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# Co-creation of public service innovation using open data and social media – rhetoric, reality or something in between?

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## ABSTRACT

*This paper presents the analysis of the usage of open data and social media in the co-creation of public service innovation. paper concludes that using open data and social media in co-creation of public service innovation is a promising approach but not yet fully implemented. It seems clear that the advances in digital technology may provide a bridge for bringing service providers and service users together. The benefits are clear. First, the more accurate and real-time data available, the more effective the service provision will be. Second, the more citizen participation, the more tailored services can be co-created. Third, the more transparent governance becomes, the more legitimate and accountable it becomes. Fourth, governmental legitimacy increases societal trust which supports knowledge sharing and spurs innovation. However, co-creation of public service innovations can be more complex, more unpredictable, and more political than what the rhetoric indicates.*

Keywords: Co-creation, Public service innovation, Open data, Social media, Complexity

## INTRODUCTION

Open innovation (Chesbrough, 2006) and democratizing innovation (von Hippel, 2005) have been cited as foundations for seeing and doing things differently, i.e. *innovation*. While the concepts have been mostly employed in the context of private sector innovation, in recent years, they have become more and more popular also in searching remedies for public sector innovation (Mergel & Desouza, 2013; Cohen, Almirall & Chesbrough, 2017). However, research suggest that the public sector suffers from an innovation deficit compared to the private sector. This has been explained to be a by-product of a culture of risk-aversion and a reluctance to close down failing programmes (Mulgan, 2014) and by an unintended consequence of the concerted public sector drive toward the elimination of waste through efficiency, accountability and transparency (Potts, 2009).

Common for open innovation and democratizing innovation is that innovation is seen as emerging from the interaction between various elements in the socio-economic system. It is believed that the more diverse the

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knowledge base, the more ideas there are, which, in turn, can be refined as new or improved products and services. Open and democratizing innovation suggests that the success of innovation can be improved by engaging users and other stakeholders in the design and development of innovation. This is understandable, as studies show that one of the main reasons for innovation failures is users' passive or active resistance (Heidenreich & Spieth, 2013). The rationale for innovation success goes that the more users (and other stakeholders) are involved, the more natural 'buy-in' for innovation adoption. Rogers (2003), for example, has argued the importance of a social system where innovation is expected to be diffused and adopted. From idea to innovation and from innovation to practice is a process that does not happen spontaneously.

Rapid development of digital technology has been seen as important for improving public sector innovation capabilities (Gil-Garcia, Helbig, & Ojo, 2014). The Quadruple Helix (Cavallani, Soldi, Friedl & Volpe, 2016) and Open Innovation 2.0 (European Commission, 2018) initiatives, for example, rely on *open data* to spur innovation. Freely accessible and re-usable open data has many indicated aims. Open data drives economic benefits and furthers transparency. Digital technology also enables governments to raise their outreach to citizens whilst empowering citizens to have their opinions heard. Based on thinking that citizens are experts of their own situation, it has been suggested that *social media* provides means for engaging citizens in public service innovation (Jalonen, 2016).

Neither digital technologies nor open and democratizing innovation are 'silver bullets' to guarantee success. This is because the benefits of openness and diversity come with costs. Open and democratizing innovation in a multi-actor environment is usually portrayed as a complex process which lack clear cause and effect sequences. The complexity of the innovation process can manifest itself in various forms, but the fundamental reason lies in the interaction containing nonlinear feedback loops and conflictual differences in opinions (Jalonen, 2016). Innovations do not 'go viral' and spread as straightforwardly as contagious diseases (Centola, 2018). In addition, many scholars have warned that digital technologies might transform our societies irreversibly. It is hypothesized that while digitalization has increased societal transparency, it has simultaneously introduced new black boxes that produce results which are based on the use of assumptions that are not made clear. (Pasquale, 2015; Cheney-Lippold, 2017.)

This paper argues that the complexity of public innovation cannot be 'solved', but rather must be 'managed' in collaborative ways. Innovation is not seen as something that can be created in isolation in 'laboratory settings' and then delivered to the users/citizens. Instead, the paper's rationale is based on the premises that public service innovations should be *co-created* with citizens and relevant stakeholders. Theoretically, the paper draws on public service logic (Osborne, 2008) and service-dominant logic for value (co)creation (Vargo & Lusch, 2004). The paper analyzes the pros and cons of co-creation of public service innovation using open data and social media.

The paper is structured as follows: Section 2 briefly describes theoretical grounds focusing on co-creation in the public sector, public service innovation, service-dominant logic of value co-creation and digital governance. Section 3 presents the methodology. Sections 4 and 5 discuss the use of open data and social media in the co-creation of public service innovation. Finally, Section 6 concludes the report.

## **CO-CREATION IN THE PUBLIC SECTOR, PUBLIC SERVICE INNOVATION, SERVICE-DOMINANT VALUE CREATION AND DIGITAL GOVERNANCE**

Various 'co-processes' (co-initiation, co-design, co-production, co-implementation, see Voorberg, Bekkers & Tummers, 2015) are enthusiastically celebrated initiatives for improving public services. While there are many similarities between the concepts, the distinctions lie in the role of key stakeholders (particularly citizens and their representatives). Fox, Jalonen, Baines, Bassi, Marsh, Moretti & Willoughby (2019, p. 15) provide the following conceptualization: in co-initiation, stakeholders form a part of the movement that spurs the creation of a new public service from the very start of the process; in co-design, stakeholders

jointly come up with ideas for the various parts of a public service, how it will be delivered and whom it needs to reach; in co-production, stakeholders collaboratively produce materials and share perspectives in a way that public services undergo continuous evaluation and improvement; in co-implementation, stakeholders are not only recipients of a service, but actively take part in putting it into practice throughout the lifetime of the scheme. ‘Co-creation’ is often mistakenly seen as a synonym for ‘co-production’. The distinction between them is the degree of involvement of citizens: co-production does not necessarily require user involvement in the service planning process, but where this occurs, it is called co-creation (Osborne & Strokosch, 2013). For Brandsen & Honingh (2018, p. 13), co-creation means ‘strategic level’ collaboration between citizens and public agencies. Co-creation occurs when people’s needs are understood holistically and based on assets (Fox et al., 2019). Co-creation is seen as providing a solution for the fiscal and service delivery problems faced by governments and public service organizations. Co-creation spurs innovation by conceiving service users as active partners rather than passive service users, co-creation promotes collaborative relationships between service providers and users in a way which might strengthen the legitimacy of decision, and co-creation improves the effectiveness of services. Seemingly, co-creation is based on the ideal of active citizenship and on the logic of effective production, combining the complementary and substitutive capabilities possessed by different stakeholders, particularly citizens who use services.

Service-dominant logic is based on the idea of intertwined roles of service providers and service users. Vargo & Lusch (2004) suggested that in the linear good-dominant view on value creation, tangible output and discrete transactions were central, whereas the service-dominant view emphasizes intangibility, exchange processes and relationships. More recently, Vargo & Lusch (2017) have identified the following five axioms as critical for service-dominant logic of value creation: i) service is the fundamental basis of exchange, ii) value is co-created by multiple actors, always including the beneficiaries, iii) all social and economic actors are resource integrators, iv) value is always uniquely and phenomenologically determined by the beneficiary, v) value co-creation is coordinated through actor-generated institutions and institutional arrangements. While S-D logic has been particularly popular in business-oriented research, it has also fed into public management/administration research. However, emphasizing ‘value’ co-creation in the public service context has been seen problematic. Osborne (2018), for example, has identified four reasons why value creation in public services differs from private service firms. First, for public services, the retention of customers and repeat business is likely to be a sign of service failure, whereas for firms they are key objectives. Second, many service users in public services (e.g. prisoners) are coerced to use services. Third, the concept of customer is blurred in public services because of multiple end-users and stakeholders with conflicting ideas about what is valuable. Fourth, public service users have a dual role as both a service user, but also a citizen who may have a broader societal interest in the outcome of a service. Despite the above-mentioned limitations, there is an emerging consensus that linear-based value creation logic should be replaced by service-oriented thinking. It is believed that value is not something that can be created by the service provider and delivered to the service user. For Osborne (2018, p. 225), public service logic assumes “an interactive and dynamic relationship where value is created at the nexus of interaction”.

Academic literature provides several typologies of innovation in the public sector. De Vries, Bekkers & Tummers (2016), for example, identify the following six innovation types: product or service innovation (creation of new public services or products), process innovation (improvement of quality and efficiency of internal and external processes), administrative innovation (creation of new organizational forms, the introduction of new management methods and techniques and new working methods), technological innovation (creation or use of new technologies, introduced in an organization to render services to users and citizens), governance innovation (development of new forms and processes to address specific societal problems) and conceptual innovation (introduction of new concepts, frames of reference or new paradigms that help to reframe the nature of specific problems as well as their possible solutions). In general, transitions in policies, civil opinion, legislation or – more widely – in social needs act as initiator of public service innovation. While De Vries et al. (2016) conjoin the product and service innovation types, there are

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also fundamental differences between them. The difference can be traced to the specific characteristics of a service, i.e. its intangibility, simultaneity of production and consumption, heterogeneity and perishability (Lovelock & Gummesson, 2004) which makes service innovation unmanageable and uncontrollable compared to product innovation. Internal organizational factors such as envisioning, energizing and enabling capabilities and conflict management capabilities have therefore been identified as fundamental for service innovation (Nijssen, Hillebrand, Vermeulen & Kemp, 2006). Changes in service needs can be connected with the increasing complexity of social problems as well as the current trend, in which the aim is to offer citizens more and more influence over the modes of service production and the content of services. Hence, the rationale goes that service innovations should be designed and implemented in conjunction with citizens, not for them (Alves, 2013).

The promises of ‘digital governance’ relate to openness, sharing, and increased communication and collaboration between the public sector, citizens, businesses and non-governmental stakeholders (Milakovich, 2011). It is expected to make government more service-oriented, competent, and transparent, and enable the provision of personalized public services. Digital governance is a wide concept which embraces different technologies. Common for them all is that they transform the ways the government interacts with its stakeholders. Digital governance promises opening and sharing of government data and increasing efficiency and effectiveness of public administration. However, digital governance also includes a risk of unintended, unexpected and undesired outcomes and new kinds of political, governmental, ethical, and regulatory dilemmas. Instead of efficient and effective public services, digital technology has introduced new kind of complexity (Helbig, Gil-Garcia & Ferro, 2009). Lember (2018, p. 124), for example, suggests that “the use of technological application may also reallocate control and power towards specific groups in society”. There are also concerns over government capabilities regarding digital technologies (Ashton, Weber & Zook, 2017). Unsurprisingly, many scholars have pointed out that using digital technology for putting users at the heart of public service innovation is easy to say, but difficult to implement (Lember, 2018).

## **A SWOT ANALYSIS OF THE USE OF OPEN DATA AND SOCIAL MEDIA**

Based on the promises of digital technology, but also keeping in mind the obvious difficulties, we analyzed the usage of open data and social media in the planning, development, delivering, and implementation of public services in ten European countries. High expectations are associated with open data and social media. Both have taken on different forms and priorities in different countries and contexts, with promises that they will increase transparency, participation and collaboration.

In order to understand the challenges and possibilities of digital technology in public service innovation, we asked CoSIE project partners ([www.cosie-project.eu](http://www.cosie-project.eu)) to provide real-life examples, where open data and social media were used in the context of co-creating public services. We analyzed the pros and cons of 61 examples by using qualitative content analysis and the SWOT (strengths, weaknesses, opportunities and threats) analysis framework. All case descriptions were content-analyzed by two researchers. The SWOT analysis was validated through discussions with project partners.

The SWOT analysis is an established method which has been used particularly in planning and strategy formulation since the 1960s. The method has its origins in Harvard Business School and other American business schools, from where it diffused rapidly and widely. Despite of its critique (e.g. Hill & Westbrook, 1997), the method is, almost 60 years later, still widely used within businesses and public organizations. Internal strengths describe characteristics of a public service organization that support the exploitation of open data and social media, whereas internal weaknesses refer to characteristics that inhibit the use of open data and social media. External opportunities are elements in the environment that may potentially enable the exploitation of open data and social media. Finally, external threats refer to the elements in the environment that may cause troubles.

The SWOT analysis provides insights into how open data and social media can be integrated in the co-creation of public service innovation. While the insights provided in the paper emerge from the CoSIE project, we believe that the findings can be applied beyond the CoSIE project.

## OPEN DATA IN CO-CREATION OF PUBLIC SERVICE INNOVATION

Open data refers to the data that anyone can access, use and share. It becomes usable when made available in a common, machine-readable format. Open data promises many societal, economic and operational benefits. The rationale behind open data is fourfold: open data helps i) to innovate new services and discover new solutions to address societal challenges, ii) to achieve more efficiency gains by sharing data between different actors, and iii) to foster participation of citizens in political and social life, and iv) to increase transparency of government (Janssen, Charalabidis & Zuidervijk, 2012; Safarov, Meijer & Grimmelikhuijsen, 2017; Zuidervijk, Shinde & Janssen, 2018). Mergel, Kleibrink & Sörvik (2018), suggest that open data can be used in public sector internally (e.g. improving processes) or externally (e.g. creating new services). However, creating value from open data is challenging. Worthy (2015: 788), for example, argues that open data rhetoric is compelling, but its reality is “more complex, more unpredictable, and more political”.

Table 1 summarizes the key findings of 61 examples of using open data in co-creating public service innovation.

*Table 1. SWOT analysis matrix of using open data in co-creating public service innovation*

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>-Strategic and visionary approach to open data</li> <li>-Technical skills to handle open data</li> <li>-Designed and implemented open data processes</li> <li>-Easy-to-use, well-known and monitored open data portal to support open data use</li> <li>-Collaboration within and between public-private partnerships in public governance</li> <li>-Conviction on evidence-based decision-making</li> <li>-Capability to provide up-to-date or real-time data</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>-Resistance to change and lack of motivation</li> <li>-Lack of knowledge and experience</li> <li>-Poor data compatibility and/or systems’ interoperability</li> <li>-Poor financial and other tangible resources</li> <li>-Lack of regulatory control and enforcement</li> <li>-Unclear ethical principles to handle open data</li> <li>-No impacts of released open data are measured or they are difficult to measure</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>-Engagement of external stakeholders</li> <li>-Political support for deploying open data</li> <li>-Companies’ increasing interests</li> <li>-Increased self-management of vulnerable citizens and new insights on vulnerable citizens</li> <li>-Emergence of social innovations</li> <li>-Increased transparency and trust on governance</li> <li>-Citizens’ integration and participation in governance and co-creation of public services</li> <li>-Economic growth through productivity &amp; innovation with external stakeholders</li> <li>-More efficient use of public premises and other resources</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>-Emergence of big brother attitude and data privacy issues</li> <li>-Cyber-attacks and malicious use of open data</li> <li>-Lack of financial and political support, and lack of societal legitimacy</li> <li>-Technical obstacles to utilize open data commercially</li> <li>-Aggressive commercial use of open data and dominance of economic drivers</li> <li>-Exclusion of digitally illiterate and disconnected citizens</li> <li>-Insufficient skills to utilize open data among the public</li> </ul>

**The internal strengths, top left quadrant.** The analyzed cases indicate that a strategic and visionary approach to using and releasing open data can lead to both high internal and external impact. Without management support and guidance, and the necessary resources, it is very difficult to create good quality open data policies. This is in line, for example, with Mergel et al. (2018) and Lassinantti, Ståhlbröst & Runardotter (2019) who argue in favour of strategic focus and Open Government policies. Presence in high visibility and easy-to-use open data portals support the developers and citizens to unleash its value potential, whereas using a wide variety of metadata and data formats can make it difficult to interlink open data sets. The continuous appearance of new linkable data sets increase in the use of common standards and procedures, and appearance of good examples of open data utilizations can increase the data quality and impact of open data. Access to the needed technical skills and to the required process skills together with sufficient funding can result in high-quality data, automated open data maintenance processes, and even real-time open data releasing if necessary. Collaboration with private businesses and other organizations can lead to service co-creation and innovations.

**The internal weaknesses, top right quadrant.** An open data policy challenges many governmental conventions. Lack of knowledge and experience regarding open data was identified as a main challenge. Lack of domain-specific knowledge together with insufficient technical skills easily produce difficulties in making sense of the data and poor understanding of the innovation potential of open data (cf. Susha, Grönlund & Janssen, 2015) and also lack of motivation (Sieber & Johnsson, 2015). Collecting, preparing, releasing and maintaining open data requires high-quality processes. Poorly standardized open data processes on the agency level cannot produce high quality data or to support wider utilization of open data. In addition to endangering the privacy of citizens, manual and unstandardized processes are error-prone and expensive to maintain. For example, outdated metadata can make the discoverability and automatic handling of a dataset troublesome. It is worth noting that some public sector data might be left unreleased simply for the reason that the skills and support to handle the tasks related to the open data processes are hard to find. Difficulties may have cultural consequences, such as rising resistance to change. This is in line, for example, with Huijboom & Van den Broek (2011) who found out that public organizations are afraid to disclose public data as it can reveal possible failures or inefficiencies in way that lead to political escalation. Also, unclear ethical principles and obscure regulation regarding open data release were identified as barriers for using open data for spurring public service innovation (cf. Conradie & Choenni, 2014). It became clear that collecting, preparing, releasing and maintaining open data is not something that should be done in isolation. The anonymization of the data, for example, is not only a technique, but requires careful consideration, a managed process, subject matter expertise and in many cases also legal counselling. Without coordination regarding responsibilities for compilation and publication of data sets, it is unlikely that open data spurs public service innovation (Mergel et al., 2018).

**The external opportunities, bottom left quadrant.** Transparency, openness, accountability and trust were empowering factors that help to find new solutions for addressing societal challenges. Compatible with Mergel et al. (2018) it was seen that having open data will help to gain new insights and discovering innovative solutions to the citizens' needs. The use of open data supports the idea of evidence-based / evidence-informed policy making (Cairney, 2016). Strong strategic support on the government's side, and a high interest for open data from the business side may stimulate public-private innovations (Mergel et al., 2018). At best, open data enables the emergence of an ecosystem of public and private actors that will feed innovations (Walravens, Breur & Ballon, 2014). In addition, open data may reveal new insights on vulnerable citizens creating 'citizen science' and spur social innovation (cf. Souza & Smith, 2014). In the longer run, open data movement can be framed as something more than just data provision such as a new way for government to interact with stakeholders (Sieber & Johnsson, 2015).

**The external threats, bottom right quadrant.** The main threats relate to reduction of political support to open data, and consequently to lowered level of funding and other resourcing. It can be hypothesized that the less there is empirical evidence of the benefits of the open data, the more sceptical government becomes

(Safarov et al., 2017; Jamieson, Wilson & Martin, 2019). There is also a concern that not all citizens will be able to take advantage of the possibilities created by open data, which can in turn lead to increased inequality. Compatible with Janssen et al. (2012) and Lassinantti et al. (2019), we identified an unfounded belief that the use of open data is something that will just happen when data is released and that everybody will be able to use it. Perhaps there is too much focus on ‘what’, not enough on ‘how’ (Janssen et al., 2012). We also found uncertainty related to the value of open data. Business opportunities were identified, but it remained unclear what government was supposed to do and how citizens will benefit from the open data. On the other hand, businesses may underrate the social/public value of open data in a way which leads to suboptimal utilization and production. This is understandable as many scholars have argued that the idea of open data is largely built on assumptions, with the result of misunderstanding on how value can be created from the use of open data (Safarov et al., 2017; Lassinantti et al., 2019). Low quality data resulting from low quality processes can potentially dash the high expectations people have of invented new applications. Finally, we identified concerns related to potentially unethical use of open data. It was questioned, for example, whether the economic drivers of open data override other values like privacy. Disclosing sensitive data was identified as a risk that, if actualized, violates the principle that individuals should be identified or inferred from the open data. Also, the malicious use of open data and cyber-attacks were raised as issues that cause distrust on open data. (Zuiderwijk & Janssen, 2015.)

## SOCIAL MEDIA IN CO-CREATION OF PUBLIC SERVICE INNOVATION

Social media refers to a constellation of shared technologies that derive their value from the participation of users through directly creating original content, modifying existing material, contributing to a community dialogue and integrating various media together to create something unique. It is worth noting that social media is not confined to technology, but involves cultural, organizational and societal consequences. We influence and are influenced by each other through continuous flow of status updates, likes, retweets, pictures and videos. Numerous studies have shown that social media has been used for facilitating innovation in the public sector. Social media has not only facilitated exploring new ideas, it has also allowed a context for collaboration between government and citizens in a way that increases government responsiveness (Bertot, Jaeger & Hansen, 2012; Jalonen, 2016; Loukis, Charalabidis & Androutsopoulou, 2017; Eom, Hwang & Kim, 2018). It has provided new opportunities for the internal use of external knowledge (inbound knowledge) as well as for the external exploitation of internal knowledge (outbound knowledge). While social media has helped communication between government and citizens, however, many studies argue that government agencies prefer using social media to push out information rather than using it in engagement activities (Mergel, 2013; Mossberger & Crawford, 2013).

The following table 2 describes the main promises and pitfalls of using social media in co-creating public services found from 61 examples. It highlights many strengths and opportunities, but also identifies some weaknesses and threats.

*Table 2. A SWOT analysis matrix of using social media in co-creating public service innovation*

<b>Strengths</b>	<b>Weaknesses</b>
<ul style="list-style-type: none"> <li>-Social media strategy for the use of inbound and outbound knowledge</li> <li>-Low-threshold and increased informal interaction between public authorities and citizens</li> <li>-Bottom-up ideas and initiatives as well as constructive reclamations</li> <li>Increased reach of citizens</li> </ul>	<ul style="list-style-type: none"> <li>-Problems of getting buy-in (e.g. because of lack of time) within public authorities</li> <li>-Lack of experience in using social media for interaction between citizens</li> <li>-Fragmented and continuously changing social media platforms</li> <li>-Biases (e.g. age, gender, logged-in users vs visitors) in citizens’ social media use</li> </ul>



<ul style="list-style-type: none"> <li>-Improvement of citizens' everyday life by providing real-time data</li> <li>-Collaboration within and between public-private partnerships in public governance</li> <li>-Efficiency in promoting awareness among target groups</li> </ul>	<ul style="list-style-type: none"> <li>-Not suitable for anything confidential</li> <li>-Anonymity feeds cyberbullying and other malicious behaviour</li> <li>-Difficulty of retrieving information from unstructured social media data</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>-Transparent decision-making from preparation to implementation</li> <li>-Improved legitimacy and increased trust in governance</li> <li>-New kind of locality and the sense of communality</li> <li>-Cost-efficient 24/7 public and tailored services with the help of machine learning algorithms, chatbots and artificial intelligence</li> <li>-Identification of weak signals and emerging issues through social media monitoring</li> <li>-Increased deliberative democracy</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>-Citizens' unwillingness to participate co-creative actions</li> <li>-Social media loses some of its popularity and value due to many negative issues</li> <li>-Emergence of 'big brother' attitude and 'dataveillance'</li> <li>-Social polarization and social bubbles resulting from social media filters and algorithms</li> <li>-Over-reliance on virtual interactions cause the loss of the sense of humanity and reduced face-to-face contacts</li> </ul>

**The internal strengths, top left quadrant.** The analyzed cases spoke for the need of a strategic approach to social media. It was found crucial that a social media strategy guides both the use of inbound knowledge and outbound knowledge. As an example of inbound knowledge, social media enable citizens to create, share and comment on issues in an uncontrollable way. In so doing, social media provide public authorities insight and weak signals about citizens' needs. On the other hand, social media enable public authorities to communicate with citizens in informal ways and promote services. This enhances government outreach and improves government transparency (Zheng & Zheng, 2014) which, in turn, are important for getting the awareness of innovations and for their diffusion. A strategical approach enables social media to become a low-threshold two-way communication environment that enlarges the scope of stakeholders' participation in the planning, development, delivering, and implementation of public services. In short, social media provides information and interaction benefits (Zheng & Zheng, 2014).

**The internal weaknesses, top right quadrant.** However, the realization of the innovation potential, which social media provides, is not an easy task. It is not a panacea, which by itself automatically translates information flows into new knowledge. The analyzed cases revealed many weaknesses of which the most detrimental were the resistance to change and difficulties of getting buy-in from public authorities as well as lack of experience in using social media for interaction with citizens. Biases in social media users' demographic profiles were seen as factors that inhibit interaction between public authorities and citizens. It was seen as problematic to rely too much on information available through social media. Also, cyberbullying and other malicious behaviour cases reported in public were mentioned as one reason for public authorities' moderating social media communication. As a result and compatible with Hofmann, Beverungen, Räckers & Becker (2013, Merkel & Dezousa (2013) and Zheng & Zheng (2014), we identified a tendency for using social media mainly in one-way communication. Relying on 'push' strategy communication indicates that public authorities' fail to take advantage of particular characteristics of social media. Our data support the argument that social media has increased the complexity of interaction within and outside public organizations (Jalonen, 2016). The challenge is to align strategic objectives with operational performance in a world where interaction has become more uncontrollable than before.

**The external opportunities, bottom left quadrant.** The analyzed cases envisioned many promising possibilities. Artificial intelligence, machine learning and chatbots were seen as intriguing technology which may transform public–citizen interaction. Social media provides easy access to public authorities and increase government responsiveness (Bertot et al., 2012; Eom et al., 2018). Social media extends public organizations because it has created new possibilities to engage with stakeholders, both internally and externally. Compatible with Loukis et al. (2017) it was seen as a possibility to develop social media monitoring and ‘citizen-sourcing’ methods for identifying weak signals and addressing emerging issues. In the longer run, collaboration may feed itself and yield to stronger legitimacy and trust in governance and strengthen the deliberation in public policy. In an ideal case, social media enhances aspects of knowledge processing including problem-seeking, recognition and formulation, creating new knowledge, and knowledge integration. Perhaps, we will witness the development where citizens become as government policymakers (Driss, Mellouli & Trabelsi, 2019).

**The external threats, bottom right quadrant.** In principle, social media platforms underpin open and democratizing innovation as they provide a context for sharing information, ideas and opinions, however, beneficial outcomes are not guaranteed. One particular problem with engaging citizens as co-creators of public service innovation through social media is that the citizens, in the first place, may be are not interested in participating in improving public services. As one main reason for citizens’ unwillingness to participate in co-creation activities was identified the negative publicity around social media sites. Due to the alarming growth of misinformation and other negative issues (such as trolling, fake news, hate speech, privacy concerns, addiction problems, issues with law) social media may lose many of its promises. Social media has empowered individuals and enabled them to attain certain good purposes, but it has also affected the conduct of individuals and in many ways objectivized and subordinated them (Cheney-Lippold, 2017). Compatible with Andrejevic (2014) and van Dijck (2014), it was seen that a gap has widened between those who collect, store, and mine large quantities of data and those whom data collection targets. Social media enables the computerization of our lives and opens up new forms of dataveillance (Zuboff, 2019). Machine learning algorithms analyse our online behaviour astonishingly precisely and determine the contours of our world without us knowing (Pasquale, 2015).

## CONCLUSION

The ‘value’ of public service innovation rests on its congruence with the citizens’ needs and expectations. Advances in digital technology have been seen as enabling factors to bridge the gap between service providers and service users. It seems that Open Data movement re-articulates notions of democracy and participation. It promises innovations if only private and public databases can be made available to application developers. The use of open data is also a cornerstone for ‘smart cities’ where digital technologies are harnessed for enhancing the quality of life for citizens (Paskaleva & Cooper, 2016). Similarly, social media is seen as encouraging citizens to share their knowledge and expertise thus enhancing collaboration and innovation. Open data and social media resonate with the idea of open innovation (Chesbrough, 2006) and democratizing innovation (von Hippel 2005) which emphasizes interactions between different stakeholders as fertile sources of innovation.

Based on the SWOT analysis of 61 cases, the paper concludes that using open data and social media in co-creation of public service innovation is a promising approach but not yet fully implemented. It seems clear that the advances in digital technology may provide a bridge for bringing service providers and service users together. The benefits are clear. First, the more accurate and real-time data available, the more effective the service provision will be. Second, the more citizen participation, the more tailored services can be co-created. Third, the more transparent governance becomes, the more legitimate and accountable it becomes. Fourth, governmental legitimacy increases societal trust which support knowledge sharing and spur innovation.

Jalonen, H. & Helo, T. (2020). Co-creation of public service innovation using open data and social media: Rhetoric, reality, or something in between? *International Journal of Innovation in the Digital Economy*, 11(3), 64–77,

However, co-creation of public service innovations – with or without digital technology – can be “more complex, more unpredictable, and more political” than what the rhetoric indicates (Worthy, 2015). Political, social, operational and technical benefits related to open data do not necessarily actualize in practice (Jamieson et al. 2019). The more we rely on algorithms and artificial intelligence to make decisions and value judgements, the more critical it is to ensure the decisions and judgements are in accordance with our understanding about human agency and that they do not violate ethical principles. Instead of seeing ubiquitous digitalization dichotomously as neither utopia nor dystopia, we argue for the need of addressing the hybridity of public governance (cf. Johanson & Vakkuri, 2018) and administrative flexibility to live with the contradictions and paradoxes in the digital realms (cf. Pasquale, 2016; Martin, 2016).

As with any study, there are some limitations that should be taken into consideration. Whilst the sample size is extensive, there is always the challenge of research objectivity. The aim was to gather a representative sample with the help of researchers from different European countries. However, due to the variations in digital maturity, it is possible that the analysis contains some bias. Despite its limitations, the paper concludes that it is important to strengthen public agencies’ strategic, operational, and technological capabilities. Due to the rapid evolution of artificial intelligence and machine learning algorithms, particular attention should be paid to ethical issues. It is worth noting that not everything that is technologically possible is ethically justifiable or even operationally preferable. Therefore, one promising avenue for further research might be the analysis of socio-technological factors that lead to failures. Instead of positive outcomes, co-creation may also lead to negative consequences such as the deliberative rejection of responsibility, failing accountability, rising transaction costs, loss of democracy, reinforced inequalities, implicit demands and co-destruction of public value (cf. Steen, Brandsen & Vershuere, 2018).

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