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User Involvement as a Catalyst for Collaborative Public Service Innovation

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Abstract

Innovation in public services is propelled by collaborations between public actors, private actors, and service users. A substantial literature has centered on the benefits of user involvement in public services, but how user involvement can stimulate collaborative innovation is still largely unknown. This article develops and tests a theoretical framework based on the combined effect of (1) the empowerment of users, (2) specialized knowledge of the users, and (3) the absence of hindering rules and procedures. Data from 19 public–private eHealth collaborations in five European countries, collected through 132 interviews and 124 surveys, are analyzed through fuzzy-set qualitative comparative analysis, and the results indicate that innovation in these partnerships is influenced by the combined effect of these conditions, but that this combined effect is also contingent on the roles the users adopt in the innovation process.

Introduction

Governments face new challenges regarding the organization of public services, which are caused by the growing aspirations of public managers in delivering services of high quality, the rise of complex problems that have no obvious solutions, the rising demands from citizens and firms, and governments' realization that their own knowledge and resources are limited, which drive them to create new, innovative services in collaboration with various actors (de Vries, Tummers, and Bekkers 2015; Sørensen and Torfing 2011). Service innovation refers to the development and implementation of new services that are qualitatively different from earlier services (Damanpour, Walker, and Avellaneda 2009; Sørensen and Torfing 2011). Collaboration with external stakeholders allows access to a large collection of skills, resources and knowledge, and facilitates synergies and learning, out of which innovation can emerge (Sørensen and Torfing 2018). Such "collaborative innovation" not only encompasses public actors, but also private actors such as firms and nonprofit organizations, and users and citizens.

Users and citizens play a crucial role in these collaborations as governments can increase their legitimacy when being responsive to the demands of citizens (Dahl 1988), and users possess key knowledge which is necessary to optimize and innovate products and services (Simmons and Brennan 2017). Although literature has focused extensively on how users can participate in policy and service creation (e.g., Brandsen and Honingh 2016; Nabatchi, Sancino, and Sicilia 2017; Pestoff 2014), and scholars suggest that user involvement in collaborative partnerships stimulates innovation processes (e.g., "coproduction for innovation", Nesti 2018; "quadruple helix" innovation, Carayannis and Campbell 2009), much is still unknown about the specific conditions under which user involvement leads to collaborative service innovation.

In such partnerships, complex innovation mechanisms arise, which are focused on the capabilities of the users, but also on the way in which the users are involved in the partnership. On the one hand, theories on user-driven innovation (Baldwin and von Hippel 2011; von Hippel 1986) show how users themselves can drive the innovation process because of their inherent capabilities (e.g., their knowledge of the user context). On the other hand, theories on collaborative innovation (Sørensen and Torfing 2011) and codesign (Osborne, Radnor, and Strokosch 2016; Trischler, Dietrich, and Rundle-Thiele 2019) show how involving particular stakeholders, such as users, in innovation processes increases the likelihood of achieving partnership synergies (Lasker, Weiss, and Millier 2001), which can propel the innovation process. The literature currently fails to show the effect of different conditions of user involvement on innovation in public–private collaborations.

This article focuses on three conditions: whether or not users (1) possess specialized knowledge of the services, (2) are empowered in the innovation process, and (3) are not restricted by rules and procedures of the partnership. First, high empowerment of users has been linked to an increased quality of services and the absence of empowered users in the innovation process is seen as a critical barrier for public service innovation (Cinar, Trott, and Simms 2019; Voorberg, Bekkers, and Tummers 2015). Second, the specialized service knowledge of users is related to the processes of learning and knowledge creation (Simmons and Brennan 2017), and to the innovativeness of created services (Greer and Lei 2012; Lettl, Herstatt, and Gemuenden 2006; Prahalad and Ramaswamy 2000). Third, reducing the rules and procedures that hinder

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the activities of involved users increases the ease of involvement and motivates the users to be extensively engaged in the process (Alford 2009; Ianniello et al. 2019). We contribute to the current literature by integrating these conditions and by showing how they combine with each other to affect the innovativeness of services created in public–private collaborations.

The theoretical model is tested on 19 eHealth partnerships in five European countries. The European Union prioritizes the search for innovative health solutions in digital technologies and data analytics (European Commission 2018). However, research has pointed to the lack of understanding regarding the mechanisms to achieve successful eHealth innovations (Andreassen, Kjekshus, and Tjora 2015). This article contributes to this by considering implemented eHealth innovations. Examples of such eHealth innovations are integrated data sharing platforms, central communication and monitoring systems, telehealth tools, mobile health tools, and smart devices (e.g., technologies based on motion sensors, mobile apps, smart cameras, and robotics). Data from 132 respondents, including project coordinators, public–sector actors, private–sector actors, and service users, were applied in this study. The data were collected through both semistructured interviews and surveys. Five European countries were involved in this study: Belgium, Denmark, Estonia, Spain, and the Netherlands. The article uses fuzzy-set qualitative comparative analysis (QCA) to exploit the rich empirical data.

This article argues that a specific combination of conditions related to user involvement explains why some public–private collaborations create more innovative eHealth services than others. More specifically, it argues that partnerships that involve users will only create innovative eHealth services when there is both a presence of appropriate user capabilities (related to user-driven innovation) and user involvement is properly organized (related to coproduction theories).

In the remainder of the article, we first present the theoretical framework, which combines aspects of user-driven innovation and coproduction, and introduce our three conditions of user involvement, with which we formulate our hypothesis. Next, we explain our used methodologies, with special attention to the QCA method. We subsequently present our results, both using QCA and qualitative interview information, and elaborate on these results in a discussion section. The conclusion summarizes the key insights of the article and provides implications for theory and practice.

Theoretical Framework

User-Driven Innovation

In his seminal work in the 1980s, Eric von Hippel noticed as one of the first scholars that innovations which were externally created by users, were often adopted and commercialized by firms (von Hippel 1986). Adopting innovations from users was counterintuitive at that time as the service provider was supposed to protect the service production, delivery, and renewal processes from external influences in order to safeguard its competitive advantage. However, von Hippel discovered that users can drive the innovation process with their knowledge about the quality of the services, their experience in using similar services, and their motivation to improve services they use (von Hippel 1986), and that they are often ideally positioned to sense new trends and introduce new ideas (Pongtanalert and Ogawa 2015; von Hippel 2005).

The basic argument of "user-driven innovation" is that service users have a good understanding of their own service needs, which implies that they are best placed to introduce service innovations (Oliveira and von Hippel 2011). They obtain crucial knowledge about how services perform and how they are supposed to perform in a given local context because of their user experiences, which gives them an advantage over other innovators, such as the government or the market (von Hippel 1994). Users exploit this knowledge by introducing new services for their own use (Lüthje, Herstatt, and von Hippel 2005) or by modifying innovations after they are launched (Sundbo 2008). Such user-driven innovation has been found in both the public and private sector (Jæger 2013). For instance, in the private sector, user-driven innovation has been identified in various sectors, including construction, ICT, and sport products (Ozer 2009). In the public sector, user-driven innovation has been used to explain service innovation in smart cities and living labs (Nesti 2018; Schaffers et al. 2011), in "quadruple helix" partnerships (Arnkil et al. 2010), and in the healthcare sector (Jenhaug 2020; Røtnes and Staalesen 2009).

Collaborative Innovation

The discoveries made by von Hippel were set at a time that management scholars were increasingly appreciating the influence of the constellation of actors that operate in the environment of organizations on the performance of these organizations. In public management particularly, the increased attention toward meta-governance and network theories of the public sector, and the rise of the New Public Governance (NPG) rationale (Osborne 2006), increasingly emphasized the importance of effective interorganizational collaboration, both between government agencies (e.g., "interagency collaboration," Bardach 2001) and between government agencies and private-sector organizations (e.g., "collaborative governance," Ansell and Gash 2007), for the effectiveness of public policy making and service delivery.

Driven by these collaboration-oriented theories on public management, researchers have started to uncover the significance of collaboration for public-sector *innovation*. Collaboration between different organizations, from both the public and private sector, allows innovators to explore and connect new ideas and knowledge bases, share resources and capabilities, and foster the capacity and commitment to implement novel and bold ideas (Sørensen and Torfing 2011). This "collaborative innovation" is founded on the principle of "partnership synergy," which argues that the combination of different perspectives, resources and skills can create something more than the mere sum of what the individual organizations can achieve (Lasker, Weiss, and Millier 2001). The collaboration itself is a stimulating condition for innovation, as new resource and knowledge pools are accessed and synergistic processes can emerge from the collaboration.

However, as users can also drive the innovation process, involving users in innovation partnerships between public- and private-sector organizations might increase the likelihood of achieving innovation even further. Collaborating with users is highly beneficial for the public and private service providers in the partnership, as the latter can acquire knowledge and experiences of the users, and information about the users'

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needs, preferences, and demands, which would otherwise be very difficult and costly to obtain (von Hippel 1994). On the other hand, users also benefit from engaging with public and private service providers, as introducing innovations on their own is a difficult and costly endeavor, especially in complex service systems. As a result, both service providers and users dependent on each other to realize the desired innovations.

This combination of user-driven innovation and collaborative innovation is particularly prominent in public–private innovation (PPI) partnerships. PPIs are partnerships in which public actors and private actors collaborate with each other to create innovative solutions, often through user-driven innovation (Brogaard 2021). Such PPIs are often established around complex services, such as healthcare services, which are difficult to procure, and are highly dependent on user experiences (Brogaard 2021; Di Meglio 2013). For instance, research shows that medical innovations often occur through collaboration between hospitals, tech firms, experts, research institutions, governments, and so on, as these services are not yet available in the market (Mina and Ramlogan 2008). Moreover, such innovations are highly dependent on user experiences of specialized users (e.g., physicians, specialists, patients), who have the capabilities to determine the required components of the innovation, but are also best suited to assess the performance and usability of these innovations.

Codesign of Service Innovation

Because of the interdependency of the users and the service providers, a natural "partnership synergy" can emerge between the users and the service providers, which might result into the codesign of services. Codesign refers to coproduction practices in which users are intentionally involved as part of the design process to create services (Trischler, Dietrich, and Rundle-Thiele 2019). Codesign can be particularly prominent in public–private collaborations because the public–private user interactions shorten feedback loops between designers and users, and increases the innovators' grasp on the problem, as all relevant stakeholders are part of the same innovation system (Sørensen and Torfing 2018). Such multidisciplinary collaborations of coproducing users and service providers enhance creative ideation (Trischler, Dietrich, and Rundle-Thiele 2019), unite relevant problem-solving capabilities (Skålén et al. 2018), introduce advanced testing opportunities (Criado et al. 2021), and propel instances of mutual learning (Voorberg et al. 2017).

However, proper involvement of users to codesign services is not a straightforward endeavor. Two hindering factors are important to consider. First, users might receive insufficient support or power to genuinely engage in the service design process (Osborne 2016). "Tokenism" in coproduction has been found in several studies in the health sector (e.g., Daya, Hamilton, and Roper, 2019; Gremyr et al. 2018; Sangill et al. 2019), which is the main empirical focus of this article. On the one hand, increasing the empowerment of users in the design of health services is a viable strategy to counter this tokenism (Ocloo and Matthews 2016). Empowering users opens bilateral communication channels between the users and the service providers through which they can better negotiate and engage with each other (Farr 2016). Empowering users in service design processes also improve the quality of the user interfaces in ICT-enabled services (Smith and Dunckley 2002), and enhance prototyping, usability evaluation, and the accuracy of user requirements (Kujala 2003). On the other hand, tokenism may also be provoked by regulatory and procedural rigidness. Formal rules and procedures might increase the rigidity and risk aversion of the service providers, which raises barriers for user engagement and might stifle creative experimentation (Sønderskov et al. 2021). Bold and creative ideas from the users might for this reason be deemed unacceptable for the service providers. The absence of such hindering rules and procedures might give the users more opportunities to freely engage in the innovation process.

Second, in complex and technologically rich service systems such as the healthcare sector, innovations are often inhibited by the limited availability of specialized knowledge (Tien and Goldschmidt-Clermont 2009). Innovating complex health services requires a profound knowledge of the intricacies of the services and the broader service system, which not all users possess. Knowledge synergies between the service providers and the users that lead to innovations might therefore only emerge when the involved users have a thorough understanding of the services (Greer and Lei 2012). Hence, from a user-driven perspective on innovation, users who possess a high level of specialized knowledge about the services are more valuable for codesign processes, as they can better respond to the knowledge demands associated with these service innovation activities, compared to users that have less of this specialized knowledge.

This article studies the conditions related to these hindering factors, i.e., whether or not users are (1) sufficiently empowered, (2) not restricted by rules and procedures, and (3) possess specialized knowledge about the services. In the following, we elaborate on these three conditions, and propose our hypothesis.

Empowerment of Users

As we mentioned before, empowering users counteracts tokenism and enhances both the process of codesign and the outcome of this process. In order to study its impact on collaborative innovation, we consider two general "levels" of empowerment (based on Karlsson et al. 2013). On the one hand, users can be involved as advisors in the process of service design, which means that they share information and knowledge with the individuals involved in the design process, but are not actively participating in the process themselves. This user involvement can be purely informative (Damodaran 1996), which means that the service provider informs the users about the service process, and the users can react to this information by providing advise. However, this type of user involvement can also be more consultative (Damodaran 1996), by involving the users more proactively through interviews or focus groups, and obtaining the necessary information from the users (Arnkil et al. 2010). On the other hand, users can also participate as "active agents" in the process of service design (Marti and Bannon 2009). Users can actively participate in the service process on equal footing with the service provider, by providing information regarding the local user context and by being involved in decision making (Arnkil et al. 2010; Holgerssona and Karlsson 2014). However, they can also be involved as "user-innovators" (Baldwin and von Hippel 2011), which means that they have extensive responsibilities and power to lead the service process and are extensively involved in the development of the services (Arnkil et al. 2010; Holgerssona and Karlsson 2014).

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Restricting Rules and Procedures

Research suggests that flexible, decentralized structures and clear organizational rules and procedures for collaboration are beneficial for collaboration and coproduction (Alford 2009; Klijn, Steijn, and Edelenbos 2010). However, a large emphasis on predetermined rules and procedures may also inhibit the freedom of the user in the innovation process, thus limiting the learning potential for the service organization and demotivating the involved users to actively engage in the innovation process (Moon and Bretschneider 2002). Coproduction research also indicates that the "ease" of involvement, and, hence, how much hindrances users experience during their involvement, is an important motive for users to participate in coproduction activities (Alford 2009; Bovaird and Loeffler 2012; Ianniello et al. 2019). High levels of restrictions of users activities due to rules and procedures may therefore limit the capacity of users to propose new and bold ideas, engage in experimentation, and add value to the innovation process (Sønderskov et al. 2021).

Specialized Knowledge

In collaborative settings, knowledge of diverse actors is combined through the interaction between these actors, which creates knowledge synergies (Torfing 2019). Close interaction between actors allows the emergence of new perspectives and knowledge as existing believes are challenged and new ideas are proposed (Crosby, Hart, and Torfing 2017; Sørensen and Torfing 2011). Users have a central position in these dynamics as they are assumed to have experiences and knowledge that are relevant for the innovation process (Oliveira and von Hippel 2011; Simmons and Brennan 2017). However, the depth of knowledge regarding the particular issues and complexities surrounding a service might vary amongst different users. For instance, research has connected the presence of specialized knowledge of users to the creation of radical innovations in health care technologies (Lettl, Herstatt, and Gemuenden 2006) and concludes that the variety of the extent of innovation with users across industries is connected to the depth of knowledge of these users (Greer and Lei 2012; Prahalad and Ramaswamy 2000). Users that lack specialized knowledge about the service might have perceptions that are limited to their individual use, might have difficulties evaluating broader concepts and prototypes, and might have problems understanding the inherent complexities of the service process or technologies, all of which restrict users to formulate radically new and feasible ideas (Lettl 2007). The level to which users introduce specialized knowledge into the collaborative innovation process should therefore be crucial for the creation of service innovations.

Hypothesis

Public–private collaborations that involve users to codesign services pursue partnership synergies, which create value for both the users and public/private service providers that cannot be achieved outside of this collaboration (Lasker, Weiss, and Millier 2001; Sørensen and Torfing 2011). However, the interdependency of the users and service providers in the collaboration requires a combination of these conditions in order to create sufficient value. Users might benefit from being empowered without being restricted by rules and procedures, as they gain power and influence in the innovation process. In parallel, service providers may benefit from the users' knowledge that is introduced in the innovation process. The more specialized this knowledge, the more valuable the users become for the service providers. In order to be successful in innovating services, this combination of conditions should therefore be present. Hence, we propose the following hypothesis:

Hypothesis 1: Collaborative partnerships that involve users who are highly empowered, have specialized knowledge about the services, and are not hindered by rules and procedures in the innovation process create highly innovative services.

Cases and Methodologies

Case Selection

The European Union not only prioritizes innovation in health-related digital solutions, but also recognizes the slow progress that is being made in developing eHealth innovations (European Commission 2018). This can be partially traced back to the lack of knowledge regarding the conditions under which these eHealth innovations are created (Andreassen, Kjekshus, and Tjora 2015). This article aims to contribute to this question by conducting empirical research regarding user involvement in public–private eHealth collaborations in Europe. A total of 19 eHealth collaborations were selected, using criteria that both ensured the comparability between the cases and the representativeness of the sample of cases. The features of these cases are detailed in supplementary table A1.

In order to ensure that the selected cases properly represented the variety of eHealth collaborations in Europe, cases from the two dominant European health care systems were selected, that is, government controlled healthcare systems (i.e., National Health Services), and "mixed" health care systems (i.e., "Etatist Social Health Insurance System") (Böhm et al. 2013). In the former systems, regulation, finance, and provisioning of health care is conducted by the government, while in the latter systems, the regulation of health care is conducted by government, the finance is societally controlled (e.g., societal, para-fiscal funds), and the provisioning is conducted by private actors (i.e., for-profit/nonprofit actors).

Because of the central role of the government in each of these healthcare systems, we also considered the politico-administrative regimes of continental Europe, which makes a distinction between Nordic, Central and Eastern European, Continental, and Napoleonic administrative regimes (Pollitt and Bouckaert 2017). The typology makes a distinction between different administrative traditions along five criteria: (1) state structure, (2) executive government, (3) minister/mandarin relations, (4) administrative culture, and (5) diversity of policy advice. Further argumentation regarding the relationship between these administrative regimes and the involvement of users/citizens in the selected countries is provided in the annex (supplementary table A2).

These considerations led us to the selection of five European countries: Belgium (Etatist Social Health Insurance System, mixed Napoleonic tradition), the Netherlands (Etatist Social Health Insurance System, Continental tradition), Denmark (National Health Services, Nordic tradition), Estonia (Etatist Social Health Insurance System, Eastern European tradition), and Spain (National Health Services, Napoleonic tradition). By including these five European countries, we believe that

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we have incorporated the proper variance to infer insights on European eHealth partnerships.

Furthermore, we included eHealth technologies that were aimed at innovating the information flows between patients, professionals and government, and technologies that were aimed at innovating the end product/service itself. The former included eHealth technologies such as integrated data sharing platforms, central communication and monitoring systems, while the latter included eHealth technologies related to telehealth and mobile health tools, and smart devices (e.g., technologies based on motion sensors, mobile apps, smart cameras, and robotics) (Scholz 2015; Van Waes 2017; Wouters et al. 2018). We also ensured that both larger collaborations (i.e., more than 10 partners) and smaller collaborations (i.e., less than 10 partners) were included in our case selection. It is important to note that all these differences were equally distributed over the cases, and, for instance, an Estonian case was not more likely to have a specific type of eHealth innovation than any of the other cases.

In order to ensure the comparability between the cases, three case selection criteria were used. First, all cases were public–private collaborations between public actors (e.g., governments, public hospitals, etc.) and private actors (e.g., nonprofits, firms etc.), which all had a formal structure and management (i.e., no informal collaborations). Second, all collaborations involved service users to some extent. In most cases (16 of 19), users were involved throughout the whole innovation process (i.e., conceptual phases and implementation/testing phases), but some projects involved users in only one of these phases, or involved different users in different phases (e.g., specialists in conceptual phases, nurses, or patients in testing phases). How users were exactly involved in the different cases is detailed in the annex (supplementary table A1). Third, all of the innovations related to eHealth *services* (and not to eHealth policy), which were all recently implemented or at least tested (within the last 5 years).

Government-Coordinated Partnerships versus Societally Coordinated Partnerships

Hybrid, public–private collaborations are established because neither the government nor the market is able to solve cross-sectoral issues in complex service environments such as the health care sector (Quelin, Kivleniece, and Lazzarini 2017). As such, a strong government alone is not sufficient to create complex public services, and a strong society, with an involvement of the market and the civil society, is needed (Baker, Ayala-Orozco, and García-Frapolli 2020). In other words, governments might take on the responsibility to create public services by establishing and coordinating hybrid arrangements, but so might societal actors through the market mechanism or through self-organization (Nederhand, Bekkers, and Voorberg 2016). For this reason, we distinguish between government-coordinated partnerships and societally coordinated partnerships, in which resp. government actors and societal actors have a central position in the partnership and are primarily responsible for creating new public services. For instance, case D1 was coordinated by a regional government, while case B2 was coordinated by a private nonprofit home nursing organization (see supplementary table A1).

These "types" of partnerships are important in this article, as different types of actors (i.e., the coordinating actors, which can be public or private) will potentially engage more frequently with the users, since the coordinators are responsible for managing the collaboration process (Klijn, Steijn, and Edelenbos 2010; Macciò and Cristofoli 2017). Because of their central position as network managers in the partnership, these coordinators may also have more power over the process of user involvement and might have more resources to engage users in the innovation process (Heidenreich, Landsperger, and Spieth 2016). Different types of coordinators (i.e., public or private coordinators) might also have different motives to involve users. For instance, a public coordinator might be motivated to involve users because of the democratic values connected to such an endeavor (Torfing, Sørensen, and Røiseland 2019), while a private coordinator might involve users because the created services might then be more client-centered (Greer and Lei 2012). These differences between types of coordinators are important to include in the analysis, but there is no obvious direction in which this condition would influence the configuration of conditions of user involvement in creating highly innovative services, as research indicates that principles of user-driven innovation and codesign are found in both the public and private sector (e.g., Jæger 2013). For this reason, the type of coordinator is not part of Hypothesis 1, but we still control for it in our QCA.

Fuzzy-Set QCA

This article uses fuzzy-set QCA. We refer to Schneider and Wagemann (2012) for a thorough introduction of the methodology. In essence, QCA is a set-theoretic and case-sensitive methodology that uses Boolean logic to examine whether or not a (combination of) condition(s) corresponds to a certain outcome (Ragin 2008). Each condition and outcome is represented by a set, in which a case can be present or absent. The calibration procedure assigns set-membership values to each of the cases (e.g., presence of user empowerment for Case A, absence of highly innovative services for Case B). As we use *fuzzy-set* QCA, these sets can have fuzzy boundaries, which means that some cases might be in or out of a set (indicated respectively as 1 or 0), but might also be *partially* in or out of a set (respectively 0.67 or 0.33). The cross-over point of 0.50 is crucial as it presents a point of maximal indifference toward membership or non-membership of a case in a set (Schneider and Wagemann 2012).

Patterns between (combinations of) conditions and the outcome are determined by the consistency of case memberships. A high consistency means that cases share the same membership in these sets. A very high consistency between a single condition and the outcome reflects that every time this condition is present, the outcome will be present too. This condition is called a *necessary condition*. When multiple combined conditions consistently lead to an outcome, these conditions are called *sufficient conditions*. A second measure of QCA corresponds to the number of cases that are covered by these relationships, which indicates how prevalent the relationship between the condition(s) and the outcome is. This measure is called *coverage*.

There is a particular importance to apply QCA in this study, both theoretically and methodologically. Theoretically, the analysis of sufficient conditions holds promise as our hypothesis predicts that the combination of our three conditions should lead to innovation, which

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is in line with the logic of configurational causation that is inherent to QCA (Ragin 2008). An assessment of the combined effect of the mentioned conditions on the created innovations is therefore needed to confirm or reject our hypotheses. Methodologically, an in-depth comparative analysis of European eHealth partnerships requires us to study more cases than is convenient using qualitative case-study research, but also less than is needed for regression analyses. QCA allows us to translate our findings to similar partnerships in Europe, but also retains the in-depth nature of qualitative case studies.

Data Collection

The results presented in this article were yielded from the combination of interview data and survey data, which were conducted in the period between September 2019 and February 2020. A full account of the data collection instruments can be found in the annex (supplementary table A3). Case data were collected through semistructured interviews of 132 respondents, including project coordinators, public-sector actors (representatives of, e.g., government agencies, local governments, public hospitals, etc.), private-sector actors (representatives of, e.g., private home care organizations, consultants, ICT companies, etc.), and service users (e.g., physicians, patients, medical professionals, citizens, etc.). Prior to these interviews, survey data were collected from 124 of these respondents. Different research teams for each of the five countries conducted these interviews.

In order to prevent common method bias, the surveys and interviews each posed questions regarding the conditions and outcome to the respondents. Furthermore, answers from multiple respondents were used to calibrate the case scores, and the surveys were used to ask standardized questions regarding the conditions of user involvement and innovation, which allowed a more consistent calibration. However, as QCA results are often quite abstract, researchers are encouraged to collect in-depth, qualitative data in order to correctly interpret particular QCA patterns in the data (Schneider and Wagemann 2012).

Hence, the interview data was used in two ways. First, the interviews provided in-depth information about the conditions and outcome, which was impossible to extract from survey answers. This allowed an advanced calibration of the conditions and outcome, as using both survey and interview data prevented potential biases in our calibration. Second, the interviews also provided contextual information and in-depth information regarding the dynamics of user involvement in the projects. This allowed the researchers to better explain patterns that resulted from the QCAs. In order to use the interview data accordingly, a highly standardized processing of the interviews was required. The interviews were recorded and processed by the individual research teams (one research team per country), which used a standardized questionnaire to provide all the relevant details obtained in the interviews. The research teams also wrote a concise summary of each case, in order to provide more general case information related to the studied conditions. To ensure proper consistency in the calibration of the conditions and outcome, one research team performed the calibration, by interacting with the other research teams to come to a shared understanding regarding the calibration value of each case. In the next section, we provide more detailed information regarding the calibration procedure.

Operationalization and Calibration

Operationalization and Calibration of the Outcome

This article defines innovation as "an idea, practice or object that is perceived as new by an individual or other unit of adoption" (Rogers 2003, 12). This definition recognizes two important characteristics of innovation, i.e., its perceived newness and the fact that it has to be adopted in a certain context, which distinguishes innovation from related concepts such as creativity or invention (Anderson, Potočnik, and Zhou 2014). Therefore, two criteria were used to measure innovation, namely the degree of novelty and the level of adoption. Seven-point bipolar scales were employed in the surveys and interviews to measure the innovativeness of the created services. Supplementary table A4 visualizes the used items. As each of the items represented the same concept (i.e., innovativeness),[1] the mean of the answers of the same respondent was calculated. Further details concerning the calibration can be found in supplementary table A9.

Operationalization and Calibration of the Conditions

The operationalization of *empowerment of users* was based on the framework introduced in the theoretical section, out of which six levels of user involvement from the perspective of the involved users were developed: (1) being informed by the partnership; (2) being consulted by the partnership; (3) advising the partnership; (4) collaborate and coproduce with the partnership; (5) making decisions; and (6) leading the process. These levels of empowerment were also inspired by the ladder of participation of Arnstein (1969). The questions were asked to the coordinators, public/private partners and involved users during the interviews, which allowed us to collect examples of these activities. Additionally, respondents were asked in the surveys to reflect on the level of freedom the users had to act in the project. This question allowed the respondents to give their own evaluation on how much the users could do in the collaboration. We also performed a qualitative analysis of the interview and case material to avoid oversimplification of the data, as respondents might interpret the levels of user involvement differently.

For the other conditions, bipolar seven-point scales were used to measure the concepts. To measure the level of *specialized knowledge* of the involved users, the respondents were asked in the surveys if the involved users brought no relevant knowledge in the project or if they brought crucial knowledge in the project. Additionally, because "knowledge" might be anything from experiences and perspectives to detailed knowledge about services and processes, a subsequent question was asked in the interviews about the kind of knowledge that was provided. Detailed knowledge about the services received higher scores than experiences and perspectives about the services. Additional interview and case data were used to check whether the provided answers matched the overall case information. The respondents were also asked in the surveys

[1]This was also checked by conducting a factor analysis for these items.

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whether or not they experienced that *user's activities were hindered by the rules and procedures* of the actors in the partnership.

As we mentioned before, two different *types of partnerships* are present in our cases. To control for this variance, we defined a fourth condition, which indicates if a partnership is "government coordinated" or "societally coordinated." The government-coordinated partnerships are partnerships that are coordinated by a public-sector actor, while the societally coordinated partnerships are coordinated by a private sector/societal actor. The types were calibrated using a continuum from the presence of a public coordinator to the presence of a private coordinator. For instance, governments (ministries, municipalities, agencies, etc.), were considered to be public, whereas firms, private health care providers and other nonprofit organizations were considered to be private.

Details regarding the calibration of the conditions are illustrated in the annex (supplementary table A9). Marx and Dusa (2011) indicate that the probability of generating solution paths on random data in QCA cannot increase 10%. The probability of generating results on random data is, with four conditions and 19 cases, 7%, which is well below the suggested threshold of the authors.

Results

QCA Results

The analyses were conducted using the fsQCA software version 3.1b[2] (Ragin 2017). The calibrated data set is illustrated in the annex (supplementary table A5). To report the results, we follow standards of practice (Schneider and Wagemann 2010). We first discuss the analysis of necessary conditions and next the analysis of sufficient conditions. Because the combination of the conditions is of particular importance for this article, we will only shortly discuss the analysis of necessary conditions, and we will elaborate in more detail on the analysis of sufficiency. Table 1 illustrates the number of cases above and below the cross-over point for "high innovativeness." We observe a relatively even distribution of high innovativeness and low innovativeness between countries from different health care systems and administrative regimes and between partnerships that created different types of eHealth innovations or involved users in different stages of the innovation process. For instance, seven of the "highly innovative" eHealth services were focused at innovating the information flows between patients, professionals, and governments, while five "highly innovative" eHealth services were aimed at innovating the end product/service itself (e.g., smart devices, telehealth, etc.).

Table 1. Set Membership of the Cases for the Outcome

Innovativeness of Created Services in the Projects		Cases
High innovativeness	Above 0.5	B1, B2, B3, B4, N2, S1, S2, S3, S4, E2, D1, D3
Low innovativeness	Below 0.5	B5, N1, N3, N4, E1, E3, D2

[2]See http://www.socsci.uci.edu/~cragin/fsQCA/software.shtml.

We first examine the analysis of necessary conditions. A condition is necessary when the outcome is always present when the condition is present. A consistency threshold of 0.90 is advised to infer the necessity of a condition (Schneider and Wagemann 2012). Table 2 illustrates the results for the presence of highly innovative services. None of the conditions have a consistency value of 0.90 or higher, which means that none of the conditions is necessary to create highly innovative services. We see a similar result for the absence of highly innovative services (see supplementary table A6).

Second, the analysis of sufficient conditions is conducted. A truth table lists all the possible combinations of the different conditions (Ragin 2008). We only report the truth table rows with at least one case covered, as empirical evidence is rarely found for all possible logical combinations in small- to medium-sized studies (Ragin 2008). The truth table is illustrated in table 3. Following best practices, we only select truth table rows with a raw consistency of 0.80 to explain the presence of highly innovative services (Ragin 2009). The threshold of 0.80 was also selected because of the relatively large number of contradictory cases (i.e., cases that are present in the solution path but do not exhibit the outcome) in the rows below the 0.80 threshold, which indicates that the threshold is reached (Schneider and Wagemann 2012). The rows are logically minimized during the minimization procedure, after which the intermediate solution is generated.

Table 4 shows the intermediate solution, which takes theoretical assumptions into account. The theoretical assumptions are summarized in Hypothesis 1. As the type of partnership was not part of our hypothesis, no theoretical assumptions were applied for this condition. Three distinct solution paths are identified by the analysis, which each lead to highly innovative services. A total of 12 cases are covered by the three solution paths, which translates into a solution coverage of 0.87. With a solution consistency of 0.84, the three solution paths show clear evidence in favor of the relationship between the specific combination of conditions and the presence of highly innovative services. One contradictory

Table 2. Analysis of Necessary Conditions

Presence of Highly Innovative Services		
Conditions	**Consistency**	**Coverage**
Government-coordinated partnership	0.734	0.668
Societally coordinated partnership	0.431	0.541
High empowerment of users	0.732	0.733
Low empowerment of users	0.631	0.702
Presence of rules and procedures that restrict users' activities	0.732	0.758
Absence of rules and procedures that restrict users' activities	0.664	0.713
Presence of specialized knowledge from the user in the project	0.833	0.781
Absence of specialized knowledge from the user in the project	0.562	0.677

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Table 3. Truth Table

	Government-Coordinated Partnership	High Empowerment of Users	Presence of Rules and Procedures That Restrict Users' Activities	Presence of Specialized Knowledge From Users	Innovation[1]	Number of Cases	Raw Consist.[2]	PRI Consist.
1	1	0	1	1	**1**	3	**0.883**	0.753
2	1	1	1	1	**1**	3	**0.883**	0.753
3	1	1	1	0	**1**	1	**0.867**	0.668
4	0	1	0	1	**1**	2	**0.858**	0.670
5	1	0	0	1	**1**	3	**0.823**	0.625
6	1	0	1	0	0	1	0.798	0.497
7	1	1	0	1	0	1	0.798	0.497
8	0	1	0	0	0	2	0.784	0.500
9	0	1	1	1	0	1	0.767	0.398
10	0	0	0	0	0	1	0.748	0.398
11	0	0	1	0	0	1	0.748	0.398

[1]The bold "1" in the column indicates that the truth table row consistently leads to the outcome.
[2]The bold values indicate consistency values of the selected truth table rows above the threshold of 0.80

Table 4. Intermediate Solution for the Presence of Highly Innovative Services

	Consistency	Raw Coverage	Unique Coverage	Cases in Path
Government-coordinated partnership * high empowerment of users * absence of rules and procedures that restrict users' activities	0.890	0.531	0.136	D1, S3, D3, B4
Societally coordinated partnership * high empowerment of user involvement * presence of rules and procedures that restrict users' activities * presence of specialized knowledge from the user	0.858	0.397	0.167	B2, B3
Government-coordinated partnership * low empowerment of users * presence of specialized knowledge from the user	0.850	0.565	0.170	N2, B1, E2, S1, S4, E1~
Solution consistency	0.840			
Solution coverage	0.867			

case (i.e., a case that is part of the solution path but does not exhibit the outcome) emerged in the third solution path (indicated with ~). As there were no tied prime implicants, there was no model ambiguity.

To summarize, our analysis identified the following solution paths:

1. Government-coordinated partnerships with a high empowerment of users and without rules and procedures that hinder the activities of the involved users, create highly innovative services;
2. Societally coordinated partnerships with a high empowerment of users with specialized knowledge about the services, but which use rules and procedures that hinder the activities of the involved users, create highly innovative services;
3. Government-coordinated partnerships with low empowerment of users with specialized knowledge about the services, create highly innovative services.

QCA solution paths should always be evaluated through the intermediate, parsimonious, and complex solutions (Maggetti and Levi-Faur 2014). The complex solution is identical to the intermediate solution (see supplementary table A8). However, the parsimonious solution (see supplementary table A7) is slightly different, as the condition "high user empowerment" is removed from path 2, and path 3 does not include government coordinated partnerships (nor societally coordinated partnerships). Because of logical minimization, the parsimonious solution might reduce the number of conditions compared to the intermediate solution, which might explain why "high user empowerment" and "government coordinated partnership" are removed respectively in paths 2 and 3. However, it might also suggest that the solution is not very stable.

To be certain of this stability, we applied a robustness check. As we mentioned before, the threshold for the raw consistency in the truth table was 0.80, partially because we noticed a lot of contradictory cases in the truth table rows below this threshold. However, even in the last truth table row that we selected (i.e., row 5, see table 3), we observed one contradictory case. Although still above the threshold, we might test whether the removal of this truth table row affects the solution paths as a robustness check (Schneider and Wagemann 2012). The more stable the paths, the less alternations we would expect from these paths. When we select a raw consistency threshold of 0.85 (which removes truth table row 5), we observe that solution paths 1 and 2 remain

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identical, but that the configuration of conditions changes in path 3 of our original solution. The absence of high user empowerment, which we observed in solution path 3, is not part of this solution path and is instead replaced by the absence of hindering rules and procedures. This indicates that we should be careful when interpreting solution path 3. Furthermore, the only contradictory case we have in our solution is present in solution path 3, which, again, urges a cautious interpretation of this solution path. Additionally, as is visible from table 3, solution path 3 has also the lowest consistency value of the three solution paths.

Qualitative Expansion of the Results

Because of the sometimes abstract nature of QCA results, solution paths are best interpreted together with qualitative case information (Schneider and Wagemann 2010). We will primarily focus on the qualitative information of the cases covered by solution paths 1 and 2, as these paths are the most stable. With regard to solution path 1, we see that all the government coordinated partnerships covered by this path indeed show high empowerment of users, often exhibited in coproduction activities throughout the whole innovation process. Users were involved in workshops, project meetings, testing environments, and coproduction sessions through which they had a real impact on the created services. In all the cases, the input from the users changed, sometimes profound, aspects of the innovation, such as the types of technologies used, the focus of the innovation and the breadth of use of the innovation. For instance, in case D1, which implemented a e-learning tool, the user representatives decided together with the other partners which criteria and parameters should be included in the e-learning tool, how it should work in practice, and which features should be part of it.

The qualitative information also reflects a complicated relationship between the degree of specialized knowledge of the users and innovation, as not all users possessed specialized knowledge useful for the innovation process. In many cases, the fact that the involved user was indeed a user, was sufficient for their impact on the innovation process. This was especially pronounced when users were involved in testing phases of the innovation process. For instance, in a project that developed assisting technologies for elderly people (case B4), individuals with severe Alzheimer's disease were involved in the testing of the innovation, as they would enable an unbiased and realistic assessment of the functionalities of the innovation. These users did not possess specialized knowledge that was useful for the innovation process, but they did provide the collaboration partners with learning opportunities about how the innovation works in reality. The following quote of the project coordinator of case B4 illustrates this:

> Some of the wearables [e.g. bracelets] that were used in the POC [proof of concept] with the residents caused irritation on the skin of the residents, which we took into account when choosing the right materials.

The qualitative case data also give an explanation for why the respondents in the government coordinated partnerships experienced no hindering rules and procedures (solution path 1), while the respondents in the societally coordinated partnerships (solution path 2) did experience such hindering rules and procedures. Both of the cases covered by solution path 2 were Belgian projects which were initiated by *user groups*. These user groups consisted of general practitioners who had specialized knowledge about the new services they wanted to create. They had already experimented with new solutions and had sometimes even implemented some of these solutions on a small scale. For instance, in case B2, the GPs (users) had already conducted a pilot study on a small scale on how information of patients from nursing organizations could be made available to them, and they remained important during the conceptual stages of the project, as the following quote of one of the users shows:

> We [the GPs] suggested to connect to the Belgian eHealth platform. By connecting to the eHealth platform—which was originally not included by [the core partners]—we were able to acquire a single sign-on in our EMD [i.e. electronic medical dossiers], which would provide us with a direct link to the patient information in [the centralized health records of the home nursing organization].

However, the users did not have the capacity to deploy these new solutions on the desired scale. As a result, the users initiated collaborative partnerships with service providers (governments and private health care providers) to implement their solutions on a large scale. At that moment, these users were confronted with the rules and procedures of the service providers that were now in charge of the innovation process. This is most visible in case B3, where a large governance structure was introduced in the partnership, which limited the possibilities of users to bilaterally communicate with public-sector stakeholders:

> We [i.e. users] are losing control over our own initiatives, because the steering committee [i.e. governance structure] now decides for us what our focus should be, while the opposite was true before the introduction of the [steering committee].

This was very different in the government-coordinated partnerships. The government or public actor initiated these projects, and involved users in the innovation process to improve the quality of the services that were being created. The users did not participate in the innovation process to realize their own ideas on a large scale, but to contribute to the creation of the solution. The consequence of this was that the users were more likely to stay within the service design framework of the service provider and, therefore, experienced little hindrance from rules and procedures that were part of this framework. For instance, in case S3, a project framework was established in which a subgroup of the healthcare staff was involved from the beginning of the project to help design the contents of the eHealth tool. Another group of health care staff was involved from the pilot testing onward. Each of these groups of users had their own tasks and responsibilities, and they all coproduced with the other partners in the collaboration within the project framework that the public actor developed.

Discussion

Collaborative innovation literature points to the advantages of user involvement in creating innovative services (Baldwin and von Hippel 2011; Cinar et al. 2019; Simmons and Brennan 2017; Voorberg, Bekkers, and Tummers 2015).

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However, which combinations of conditions of user involvement exactly influence the creation of innovation in collaborative partnerships, remained to a large extent unknown. The combined effect of three conditions of user involvement was linked to innovation: (1) the empowerment of users, (2) the specialized knowledge of the involved users, and (3) the rules and procedures that hinder users' activities. By using theories on user-driven innovation and codesign for innovation, we hypothesized that through the combination of these three conditions, a synergy between the involved users and the service providers was possible. Indeed, the users obtain the freedom and capacity to translate their ideas into real services (by being empowered and not being limited by restricting rules and procedures), and the service providers received valuable knowledge and information from the users because of the specialized service knowledge of the involved users.

Our hypothesis was only partially confirmed, however. The QCA results demonstrate a complex relationship between the combination of the three user involvement conditions and innovation. Multiple observations can be made. A first observation concerns the differences between user-oriented innovation processes in these cases. Solution path 1 covered innovation processes in which users participated to jointly *codesign* services (Nesti 2018; Torfing, Sørensen, and Røiseland 2019), while solution path 2 covered innovation processes which were initiated by user groups, who acted as "*user-innovators*." The users in the latter path were involved in the innovation process to introduce innovations for their own use (Bogers, Afuah, and Bastian 2010; Baldwin and von Hippel 2011), which had consequences for the way in which their activities were hindered by the partnership. These users have a lot of knowledge about the services and participate in the innovation process to translate their own ideas, which might cause tensions with the service provider. The resistance of service providers to new ideas from user-innovators might also be a factor, as was recently shown by Jenhaug (2020) in Norwegian public care services. In the partnerships covered by solution path 1, the involved users were less occupied with convincing the service provider to translate their own ideas into implemented services, as the joint participation in the codesign of services was their primary driver. This suggests that different user-oriented innovation processes can occur in similar partnerships (i.e., user-driven innovation vs. codesigned innovation), and that this might affect the role, behavior and expectations of the involved users, and their relationship with the service provider in the partnership.

A second observation concerns the role of specialized knowledge in the configuration of conditions. In solution path 1, we see that specialized knowledge can be present or absent. The condition, therefore, has no large contribution to the solution path. In contrast to research which emphasizes the importance of knowledgeable users (e.g., Lettl 2007), user experiences, for instance in testing environments, is at least as important as specialized knowledge in these cases. This is, however, different in the partnerships covered by solution path 2, where user-innovators have by definition a lot of specialized knowledge useful for the innovation, and which explains the presence of this condition in this path. However, this condition is also present in solution path 3. Although there are questions about the reliability of this solution path (see Results), it is still relevant to discuss the solution path because the general solution is generated based on all three of these solution paths, and a large portion of the cases are covered by the path. The solution path demonstrates that in particular configurations of conditions, the presence of specialized knowledge from the involved users is important to produce innovation. It appears that in cases in which users are less empowered, partnerships rely on the specialized knowledge of users, and select users as *advisors* for the service innovation process (i.e., highly specialized knowledge, low empowerment).

Furthermore, the specialized knowledge of the users in the covered cases may also be related to the influence of important healthcare institutions in the partnership. Although their specialized knowledge has clearly influenced the innovation process (e.g., input regarding technical procedures and viable functionalities in case E1, medical protocols for patients in case S4, advice on patient rights and privacy in case B1), the fact that these users are part of an important healthcare institution might also have contributed to the influence of their knowledge on the innovation process.

Conclusion

Although collaborative innovation literature has expanded greatly in the last decades, little is known about the influence of specific conditions of user involvement on technological innovations in public–private collaborations. Furthermore, little is known about the combined influence of certain conditions of user involvement on collaborative innovation. We used theories of user-driven innovation, collaborative innovation, and codesign to unveil the conditions of user involvement that influence the innovation process in collaborative partnerships. We tested the combined effect of three interrelated conditions on the innovativeness of the created services in collaborative partnerships, which revealed a more complicated combined effect than we initially expected. Our contribution is, therefore, twofold: (1) this article tested the combined effect of the empowerment of users, the level of specialized knowledge of involved users, and the presence/absence of hindering rules and procedures on innovation in collaborative partnerships, and (2) the article unveiled the contingent nature of these conditions of user involvement and proposed a more nuanced depiction of how user involvement can impact the collaborative innovation process.

Our theoretical framework was tested on 19 eHealth partnerships in Belgium, the Netherlands, Estonia, Denmark and Spain, which represented different European healthcare systems, administrative traditions and eHealth technologies, and as such, allows cautious generalizations to similar European eHealth partnerships. Our QCAs showed that service innovation is created in some partnerships through a collaboration with *user-innovators*, who are highly empowered and possess specialized knowledge about the services, but can also collide with the rules and procedures of the service provider, as their primary objective is to translate their own ideas into innovative solutions. In other partnerships, service innovation is created through a collaboration with users as *codesigners*, who are also highly empowered, but stay within the boundaries of the service design framework of the service provider, and, as such, are less hindered in their activities. The latter type of users do not necessarily need to possess specialized knowledge, as their user experiences are also relevant for these partnerships. However, specialized knowledge remained important to innovate in partnerships in which users were not highly empowerment, which might suggest that these partnerships create service innovation through a collaboration with users as *advisors*.

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These results have also practical implications. First, the results indicate that user involvement is indeed a catalyst for collaborative service innovation, but that its effect on innovation relates to specific configurations of conditions. Coordinators of such partnerships should be aware that a combination of conditions affects the innovation in their partnership and that influencing one condition (e.g., empowering users) is not enough to successfully coinnovate. Second, the combination of conditions is contingent on the circumstances in the partnership, which means that coordinators should be aware that there is a difference between the involvement of user-innovators, codesigners, and advisors. User-innovators can be given extensive responsibilities and are able to autonomously work on complex tasks, whereas codesigners and advisors need to be guided and supported throughout the innovation process. Hence, other types of involved users requires other types of user management. This "user management" is crucial, as user involvement is often a complex and time-consuming process. Also, user-innovators should be aware that a perfect translation of their ideas into real services is far from obvious. Third, specialized knowledge of users about the services is crucial in partnerships that are dependent on this knowledge to innovate. However, partnerships that acquire this knowledge through other means (e.g., collaborating with experts) should not hesitate to involve users that lack this specialized knowledge. Such users are still able to provide valuable information in the form of their user experiences, which is a crucial asset in the testing phase of the innovation process.

This article also provides opportunities for further research. As we collected data from 19 eHealth partnerships in five different countries, we were restricted in the level of detail we could obtain. Our research design therefore only allows for very specific types of partnerships, in which either public actors or private actors coordinate the partnership. There are also other types of partnerships, which makes the dynamics of user involvement more complicated and which would be valuable for future research. Furthermore, the distinction between government coordinated and societally coordinated partnerships has its limitations, as the latter type of partnership can be coordinated by both nonprofit and for-profit actors. A further distinction between different actors might expand our results. In-depth qualitative case studies or process-tracing might shed more light on the variety and influence of these different types of partnerships (see Schneider and Rohlfing 2013). Furthermore, due to our sample size, we could only focus on three interrelated conditions of user involvement and their related combinations. However, particularly in public–private collaborations, much is still unknown about the conditions of user involvement that create innovation. Future research should investigate these conditions even further.

Supplementary Material

Supplementary data are available at the *Journal of Public Administration Research and Theory* online.

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Ethics Declaration

This study has been approved by the ethical commission of the University of Antwerp. Respondents signed a consent form before the interviews and surveys which detailed how their data would be used and stored. All the information from the respondents that is used in this article is anonymized.

Data Availability

The data underlying this article are available in the article's supplementary material (supplementary table A5). Other data (i.e., survey and interview data) underlying this article cannot be shared publicly in order to protect the privacy of individuals that participated in the study.

References

Alford, J. 2009. *Engaging public sector clients: From service-delivery to co-production*. Houndmills, UK: Palgrave Macmillan.

Anderson, N., K. Potočnik, and J. Zhou. 2014. Innovation and creativity in organizations: A state-of-the-science review, prospective commentary, and guiding framework. *Journal of Management* 40 (5): 1297–333.

Andreassen, H. K., L. E. Kjekshus, and A. Tjora. 2015. Survival of the project: A case study of ICT innovation in health care. *Social Science and Medicine* 132: 62–9.

Ansell, C., and A. Gash. 2007. Collaborative governance in theory and practice. *Journal of Public Administration Research Theory* 18 (4): 543–71.

Arnkil, Robert, Anu Järvensivu, Pasi Koski, and Tatu Piirainen. 2010. Exploring Quadruple Helix: outlining user-oriented innovation models. Final Report on Quadruple Helix Research for the CLIQ project, Working Paper 85/2010. Work Research Centre, University of Tampere, Tampere, Finland. https://trepo.tuni.fi/bitstream/handle/10024/65758/978-951-44-8209-0.pdf

Arnstein, S. R. 1969. A ladder of citizen participation. *Journal of the American Institute of Planners* 35 (4): 216–24.

Baker, S., B. Ayala-Orozco, and E. García-Frapolli. 2020. Hybrid, public and private environmental governance: The case of sustainable coastal zone management in Quintana Roo, Mexico. *International Journal of Sustainable Development & World Ecology* 27 (7): 625–37.

Baldwin, C., and E. von Hippel. 2011. Modeling a paradigm shift: From producer innovation to user and open collaborative innovation. *Organization Science* 22 (6): 1399–417.

Bardach, E. 2001. Developmental dynamics: Interagency collaboration as an emergent phenomenon. *Journal of Public Administration Research and Theory* 11 (2): 149–64.

Bogers, Marcel, llan Afuah, and Bettina Bastian. 2010. Users as innovators: A review, critique, and future research directions. *Journal of Management* 36 (4): 857–75.

Böhm, Katharina, Achim Schmid, Ralf Götze, Claudia Landwehr, and Heinz Rothgang. 2013. Five types of OECD healthcare systems: Empirical results of a deductive classification. *Health Policy* 113 (3): 258–69.

Bovaird, Tony, and Elke Loeffler. 2012. From engagement to co-production: The contribution of users and communities to outcomes and public value. *Voluntas* 23 (4): 1119–38.

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Brandsen, Taco, and Marlies Honingh. 2016. Distinguishing different types of coproduction: A conceptual analysis based on the classical definitions. *Public Administration Review* 76 (3): 427–35.

Brogaard, L. 2021. Innovative outcomes in public–private innovation partnerships: A systematic review of empirical evidence and current challenges. *Public Management Review* 23 (1): 135–57.

Carayannis, Elias G., and David F. J. Campbell. 2009. "Mode 3" and "Quadruple Helix": Toward a 21st century fractal innovation ecosystem. *International Journal of Technology Management* 46 (3/4): 201–34.

Cinar, E., P. Trott, and C. Simms. 2019. A systematic review of barriers to public sector innovation process. *Public Management Review* 21 (2): 264–90. doi:10.1080/14719037.2018.1473477

Criado, J. I., T. F. Dias, H. Sano, F. R. Martín, A. Silvan, and A. I. Filho. 2021. Public innovation and living labs in action: A comparative analysis in post-new public management contexts. *International Journal of Public Administration* 44 (6): 451–64.

Crosby, B. C., P. Hart, and J. Torfing. 2017. Public value creation through collaborative innovation. *Public Management Review* 19 (5): 655–69.

Dahl, R. A. 1988. *On democracy*. New Haven, CT: Yale Univ. Press.

Damanpour, F., R. M. Walker, and C. N. Avellaneda. 2009. Combinative effects of innovation types and organizational performance: A longitudinal study of service organizations. *Journal of Management Studies* 46 (4): 650–75.

Damodaran, L. 1996. User involvement in the systems design process—A practical guide for users. *Behaviour & Information Technology* 15: 363–77.

Daya, I., B. Hamilton, and C. Roper. 2019. Authentic engagement: A conceptual model for welcoming diverse and challenging consumer and survivor views in mental health research, policy, and practice. *International Journal of Mental Health Nursing* 29 (2): 299–311. doi:10.1111/inm.12653

De Vries, H., V. Bekkers, and L. Tummers. 2015. Innovation in the public sector: A systematic review and future research agenda. *Public Administration* 94 (1): 146–66.

Di Meglio, G. D. 2013. The place of ServPPINs in the range of public–private collaboration arrangements for services provision. In *Public–private innovation networks in services*, eds F. Gallouj, L. Rubalcaba, and P. Windrum, 59–87. Cheltenham, UK: Edward Elgar Publishing.

European Commission. 2018. *Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions on enabling the digital transformation of health and care in the Digital Single Market; empowering citizens and building a healthier society*. 25 April. European Commission, Brussels, Belgium.

Farr, M. 2016. Co-production and value co-creation in outcome based contracting in public services. *Public Management Review* 18 (5): 654–72.

Greer, C. R., and D. Lei. 2012. Collaborative innovation with customers: A review of the literature and suggestions for future research. *International Journal of Management Reviews* 14: 63–84.

Gremyr, I., M. Elg, F. Smith, and S. Gustavsson. 2018. Exploring the phase for highest impact on radicality: A cross-sectional study of patient involvement in quality improvement in Swedish healthcare. *BMJ Open* 8: e021958. doi:10.1136/bmjopen-2018-021958

Heidenreich, Sven, Johannes Landsperger, and Patrick Spieth. 2016 Are innovation networks in need of a conductor? Examining the contribution of network managers in low and high complexity settings. *Long Range Planning* 49 (1): 55–71.

Holgerssona, Jesper, and Fredrik Karlsson. 2014. Public e-service development: Understanding citizens' conditions for participation. *Government Information Quarterly* 31 (3): 396–410.

Ianniello, M., S. Iacuzzi, P. Fedele, and L. Brusati. 2019. Obstaclesand solutions on the ladder of citizen participation: A systematic review. *Public Management Review* 21 (1): 21–46.

Jæger, Birgit. 2013. User involvement in public services innovation. In *Handbook of innovation in public services*, eds S. P. Osborne and L. Brown, 432–44. Cheltenham, UK: Edward Elgar Publishing Limited.

Jenhaug, L. M. 2020. Employees' resistance to users' ideas in public service innovation. *Australian Journal of Public Administration* 79 (4): 444–61. doi:10.1111/1467-8500.12415

Karlsson, F., J. Holgersson, E. Söderström, and K. Hedström. 2013. Exploring user participation approaches in public e-service development. *Government Information Quarterly* 29 (2012): 158–68.

Klijn, E. H., B. Steijn, and J. Edelenbos. 2010. The impact of network management on outcomes in governance networks. *Public Administration* 88 (4): 1063–82.

Kujala, S. 2003. User involvement: A review of the benefits and challenges. *Behaviour & Information Technology* 22 (1): 1–16.

Lasker, R. D., E. S. Weiss, and R. Millier. 2001. Partnership synergy: A practical framework for studying and strengthening the collaborative advantage. *The Milbank Quarterly* 79 (2): 179–205.

Lettl, C. 2007. User involvement competence for radical innovation. *Journal of Engineering and Technology Management* 24: 53–75.

Lettl, C., C. Herstatt, and H. G. Gemuenden. 2006. Users' contributions to radical innovation: Evidence from four cases in the field of medical equipment technology. *R&D Management* 36 (3): 251–72.

Lüthje, C., C. Herstatt, and E. von Hippel. 2005. User-innovators and "local" information: The case of mountain biking. *Research Policy* 34: 951–65.

Macciò, L., and D. Cristofoli. 2017. How to support the endurance of long-term networks: The pivotal role of the network manager. *Public Administration* 95: 1060–76.

Maggetti, M., and D. Levi-Faur. 2014. Dealing with errors in QCA. *Political Research Quarterly* 66 (1): 198–204.

Marti, P., and L. J. Bannon. 2009. Exploring user-centred design in practice: Some caveats. *Knowledge, Technology & Policy* 22 (1): 7–15.

Marx, A., and A. Dusa. 2011. Crisp-Set Qualitative Comparative Analysis (csQCA), contradictions and consistency benchmarks for model specification. *Methodological Innovations* 6 (2): 103–48.

Mina, Andrea, and Ronnie Ramlogan. 2008. Health innovation processes at the public-private interface. In *Innovation in public sector services—Entrepreneurship, creativity and management*, eds P. Windrum and P. Koch, 118–38. Cheltenham, UK: Edward Elgar.

Moon, M. J., and S. Bretschneiber. 2002. Does the perception of red tape constrain IT innovativeness in organizations? Unexpected results from a simultaneous equation model and implications. *Journal of Public Administration Research and Theory* 12 (2): 273–92.

Nabatchi, Tina, Alessandro Sancino, and Mariafrancesca Sicilia. 2017. Varieties of participation in public services: The who, when, and what of coproduction. *Public Administration Review* 77 (5): 766–76.

Nederhand, J., V. Bekkers, and W. Voorberg. 2016. Self-organization and the role of government: How and why does self-organization evolve in the shadow of hierarchy? *Public Management Review* 18 (7): 1063–84.

Nesti, G. 2018. Co-production for innovation: The urban living lab experience. *Policy and Society* 37 (3): 310–25.

Ocloo, J., and R. Matthews. 2016. From tokenism to empowerment: Progressing patient and public involvement in healthcare improvement. *BMJ Quality & Safety* 25: 626–32.

Oliveira, Pedro and Eric von Hippel. 2011. Users as service innovators: The case of banking services. *Research Policy* 40 (6): 806–18.

Osborne, S. P. 2006. The new public governance? *Public Management Review* 8 (3): 377–87.

Osborne, S. P., Z. Radnor, and K. Strokosch. 2016. Co-production and the co-creation of value in public services: A suitable case for treatment? *Public Management Review* 18 (5): 639–53.

Ozer, M. 2009. The roles of product lead-users and product experts in new product evaluation. *Research Policy* 38 (8): 1340–9.

Pestoff, V. 2014. Collective action and the sustainability of co-production. *Public Management Review* 16 (3): 383–401.

Pollitt, C., and Bouckaert, G. 2017. *Public management reform: A comparative analysis—Into the age of austerity*. Oxford: Oxford University Press.

Pongtanalert, Kritinee, and Susumu Ogawa. 2015. Classifying user-innovators—An approach to utilize user-innovator asset. *Journal of Engineering and Technology Management* 37: 32–9.

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Prahalad, C. K., and V. Ramaswamy. 2000. Co-opting customer competence. *Harvard Business Review* 78: 79–87.

Quelin, B. V., I. Kivleniece, and S. Lazzarini. 2017. Public–private collaboration, hybridity and social value: Towards new theoretical perspectives. *Journal of Management Studies* 54 (6): 763–92.

Ragin, C. and S. Davey. 2017. User's guide to fuzzy-set/qualitative comparative analysis. http://www.socsci.uci.edu/~cragin/fsQCA/download/fsQCAManual.pdf.

Ragin, Charles. 2009. Qualitative comparative analysis using fuzzy sets (fsQCA). In *Configurational comparative methods*, eds B. Rihoux and C.C. Ragin, 87–122, Thousand Oaks, CA: Sage.

Ragin, Charles C. 2008. *Redesigning social inquiry: Fuzzy sets and beyond*. Chicago, IL: University of Chicago Press.

Rogers, Everett M. 2003. *Diffusion of innovations*. 5th ed. New York, NY: Free Press.

Røtnes, R., and P. D. Staalesen. 2009. *New methods in user-driven innovation in the health care sector*. Oslo, Norway: Nordic Innovation Center.

Sangill, C., B. Niels, H. Lisbeth, and B. Lene Lauge. 2019. Service user's actual involvement in mental health research practices—A scoping review. *International Journal of Mental Health Nursing* 28 (11): 798–815.

Schaffers, Hans, Nicos Komninos, Marc Pallot, Brigitte Trousse, Michael Nilsson, and Alvaro Oliveira. 2011. Smart cities and the future internet: Towards cooperation frameworks for open innovation. In *Future Internet Assembly*, eds J. Domingue et al, Vol. 6656, 431–46. LNCS. Heidelberg: Springer.

Schneider, C. Q., and C. Wagemann. 2010. Standards of good practice in qualitative comparative analysis (QCA) and fuzzy-sets. *Comparative Sociology* 9: 1–22.

Schneider, C. Q., and C. Wagemann. 2012. *Set-theoretic methods for the social sciences: A guide to qualitative comparative analysis*. New York: Cambridge University Press.

Schneider, C. Q., and I. Rohlfing. 2013. Combining QCA and process tracing in set-theoretic multi-method research. *Sociological Methods & Research* 42 (4): 559–97.

Scholz, Nicole. 2015. eHealth—Technology for health. European Parliamentary Research Service. https://www.europarl.europa.eu/RegData/etudes/BRIE/2015/551324/EPRS_BRI(2015)551324_EN.pdf.

Simmons, R., and C. Brennan. 2017. User voice and complaints as drivers of innovation in public services. *Public Management Review* 19 (8): 1085–104. doi:10.1080/14719037.2016.1257061

Skålén, P., J. Karlsson, M. Engen, and P. R. Magnusson. 2018. Understanding public service innovation as resource integration and creation of value propositions. *Australian Journal of Public Administration* 77 (4): 700–14. doi:10.1111/1467-8500.12308

Smith, A., and L. Dunckley. 2002. Prototype evaluation and redesign: Structuring the design space through contextual techniques. *Interacting with Computers* 14 (6): 821–43. doi:10.1016/S0953-5438(02)00031-0

Sønderskov, M., R. Rønning, and S. Magnussen. 2021. Hybrid stimulations and perversions in public service innovation. *Public Policy and Administration* 37 (3): 363–384.

Sørensen, E., and J. Torfing. 2011. Enhancing collaborative innovation in the public sector. *Administration & Society* 43 (8): 842–68.

Sørensen, E., and J. Torfing. 2018. Co-initiation of collaborative innovation in urban spaces. *Urban Affairs Review* 54 (2): 388–418.

Sundbo, J. 2008. Customer-based innovation of knowledge e-services—The importance of after innovation. *International Journal of Services, Technology and Management* 9 (3–4): 218–33.

Tien, J. M., and P. J. Goldschmidt-Clermont. 2009. Healthcare: A complex service system. *Journal of Systems Science and Systems Engineering* 18 (3): 257–82.

Torfing, J. 2019. Collaborative innovation in the public sector: The argument. *Public Management Review* 21 (1): 1–11. doi:10.1080/14719037.2018.1430248

Torfing, J., E. Sørensen, and A. Røiseland. 2019. Transforming the public sector into an arena for co-creation: Barriers, drivers, benefits and ways forward. *Administration & Society* 51 (5): 795–825.

Trischler, J., T. Dietrich, and S. Rundle-Thiele. 2019. Co-design: from expert- to user-driven ideas in public service design. *Public Management Review* 21 (11): 1595–619. doi:10.1080/14719037.2019.1619810

Van Waes, L. 2017. *De visie van de zorgsector (VIVO) op digitalisering en robotisering. OVER*. WERK Tijdschrift van het Steunpunt Werk, nr. 2. Uitgeverij Acco.

von Hippel, E. 1986. Lead users: A source of novel product concepts. *Management Science* 32 (7): 791–805.

von Hippel, E. 1994. "Sticky information" and the locus of problem solving: Implications for innovation. *Management Science* 40 (4):429–39.

von Hippel, E. 2005. *Democratizing innovation*. Cambridge, MA: MIT Press.

Voorberg, W., V. Bekkers, K. Timeus, P. Tonurist, and L. Tummers. 2017. Changing public service delivery: Learning in co-creation. *Policy and Society* 36 (2): 178–94.

Voorberg, W. H., V. J. J. M. Bekkers, and L. G. Tummers. 2015. A systematic review of co-creation and co-production: Embarking on the social innovation journey. *Public Management Review* 17 (9): 1333–57.

Wouters, Myrah, Ilse Swinkels, Britt van Lettow, Judith de Jong, Judith Sinnige, Anne Brabers, Roland Friele, and Lies van Gennip. 2018. *E-health in verschillende snelheden—eHealth-monitor 2018*. Den Haag and Utrecht, The Netherlands: Nictiz and het Nivel.

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