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Importance of Managerial Networking for Innovation in Governance Networks

Betydningen av nettverksledelse for innovasjon i styringsnettverk

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Abstract
Although innovation has attracted increasing attention among scholars and governing bodies seeking to address growing levels of complexity and ongoing crises, little attention has been given to the role of managerial networking in facilitating innovation in networked arrangements. This article examines how and why various types of managerial networking might generate different types of innovation. It presents a two-dimensional networking design model that was verified empirically by comparing four different governance networks that coordinate the development and implementation of digital innovations. The findings demonstrate the significance of managerial networking, especially in facilitating the most advanced innovations, such as radical and architectural innovations.

Keywords
managerial networking, innovation, public managers, governance network, public administration

Sammendrag
Samtidig som innovasjon har tiltrukket seg økende oppmerksomhet fra forskere og praktikere i søken etter å løse stadig mer komplekse oppgaver og pågående kriser, har mindre oppmerksomhet blitt viet til betydning av ledelsesmessige interaksjoner (managerial networking) som legger til rette for innovasjon under nettverksarrangementer. Denne artikkelen undersøker hvordan og hvorfor ulike typer av ledelsesmessige interaksjoner kan generere ulike typer innovasjon. Artikkelen presenterer en todimensjonal modell for ledelsesmessige interaksjoner som er empirisk verifisert ved å sammenligne fire ulike styringsnettverk som koordinerer utvikling og implementering av digitale innovasjoner. Funnene demonstrerer betydningen av ledelsesmessige interaksjoner i nettverk, spesielt betydningen det har for de mest avanserte typer av innovasjon, slik som radikale og arkitektoniske innovasjonene.

Nøkkelord
nettverksledelse, innovasjon, offentlige ledere, styringsnettverk, offentlig administrasjon

Introduction
The current turbulence and fast-changing nature of our society increasingly demands innovative policies, services and forms of organising in the public sector to meet citizens' expectations and deal with wicked and complex problems such as climate change and global pandemics (e.g. Ansell & Torfing 2014; Cristofoli, Meneguzzo, & Riccucci 2017; Crosby, 't Hart, & Torfing 2017; Head & Alford 2015; Torfing 2016). Therefore, organisations collaborate across government levels and sectors to address ongoing complex issues and take advantage of opportunities in the public sector. However, this has implications for public managers as their management bandwidth grows (Zyzak 2023). In addition, the increased focus on innovation in the public sector, coupled with a discourse that shifts from *what* to

how knowledge (Bason 2018), shapes the imperative to better understand the role of public managers in exploiting and exploring diverse interactions. In the literature on public management, this falls under managerial networking.

Networking is not a network property (structural arrangement); it outlines the interactions undertaken by managers with different actors inside and outside their core agency (Zyzak & Jacobsen 2019). Recently, scholars have tried to explain the effects of managerial networking (Schönherr & Thaler 2022) and innovation (Lewis, Ricard, & Klijn 2018) in various public organisations; however, they have tended to use network structure rather than networking behaviour as the unit of analysis (Bashir, Ashfaq, & Khalid 2022). Moreover, a focus on the actual doing or practicing of managerial networking in networks (O'Toole 2015) is lacking in the literature (Lewis et al. 2018; Zyzak & Jacobsen 2019). Therefore, addressing this issue would improve managers' awareness and understanding of networking value in facilitating innovation in inter-organisational settings.

Current academic discussions on the multidimensionality of managerial networking are largely separate, despite these concepts being highly interconnected (e.g. Hansen & Villadsen 2017; Torenvlied et al., 2013). Nevertheless, the literature indicates that networking can not only generate unique means of communication aimed at accessing a larger set of resources, but also gather the information and knowledge necessary to achieve individual and collective organisational objectives—including those related to innovation (Zyzak & Jacobsen 2019). Previous studies have demonstrated that innovation success increasingly occurs through interactions or networking (e.g. Considine, Lewis, & Alexander 2009; Õzman 2017) and that relationships are perceived as 'connective tissue' for networks (Keast & Mandell 2009). However, we still lack a clear understanding of why managers should vary and intensify their networking in governance networks to achieve different results. By governance networks, we mean networks consisting of actors with different interests, structures and positions (asymmetric power relations), who are mutually dependent (Torfing 2012). This article addresses this knowledge gap by attempting to answer the following question: *How and why might various types of managerial networking generate different types of innovation*?

The contribution of this study is twofold. First, it provides new insights into the relationships between different managerial networking dimensions and innovation types in a governance network context. In doing so, the study is based on recently established regional governance networks in Norway that focus on digitalisation and innovation in the public sector. Second, whereas most of the previous research on managerial networking has employed quantitative methods (Schönherr & Thaler 2022), this study employed a qualitative approach to examining the importance of managerial networking for innovation results in governance networks.

The remainder of this article is structured as follows: in the next section, we introduce public sector innovation (PSI), especially innovation taxonomy. Then, we briefly present research on managerial networking, describe the interplay between networking and innovation, and suggest a model representing different combinations of networking dimensions and their implications for innovation results. Subsequently, we present the methods and data used in this study. Finally, we present and discuss the findings and consider avenues for future research.

Public Sector Innovation

PSI has attracted increasing attention among scholars and governing bodies (e.g. Bason 2018; Bloch 2011; Bugge & Bloch 2016; Hartley 2005; Moore & Hartley 2008). In particular, public managers and legislators seek to design innovation solutions to tackle wicked or

complex problems, reduce costs and increase quality to meet heightened expectations (i.e. Bekkers, Edelenbos, & Steijn 2011; Cristofoli et al. 2017; Head & Alford 2015; Sørensen & Torfing 2011; Torfing 2019). Despite widespread interest, the breadth and complexity of the innovation phenomenon makes it difficult to agree on a common understanding of this concept and its different types and degrees (Damanpour 1991; De Vries, Bekkers, & Tummers 2016; Langergaard 2021; Walker 2006, 2008).

In general, innovation is characterised by novelty (De Vries et al. 2016; Enquist, Fuglsang, & Rønning 2014) and involves the adoption or adaptation of methods, ideas or solutions created by others in unique ways (Bason 2018). An innovation can also represent different degrees of innovativeness, such as radical, transformative and incremental (Buchheim, Krieger, & Arndt 2019; Chen, Walker, & Sawhney 2019). Despite this, current research lacks a common framework for measuring innovation in the public sector (Chen et al. 2019; Cristofoli & Macciò 2018; Damanpour, Walker, & Avellaneda 2009; De Vries et al. 2016). Given that innovation might have several waypoints along the innovation continuum, this article suggests exploring the impact of managerial networking on innovation results by adapting the Henderson–Clark innovation typology (1990) into this study. This model is clarified in the following section.

Innovation Taxonomies

While De Vries et al. (2016) claim that there is a general tendency among organisational scholars and practitioners to treat innovation as a uniform phenomenon, some studies (e.g. Bloch & Bugge 2013; Chen et al. 2019; Damanpour 1991; Hartley 2005; Henderson & Clark 1990; Tidd & Bessant 2018) have considered many small but significant variances between innovation types in both the public and private sectors (Bason 2018; Sørensen & Torfing 2022). However, some of these taxonomies are too broad, lack clear overarching criteria for categorising innovation – such as the innovation typology developed by Hartley (2005) – or focus solely on one concrete type of innovation (i.e. process innovation; Walker 2014). Thus, the variety of these factors and approaches makes it difficult to generalise findings that might contribute to theory building, or guide public managers in pursuing innovation activities comprehensively (Chen et al. 2019; Buchheim et al. 2019).

Therefore, the key element to understand innovation must entail whether innovation is an outcome or a process for reaching an outcome (Quintane et al., 2011; Brogaard 2021). The latter approach has scarcely been investigated (16% of the public sector literature; Buchheim et al. 2019). In addition, the literature distinguishes between innovation outcomes (the consequences of the introduction of innovations) and innovation outputs (the direct results of innovative efforts) (Janger et al., 2017). This article focuses on innovation outputs that are the result of managerial networking.

The Henderson–Clark model was applied in this study (1990) to complement the rather narrow incremental–radical dichotomy, inserting modular and architectural innovations between them. Henderson and Clark (1990) argue that the incremental-radical classification is incomplete and misleading, as innovation should be understood as ranging from incremental, through modular and architectural, to radical. There might be some intermediary changes in a process or outcome that disrupt and foster innovation; that is, innovations might not be equally radical or incremental. Moreover, Henderson and Clark's (1990) research concentrates on two dimensions that are necessary for distinguishing the ways in which innovations differ: knowledge of the components and knowledge of the linkages between components. They define a "component" as a physically distinct part of the product or service that expresses a core design concept or knowledge. We suggest enhancing this

model via the concepts of exploration, exploitation and ambidexterity (Benner & Tushman 2015; Jansen, van den Bosch & Volberda 2006). Exploration comprises searching, uncertainty, risk taking and contacts outside agency boundaries. Exploitation involves refinement, efficiency, interaction and implementation within agency boundaries (March 1991). Ambidexterity combines both explorative and exploitative activities (Gieske, van Buuren, & Bekkers 2016). Accordingly, the four enhanced innovations are defined as follows:

(1) Incremental innovation is a type of innovation in which both architectural and component knowledge are only slightly improved simultaneously. It is similar to the bricolage approach ("making do with what you have") introduced by Lévi-Strauss (1966). This method consists of improving certain characteristics without any change to the structure of the system (Norman & Verganti 2014), and includes components that can be reused in new situations. Thus, incremental innovation mainly consists of exploiting existing competencies and services to strengthen the current activities of an organisation (Blindenbach-Driessen & Ende 2014; March 1991). This type of innovation is often used by public entities only for improving their ongoing services rather than changing the main components or links between components.
(2) Modular innovation is a type of innovation in which a single knowledge component is changed (as opposed to several components simultaneously) and architectural knowledge (links between components or a single process) is unchanged or only marginally improved. This type of innovation enhances exploitation (internal resources) and has some elements of exploration (external resources) needed to increase the knowledge of an individual component. In terms of results, the change does not influence users' experiences or the function of the model or device. It is easier to implement modular innovations than architectural innovations, as the latter require an understanding of all the components necessary for changing a process (Popadiuk & Choo 2006). An example of modular innovation is the transition from analogue to digital telephones.
(3) Architectural innovation is a type of innovation in which component knowledge remains the same or is slightly improved but architectural knowledge is changed. Therefore, it is necessary to understand the linkages between the components (architectural knowledge) needed for innovation. It is a more complicated process than modular innovation or design transformation (e.g. product size), which is more visible among users. Architectural innovations are designed to use existing core knowledge in a new architecture. Therefore, ambidexterity – a novel combination of exploitation and exploration required for building architectural knowledge – is important for effective design creation (Gieske et al. 2018). Accordingly, different communication channels are created between various groups of individuals (i.e. designers, engineers and managers) who share their knowledge. That exchange is ultimately filtered, and key relationships are selected to define the dominant design of innovation (Henderson & Clark 1990). For example, the desktop photocopier (multifunctional) is an architectural shift away from the stand-alone photocopier.
(4) Radical innovation is a type of innovation in which both types of knowledge undergo significant changes. Thus, it requires creative, out-of-the-box thinking. This breakthrough, complex approach (O'Connor 2008) is the exact opposite of the aforementioned bricolage approach, as exploration is mandated to access new knowledge, incentives and research to achieve objectives and innovation (Gilsing & Nooteboom 2005; Jansen et al. 2006). Radical innovation fundamentally transforms existing components and links them at the same time and simultaneously creates something entirely new.

The innovation taxonomy presented above helps unpack and order the different available innovation approaches. It also constitutes a useful guide for public managers responsible for innovation activities, including outreach channels and platforms necessary for achieving innovation outputs (Chen et al. 2019). In view of this, the following raises specific enquiries such as what type of networking is associated with what type of innovation.

Managerial Networking and Innovation

There is a growing awareness among scholars and practitioners that practicing networking may be an essential means of knowledge exchange in the innovation process (Gieske et al. 2018). Externally oriented networking is an especially important part of a manager's activities related to, among others, the collection of non-redundant information and innovation (Andrews et al. 2011; Hansen & Villadsen 2017). It is also recognised in research that actors combine resources and activities, and due to the variety and intensity of their interactions, as well as through these exchanges or ties, they can address rapidly changing environments and share the risks in generating innovation (Koschatzky 2002; Õzman 2017; Sandberg et al. 2015). However, this creates a challenge for public managers, because the management of interactions in a governance network is more complex than the management of networking in a traditional organisation, due to the increase in management bandwidth (Cristofoli et al., 2020; Zyzak 2023). Therefore, it calls for more research on networking in networks.

The literature emphasises the relevance of networking for innovation (e.g. Barrutia & Echebarria 2019; Pittaway et al. 2004) by considering the *density* (Jansen et al. 2006), *diversity* (Sørensen & Torfing 2010) and *strength* of relationships between parties (Mandell & Keast 2013) as well as *networking frequency* (Lewis et al. 2018). However, these studies often consider networking dimensions individually rather than multidimensionally. Moreover, the public administration literature often differentiates between networking dimensions (Burt 1992; Granovetter 1983; Jacobsen 2015). However, the thick and frequent relationships in a system often distribute redundant information that increases costs and lowers efficiency (Gilsing & Nooteboom 2005), while seldom providing anything new. Therefore, we argue that one-dimensional networking has too narrow focus to explain the importance of managers' networking in governance networks that seek to innovate. According to Schönherr and Thaler (2022), managerial networking involves nine relational and structural dimensions. Although the intensity and specificity of managers' interactions are the most dominant dimensions, they are often discussed separately in the literature.

Accordingly, this article suggests a two-dimensional network comprising networking intensity and specificity (as well as their sub-dimensions). Networking intensity refers to the strength and frequency (high or low intensity) of a manager's interactions inside and outside their governance network (Meier & O'Toole 2003). Networking specificity refers to a manager's interactions with various actors inside and outside their governance network (wide or narrow range of actors) (Barrutia & Torenvlied 2013).

What matters is not only the two dimensions of the relational variety of networking (specificity and intensity), but also the managerial activity that ought to be the subject of considerable attention, for instance connecting people, organisations and networks, by either introducing disconnected individuals, or facilitating coordination between connected parties (i.e. Edelenbos, Klijn, & Steijn 2011; Gieske et al. 2016; Johansen & LeRoux 2013; Lewis et al. 2018; Meijer 2018; van den Bekerom, Schalk, & Torenvlied 2017). Thus, the aim of this article is to illustrate that innovation is contingent on networking. However, the connections on their own are not productive; rather, to facilitate the creation of something new, they must be identified and strategically leveraged. Therefore, this article emphasises the value of public

managers, as they can use their core position within the governance network to broker new connections by exploring new opportunities and exploiting existing knowledge. Such efforts are vital to enabling innovations in public sector networks (Edelenbos, van Buuren, & Klijn 2012; Gieske et al. 2018; Keast & Mandell 2014; Mandell & Keast 2013; Meijer 2014).

Combinations of Managerial Networking Dimensions and Innovation Types

This article adapts the notion of the multidimensionality of networking (Torenvlied et al. 2013), and focuses on the two aforementioned dimensions of managerial networking: networking intensity and networking specificity (as well as their sub-dimensions). We then suggest a managerial networking framework that illustrates the interplay between networking variety and four innovation outputs or results. This model accounts for the fact that public managers involve their networking partners for various reasons and at different frequencies, so one networking dimension might not be sufficient to explain each type of innovation.

Based on the enhanced Henderson–Clark model (1990) presented above, this study suggests four different combinations of wide and narrow networking specificity that, as well as low and high networking intensity, may lead to four types of innovation through managerial activity (Figure 1).

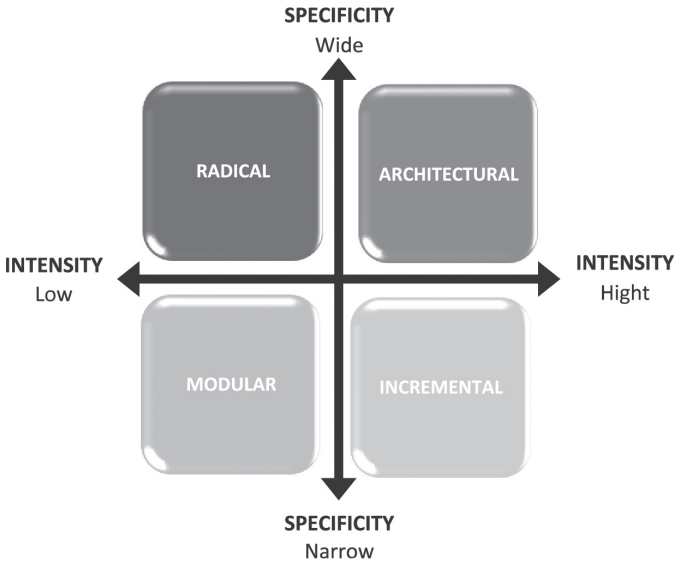

Figure 1. Combinations between and among networking dimensions and innovation types. **Source:** Author.

Combination of Narrow Specificity and High Intensity: Incremental Innovation

Incremental innovation may insist on narrow specificity and a high intensity of networking. Based on previous research, this combination mainly involves the exploitation of existing knowledge supported by regular connections between actors inside the network (Gieske et al. 2016). For the most part, the relevance of strong and weak ties depends on the functions and conditions of relationships (Gabbay & Zuckerman 1998). Thus, a preference for exploration may not be risky in the short run, especially when network managers are more experienced and can strategically use current contacts (Greve 2007).

Combination of Narrow Specificity and Low Intensity: Modular Innovation

Research shows that linkages with actors who share similar knowledge and experiences about a component may reduce the possibility of learning via interaction by absorbing other

people's thought processes (Gilsing & Duysters 2008). However, it is beneficial for mapping knowledge that has already proven useful by others in their own contexts (Gilsing & Duysters 2008). Thus, modular innovation involves some elements of exploration, but favours exploitation when changing a knowledge component. Therefore, this type of innovation requires weak ties to identify similar (homogeneous) sources of knowledge. Using and maintaining weak ties can bring far-reaching benefits and opportunities for networks that would never be achievable through strong networking. Combining homogeneous and weak ties favours modular innovation.

Combination of Wide Specificity and High Intensity: Architectural Innovation

Architectural innovation is mostly grounded in heterogeneous knowledge and information that originate outside agency boundaries. Research has shown that one of the reasons organisations join or create groups or networks is to gain access to diverse resources in order to achieve complex objectives, such as innovation (Davis 2016). In network studies, diversity is often identified with creativity and multi-actor (public–private) collaboration (Torfing 2019). Studies have shown that actors with diverse backgrounds, ideas, interests, goals and competencies are more likely to search for innovative solutions and generate innovation (Lungeanu & Contractor 2015). Thus, the multiple interaction forms and platforms within and outside organisational or network boundaries might hold the key to understanding innovation dynamics. According to Davis (2016), managers' active involvement in their own agency increases access to better resources. In addition, existing knowledge is also present to secure the main design concepts of a product. Following that, a mix of exploitation with a significant emphasis on exploration (Gieske et al. 2016) fits the conditions of architectural innovation. According to Granovetter (1983), strong ties within concrete types of knowledge reduce the cognitive distance between actors, and can also expand current knowledge by learning something new. Thus, specific investments in mutual understanding of components that already exist, but need changes, in turn increase strong but expanded networking. In practice, having many weak ties may turn architectural innovations into misunderstandings and chaos (Gilsing & Nooteboom 2005; Gilsing & Duysters 2008).

Combination of Wide Specificity and Low Intensity: Radical Innovation

Scholars emphasise that innovation, particularly radical innovation, involves exploration, which is necessary for combining and integrating complementary knowledge and capabilities (Gilsing & Duysters 2008; Jansen et al. 2006; March 1991). Thus, the increased cognitive distance between actors in a network will have a positive effect on learning by interaction; yet actors must strive to achieve mutual understanding to utilise those opportunities (Nooteboom 2000). So, intense networking might impede networking quality because strong networking with one individual usually offers access to in-depth knowledge and information but at the cost of reduced breadth (Granovetter 1973, 1983). Following Granovetter's (1973, 1983) theory, weak ties between loosely connected actors provide an opportunity for heterogeneous sources of knowledge and information. However, weak ties might also create misunderstandings due to the large cognitive distance between actors. Hence, low intensity is seen as a mode of identifying relevant knowledge and information essential for innovation. Furthermore, Burt (1992) suggests increasing organisational efficiency by eliminating redundant contacts and instead searching for connections that provide opportunities for information access (Gilsing & Duysters 2008). Hence, having several strong ties is important for knowledge creation, while weak ties are important for knowledge acquisition (Lechner & Dowling 2003). This article argues that the radical innovation approach characterised by low intensity and wide specificity (interacting with different sets

of actors and using various traditions of communication channels) provides the best conditions for absorbing new knowledge and information.

Methodology and Data

Case Description

Previous research on networks and collaboration in the public sector has applied different types of case study research designs (Cheng & Voets 2020, 48). This article uses multiple-case study (Yin 2014) consisting of four regional governance networks that focus on digitalisation and innovation in Norway. These networks comprise actors with different roles and tasks: the autonomous municipalities in a respective region (members), the Norwegian Association of Local and Regional Authorities (facilitator) and a county governor (observer). These governance networks, focusing on a number of complex and novel digital innovation services for citizens and businesses, are often multi-project oriented (e.g. e-health, welfare technology and digitalisation in schools), and cover almost a third of all municipalities in Norway – 137 out of 422 municipalities (32%) in 2019. Their structures differ in terms of the number and size of the actors involved – often covering all municipalities in a region and at least one large municipality, from small (under 200 inhabitants) to large municipalities (over 100,000 inhabitants). The cooperation is led by a steering group consisting of representatives of member municipalities. Working groups or resource groups handle important areas such as health, school, planning and construction, information security and ICT. The secretariat organises, implements and follows up on meetings and activities in a network. Moreover, network cooperation is intentionally designed, and it is often formalised with its own status, logo and agreement (see Table 1).

Sample

We selected the first four of the eleven governance networks that have recently been created in Norway, as at the time of data collection, the remaining seven networks had not yet been established. These regional governance networks aim to provide better and equal services for citizens and businesses in their region, regardless of which municipality they live in. Innovation, alongside digitalisation and sustainable development in member municipalities, is the key to achieving these goals. Cooperation takes place through interactions with other existing regional actors. In addition, although these networks share some similar characteristics, such as network organisation and focus on digital innovation, they deliver different innovation outcomes. As shown in Table 1 below, these digital innovation projects address issues in various sectors, such as safety, health and social care. Although the selected networks are relatively new, and coordinate a rather small number of projects (compared to other innovation networks), they consistently demonstrate the role of managerial networking in fostering various types of innovation.

Accordingly, in this article, we used most similar systems design (MSSD) (Anckar 2008; Seawright & Gerring 2008) to compare similar governance networks cases that differ in their dependent variable. We investigated how managerial networking intensity and specificity (the two independent variables) influence the outputs in four innovation types (the dependent variables) in the case networks (see Table 2 in Findings).

Data Collection

In this study, we used both primary and secondary data. We conducted online semi-structured interviews between April and May 2019 (fifteen individual interviews and one group interview, as the managerial position in this network was shared by two people). We

used purposive sampling (Yin 2011) to identify individuals holding managerial positions in selected governance networks. This technique allowed us to identify interviewees who were especially knowledgeable about or experienced with the phenomena of interest. Accordingly, the following participants in each network were selected: network coordinators (administrators and secretaries), network managers, county governors and KS representatives.

The primary data was supported by secondary sources (i.e. meeting minutes, reports, information on projects on network websites) to provide more insight into the specificity and intensity of meetings and projects. The semi-structured interviews helped to cover knowledge about managerial networking in governance networks, especially knowledge of what the most important communication mechanisms facilitating the intensity and specificity of networking are, and how the manager contributes to facilitating interactions inside and outside the network.

Data Analysis

The empirical data was analysed using thematic coding (Saldaña 2009). Previous studies on managerial networking (Schönherr & Thaler 2022) were beneficial in identifying the two independent variables (theory-based categories) – managerial networking specificity (actors with whom network managers interact), and managerial networking intensity (how often and how strong the managerial contacts are). Then, the empirical material was assigned to an adequate theme area and the system of categories was refined to allow for new categories to emerge (the two main categories were also supported by information coded as "relationship management", "innovation results" and "other relevant data"). Coding was done manually by highlighting text in different colours to categorise and then sort the data.

Using the project webpages, network agreements, strategies and reports, we determined the incremental–radical dichotomy in the governance networks. Following the content of innovation projects in a selected governance network, two criteria were used to determine the level of innovativeness: 1) the purpose of the innovation project, and 2) the complexity of its knowledge components (see Table 1 below). Based on that, the four types of innovation, incremental, modular, architectural and radical innovation, were operationalised. First, *incremental innovation* involves knowledge components that may only implement or improve an already simple design in a project by, for instance, introducing an app, or improving an existing communication platform. Second, *modular innovation* is less advanced, yet it makes small changes or improvements to the existing design of a component in a project (digitisation – from analogue to digital). Third, *architectural innovation* is less complex than it is radical, and preserves the knowledge of existing components to establish a new design, or to change the way components interact in a project (often a joint digital or knowledge platform for diverse actors). Then, *radical innovation* involves multiple links between various knowledge components in a project on different organisational levels and layers, and entails highly specialised components necessary for creating entirely novel solutions (often Artificial Intelligence). Additionally, non-innovation projects were considered, as they might contribute significantly to knowledge component renewal, which is essential for future innovation projects. Finally, this article suggests measuring the level of innovativeness on a scale from 1 to 4, starting with incremental, followed by modular, architectural and radical (a non-innovative project receives a score of 0: see Table 1). The sum of all the project scores in a case network is divided by the number of ongoing projects (innovation outputs) to obtain the average score, which gives us a sense of the degree of innovativeness in a respective governance network.

Table 1. Innovation results in selected governance networks.

PROJECT (P) NAME	SELECTED FEATURES FROM PROJECT CONTENT: Purpose of the project & Knowledge components	Governance network				
		Name of network	**A**	**B**	**C**	**D**
		Year of establishment	2016	2017/ 2018	2018/ 2019	2014 ‡
		Municipalities (number of members)	30	33	26 (+3 observers)	48
P1 Municipal response center	Transition from analogue to digital security alarms (a component is changed)		M			
P2 One citizen – one journal	Development of the Health Platform based on several components (data available for quality improvement, health monitoring, management, and research)		A			
P3 Introducing welfare technology	Combination of several specialized components that require comprehensive solutions, including integrations (connect all the disk alarms in one)		R			
P4 Joint Telemedicine solution	Combination of several specialized components that require development of a common future model for telemedicine interaction in a region (Artificial Intelligence)		R			
P5 DigiHealth	Development of communication platform for patients and healthcare require combination of serval components		A	A	A	
P6 DigiSOS	Digitalization of the social services in Norwegian Labour and Welfare Administration combines several components into one platform			A	A	
P7 Counting in kindergarten	Implementation of a solution/app				I	
P8 KS Mypage	Development of the existing MyPage into a better platform for citizens and municipalities			I	I	
P9 DigiChildcare	Development of the platform that allows children and parents to interact and communicate easily and effectively with child welfare (includes several components and phases)			A		
P10 Joint procurement of case /archive system for all municipalities in a region	Development of an archive system for all municipalities					M
P11 Digital transformation – skills enhancement for municipal leaders	Knowledge improvement on digital transformation					N
SUMMARY †	**Average** (the sum of projects divided by the number of projects)		3,2	2,5	2	1

† **I** (Incremental=1)**; M** (Modular=2)**; A** (Architectural=3)**: R** (Radical=4)**; N** (Not innovation project=0); **P** (Project)

‡ Informal cooperation, formalization in some municipalities in 2019, full formalization in 2020. Only one project was implemented in all municipalities. The other project is implemented in some of municipalities.

Source: Author.

The level of innovativeness was calculated as follows:

- Network A had five innovation projects – two radical, two architectural, one modular: (2 * 4 + 2 * 3 + 1 * 2) / 5 = 16 / 5 = **3.2**
- Network B had four innovation projects – three architectural, one incremental: (3 * 3 + 1 * 1) / 4 = 10 / 4 = **2.5**
- Network C had four innovation projects – two architectural, two incremental: (2 * 3 + 2 * 1) / 4 = 8 / 4 = **2**
- Network D had one modular innovation project and one non-innovation project: (1 * 2 + 1 * 0) / 2 = **1**

Findings

Specificity and Intensity of Networking in Networks

In this section, we present the findings on managerial networking in the four governance networks (A–D; Table 2), and discuss the links between networking and innovation. Interviewees were asked to indicate *how often* (intensity) and *with whom* (specificity) they interact inside and outside the network domain, by nominating important networks/organisations/individuals and by suggesting members' participation in different arenas, such as conferences, workshops, webinars and seminars. The suggested external contacts/parties were then classified according to different profiles, such as academia and regional actors (see Table 2). Networking intensity was measured on a scale from 1 = sparse to 2 = regular and 3 = very regular. Table 2 presents both the specificity and intensity of networking in each network. Finally, interviewees were asked about the role of network managers in facilitating networking and innovation projects.

Network A

Table 2 shows that Network A interacts with nine different types of contacts (inside and outside its domain) and the total intensity, which was calculated by summing each contact's intensity, was 17. Network A developed a unique internal communication structure with both digital and traditional meetings among municipalities, KS and the county governor. One of the participants mentioned, "If I compare it with other networks, there are no other regional actors with such good meeting structures." Despite this, Network A favours networking with external actors, especially those in academia: "The network is connected to the ICT milieu, and they are central to making the technical work function." In addition, the network interacts with both regional actors (the regional European office) and a number of professional networks. The results also show that managers are especially crucial for facilitating innovative ideas. As one of the interviewees said, "We focus even more on network management because we believe that to understand innovation, we need to have management anchored to reach the goals." Finally, this network had both the largest range of contacts (9) and the most intensive managerial networking (17) among the selected cases. However, its network members attend regional and national conferences, workshops and seminars rather sporadically.

Network B

Table 2 shows that Network B interacts with eight different types of actors and that its networking intensity was 13. Its networking strategy differs from that of Network A, as the network manager somewhat ignores internal networking and prioritises external networking, especially linkages with a similar network, national agencies and participation in different conferences. According to one interviewee, a network manager is "an important person in the field of

digitalisation throughout the country. He is very central. He is also good at connecting people with excellence." Moreover, compared to other network cases, Network B has privileged access to an innovation lab that provides its members with opportunities to develop relevant contacts with a wide range of specific regional actors. However, it has not developed a joint meeting agenda for its members (only individual meetings between the network manager and individual municipalities). Otherwise, municipalities arrange regular meetings among themselves in sub-regional groups or during large events in the region, such as conferences or seminars.

Network C

Table 2 shows that Network C interacts with six different types of actors and the sum of its networking intensity was 10. Managerial networking in Network C is not so intensive, and 67% of its interactions (four out of six contacts) are based on frequent networking mainly within sub-regional groups, similar networks and internal actors (except municipalities). On the whole, interviewees stressed that low networking activity is caused by a lack of managerial competency in the network. One interviewee said, "We need a person with managerial skills who can lead without formal managerial rights and can also be competent at communicating externally." Participants also mentioned the lack of a joint learning platform or forum on which members could meet regularly and exchange experiences and knowledge. Despite this, occasional networking has been practiced with external stakeholders, such as national agencies, smart-city networks and Innovation Norway (the Norwegian government's most important instrument for innovation and development of enterprises and industry).

Network D

Although Network D interacts with the same number of actors as Network C, the sum of its networking intensity (9) was the lowest among the network cases. Furthermore, Network D is embedded in comparatively intense sub-regional networking. This was the largest case network in this study (48 municipalities), and the geographical distances between member municipalities indicate the need for better coordination mechanisms to facilitate networking. Nonetheless, its large size is an advantage when it comes to the available resources and knowledge within the network domain. However, at the time of data collection, Network D has not been formally established among all the municipalities, and it lacked a leader who could bring all the formal and informal members together and create a relevant networking environment. One of the interviewees said, "We need to have someone who facilitates, enables, makes sure people talk well, makes sure you listen and get ideas and connect people (…) It is necessary to have people who make sure that things are done in the best possible way." Moreover, interviewees stressed the absence of a common learning platform and meeting agenda for all members.

The above case networks (A-D) demonstrate that networking specificity ranged from 6 to 9, whereas intensity ranged from 9 to 17 (Table 2).

Table 2. Governance networks across networking dimensions.

Case Specific actor	Network A	Network B	Network C	Network D
Municipalities (network formal members)	3	1	1	1
KS (network formal member)	2	1	2	2
County Governor (network formal member)	3	2	2	2
Academia	2			
Professional networks	2	1	2	2

Case Specific actor	Network A	Network B	Network C	Network D
Similar governance network(s)	1	2	2	1
Regional actors (EU office, smart city, NAV, hospital)	2		1	
National agency (KommIT, KommUT, Ministry, KS)	1	3		1
Similar actors in conferences, seminars, workshops	1	2		
Innovation Lab		1		
Total sum of contacts	**9**	**8**	**6**	**6**
***The sum of contacts' intensity**: Max = 3, Min = 1)*	**17**	**13**	**10**	**9**

Very Strong (**VS=3**): Very regular and often (at least once a month or often), Strong (**S=2**): Rather regular and often (3–6 times a year), Weak (**W=1**): Rather sporadic and weak (2 times a year or less)

Source: Author.

Figure 2 presents the results of the combinations of networking specificity and intensity for each of the four selected networks. The sum of each managerial networking dimension for low and high intensity and narrow and wide specificity was placed in Figure 2. The results of combinations between these two dimensions show that the networks fall into the following categories: modular innovation (Networks C and D), architectural innovation (Network A) and between architectural and radical innovation (Network B). Notably, all the networks are quite far from incremental innovation, and none of the networks are characterised by radical innovation.

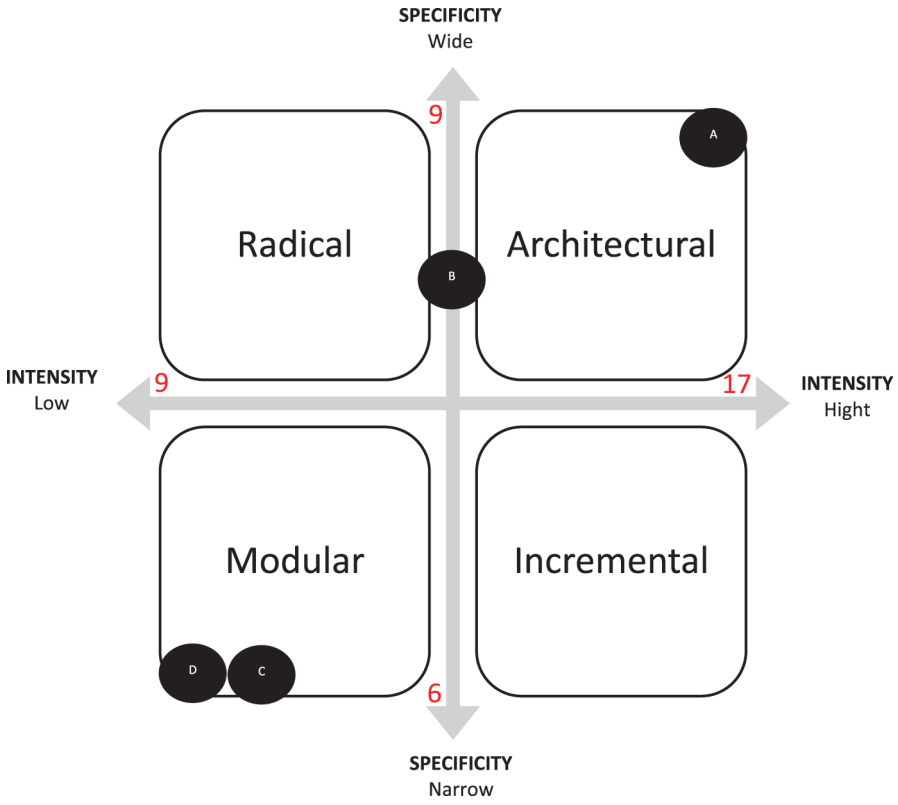

Figure 2. The interplay between the networking specificity and networking intensity in selected networks.

Source: Author.

Overall, the four governance networks varied in terms of managerial networking specificity and intensity. Compared to the other three case networks, Network A has developed the highest values of managerial networking intensity and specificity, while Network D holds

the lowest values. This finding aligns with these networks' levels of innovativeness, with Network A having the highest level and Network D the lowest. Moreover, network managers share networking with similar types of actors (internally with KS and the county governor and externally with similar governance networks). The findings regarding the two most advanced networks (A and B) strongly emphasise the significant role of network managers in practicing networking to reach the most advanced innovation types, namely radical and architectural innovation.

Discussion

Previous studies on managerial networking predominantly focused on one-dimensional networking in various public sector organisations rather than networks (Schönherr & Thaler 2022, Zyzak & Jacobsen 2019), including its effects for innovation in the public sector (Lewis et al. 2018). Instead, this article provides a novel two-dimensional managerial networking framework for analysing how and why various types of managerial networking may generate different types of innovation in governance networks. Specifically, this article has explored the role of public network managers in practicing their networking in order to facilitate various innovation results. Another strength of this study is that it used the Henderson–Clark model, which has not previously been used to study PSI. This model was enhanced with the concepts of exploration, exploitation and ambidexterity, to elucidate the interplay between managerial networking and innovation. This also helped unpack and order different available innovation approaches and their associated networking elements that might be used in the public sector to launch innovation services. Our study's contributions to public management and innovation literature are outlined below.

First, our findings show that innovation outputs in governance networks arise from different combinations of networking dimensions, so we cannot treat innovation as a whole (De Vries et al. 2016). Previous research has emphasised the influence of factors such as project characteristics, resources, and governance on innovation outcomes (Kelley & Lee 2010). This study lacks such a broad perspective, and concentrates on a concrete aspect, namely the influence of managerial networking on innovation results. However, despite this narrowed focus, we were able to obtain a deep understanding of the specificity (wide and narrow levels of interactions with various actors inside and outside the network) and intensity (high and low levels of ties inside and outside the network) of networking that enhances the four innovation types: incremental, modular, architectural and radical. Our findings show that radical innovation requires thinking outside the box by emphasising very advanced and broad external networking, which was still underdeveloped in all the selected cases. Other types of innovation could be achieved thanks to the managerial networking developed at that time. The selected networks were mainly situated between modular and architectural innovation, with one network approaching radical innovation (Network B). It appears that the strategy of young networks is to focus on maintaining contacts around existing projects rather than investing time in developing new connections. The findings also show that while networking boosts the likelihood that innovation will occur, the connections on their own are not productive and must be intentionally leveraged to create something new. Accordingly, managers, due to their brokerage positions in the network, are the key to creating new contacts or using existing relationships.

The findings especially demonstrate that managers are important in exploiting and exploring diverse interactions to facilitate the most advanced innovation results (architectural and radical), as they are perceived as an effective way of gaining valuable insight

and external knowledge to improve innovation (Gieske et al. 2016; Özman 2017). This was confirmed by the interviewees in Networks A and B. In addition, we found that not all innovation types require enhanced attention from managers. Networks C and D show that modular innovation, a combination of narrow specificity and low intensity networking, has the potential to be developed and implemented without strong managerial capacity in the networks. None of the case networks were characterised by a combination of high intensity and narrow specificity of networking (i.e. incremental innovation). Therefore, more research with larger data sets involving several case networks (also across sectors and levels) is needed to test the suggested managerial networking framework.

This study confirms that networking should not be treated as a one-dimensional phenomenon, as this narrows our understanding of its value in creating different types of innovation. The multidimensionality of networking (Hansen & Villadsen 2017; Torenvlied et al. 2013) has been discussed sporadically in public management literature, and scholars have often focused on concrete networking dimensions such as frequency (Lewis et al. 2018), density (Jansen et al. 2006) and diversity (e.g. Sørensen & Torfing 2010). Moreover, most of these studies have been quantitative, and do not have a deep understanding of the value of networking, which is why this article took a qualitative approach. Having both qualitative and quantitative approaches would improve the validity of the networking intensity dimension used in this study, as this dimension is often measured quantitatively. Thus, future research involving multidimensional networking should consider using a mixed methods approach.

Finally, this was only an exploratory study, and thus provides just a hint of the importance of managerial networking for innovation results in governance networks. Therefore, we recommend that future studies evaluate the proposed framework, especially beyond Norway and other developed countries. It would also be useful to conduct comparative research to explore the influence of managerial networking on innovation results in young versus well-established networks.

Conclusion

This study explored how and why public network managers should diversify and intensify their networking in order to achieve different innovation results. The combination of various degrees of exploration and exploitation in networking behaviour, and balance between both (ambidexterity) or the advantages of one activity over another, can result in network managers adopting four different types of innovation: incremental, modular, architectural and radical. We developed a framework that can be used to demonstrate a differentiated approach to measuring the combination of two dimensions of managerial networking – specificity and intensity – for these four types of innovation. This study found that public managers' activities are crucial for enhancing innovation results, especially in the context of the most advanced categories of innovation, such as radical and architectural innovation. The more managers use their positions as brokerage centres, the more diverse and regular the connections are, both within and outside the network. Thus, active managerial networking in governance networks is an essential contributor to PSI endeavours.

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