therefore makes sense not only to focus on promoting media competence here, but also to support the emergence of platforms that provide trustworthy information in order to help people to find their way around the virtual world. Because democratic decision-making does not function without a political public, the arguments of those who demand measures to maintain a collective attention space, however, cannot be dismissed either. This also results in a fundamental conflict. The provision of suitable websites, blogs or search engines can indeed have a positive effect on the information, respectively the knowledge of society members and provide them with guidance. But this is only achievable at the cost of a further disintegration of the public sphere, since even platforms with legitimate objectives further enrich the virtual world, and thus become driving forces of the medial differentiation.

Privacy protection versus maintenance of public safety

In the transition to a digital information society, many technical restrictions that in the past made it difficult for companies and intelligence agencies to monitor and spy out the population have disappeared. To the extent that the new technical potentials are exploited, the “end of privacy” (Whitaker, 2000) threatens fatal consequences for individuals and society. It is therefore beyond question that states of the western world must not only keep their own security authorities in check, but must also take action to prevent encroachments by corporations.

However, existential dangers for society do not only result from the new opportunities for monitoring and investigating the citizenry, but also from the vulnerability of critical infrastructures and the manifold forms of cybercrime. The challenges facing politics and administration here are also immense. Thus another dilemma is revealed at this point. For much that can serve to maintain public security seems questionable from the point of view of privacy protection, and much that is appropriate for the protection of privacy seems problematic under aspects of public safety. This becomes particularly clear when one considers the potential that electronic cryptography offers to protect confidential content and allow for anonymous communication. From the point of view of privacy, the state seems well advised to promote the dissemination of corresponding instruments among the population or perhaps even to establish an infrastructure for confidential and anonymous communication itself. Under aspects of public safety, however, the opposite is the case. After all, in a society whose communication is increasingly shifted to electronic networks, the protection of critical infrastructures and the effective fight against crime require that security authorities know about communication relationships and can, if necessary, gain access to their contents.

In the transition from the analog to the digital, not only the emergence of a totalitarian surveillance society seems conceivable, but also the formation of a radical liberal anarchy in which the only valid law is that of the strongest. However, the search for ways to create a balance between the protection of privacy and public security under the changed circumstances of a digital information society is becoming increasingly difficult.

NEED FOR CULTURAL AND INSTITUTIONAL INNOVATION

The strategic answer of politics and administration facing wicked problems is threefold: trying to generate and use new knowledge, striving for interdepartmental cooperation, and trying to find more suitable forms of organization and management (Fuhr, 2016: 101ff.;

Danken et al., 2016: 15ff.). But it is becoming increasingly clear that this alone is not enough. The challenges facing policymakers and public authorities by the rise of new, or the intensification of existing wicked problems in the transition to the digital information society are so grave, that for mastering them, fundamental cultural and institutional innovation could become necessary.

Cultural Innovation

A change in the culture of dealing with problems could begin with a comprehensive sensitization of decisionmakers in politics and administration to the developments described (AGPSC, 2007: 31ff.; Head, 2008: 107ff.; Weber and Khademian, 2008: 340f.). The aim should be to enable them to recognize superordinate relationships even when dealing with supposedly familiar issues, and to identify not only the potential for conflict, but also possible common grounds and shared interests with players active in other areas and established at other levels.

If this could be achieved, perhaps even dedicated defenders of privacy and committed guardians of public safety might realize that they have more in common than apparent at first glance. After all, it is also in the interest of informational self-determination, if basic public security concerns are safeguarded, and in the interest of the security authorities, if there is no complete loss of privacy. For both sides legitimize themselves by claiming to protect democracy and the rule of law. And both democracy and the rule of law are unconceivable without guaranteed individual freedom on the one hand and a system of rules and sanction mechanisms that counteract the abuse of liberal spaces on the other. If one party would be able to enforce its interests in the transition to the digital information society totally, not only the project of the other side, but also its own would have failed.

Institutional innovation

The more the shift from analog to digital changes the character of social problems and leads to an increase of interdependencies between relevant factors within and outside of the problem areas, the more the necessity grows to put not only the cultural, but also the institutional preconditions of societal problem-handling to the test (AGPSC, 2007: 27ff.; Weber and Khademian, 2008:

337f.; Weber et al., 2017: 5.).

With regard to the difficulties that arise in balancing privacy and public safety concerns, such a review could, for example, reveal the need for a new body or forum that brings together representatives of both camps with players from other sectors of society and allow them, with scientific support, to reconcile interests more effectively than before and to work more consistently towards mutually acceptable solutions than previously. There are certainly starting points in sight for the rapprochement of data protectors and security politicians. For example, Internet companies that collect user data on a massive scale and summarize them into detailed profiles not only impair the informational self-determination of the society members, their activities also run counter to the task of security authorities to protect citizens against encroachments by third parties. In addition, the accumulated power in the private sector can also be used in a way that directly endangers the political community as the case of Cambridge Analytica shows (Kaiser, 2019).

If new institutions were available, they should be used to develop solution strategies that are as simple as possible. The idea obvious at first glance that every wicked problem requires a "wicked solution" (Watkins and Wilber, 2015: 53) is misleading. For if the strategy for dealing with a complex problem is as complex as the problem itself, the resulting increase in complexity actually leads to an aggravation as opposed to defusing the situation. For example, it would be extremely difficult to counter the lack of transparency and democratic control in corporations such as Alphabet or Facebook, whose knowledge exceeds that of intelligence agencies and whose turnover surpasses the gross national product of many states, by establishing a cross-border effective system of checks and balances. To tackle the issue, it could be more promising, at any rate in the short run, to work towards an improved protection for whistleblowers from the Internet industry.

CONCLUSION

This study predominantly follows a hermeneutic dialectical approach. Hence the outcome cannot be as exact, structured, and viable as results gained in empiric analytical research. Nevertheless, the outcome of the study, which explores complex phenomena and relationships from a generalist perspective in order to gain an overview of the issue, leaves no doubt that digitization is apt to increase social complexity, diversity and uncertainty, to encourage the divergence of interests, and to push conflicts of goals to the extreme.

The fact that the transition to the digital information society leads to a boost in social complexity, diversity and uncertainty is primarily due to the reality that globalization, differentiation and acceleration are unavoidable companions of digitization. The new challenges arising for politics and administration especially from the rapid growth in complexity become clear when fields of action, such as the expansion of information technology infrastructures or the promotion of media competence, are brought to the fore.

The digitally induced increase in diversity is also reflected in an increase in conflicts of interest. The shift of conventional communication to electronic networks opens up unprecedented opportunities for like-minded people to find each other, to exchange ideas and to organize follow-up communication beyond the virtual world. And the thereby resulting formation of subcultures and the associated disintegration of formerly shared values, attitudes and perceptions reduce the social stock of common goals and promote the emergence of special interests. The fact that in the transition from analogue to digital conflicts of interests not only occur more often, but are also increasingly difficult to resolve or at least to contain, is primarily due to the reality that the functionalities of electronic networks are determined less by hardware than by software.

Unlike hardware the software follows a social paradigm and therefore is open to political shaping. Political goals, organizational structures, organizational procedures, business models and much more can be cast into software and thus be made directly binding. But if an objective that becomes written in software is in competition with another, this also means that concerning the other goal significant steps backwards must be accepted. As a result, a society is emerging in which interests running counter to own concerns are more and more perceived as existential threats. As the process continues, it becomes increasingly hard for the members of society to show understanding for differing values and perceptions of others, and it becomes more and more difficult for politics and administration to defuse conflicts of interest by means of compromise and compensation. This becomes particularly evident in the problems arising from tensions between the competing but nevertheless for themselves quite legitimate concerns of privacy protection and of the maintenance of public safety.

The new challenges for politics and administration resulting from the emergence of new and the aggravation of already existing wicked problems in the transition to the digital information society are so grave that cultural and institutional innovations in order to improve the societal abilities for problem resolution have to be considered. A change in the culture of problem solving could be set in motion by a comprehensive sensitization of the functionaries in politics and administration to the developments described. The aim would have to be to enable

them to recognize overarching connections even when dealing with supposedly familiar issues, and to identify not only potential for conflict but also possible common ground with players active in other areas and at other levels.

Institutional innovations would have an enhanced culture and a corresponding increase in knowledge on the part of the functionaries in politics and administration as a precondition. For their task would be to examine the need for new arenas, committees or forums, in which players concerned with different facets of a problem could compare perceptions more effectively, and work towards mutually acceptable resolutions with greater success than before. Scientific institutions could contribute to the enlargement of the societal ability for problem resolution by taking on functions that go beyond research, consulting and procurement of legitimacy, for example by acting as early warning systems or as mediators capable to rationalize controversial and emotionally charged discourses.

CONFLICT OF INTERESTS

The author has not declared any conflict of interests.

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