Digital Transformation in Public Sector Organisations: The Role of Informal Knowledge Sharing Networks and Social Media

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Abstract. It is estimated that during the period 2020–2025, about 30% of the employees at the Austrian Ministry of Defence will retire. This raises the question of how to encourage employees to share informal knowledge in order to successfully embrace organisational change in increasingly digitised environments with a view to retaining them long-term. Through the development of a three-part empirical study, this research paper investigates the role played by informal knowledge sharing networks and social media in expediting digital transformation within a public sector organisation. Our findings show that the public sector stands to benefit from informal knowledge sharing, and that both a permissive organisational culture and the provision of clearly demarcated 'knowledge sharing spaces' are fundamental in this respect.

Keywords: Informal knowledge sharing · Social media · Digital transformation

1 Introduction

Knowledge has always been at the heart of economic growth, political power, and social well-being. However, the rapid global proliferation of the new Information and Communication Technologies, their advanced ability to gather and manipulate large amounts of data and information, has placed knowledge at the heart of business innovation, strategic decision-making and thus represents an economic asset that needs to be strategically managed [1]. For businesses and governments alike, accessing and harnessing knowledge lying latent in employees by creating appropriate networks and channels for its transmission is being viewed as more and more critical to innovation and organisational success. In parallel, the popularity of social media, originally seen and used for entertainment and youth activities, has also significantly contributed to a change in business models [2], making new technology-based operating environments and continuous change the new norm, rather than the exception, for the contemporary organisation.

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Web 2.0, social media and networks also play a significant role in the digital transformation of the public sector where, for example, Mergel [3] argues that the use of social media in the public sector can be considered to be the "fifth wave" of Information and Communication Technologies and sees social media as supporting government organisations' "mission". Measurements and evaluation are important aspects in implementing social media, and it is important to identify the factors that lead to success that are important for interaction and engagement [4, 5]. The use of social media in public sector not only requires a strategy, it must be used on a day-to-day basis, it use monitored and observed so that problems or operational deficiencies can be corrected [6]. Whilst it is important to understand what motivates employees to contribute to innovation, adapt to new HR policies and use social media, it is also important to measure and evaluate to what extent current activities are helping to achieve the desired or set aims.

The purpose of this research paper is to investigate, through an empirical study, the role played by informal knowledge sharing networks in expediting digital transformation within a public sector organisation. In particular, the paper will focus on the opportunities afforded by social media, in the guise of a new so-called third generation of communication tools, to help public sector actors successfully negotiate this transition. The research paper is structured as follows: The second section presents the literature review that addresses the global trends in governmental transformation and knowledge sharing. In the third section, the research design of the study is discussed. The fourth section presents essential empirical findings. These results are critically analysed in Sect. 5. Strategic recommendations based on the research results are derived in Sect. 6.

2 Literature Review

We live in 'knowledge societies' and work in 'knowledge economies' [7, 8], and for businesses and governments alike, knowledge is a central strategic resource; it is critical to organisational success, and needs to be effectively managed through the adoption of a series of activities and practices known collectively as *knowledge management* [1]. Within the broader context of knowledge management, *knowledge sharing* may be defined as any activity that involves the exchange of information, skills and expertise between people or within and across organisations and institutions [9]. More particularly, Ipe [1] defines knowledge sharing as "the act of making knowledge available to others within the organisation" [p. 341], that is, converting knowledge into a form that can be understood, and used by other individuals and collectives, or the wider organisation [10]. Organisational knowledge sharing may be uni-, two-way, or multidirectional [9], is involved in the dissemination of innovative ideas [11, 12] and is thus central to creating economic value and benefit from competitive advantage [13].

Knowledge sharing within organisations can occur through both formal and informal channels [1, 14, 15]. Formal knowledge sharing is usually the outcome of activities via outlets institutionalized by management that are explicitly designed to acquire, aggregate, structure, and disseminate knowledge; including through scheduled meetings, brainstorming sessions, training programmes, highly-organised work teams,

and technology-based infrastructure designed to facilitate the exchange of information, know-how, and expertise [14]. Informal knowledge sharing, however, involves the exchange of knowledge and transfer of practices via informal socialization mechanisms that exist alongside all institutionalized forms of knowledge sharing; including spontaneous conversations, interactions based on personal relationships – both friendship and business – and social network dynamics occurring within the context of informal settings [1, 14, 15]. Almahamid [16] maintains that the process of knowledge sharing within an organisation is key to its ability to respond quickly and proactively to situational change in an unpredictable business environment.

Social relationships and the networks they constitute have a direct influence on the effectiveness and efficacy with which individual actors and collectives create, acquire, transfer, absorb and apply knowledge [17, 18]. Such networks may be referred to as *knowledge networks*, defined by Phelps et al. [17] as "… a set of nodes – individuals or higher level collectives that serve as heterogeneously distributed repositories of knowledge and agents that search for, transmit, and create knowledge – interconnected by social relationships that enable and constrain nodes' efforts to acquire, transfer, and create knowledge" [p. 1117]. Knowledge networks may be considered as informal transmission channels of knowledge between both individuals and firms activated by occasions like incidental meetings, or the need for favours or services [18], they are social relationships or loose linkages among different knowledge who nonetheless possess certain commonalities or common attributes [19]. Despite the assumption that employees primarily search in databases to find relevant information, various studies show that it is about five times more likely that employees turn to other colleagues than using impersonal sources like databases [20, 21]. This implies that the right kind of knowledge network is necessary to facilitate the search and transfer of knowledge. The qualities of networks, according to Augier & Thanning Vendelo [18], have two implications for the management of knowledge networks: first, knowledge networks are difficult to manage, control and access in the traditional sense given the loose interlinkages between different actors; secondly, it is difficult to predict in advance which knowledge will be needed by a particular part of the network, and even when identified, that knowledge may exist in a different place than expected. Cross et al. [22] found that four relational qualities facilitate effective knowledge sharing [p. 105]: knowing what another person knows and identifying sources of information and expertise (overview), being able to gain timely access to a knowledge source (access), the willingness of the knowledge source to engage in proactive problem solving with the knowledge seeker as against merely dumping information (engagement), learning interactions are carried out in a safe and permissive environment (safety).

Knowledge sharing also occurs in virtual organisational settings [16, 23, 24], and Hsu et al. [23] identify trust, self-efficacy, and outcome expectations as factors influencing the willingness of individuals to share knowledge within the virtual space. In more recent years, many have argued that the use of social media tools in digital networks, are key for interactivity, collaboration, co-creation, re-shaping the relationships between actors in organisations across all sectors [4, 25–27]. The public sector benefits from knowledge sharing; it helps the public sector find "innovative new ways to deliver public value" [6], and consequently it has become commonplace for governments to advocate the use of social media. The rise of social media allows for the

emergence of new forms of open collaboration, coproduction, partnerships and collective action [5, 6, 28], to increase organisational transparency, participation or engagement, support a community or develop an identity, or help public sector organisations learn what is being said about them [29]. Many public administrations already use social media channels to disseminate content (usually for marketing or PR purposes), but they can be used for other external purposes too, such as providing information, communicating with citizens, for co-creating content, or designing or delivering new services. Mergel [2] suggests that a change of paradigm in public administrations can be seen, that social media supports the move from "need-to-know" to "need-to-share" information, a paradigm that includes dimensions such as openness, conversations, inclusion, co-creation, and real-time feedback cycles. Social media can also be used for internal purposes too, making it easier to collaborate and communicate within and between departments, to help staff in their work [30, 31]. To ensure the success of social media in an organisation, government or public administration, it is important to remember that the use of social media requires resources and must be accepted by the staff in an organisation. If the use of social media is to support knowledge networks, the actors involved and the sharing of knowledge, then the implementation of social media should not be seen as an IT project but as the need for a cultural shift within the organisation so that technology can make a difference [31].

3 Research Design

To examine the central research problem, and to test the associated hypothesis, a sequential mixed-methods research design was used. This comprised of, first, a systematic review of relevant literature [32]. The results of this review were then used to guide the development of qualitative data collection tools (a co-creation workshop, a framework for qualitative interviews, and a stakeholder workshop). Research data collected by these tools was then used to inform the creation of a quantitative research component (a questionnaire, Implicit Association Test, Social Network Analysis).

In order to conduct a comprehensive review of relevant scholarly and practitioner literature, researchers made use of one database of peer-reviewed literature (Scopus). Further databases were used to incorporate additional publications from diverse sources, that also includes knowledge from practitioners, i.e. one specialist search engine (Google Scholar), and one database of full-text books (Google Books). A systematic conventional search string launched within the 'title', 'abstract' and 'keywords' fields was used to query the Scopus Database for peer-reviewed, scholarly literature. A conventional key word search also used to obtain full-text sources of material previously discovered using Scopus, to identify clusters of publications authored by the same person, and to discover new citations of pertinent material from via the Google Scholar search engine. Simultaneously, a similar keyword search was used to trawl the Google Books database, with the aim of uncovering new material from both single-author books and chapters within edited volumes, and to access books and material from books identified in previous literature searches by other search engines.

From the research literature, qualitative and quantitative data collection approaches were developed to gain a deeper insight into the knowledge management strategy at the

Austrian Ministry of Defence. Three consecutive individual studies were carried out during the qualitative phase in order to gradually accumulate and integrate the topics and meanings of the concept of knowledge transfer from different perspectives of different actors and stakeholders from outside and inside the ministry. In the first phase, a co-creation workshop was held at the Danube University of Krems with 23 participants at the Department for E-Governance and Administration. The aim of this workshop was to develop a deeper understanding of this particular organisation's system dynamics and was used as a pre-study for later interviews and stakeholder workshops held at the Ministry of Defence. Broad questions asked concerned current topics on knowledge transfer in various companies. One of the main topics mentioned during the workshop focused on corporate culture. During the second phase, qualitative interviews about knowledge management were conducted with four stakeholders from different departments and Communities of Interest (COI) at the ministry. Two theoretical models - knowledge components by Probst et al. [33], and knowledge sharing in organisations by Ipe [1] - were used to inform the guided interviews. The guiding questions concerned knowledge sharing between individuals, focusing on the motivation to share their knowledge, which opportunities and channels are provided to do so, the perceived culture of the working environment and to what extent they are supported from others and the organisation to share their knowledge. In the third phase, a final workshop was held with stakeholders of the ministry to develop a general overview of relevant factors necessary to prepare a questionnaire and an Implicit Association Test (IAT), and to identify the relevant actors and relations for social network analysis.

Based on the findings of the workshop, three main topics were identified: *Personal Intentions* (motivation and attitudes toward informal knowledge sharing); *Interpersonal Relations* (e.g. overview of expertise); and *Organisational Support* (the degree to which an organisation facilitates knowledge sharing). A questionnaire was created, and a customised Implicit Association Test developed, based on the collection of relevant top-level concepts and stimuli. The questionnaire addressed socio-demographic aspects, motivation and support for knowledge sharing, and contained relational questions to measure interpersonal relations. Central to this study are the following questions: *To what extent are you motivated to share your informal knowledge? What motivates you to share your informal knowledge? What discourages you from sharing informal knowledge? To what extent are you encouraged within your department or community to share your informal knowledge? To what extent is informal knowledge sharing promoted in your department or community? How is informal knowledge sharing prevented in your department or community?*

The online test consisted of the standard version of the Implicit Association Test [34, 35] to analyse to what extent the concepts "share knowledge" and "retain knowledge" as well as "good" and "bad" are associated. For the concept "share knowledge", the stimuli *openness*, *general usage*, *communication*, and *distribute knowledge* were used; for the concept "retain knowledge" the stimuli *reticence*, *self-interest*, *secret*, and *hoard knowledge*; and for "good" and "bad" the stimuli proposed by Nosek et al. [36]. From 04 May 2017 to 06 June 2017 one link to the survey, that included the online test and questionnaire were sent to three departments and two Communities of Interest (COI). In total, 116 persons were invited via email, and 59

persons (men = 52, women = 4) completed the whole survey. On average the employees worked for 21.75 (SD = 10.21) years in the Ministry of Defence. In the sample, most of the employees have completed a higher level of education, over 50% of the participants graduated from university. One third of the respondents indicated that they had obtained school leaving examination and 17% state that their highest educational attainment is a Vocational Education and Training (VET) qualification. The percentage of informal knowledge sharing (46%) compared to formal knowledge sharing (54%) in the Ministry of Defence was quite high and indicated the importance of studying informal knowledge sharing in more detail.

Legal restrictions foreclosed the possibility of carrying out a detailed social network analysis needed to investigate the informal knowledge sharing between the participants. Instead, knowledge relations between the participants' functions were included in the questionnaire to analyse the general knowledge flow between hierarchical roles as well as items for relational qualities. To integrate these different methods and questions, the empirical part of the study will test the following derived hypotheses:

Hypothesis 1. Employees will have a tendency to share their informal knowledge within the same hierarchical functions.
Hypothesis 2. There exists a positive correlation between relational qualities and the personal intention (explicit and implicit) to share informal knowledge.
Hypothesis 3. The use of electronic channels of communication, and in particular social media, will increase as office environments get digitised.
Hypothesis 4. The degree of physical proximity between departments and Communities of Interest determines the nature of the communication channels used to share knowledge. The greater the physical distance, the more frequent the use of electronic channels.
Hypothesis 5. The degree of physical proximity between departments and Communities of Interest determines the nature of the situations in which knowledge is shared; the smaller the distance, the more popular face-to-face interactions are.

4 Empirical Results

The final report submitted to the ministry [37] concluded that members of staff with different functions, based within different departments and Communities of Interest exhibited homogeneous positive personal intention toward knowledge sharing. Based on this result, the impact of interpersonal relations and organisational support on informal knowledge sharing between constituent actors is critically explored here in detail.

4.1 Interpersonal Relations

Two dimensions of knowledge sharing networks within the Austrian Ministry of Defence pertaining to interpersonal relations were investigated: the knowledge flows between different hierarchies, and to the extent to which people rate the relational qualities. Based on previously articulated hypotheses the following results are discussed:

Result 1. The ministry expected that their employees would share their informal knowledge within the same hierarchical functions, as they assumed that people with similar organisational functions share their knowledge with each other. As expected, a tendency towards knowledge sharing between the same hierarchical functions was revealed. However, most relational ties were collected between different hierarchical functions. As opposed to homophily theories, even employees with significantly different hierarchical functions passed on their knowledge.

Result 2. Data collected also shows that ministry employees rated all four relational qualities identified by Cross et al. [22] very highly (on average between 4.35 to 4.67 on a 5-point Likert Scale; From 1 "does not apply" to 5 "applies"). This means that employees have a good overview of others' expertise (they know what others know), have access to others with the relevant information (they can contact relevant colleagues), they rate their colleagues as engaged (they are willing to answer professional questions proactively), and feel safe to ask for advice (they can ask others openly). Correlations between personal intention and each relational dimension, as well as the sum of all relational dimensions were calculated. As expected, a significant correlation between explicit motivation and the sum of all relational qualities was found ($r = .32$), but there was no significant correlation between the implicit attitude and the relational qualities ($r = .16$). Focusing on a single dimension of relational qualities (safety), we found a significant correlation between explicit motivation and safety ($r = .27$), as well as explicit motivation and overview ($r = .32$).

Result 3. Besides the individually perceived qualities of relational qualities, channels used to share informal knowledge were examined. Almost all of the employees were found to share their knowledge via face-to-face communication. Around half of the respondents use telephone and email. Far fewer people stated that they use different kinds of media to share their informal knowledge.

Result 4. Based on the questionnaire, most of the people stated that they share informal knowledge during meetings (83%), in the office (68%), or during breaks while drinking coffee or smoking a cigarette (58%). Hence, against our expectations, the results show no significant differences regarding the communication channels. Only minor differences could be detected such as the preference of employees in departments to share their knowledge through face-to-face communication (100% for collocated departmental members as compared to 91% within COIs) and the preference of employees in communities of interest to share their knowledge through short message systems (54% for collocated departmental members as compared to 41% within COIs).

Result 5. The results show that both employees in departments and communities of interest prefer to share their knowledge in face-to-face situations. Nevertheless, the preferences for specific situations had a greater variance than the communication channels. Members of departments prefer to share their knowledge during meetings (92% for collocated employees compared to 68% for members of COIs) and in their office (76% for collocated employees as compared to 55% for COI members); while members of communities of interest indicated to share their knowledge in situations such as lunch (41% as compared to 22% for collocated employees) and events (32% compared to 16% for collocated employees) was twice as high as members of departments.

4.2 Organisational Support

This part of the empirical enquiry examined the extent to which employees feel supported by their organisation to share their informal knowledge. Although employees are motivated to share their informal knowledge, there is a lack of organisational support to do so. Our calculations revealed that employees rated their motivation to share informal knowledge on average with 4.2 on a 5-point Likert Scale ("To what extent are you motivated to share your informal knowledge?"; From 1 "not supported at all" to 5 "highly supported"). Compared to the explicit motivation, the mean value of the perceived support by the organisation is lower with 3.5 on a 5-point Likert Scale ("To what extent are you supported to share your informal knowledge?").

Nevertheless, for the purpose of the study, a positive correlation between the personal intention (explicit motivation and implicit attitude) and the perceived support to share knowledge by the organisation was assumed. As hypothesized, a significant positive correlation between explicit motivation and the perceived support ($r = .42$) was found, but no significant correlation between implicit attitudes and perceived support. A positive correlation was also assumed between the interpersonal relations and the organisational support. Regarding the accumulated value of interpersonal relations (information flow), no significant correlation was found, however, a correlation between a single dimension of relational qualities, safety, and the organisational support ($r = .36$) was found.

5 Discussion

Based on earlier discussions of scholarly literature, and on the basis of the findings from this study, a number of recommendations pertaining to knowledge creation, knowledge sharing, and the use of social media within public organisations may be derived. The advent of new information and communication technologies has dramatically altered the environments within which private and public organisations operate and has placed several new demands on the individual actors and collectives that make up these larger entities. Knowledge is central, and organisation's constituent elements must know how and when to respond rapidly and appropriately to external changes and fluctuations; employees have to share informal knowledge within modern public organisations.

Digital transformation, when spoken of within the context of public administration, may occur in two distinct ways: either through the transformation of internal processes, or through the transformation of the external relationships between governments and other political, economic and social actors [38]. The organisation must actively support the formation of knowledge networks amongst its constituent elements and with external actors. To generate new knowledge, and to match information to those who need it, formal and informal channels of communication need to be devised that bring knowledge seekers together with knowledge sources. Here, the importance of *tacit knowledge* - operational skills and know-how that are acquired through personal or practical experience [1] - must not be ignored. A wealth of information, skills and experience is locked up in individuals and collectives as tacit knowledge. Often

knowledge sources are reticent to share this sort of knowledge as it can be difficult to impart and can be regarded as a form of personal wealth or power. The organisation must adopt a strategy to encourage employees and groups to share this latent potential with others, a strategy that must include knowledge networks and the opportunities offered by new technologies.

Public organisations are shaped by the interactions, rules and norms, behaviours of their internal systems, and cognitive patterns of their inhabitants. The organisation evolves through the mutual interactions of its participants and the stakeholders involved, and digital technology can be used to shape new forms of organisational functions, increase public sector legitimacy, and integrate the functions between public agencies. Institutional support must be given to the formation of knowledge networks within the organisation, particularly those concerned with informal knowledge sharing and weak ties. An overt demonstration of institutional backing is likely to motivate employees from across departments and sub-units to seek out, impart, and exchange informal or tacit knowledge. A four-fold strategy for effective knowledge sharing may be derived from [22]: the development of an internal system that enables employees to quickly determine who holds the required knowledge, skillset, or expertise; the maintenance of an internal information technology infrastructure that connects knowledge seekers with knowledge sources, instantaneously and (often) in real-time; the initiation of an institutionalized or semi-institutionalised constructive and sustained dialogue between knowledge sources and knowledge seekers to promote meaningful knowledge sharing; and the creation of a 'safe' and permissive environment to encourage informal knowledge sharing. It may be concluded, therefore, that both a permissive organisational culture, and the clear designation of virtual and physical 'enabling spaces' for informal knowledge sharing are fundamental prerequisites of effective knowledge exchange or transfer.

The high relevance of face-to-face communication leads to us to question the types of situations within which employees are able to effectively share their knowledge. Allen [20] shows that physical distance affects the frequency of communication between employees, and thus spatial arrangements of buildings can influence informal knowledge sharing and physical proximity enhances not only the communication between attendants but also their use of virtual communication.

Public organisations and social media do not fit easily. There are huge lags between the rate at which technology is developing and the government implements and digitisation does not always match the internal processes well. Mergel [30] points out that the main problem may be that the characteristics of social media are very different to the characteristics of public administrations, and these can often lead to conflicts and difficulties. Merely pressurising organisations and public administrations to digitize processes may lead to simply converting processes from analogue to digital, which may neither be the best strategy nor result in the adequate processes being chosen for this transformation. The process of digital transformation is therefore more than an "(IT)-project" and not about finding an IT-solution to an IT-problem. An organisation needs to think about what the results and aims to be achieved should be and what users need, as digital transformation requires changing government processes, involves flexible HR policies, overcoming cultural hurdles and agile leadership that allows experimenting.

Mergel [2] notes that further barriers to the use of social media in the public sector can be the costs, the distribution of government power, organisational and cultural challenges, operating procedures, informational challenges and legal challenges. Serrat [31] argues that barriers to a successful implementation can include the demographics of an organisation, a reliance on outdated hardware, software or information systems but also factors external to the organisation (e.g. legal and privacy issues). But there may also be systematic challenges, e.g. the need for a change in organisational processes so that they adapt and accommodate new forms of interaction and task fulfilment, a change in the rules, standards, requirements and resource allocation [31]. Such barriers can be reduced through the implementation of a social media strategy, the implementation of policies, adequate staffing and staff guidelines regarding their use of social media. It can be challenging for a government public administrations to integrate new social media application(s) or tool(s) into the (daily) routine of knowledge creation and dissemination, it may also be hard to motivate employees to share their knowledge and do more than is defined in the established job descriptions [31], but it also clear that governments should not miss the opportunities afforded by social media.

The successful implementation of social media in an organisation depends on the people who use it rather than on the technology itself. Staff needs to learn how to use new tools and applications, but also new roles and regulations may have to be defined: social media makes it easy to mix private and official functions and guidelines for their use will have to implemented. In order for social media to support the organisation, [30] and [31] suggest that it works best when implemented in a context characterised by high trust, collaboration and knowledge intensity; that is, in an environment where there are no barriers to social media, a culture that favours cooperation, and ensuring that tools and applications are adopted at an early stage. It is also important to decide what contents are to be made available, as not all content is suitable for all social media channels and applications. Not only may content be bound to data protection regulations and privacy policies, but it may also depend response times required, whether content has to be adapted for the specific channel and what the further use or dissemination may be.

6 Conclusion

New technologies present the unique opportunity to bridge old divides of space and time. Digital technologies are able to bring together people and collectives separated by physical and temporal distances to generate and share new knowledge. For this study, two main areas of knowledge sharing in the organisation were analysed: (1) interpersonal relations: employees were asked to rate their interpersonal knowledge relations; and (2) organisational support: the extent to which employees feel supported by their organisation to share informal knowledge was analysed. A better overview of the expertise within the organisation and an organisational culture that provides the social legitimization to openly ask questions seems to have a positive impact on knowledge sharing.

Our study revealed that the efficacy of new technologies as tools to facilitate informal knowledge sharing between public sector actors, and by extension their ability

to cope with digital transformation, will depend to a significant extent on the degree to which the use of these tools is aligned with existing internal workflow processes and organisational culture. There are several benefits to be gained through the implementation of social media in particular, for example, providing access to external stakeholders and managing external relationships. However, their introduction should support the organisation's internal communication patterns, thereby making them more effective, faster and gaining feedback. An important aspect of deciding about the use of social media is the use of strategy that considers which tool to use, whether they are suitable for the content to be transmitted and/or stored, length of communication, the response times. The organisation has to adapt to specific cultural characteristics of the social media tools and all channels chosen have to be maintained equally well. The use of guidelines will make it necessary to consider questions such as: what is the aim to be achieved? Who will use it? What contents will it transport? What tools or platforms will be used? What is the time framework? What resources are available? What parts of the organisation are involved? Have the aims been reached? [39].

At the same time, first- and second-generation channels of communication must not be forgotten. Evidence from the empirical study presented in this paper suggests that people still make use of traditional methods of communication such as face-to-face interactions or the telephone to exchange knowledge and to forge networks. In devising a communications or knowledge sharing strategy, the 'old school' technologies must also be considered for inclusion. Finally, the implementation and use of social media in public sector organisations must be monitored and evaluated. The impact of new tools on informal organisational knowledge sharing needs to be evaluated. Such evaluations may be quantitative and/or qualitative, can be conducted at the beginning, the end, or during the implementation of the new tools. Several indicators can be used for this, and although the focus is usually on the measurement of online activities and interaction, it is equally important to consider the network effects that may not always be visible but have an impact on the transfer of knowledge between public sector knowledge actors.

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