How service users envision their engagement in processes of collaborative innovation : a Q-methodological study on user involvement in eHealth collaborations

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Abstract

Involving users in innovating public services is an increasingly common, but challenging practice, as users often have different viewpoints on their own role in the process. Particularly in complex innovation arrangements such as public-private collaborations, governments and service innovators need to be aware of users' perceptions of their involvement to maximally exploit the advantages of including them. This article theorizes and tests four different roles of user-provider interaction on co-innovation processes: users as 1) legitimators, 2) customers, 3) partners, and 4) self-organizers. These theoretical roles are tested through Q-methodology on service users in 19 public-private eHealth collaborations from five European countries. Our findings suggest the existence of three hybrid empirical profiles of user involvement: 1) users as 'service consultants', 2) users as 'co-designers', and 3) users as 'hands-off supporters'. The discovery of these profiles suggests the existence of different viewpoints on user involvement, which can influence the expectations and behavior of the users in innovation processes.

Key words: User involvement, eHealth innovation, co-creation, collaboration, Q-methodology

Introduction

Emerging societal issues such as financial crises, global warming, and an ageing population have spurred governments to collaborate with external stakeholders to innovate their services (Torfing 2019). Prior research on public service innovation suggests that collaborating with a rich variety of stakeholders can create partnership synergies (Lasker et al. 2001), which can lead to the generation and practical adoption of innovative services (Sørensen and Torfing 2011). This 'multi-actor' approach to innovation (Torfing 2019) has spurred ample research into the conditions that allow such collaborations to increase their innovation potential.

A promising avenue for further research on this topic is how the involvement of *service users* in collaborative constellations increases the likelihood of achieving innovation. Service users are important stakeholders as they know which needs should be met through new services, but they also have knowledge about how similar services work in practice - knowledge which can then be used to innovate services (Simmons and Brennan 2017). Hence, collaborative innovation constitutes a win-win situation in which service providers obtain much needed information and knowledge from the users, while the users are able to shape their own services (Baldwin and von Hippel 2011; Osborne 2013). This win-win situation is particularly promising in partnerships in which public actors collaborate with private actors with the purpose of creating innovative services, for which they also often involve service users (Brogaard 2021). These partnerships are especially prevalent in the healthcare sector in which governments, universities and public healthcare actors work together with private healthcare actors (technology firms, private healthcare providers) and service users such as physicians, specialists, patients, and user representatives to produce technological innovations (Brogaard 2021).

Research into the co-design of innovative services explores this connection between collaborative innovation and user involvement further (Trischler et al. 2019), and argues that, among other conditions, the role that the users take on in the innovation process can affect the collaborative outcomes (Torvinen and Haukipuro 2018). Recent research into innovation partnerships indicates that users can adopt different roles, which reflect different processes of user-enabled innovation (Callens 2022). These roles can be determined by the viewpoints of the users about their involvement. For instance, empirical research by Van Eijk and Steen (2014) shows that users, involved in health policy coproduction, can have different motives to be involved, each of them resulting in different roles the users can take on. In service innovation processes, these viewpoints of the involved users might also affect the creation of *new* services, which makes them even more relevant to consider. The presence of these different viewpoints of the users on user involvement might also be the reason for the difficulties service providers often encounter when involving them (e.g. lack of active engagement in or commitment to the innovation process, problems to translate users' ideas to workable solutions, etc.).Thus, being unaware of the different viewpoints of the users might inhibit proper user involvement.

In this study, we examine what user viewpoints are present in innovation partnerships and how users perceive themselves in the collaborative innovation process. We propose that these viewpoints are related to the general ways in which service users (e.g. citizens) can interact with service providers (e.g. government). In contrast to previous models on user-provider interaction roles, we attempt to compare these ideal typical user roles of user behavior with the roles that the users believe to have, which makes a comparison between behaved user roles and *perceived* user roles possible. Four user-provider interaction roles – legitimators, customers, partners, self-organizers – are developed in the theoretical section of the paper and translated to possible viewpoints of users on user involvement in collaborative innovation processes. These interaction roles are operationalized through 24 statements (six statements for each

interaction role), and subsequently tested on a dataset of 61 users from 19 eHealth partnerships in Europe through Q-methodology. Q-methodology is ideally suited to identify viewpoints of individuals, as it uses inverted factor analysis to derive differences between discourses (van Exel and de Graaf 2005).

In the remainder of the article, we first provide our theoretical framework in which the four interaction roles of user involvement are elaborated. Next, we explain Q-methodology and elaborate on the dataset. The results section then shows our findings, and we end with a discussion and conclusion section in which we formulate the implications of our study for research and practice.

Theory

Modes of interaction between service users and service providers

How governments interact with the public often depends on how the government perceives the public, or how the public perceives itself in relation to the government. For instance, Thomas (2013) identifies three *modes of interaction* between the public and the government: 1) citizen-government interaction, 2) customer-provider interaction, and 3) partner-partner interaction. The public can thus be seen as a citizen, a customer, or a partner. The *citizen* is primarily interested in the protection of the common good and assesses if decisions of the government are legitimate. The *customer* is focused on his/her own interest, and checks if the government spends public resources appropriately and to satisfy individual interests. The *partner* considers activities of the public sector as a joint endeavor of the public and the government, which is achieved through intensive collaboration and coproduction. Each of these roles relate to the large rationales of public administration, i.e. the (New) Public Administration (citizen), the New Public Management (customer), and the New Public Governance (partner). However, rationales related to self-organization (Ostrom 1995) and self-governance (Kooiman and van Vliet 2000)

distinguish a fourth role of the public: the self-organizer. The *self-organizer* takes the initiative in decisions and activities of the public sector and considers the government as an important stakeholder to provide resources and support, but not as the central or dominant actor (Nederhand et al. 2019).

A practical example of the importance of these modes of interaction can be found in the realm of *service delivery*. According to public service theories, the interaction between service users (the public) and service providers (the government) is crucial for service delivery, as users are an integral part of the larger service system (Osborne and Strokosch 2013). Services are not provided by a single actor (i.e. the service provider), but emerge out of intricate interactions between multiple stakeholders, as the production and consumption of services often occur at the same time (Osborne and Strokosch 2013). In other words, the production and consumption of services are inseparable (Normann 2001; Gronroos 2007). In contrast to, for instance, the production of goods – in which it is quite clear that the main role of the manufacturer is to produce the goods, while the main role of the customer is to consume the good – the roles of the service users and service providers in the service process are more intertwined (Vargo and Lusch 2008). Hence, users might consider themselves as important driving forces of the service delivery, as they are closely involved in the production of services. Dependent on how these users perceive their interaction with the service provider, different outcomes might be achieved (e.g. provider-led service delivery vs. user-led service delivery).

The role of users in innovation-oriented public-private collaborations

These different modes of user-provider interaction become even more important if *new* services are created, as these interactions can then mold the design process and directly influence the features of these services. For instance, Osborne and Strokosch (2013) make a distinction between 1) consumer coproduction, in which the users are empowered to influence the service experience during the consumption of the services, 2) participative coproduction, in which the

users are involved to influence existing service delivery, and 3) enhanced coproduction, in which the users are involved to influence the creation of new services. The authors argue that enhanced coproduction has a far larger impact on the services than participative coproduction and consumer coproduction, as enhanced coproduction combines operational-level interactions (execution of services) with strategic-level interactions (strategic planning and decision-making about services). As such, in instances of co-innovation between users and providers, the modes of interaction would become particularly influential because of the close interaction between the users and providers, and the direct contribution of their mutual endeavors to the new services.

Recent research in public-private partnerships (PPPs) and public-private innovation partnerships (PPIs) seems to support this view and reveals different roles of involved users, which strongly resemble the mentioned modes of interaction. For instance, Torvinen and Haukipuro (2018) show in their exploratory qualitative case study based on data from 23 key stakeholders (i.e. procurers, end-users, supplier informants) in three Finnish PPPs that users that are engaged in innovation-oriented public-private partnerships adopt four different roles. First, users can be regarded as targets for service delivery, in that they are the *consumer* of services and that the interaction between the user and provider (i.e. partnership) is rather passive and one-sided. Second, the users can also assist the partnership in particular tasks, and, as such, *cooperate* with the partnership in order to create new services. Third, users can also create synergies together with the partnership, by intensively *collaborating* with each other during the project. Fourth, users can also behave as *controllers*, who control, lead and dominate the process, and have an important decision-making role in the project.

Similar results have been found in PPIs. Research from Callens (2022), who studied data from over 130 public partners, private partners and users in multiple public-private innovation partnerships through fuzzy-set QCA, indicates that some partnerships employ user-driven

innovation processes, in which they involve *user-innovators* who are highly empowered and possess specialized knowledge about the services. Other partnerships employ co-designed innovation, in which they involve users as *co-designers*, who are also highly empowered, but do not necessarily possess specialized knowledge about the services. Even other partnerships involve users as *advisors* in the innovation process. Advisors have specialized knowledge about the services, but are not highly empowered in the innovation process.

Because of the similarities between the modes of interaction and the user involvement roles we find in innovation-oriented public-private collaborations, we propose that the viewpoints of the users about their role in such collaborations are related to the modes of interaction. Users that are involved in innovation collaborations have specific perceptions about the user-provider relationship in coproduction activities. We propose that these differences in viewpoints are related to the differences in the way the users perceive their user role in their day-to-day interactions with service providers. For this, we propose four interaction roles for users, which are based on the modes of interaction that were introduced in the previous section: users as 1) legitimators, 2) customers, 3) partners, 4) self-organizers. The different characteristics of these user roles are summarized in table 1.

Table 1 about here

Note that these proposed interaction roles should be interpreted as *ideal types*, in that they represent broader theoretical inferences regarding user-provider interaction, which can be applied to innovation partnerships, but that we also do not expect that the empirically derived viewpoints of the users will be identical to these roles. For one, specific features of the partnerships, such as the type of partnership design in the study of Torvinen and Haukipuro (2018) or the application of particular partnership structures that affect the interactions between the partners (e.g. the use of particular interactions arenas), might influence the viewpoints of

the involved users. Indeed, collaborative governance literature has repeatedly showed the effect of these structures on cross-sectoral collaborations (Bryson et al. 2006; Provan and Kenis 2007; Klijn et al. 2010; Emerson et al. 2011).

Legitimators

Legitimators are users who are especially concerned about the legitimacy of services. Legitimacy can be defined as 'a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs and definitions' (Suchman 1995, 574). Legitimacy can be derived from the actual performance of services (i.e. output legitimacy), but it can also be derived from specific actions of the entity, such as the responsiveness to users' needs or the inclusion of users (input legitimacy) (Scharpf 1999). During their interaction with the service provider, the legitimators act on behalf of the *common good*, not their individual preferences. Similar to how interest groups protect the interests of those they represent in order to increase the legitimacy, the legitimators will also aim to protect the user rights and needs. They expect that the service provider watches over the correct application of regulation, so public interests are not endangered. They interact with the service provider to provide or remove support for the services, as actively supporting services increases the legitimacy of these services (Suchman 1995). For this, they need enough information about the service process, as they themselves are no service experts and, therefore, lack specialized knowledge. Indeed, legitimacy increases when processes are deemed transparent and open, which some authors refer to as 'throughput legitimacy' (Schmidt and Wood 2019). Open and transparent communication and information sharing is therefore particularly important for legitimators. Because of their legitimizing function, legitimators are not interested in an active involvement into the development of the services, and expect that this is a task of the service provider.

Customers

Customers are users who are particularly concerned with the selection and consumption of services that satisfy their *individual needs*, and expect the service provider to *respond* to these individual needs. Customer-provider interaction grows from the connection between the presence of individual needs and the responsiveness of the service provider to these needs (Greer and Lei 2012). On the one hand, the heterogeneity of users' needs over the last decades have driven the demand for customized services (von Hippel 2005), for which the users are dependent on the service provider. On the other hand, the user's freedom of choice in selecting and consuming the services of the service provider stimulates competitive behavior between service providers, and prioritizes user-satisfaction (Callahan and Gilbert 2005; Jung 2010). As a result, users start to articulate their demands more actively, while service providers become more responsive to the wishes of these users, which stimulates the interaction between them (Alford 2009). This interaction might be achieved by consulting the users about their preferences, but also by observing the response of users to certain services in a real-time context (Trischler and Trischler 2021).

Partners

Partners are users who assume an active role in the service process, by *collaborating* directly with the service provider, and by sharing tasks and responsibilities with the service provider. In their interaction with the service provider, partners stand on the same level as the service provider (Torvinen and Haukipuro 2018). This means that there is a joint decision-making regarding changes to the service process, and the service providers are not the dominant service actor. They work together during the service process, by sharing resources, but also responsibilities, which makes them highly dependent on each other (Ansell and Gash 2007).

Because of the intensive collaboration between the users and providers, users and providers can exchange new views and experiences with each other, which can lead to partnership synergies (Lasker et al. 2001). During such interactions, both the users and service providers are responsible for problem-solving activities, which they tackle through co-creation (Voorberg et al. 2017). However, such intensive interactions are only possible if the service providers are able to govern the processes within the collaboration, for instance by trying to align the different goals of the users and service providers (Klijn et al. 2010).

Self-organizers

From the perspective of the self-organizer, the service process is in the hands of the users. Self-organization refers to a situation in which higher-level order emerges out of the interaction between components at a lower level, without the need of any interference of a central actor who coordinates these interactions (Kauffmann 1993). Although the concept stems from physics and mathematics, it has been applied to governance processes (Kooiman and van Vliet 2000; Nederhand et al. 2016). This mode of societal self-governance has been explored by Elinor Ostrom, who considers how physical, social and human capital are self-organized through a delicate balance between actors' interests (Ostrom 1995). In this perspective, actors who can take decisive action (e.g. governments, service providers, etc.) are aware of the constructive capacity of the interactions between the actors at the practical level (e.g. citizen, users, etc.), and relate to these actions (Sørensen and Torfing 2007; Nederhand et al. 2019). Self-organizers can be considered to be user-innovators, who possess specialized knowledge of the services and the service context, and are extremely motivated to innovate because they directly encounter the problems of the existing services (Baldwin and von Hippel 2011). This means that the actions of the self-organizer are of primary importance for the service process and the service providers align themselves to these actions by supporting and stimulating the users. The service provider adopts a 'hands-off' approach to the service process, by providing

the outline, scope and resources for the services, but minimally interfering in the day-to-day activities of the service process (Sørensen and Torfing 2009).

Research design

This article makes use of Q-methodology. In contrast to the classical R-methodological factor analysis, Q-methodology enables a researcher to factorize individuals on a population of traits, abilities or characteristics, out of which differences between these individuals arise (Watts and Stenner 2012). In recent years, public management scholars have used the methodology to study differences in viewpoints of respondents regarding policy choices (e.g. Nederhand et al. 2019; Molenveld et al. 2019; Warsen et al. 2020) and citizen involvement in coproduction arrangements (van Eijk and Steen 2014; van Eijk et al. 2017).

We refer to Watts and Stenner (2012) for a comprehensive introduction into Q-methodology. Generally, Q-methodology is conducted in four sequential steps (Watts and Stenner 2012). We summarize these steps here, but also refer to the annex (table A1) for a more elaborated depiction of the performed steps. First, the *Q-set* is constructed. The Q-set is composed of statements that reflect the different discourses or viewpoints present in the population. These statements are based on the interaction roles we proposed in the previous section. Hence, we employ a deductive Q-methodological approach (e.g. Nederhand et al. 2019; Warsen et al. 2020). In order to ensure that these statements accurately reflect the theoretical roles, we identified three dimensions from these roles, which can be applied on processes of user involvement in innovation partnerships, i.e., 1) the motives for the involvement of the users, 2) the activities the users expect to perform during their involvement, and 3) the role the service provider plays in these processes. We also followed standards of practice (cf. van Eijk and Steen 2014; Molenveld et al. 2019) by selecting different types of formulations of the statements (i.e. designative and advocative statements, see Dryzek and Berejikian 1993). To further refine the

statements, a pilot study with similar users as in the P-set was conducted in one of the countries. 24 statements were eventually selected (i.e. two statements per dimension and role, one designative and one advocative) which are presented in Table 2. The specific operationalization of the theoretical roles is depicted in the annex (table A2).

Table 2 about here

Second, the *P-set*, or set of participants, is defined. In our case, the P-set consists of service users that are related to processes of collaborative service creation and innovation in Europe. As the health sector is an established policy field in the coproduction literature (e.g. Van Eijk and Steen 2014), and the partnerships that we are interested in are particularly found in the healthcare sector (Brogaard 2021), we selected 61 users from 19 public-private eHealth collaborations, in five European countries (Belgium, Netherlands, Denmark, Estonia, Spain). We selected the European context because of its priority on technological innovation in the healthcare sector (European Commission 2018). We selected these five countries as they depict a good representation of the European context. Indeed, these countries represent the two most dominant continental European healthcare systems (i.e. National Health Services and Etatist Social Health Insurance System, Böhm et al. 2013), and, as the government is central in regulating these systems, they also represent the most common continental European politico-administrative regimes (i.e. Nordic, Central and Eastern European, Continental and Napoleonic administrative regimes, Pollitt and Bouckaert 2017).

All of the eHealth partnerships involved collaborations between public actors (e.g. governments, agencies, public hospitals, etc.), private actors (e.g. non-profit organizations, firms, etc.), and service users (e.g. GPs, medical professionals, representatives of patients and health professionals). As public-private collaborations can be coordinated by both the public or the private partner, both 'types' of collaborations were included in this study. Furthermore, both

individual service users (i.e. GPs, nurses, physicians, therapists, etc.) and representatives of patients and health professionals were selected. Most of the partnerships involved users throughout the whole innovation process. Dependent on their profiles, different types of users were involved in different stages of the innovation process (e.g. health professionals in the conceptual phase, patients in the testing phase). Users were involved through workshops, focus groups, project teams, bilateral meetings, and experimentation and testing environments. A detailed overview of the cases, the employed user involvement, and the respondents can be found in the annex (table A3).

Third, the statements defined in the Q-set are applied to the respondents in the P-set by conducting a *Q-sort*. During the Q-sort, the respondents rank the different statements in the Q-set according to the degree to which these statements reflect their own viewpoints. We used a fixed structure (from -3 to 3), in which the respondents could indicate if they agreed or disagreed with the statement. Flatter distributions (e.g. from -4 to 4) are often used in P-sets with a lot of knowledgeable respondents. However, as we have a mixed group of users with specialized knowledge (e.g. medical professionals) and with less specialized knowledge (e.g. patients), a steeper distribution was better suited for our P-set. We also tested different flatter and steeper distributions during a pilot testing of the Q-sorts, which revealed that indeed the -3;3 distribution was more convenient for the respondents. The Q-sorts were conducted through the Q Method software package.

Fourth, the Q-sorts are analyzed through Q-methodological *factor analysis* to separate the common variance between the respondents. The correlation matrix, eigenvalues and factors loadings were calculated. Subsequently, three criteria were used cumulatively to retain reliable factors. First, the Kaiser-Gutmann criterion, which advises to only retain factors with a eigenvalue of the factor loadings greater than 1, was applied (Watts and Stenner 2012). Second, only the factors with at least two statistically significant Q-sorts (calculated by 1.96

×1/√(Number of items), $p < 0.05$), were retained (Watts and Stenner 2012). Third, only the factors with a explained variance of at least 7% and a cumulative variance of at least 30% were retained (Molenveld 2020). We also performed a varimax factor rotation. The factor analysis was conducted with the KenQ software package. Additionally, we checked how well the three factors were able to explain patterns of user-involvement considering the specificity of the employed P-set, in comparison to a two-factor and four-factor solution. The three-factor solution proved to be superior to the other factor solutions.

Results

Seven factors were initially retained from our analysis. After applying the three cumulative criteria described above, three factors remained. The three remaining factors explain 40% of the total variance, which is sufficient in Q-methodological research (Watts and Stenner 2012, p. 199), and is similar to other recent empirical studies (e.g. Nederhand et al. 2019; Warsen et al. 2020; Molenveld et al. 2019). The factors are illustrated in table 3. The three factors represent three groups of respondents that share a coherent set of statements on how users can be involved in the innovation process. These groups will be called *'empirical profiles'* in the article.

Table 3 here

The three empirical profiles are labelled as follows: 1) users as *'service consultants'*, 2) users as *'co-designers'*, and 3) users as *'hands-off supporters'*. Note that these empirical profiles are different from the theoretical roles we constructed in our conceptual framework, which will be discussed in subsequent sections of the article. However, before we introduce the three empirical profiles, we display some of the descriptive information that may be relevant for our interpretation of the profiles. As is visible from table 4, the majority of service consultants come from the four Spanish partnerships, while the Estonian partnerships are not represented in this profile. We see quite the reverse for the co-designers, who are well-represented in the Estonian

cases, but not in the Spanish cases. In comparison to the other profiles, most of the users from the Danish cases also identify themselves with the co-designers, but none of them adhere to the profile of the hand-off supporters. Furthermore, in comparison to the other countries, Belgian cases are well-represented in the profile of the hands-off supporters. The respondents from the Dutch cases are relatively equally distributed over the three profiles. Moreover, considering that ca. one in four respondents were user representatives, only 11% of the service consultants are user representatives (e.g. representative of patient organizations, physician associations, etc.), in comparison to 40% of the co-designers and 42% of the hands-off supporters.

Table 4 about here

When we consider the types of partnerships that underlie the empirical profiles, and particularly look at the partnerships that are exclusively present in one of the profiles (i.e. excluding overlapping partnerships), we also see differences between the underlying rationales for why these partnerships involved users. For instance, partnerships B4, S1, S3, and S4 are partnerships that extensively relied on the expert knowledge of the involved users, particularly in the conceptual stages of the innovation process. This might be the reason for why the large majority of involved users in this profile are health professionals. The partnerships that are represented in the second profile (i.e. B2, B5, D1, D3) are partnerships that tried to co-develop the solutions together with the users in more or less delineated phases of the innovation process. In these partnerships, not only expert users but also individuals who represented the needs of citizens, patients and professionals were involved. The partnerships in the third profile present perhaps the most interesting results, as both B3 and E2 enabled profound opportunities for user participation (e.g. adoption of users in advisory boards and other collaboration arenas), but were also met with extensive skepticism from the involved users because of negative experiences with similar collaborations on related topics in the past.

The next sections address the characteristics of these three empirical profiles in detail. The main features of these profiles are summarized in table 5. In order to develop a clear depiction of the three empirical profiles, we will particularly focus on the extreme and distinguishing statements, which are the statements that are significantly differently ranked as opposed to the other profiles, and whose scores deviate strongly from the scores of the other profiles. This approach has been used in other Q-methodological research (see Molenveld et al. 2019), and it allows us to differentiate the core characteristics of these profiles. For this, we rely on the relative rankings of the statements, which considers the distinguishing statements that are ranked higher and lower than the statements in the other profiles. These relative rankings are visualized for each of the profiles in the annex (table A4, table A5, and table A6). In order to visualize the relative importance of the different characteristics of the profiles, we indicate the scores of the ranked statements that match these characteristics between brackets. These scores can reflect positively ranked statements (e.g. +2), but also negatively ranked statement (e.g. -3).

Table 5 about here

Users as service consultants

Service consultants are involved in the innovation process because they possess valuable knowledge of and experience with the targeted service context, and can facilitate the partnership in achieving a desirable innovation. Facilitating the partnership in achieving a desirable innovation requires them to be well-informed by the partnership (+3). Probably because of their knowledge of the service context, the users in this profile are able to introduce alternative ideas that are useful for the partnership (+2). These users might want to convey what they know about this service context, but do not perceive themselves are representatives of the larger 'user community'. As such, they are not interested in voicing what quality this user community

expects from the innovation (-2). However, the users also strongly oppose the idea that they should just listen to what the partnership has to say (-3), which suggests that they want to have an active role in the innovation process. Nevertheless, this active role is *externally oriented*, as the service consultants receive a sufficiently defined, external advising 'assignment' from the partnership. Hence, the service consultant perceives himself/herself as an actor that is external to the partnership and innovation process, and is therefore not interested in being recognized as a partner (-2). Possibly because of this external and more distant role, the users in this profile do not expect that the partnership mobilizes resources to develop the users' proposals (-1).

Users as co-designers

Co-designers want to be involved in the innovation process because of their desire to be part of creating something they can use in the future. Co-creation activities, in which the users and partnership equally contribute to the innovation, are crucial for these users (+3). Related actions, such as ensuring joint decision-making between the users and the partnership (+2), and jointly defining the problem and solution (+2), are therefore also very important for the users in this profile. Co-designers co-create services because they might have a use for them in the future, which means that they are highly motivated to voice what quality they expect from the innovation (+2). Because of the emphasis on co-creation and co-development, these users are strongly opposed to statements such as "Users best leave development of innovations to others" (-3). Moreover, co-designers do not expect that the partnership is focused on ensuring that the users' input does not go against any regulation (-1), possibly because this might inhibit open experimentation and co-creation.

Users as hands-off supporters

Hands-off supporters are involved in the innovation process to give support to the innovation, but without taking on any binding responsibilities. In contrast to the other profiles, these users

agree very much with the statement that users should be primarily involved to create support for the innovation (+3). Hands-off supporters position themselves at a distance from the partnership, and withdraw from any demanding commitments. Hence, they expect very much from the partnership, and very little from their own involvement. For instance, the users in this profile expect that the partnership ensures that the input of the users does not go against regulations (+2) and invests energy in aligning the differences in goals between the users and the partnership (+2). Furthermore, hands-off supporters do not believe that users know best how to develop and organize services (-3), or can best define problems and solutions (-2). They are also quite skeptical towards jointly defining the problem and solution with the partnership (-1). Interestingly, and in contrast to the other two profiles, hands-off supporters are the only users who are neutral towards the statement "Users best leave the development of innovations to others" (0), which is very negatively ranked by both the service consultants and the co-designers (resp. -2 and -3).

Additional observations

In the previous sections, we focused particularly on the distinguishing characteristics of the empirical profiles. However, there are also some important features of the profiles that can partially overlap with other profiles, and which prevent them from being a distinguishing characteristic of the profile. Nevertheless, these features may also contain important information about the profiles. An important observation is that the users in the profile of service consultants also believe that users should be consulted about their preferences (+2), and should advise the partnership about how to increase user satisfaction (+2), which is in line with the facilitative nature of the service consultants. Furthermore, the statement that suggests that users are especially involved to listen to what the partnership has to say is ranked very negatively in all three profiles (resp. -3; -2; -2). This observation is particularly interesting in relation to the hands-off supporter, as it introduces some nuance to the supposedly passive role

of these users. Notwithstanding that they are still much less active in the collaboration than the service consultants and the co-designers, they do want to have a voice in the partnership.

Discussion and Conclusion

User involvement is a complex process, which demands a lot of time and energy from both the service providers and the users, without a guarantee of success. Different envisioned roles of the users lead to different expectations about their involvement in the innovation process, which might affect the process of user involvement and how successful this process will eventually turn out to be. Understanding how involved users envision their roles in the innovation process can encourage the pursuit of a more suitable alignment of the expectations and needs of the involved users and the partnership in the innovation process. Hence, this article aimed to conceptually and empirically contribute to our understanding of the roles users wish to take on during their involvement in collaborative innovation processes by proposing and testing four distinct perspectives on user involvement.

Theoretical reflections on the results

In our study, we found three empirical profiles, based on our theoretical distinction of user-provider interaction roles. The first empirical profile, which we labelled as 'service consultants', includes users who possess knowledge of and experience in the service context of the users, and who are ideally placed to advise the partnership in the innovation process. This profile matches service literature that emphasizes the importance of user knowledge for the innovation process (Simmons and Brennan 2017). Indeed, seminal work of von Hippel in the 1980s shows how users are able to innovate services on their own because of their knowledge about the service context. Users have information about the demands and expectations of the user community, know what does and doesn't work because of their experience in the service system, and are ideally positioned to detect new trends in this service system (von Hippel 1986;

von Hippel 2005). Von Hippel (1994) calls this information 'sticky information', because it is challenging to access, transfer and use in a new context. Service consultants know they possess this sticky information, and, through their involvement in the innovation process, can mobilize this information to help create service innovation. This is confirmed by the case information of the partnerships, as the large majority of the involved users were health experts and the partnerships depended on their knowledge to innovate their services.

The second profile depicts users as 'co-designers', and includes users who want to co-create services with the partnership, which they might also later use in practice. The case information of the partnerships in this profile indicates that both individual users (i.e. health professionals) and user representatives co-develop with the service providers in order to produce desirable solutions. These characteristics relate to literature on open collaborative innovation (Baldwin and von Hippel 2011; Sørensen and Torfing 2018), in which users are involved in innovation processes of service providers or partnerships because they want to co-develop services they might later use. During co-design, users are intentionally involved in the innovation process to jointly develop the innovation with the service providers (Trischler et al. 2019). This leads to a win-win situation in which the users acquire additional resources and capabilities, and the partnership is able to access sticky information (von Hippel 1994). Additionally, and in contrast to private partners, users are also less interested in shielding the innovation from competitors or in commercializing the innovation for their own gain, which is beneficial for the partnership as this simplifies the implementation and diffusion of the innovation (Roszkowska-Menkes 2017).

The third profile, which we labelled the 'hands-off supporters', is characterized by users who want to create support for the innovation, without adopting any demanding responsibilities in the innovation process. The fact that these users lack commitment to fully engage in the innovation process might have something to do with the complexity of the innovation subject

in the studied cases (i.e. eHealth innovations). Service research indicates that involving users in the creation of technically complex and radical innovations often leads to a more passive role of the users, because the users lack the required knowledge to feel comfortable advising and co-designing with the service provider (Lettl 2007). The specific innovation context and the self-awareness of the users about their own capabilities might therefore have influenced the viewpoints of these users. However, case information of the partnerships also revealed that some of the involved users were rather skeptical about their involvement due to their negative experiences with similar collaborations in the past. These experiences might have influenced their viewpoints on user involvement, and can reduce the levels of trust and commitment in these collaborations (Ansell and Gash 2007).

Additionally, we observe a difference between how much users adhere to specific profiles dependent on the countries in which their partnerships are established. Whereas service consultants are particularly found in the Spanish partnerships, and the co-designers in Estonian and Danish partnerships, the hands-off supporters are especially identified in the Belgian cases. Although we lack the comparative data to thoroughly substantiate these claims, these differences might result from cultural differences between the countries, regarding how they perceive user involvement. For instance, due to the Napoleonic politico-administrative tradition in southern European countries such as Spain, (but also Belgium, which legal tradition and administrative culture resemble the Napoleonic tradition), these countries have a larger power distance between governments (i.e. service providers) and citizens (i.e. users) (Pollitt and Bouckaert 2017). This might result in viewpoints that are more conservative as to the degree to which users can fully engage in the partnerships. Nordic countries such as Denmark (and partially the Netherlands), however, have an egalitarian system with a pronounced citizen and user participation (Pollitt and Bouckaert 2017). Similarly, in recent decades, Estonia has introduced various initiatives to foster participation and engagement (e.g. e-participation,

Åström et al. 2013; Randma-Liiv 2022), which might have influenced the viewpoints of the users. Again, these are only tentative findings, which require further investigation using a larger sample of respondents and explanatory research methodologies (e.g. regression analyses).

Hybridity of the empirical profiles

Our findings indicate that none of the empirical profiles perfectly matches the theoretical roles out of which the Q-sort statements were derived. Although the service consultants have much in common with the customers, the co-designers share important features with the partners, and the hands-off supporters are quite similar to the legitimators, there are still a lot of statements from the other theoretical roles combined in the respective profiles. Still, we yield quite well-defined and delineated, but also *hybrid* empirical profiles from these statements. The explanation for this hybridity of the profiles might be broken down into three arguments, which can reinforce each other.

First, the theoretical roles are useful to depict the general modes of interaction between the service providers and the service users, but may also need additional refinement when applied to service innovation processes in public-private collaborations. For instance, we see important similarities between our results and the empirical results of Torvinen and Haukipuro (2018) and Callens (2022) on PPPs and PPIs. The authors identify comparable user roles, such as the consumers, cooperators and collaborators (Torvinen and Haukipuro 2018), and the advisors and co-designers (Callens 2022). Hence, the modes of interaction might provide us with a general theoretical framework from which context specific roles of user involvement can be constructed. This would also be the reason why our profiles match well with service management literature on user involvement in collaborative innovation processes (e.g. Baldwin and von Hippel 2011; Sørensen and Torfing 2018).

Second, the hybridity of the profiles might also mean that the viewpoints of the users in the studied innovation processes are different from their actual role in the innovation process, on which the theoretical roles were based. This argument is particularly supported by the surprising fact that the self-organizer role is totally absent in our empirical profiles. None of the distinguishing statements were positively ranked in all three the profiles, and even the non-distinguishing statements were either neutral or negatively ranked. This is remarkable because both Torvinen and Haukipuro (2018) and Callens (2022) found a similar role to the self-organizer in their studies, i.e. resp. the 'controller' and 'user-innovator'. Furthermore, a significant part of the innovation literature emphasizes the importance of the role of such a 'user-innovator' in service design processes (Oliveira and von Hippel 2011). User-innovators are on the leading edge of new trends, have knowledge and experiences about the local implementation context, and often innovate on their own (Oliveira and von Hippel 2011), which resembles features of the self-organizer role, and relates to the innovation projects we studied.

The absence of a profile that relates to the self-organizer should not necessarily mean that self-organizers are absent in these processes. It might also mean that self-organizers are too dependent on the partnership to develop the innovation, and their viewpoints are therefore captured by the co-designer or even the hands-off supporter profile. Regarding the latter, we have some tentative case evidence that some of the partnerships in the hands-off supporter profile actually established important opportunities for user involvement and collaboration, but past experiences with similar collaborations might have negatively influenced their viewpoints. Hence, these users could perceive user involvement as a process that is largely guided by the partnership, and that they are not able to significantly shape the course of the innovation process, even when they have all the features of self-organizers. This is actually confirmed by Callens (2022), who shows that the user-innovators are more likely to collide with the design framework (and corresponding rules and procedures) of the partnership, which hinders them in

fully implementing their own ideas. This also implies that features of the partnership (e.g. set-up of the user involvement or past collaboration experiences) might influence the viewpoints of the users, which might be why we observe hybrid empirical profiles.

Third, the hybridity of the profiles might also mean that we have discovered a underlying theoretical mechanism that is more suitable to separate the different types of users. Indeed, one key element distinguishes the three empirical profiles: whether the users view themselves as *external stakeholders* who observe the innovation process at a distance (i.e. service consultants and hands-off supporters), or as *internal stakeholders* who are part of the innovation process (i.e. co-designers). Users who see themselves as external stakeholders will be motivated by the prospect to contribute to the innovation process, without being responsible for the outcome, while users who view themselves as internal stakeholders will be motivated by the prospect to influence the innovation as they see fit. We see this somewhat reflected in the differences between the countries, where respondents from countries with a larger power distance (i.e. Spain and Belgium) view themselves more as external stakeholders at a distance from the service provider (i.e. service consultants or hands-off supporters), while respondents from countries with a stronger tradition of user participation (i.e. Denmark and Estonia) view themselves more as internal stakeholders, which are closely involved in the collaboration (i.e. co-designers).

Practical implications and future research

The findings suggest that service providers who want to engage users in the innovation process should recognize the differences in how these users envision user involvement. Network management strategies directed towards the exploration and connection of these perceptions might help to increase the performance of user involvement as expectations of the service providers and users become better aligned (Klijn et al. 2010). Similarly, process agreements which depict in advance what the service provider wants to accomplish with the user

involvement and what role users can play in the innovation process might help in communicating the expectations of the service provider and clearly establishing the role of the users during the innovation process (Klijn et al. 2010).

Furthermore, project coordinators should be aware that there can be differences between the roles the users adopt in the innovation process. Indeed, users that see themselves as service consultants might also act as consultants, which means that the user might expect to be guided by the partnership. In contrast, co-designers perceive themselves as an inherent part of the collaboration, and might be given more responsibilities. Project coordinators should recognize these differences, and manage the user involvement process accordingly.

Our research design and methodology has several advantages, but also comes with some limitations. The value of this study was its wide scope with regard to the collaborative innovation processes and user groups that are involved. We considered (similar) eHealth collaborations between public and private actors in five European countries, and we also looked at a realistic group of users, including both individual service users and user representatives. This approach helped us to formulate conclusions that are relevant for other European countries and innovation projects. However, less homogeneous samples also introduce more degrees of freedom to explain patterns, which makes a thorough explanation of the found patterns challenging. Moreover, the complexity of the selected policy sector (i.e. eHealth sector), might have influenced the perspectives of the respondents (i.e. users). Furthermore, Q-methodology is in essence a descriptive tool and not a method that allows researchers to explain patterns, which means that future quantitative and qualitative research should investigate these patterns in more detail.

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Tables

Table 1: Characteristics of user roles

Legitimators…	Customers…	Partners…	Self-organizers…
• Give support to services, but have no active role in the service process • Check that rights are protected and watch over the correct application of regulation • Are involved to listen and receive information from the service provider	• Check that services are client-centred • Are being consulted by the service provider to communicate preferences and quality expectations • Give their user experiences of working with services	• Behave as partners of the service provider and are actively involved in the service process • Jointly make decisions and co-create with the service provider • Exchange views and experiences, and align goals and perspectives	• Are the central actor in the service process • Take initiative and responsibility in the service process • Are being supported by the service provider with regard to the scope and resources for the services, but actions are minimally steered by the service provider

Table 2: The Q-set

Dimensions/Roles	Legitimator	Customer	Collaborator	Self-organizer
Motives to participate	1. Users should be involved primarily to create support for the innovation	7. Users want to be involved primarily to indicate what they perceive as an exquisite end product	13. Involved users especially want to be recognized as partners	19. Users should tackle user issues themselves instead of waiting for others to do it
	2. Users are especially involved to check whether the rights of those they represent are guaranteed	8. Involved users should above all check how user-oriented the innovation is	14. Users should be involved because they can have alternative views, useful for the other partners	20. Users know best how to develop and organize service delivery
Activities of involved users	3. The majority of users is there predominantly to listen to what the partners have to say	9. Involved users have to advise the partnership about how to increase user satisfaction	15. Users and the other partners should jointly define the problem and the solution	21. Users can best define problems and solutions
	4. Users best leave development of innovations to others	10. Just like a company asking its customers about its products, the partnership needs to consult the users about their preferences	16. Equal contributions of users and other partners (co-creation) is the only way to create relevant innovations	22. Users should set and guard the direction for the innovation process
Role of the service partnership towards user involvement	5. The users should be well-informed by the partnership because the innovation can then be easily accepted	11. The partnership should enable the involved users to see how the innovation works in reality	17. A crucial task of the partnership is to ensure joint decision making between the involved users and the other partners	23. The main role of the partnership is to provide the resources to develop proposals of the users
	6. The partnership actors are there to make sure that the input of the users and other actors certainly does not go against the regulative framework (e.g. legislation)	12. The principal concern of the partnership is letting involved users voice what quality they expect from the innovation	18. The partnership should primarily align the different goals of the involved users and the other partners	24. The partnership should maximally give room to the involved users to develop their own proposals for the innovation

Table 3: Matrix of the statements and empirical profiles

	Dimension	Statement	Factor 1	Factor 2	Factor 3
Legitimator	Motives	1. Users should be involved primarily to create support for the innovation	-1	-1	3*
		2. Users are especially involved to check whether the rights of those they represent are guaranteed	0	-2	-1
	Activities	3. The majority of users is there predominantly to listen to what the partners have to say	-3*	-2*	-2*
		4. Users best leave development of innovations to others	-2*	-3*	0*
	Role of service provider	5. The users should be well-informed by the partnership because the innovation can then be easily accepted	3*	0*	1*
		6. The partnership actors are there to make sure that the input of the users and other actors certainly does not go against the regulative framework (e.g. legislation)	0*	-1*	2*
Customer	Motives	7. Users want to be involved primarily to indicate what they perceive as an exquisite end product	0*	-1	-1
		8. Involved users should above all check how user-oriented the innovation is	1	0	1
	Activities	9. Involved users have to advise the partnership about how to increase user satisfaction	2	0*	1
		10. Just like a company asking its customers about its products, the partnership needs to consult the users about their preferences	2	0*	1
	Role of service provider	11. The partnership should enable the involved users to see how the innovation works in reality	1	1	2
		12. The principal concern of the partnership is letting involved users voice what quality they expect from the innovation	-2*	2*	0*
Partner	Motives	13. Involved users especially want to be recognized as partners	-2*	-1*	0*
		14. Users should be involved because they can have alternative views, useful for the other partners	2*	1	0
	Activities	15. Users and the other partners should jointly define the problem and the solution	1*	2*	-1*
		16. Equal contributions of users and other partners (co-creation) is the only way to create relevant innovations	-1	3*	-1
	Role of service provider	17. A crucial task of the partnership is to ensure joint decision making between the involved users and the other partners	1*	2*	0*
		18. The partnership should primarily align the different goals of the involved users and the other partners	0*	1*	2*
Se lf-	Motives	19. Users should tackle user issues themselves instead of waiting for others to do it	0*	-2	-1

		20. Users know best how to develop and organize service delivery	-1	-1	-3*
	Activities	21. Users can best define problems and solutions	0	1	-2*
		22. Users should set and guard the direction for the innovation process	-1	0*	-2
	Role of service provider	23. The main role of the partnership is to provide the resources to develop proposals of the users	-1*	0	0
		24. The partnership should maximally give room to the involved users to develop their own proposals for the innovation	1	1	1

*Distinguishing statements (i.e. statements that are significantly differently ranked in one factor as opposed to the other factors, with $p < 0.01$)

Table 4: Representation of countries, users, and partnerships in profiles

	Service consultants (N=18)	**Co-designers (N=20)**	**Hands-off supporters (N=12)**
Countries			
Belgium	16.67%	25.00%	50.00%
The Netherlands	16.67%	15.00%	25.00%
Spain	61.11%	5.00%	16.67%
Estonia	-	30.00%	8.33%
Denmark	6.00%	25.00%	-
Users			
Individual service users (i.e. health professionals) (N=46)	88.89%	60.00%	58.33%
User representatives (N=15)	11.11%	40.00%	41.67%
Partnerships			
All partnerships (N=19)	B1, B4, N1, N2, N4, S1, S2, S3, S4, D2	B1, B2, B5, N1, N2, N4, S2, D1, D2, D3	B1, B2, B3, N1, N2, S2, E2
Excluding overlapping partnerships (N=10)	B4, S1, S3, S4	B2, B5, D1, D3	B3, E2

Table 5: Main characteristics of the identified profiles, based on the relative rankings of the distinguishing statements

Service consultants	Co-designers	Hands-off supporters

• Users are well-informed by the partnership (+3)
• Users introduce alternative ideas that are useful for the partnership (+2)
• Users are not involved to…
  ○ listen to the partnership (-3)
  ○ voice what quality they expect from the innovation (-2)
  ○ be recognized as partners (-2)
• It's not the partnership's role to provide the resources to develop the proposals of the users (-1)
	• Users co-create with the partnership (+3)
	• There is joint decision-making between the users and the partnership (+2)
	• Users and the partnership jointly define the problem and solution (+2)
	• Users voice what quality they expect from the innovation (+2)
	• Users should not leave the development of the innovation to others (-3)
	• It's not the partnership's role to check that users' ideas do not go against regulation (-1)
		• Users are involved to create support for the innovation (+3)
		• The role of the partnership is …
		  ○ to check that users' ideas do not go against regulation (+2)
		  ○ to align the goals of the users and partnership (+2)
		• Users do not know best how to develop and organize services (-3)
		• Users are not best at defining problems and solutions (-2)
		• Users should not jointly define the problem and solution with the partnership (-1)

Online annex

Table A1: Methodological steps

Step 1: Constructing the Q-set
Selecting statements that represent the discourses: • Deductive approach (e.g. Nederhand et al. 2019; Warsen et al. 2020): using academic literature as a basis; • Inductive approach (e.g. van Eijk and Steen 2014; Molenveld et al. 2019): using explorative interview This paper uses the deductive approach as we aim to compare theoretical roles with empirical profiles. However, a document analysis was also performed to enrich these roles with empirical data.
Selection of multiple types of statements in order to eliminate gaps and overlaps between statements, and properly represent the discourses: • Typology of Dryzek and Berejikian (1993): four types of statements: 1) definitive statements ('concerning the meaning of terms'), 2) designative statements ('concerning questions of facts'), 3) evaluative statements ('concerning the worth of something that does or could exist'), and 4) advocative statements ('concerning something that should or should not exist'). • This paper employs the *designative* and *advocative* statements, as they are broadly used in public administration research (e.g. van Eijk and Steen 2014; Nederhand et al. 2019; Molenveld et al. 2019; Warsen et al. 2020) • Three dimensions: 1) the *motives* the users have to be involved, 2) the *activities* the users conduct during their involvement, and 3) the *role of the service providers* during the user involvement • 24 statements: two statements for each dimension (and four theoretical roles in total), of which one designative and one advocative.
Step 2: Defining the P-set
Case selection criteria: • Formally established collaborations (i.e. no informal networks) between public and private stakeholders in the health sector: o Health sector is established policy field in coproduction literature (e.g. Van Eijk and Steen 2014; Gremyr et al. 2018; Sangill et al. 2019; Daya et al. 2019) o Technological innovation in health sector is high priority for European Commission (European Commission 2018), but research is limited (Andreassen, Kjekshus and Tjora 2015) • Two types of collaborations: partnerships coordinated by the public actor and partnerships coordinated by the private actor • Five European countries: Belgium, the Netherlands, Denmark, Estonia, Spain o Research is part of European Horizon 2020 framework program o Countries represent four continental European administrative traditions (Pollitt and Bouckaert 2017), and the two most common healthcare systems (Böhm et al. 2013). • Creation and adoption (or at least thorough testing) of eHealth innovations:

- eHealth innovations regarding administrative simplification and the digitalization of information (e.g. virtual networks for patient information exchange, central patient registration platforms, and central communication systems for monitoring patients)
- eHealth technologies related to telehealth and mobile health tools, and smart devices (e.g. health technologies using motion sensors, mobile apps, smart cameras, robots, and security systems)

Selection of 19 eHealth collaborations in Belgium (5), the Netherlands (4), Spain (4), Estonia (3), and Denmark (3). See also table A3.

Selection of respondents:

- Health professionals (e.g. GPs, nurses, physicians, therapists) and representatives of patients and health professionals
- The respondents were also involved in the projects, which prevented overly stereotypical assessments of user involvement (e.g. 'they never listen to us'), as the users had first-hand knowledge of how user involvement can be executed
- 61 users were selected:
  - Q-methodology requires a proportional amount of respondents for a given number of statements (most often a 1:1 ratio) (Watts and Stenner 2012),
  - Inclusion of more respondents because of inherent variance in research design (multiple countries, multiple types of actors in the partnerships, multiple types of eHealth services).
  - Studies conducted in multiple countries generally consider larger P-sets, and manage to obtain valid results (e.g. ratio of 5:1 in Warsen et al. 2020).

Step 3: Conducting the Q-sort

- Pilot testing of Q-sorts in one of the countries (Belgium), on similar respondents
- First presorting of the statements into three piles (disagree; neutral; agree)
- Final sorting through fixed structure (-3; 3) (e.g. Watts and Stenner 2012), using Q Method Software

Step 4: Factor analysis

- Factor analysis through KenQ software package;
- Calculation of correlation matrix, eigenvalues, factor loadings
- Cumulative selection criteria for retainable/valid factors:
  - Kaiser-Gutmann criterion: eigenvalue of factor equal or greater than 1 (Watts and Stenner 2012)
  - At least two statistically significant factor loadings of factor, calculated by $1.96 \times 1/\sqrt{}$(Number of items), $p < 0.05$ (Watts and Stenner 2012)
  - Explained variance of the factor at least 7% and the cumulative variance of the selected factors larger than 30% (Molenveld et al. 2019)
- Varimax rotation of selected factors

Table A2: Operationalization of the Q-set

Role	Characteristics	Statements
Legitimators	Check that rights are protected and watch over the correct application of regulation	Users are especially involved to check whether the rights of those they represent are guaranteed (motives/designative)
		The partnership actors are there to make sure that the input of the users and other actors certainly does not go against the regulative framework (e.g. legislation) (role service provider/advocative)
	Give support to services, but have no active role in the development of the services	Users should be involved primarily to create support for the innovation (motives/advocative)
		Users best leave development of innovations to others (activities/advocative)
	Receive transparent information from the service provider	The majority of users is there predominantly to listen to what the partners have to say (activities/designative)
		The users should be well-informed by the partnership because the innovation can then be easily accepted (role of service provider/advocative)
Customers	Check that services are client-centered	Involved users should above all check how user-oriented the innovation is (motives/advocative)
		Involved users have to advise the partnership about how to increase user satisfaction (activities/designative)
	Are being consulted by the service provider to communicate preferences and quality expectations	Just like a company asking its customers about its products, the partnership needs to consult the users about their preferences (activities/advocative)
		The principal concern of the partnership is letting involved users voice what quality they expect from the innovation (role of service provider/designative)
	Give their user experiences of working with services	Users want to be involved primarily to indicate what they perceive as an exquisite end product (motives/designative)
		The partnership should enable the involved users to see how the innovation works in reality (role of service provider/advocative)
Partners	Behave as partners of the service provider and are actively involved in the service process	Involved users especially want to be recognized as partners (motives/designative)
		Users and the other partners should jointly define the problem and the solution (activities/advocative)
	Jointly make decisions and co-create with the service provider	A crucial task of the partnership is to ensure joint decision making between the involved users and the other partners (roles of the service provider/designative)
		Equal contributions of users and other partners (co-creation) is the only way to create relevant innovations (activities/advocative)
	Exchange views and experiences, and align goals and perspectives	Users should be involved because they can have alternative views, useful for the other partners (motives/advocative)
		The partnership should primarily align the different goals of the involved users and the other partners (role of the service provider/advocative)
Self-organizers	Are the central actor in the service process	Users should tackle user issues themselves instead of waiting for others to do it (motives/designative)
		Users know best how to develop and organize service delivery (motives/advocative)
	Take initiative and responsibility in the service process	Users can best define problems and solutions (activities/designative)
		Users should set and guard the direction for the innovation process (activities/advocative)
	Are being supported by the service provider with regard to the scope and resources for the services, but actions are minimally steered by the service provider	The main role of the partnership is to provide the resources to develop proposals of the users (role of the service provider/designative)
		The partnership should maximally give room to the involved users to develop their own proposals for the innovation (role of the service provider/advocative)

Table A3: The P-set

Cases			Selected partnerships	User involvement	Selected users
Belgium	Mixed Napoleonic adm. regime Etatist Social Health Ins.	B1	Partnership between multiple national government agencies, ministerial cabinet, multiple hospital networks, regional governments, private health suppliers, and insurance organizations, and user organizations which created a national portal website that connects patient information from different healthcare organizations.	Presence of patient representatives in 'core team' of project	Patient organization (1), organization for elderly people (1), user experience organization (1), GP association (2)
		B2	Partnership between private nursing organizations and federation, ministerial cabinets, national government agencies, hospital networks, individual GPs, and several private health organizations, which created a web-tool that allows general practitioners to access patient information from home care organizations	Several GPs were involved throughout the project	GPs (3)
		B3	Partnership between universities, private health organizations, national and regional government agencies, red cross organizations, knowledge organizations, ICT suppliers, and individual health professionals, which created a new way to create, validate, and disseminate official evidence-based guidelines and principles for healthcare professionals.	GPs and health professionals initiated the project, and were involved throughout the project	GPs (2)
		B4	Partnership between public nursing home (local government), private construction companies and contractors, consultant companies, nurses, and patients, which created several technologies (wearables, smart cameras, …) that are implemented in a nursing home, with the purpose to facilitate residents and health staff in their daily activities	Health professionals and patient (representatives) involved in conceptual phase and testing phase	Healthcare professionals (3)
		B5	Partnership between municipalities, communal network, private hospitals, private ICT companies, consultant companies, citizens, and health professionals, which created an online platform that connects citizens with healthcare and social care demands with volunteers.	Citizens involved in conceptual phase and testing phase	Care-dependent citizens (3)
The Netherlands	Continental adm. regime Etatist Social Health Ins.	N1	Partnership between municipality, public hospital, and several private health organizations, which created a digital platform that allow the exchange of health information between patients and healthcare providers	Patient (representatives) and health professionals involved in pilot testing	Patient organizations (2), GP (2)
		N2	Partnership between municipality (departments of social affairs, ICT, and service quality), private health care provider, neighbourhood teams, citizens, which created an online platform that stimulates the establishment of local neighbourhood collaborations between service providers and clients.	Family of patients and nurses involved in pilot testing	Healthcare professionals (4)
		N3	Partnerships between semi-private association, software developer, and patient organization, which created a system of tracking technologies that supports patients to freely walk around in the nursing home.	Family of patients and nurses involved in pilot testing	Nurses (2)
		N4	Partnership between semi-private association, ICT company, consultant company, which created a diaper in which sensors are integrated which automatically detect defecation and signal this to the staff.	Health professionals and patient (representatives) involved in conceptual phase and testing phase	Healthcare professionals (2)
Spain	Napoleonic	S1	Partnership between several public hospitals, private ICT companies, several patient organizations, university, which created several hard- and software innovations for hospital services (i.e. digital prescription and appointment systems, robot for automatic storage and dispensing)	Health professionals involved in conceptual phase and patient	Pharmaceutical (2), medical specialists (1)

				associations involved in testing phase	
		S2	Partnership between public hospital/health service, regional government, ICT companies, consultancy companies, several other private companies, universities, health professionals and patients, which created digital systems for integrated, patient-centred home health care for chronic patients	Patients, health professionals and social workers involved in conceptual phase and testing phase	Medical specialists (3)
		S3	Partnership between public hospitals and healthcare services, public research institute, private technology centre, several health professionals (e.g. psychiatrist, psychologists, physicians, etc.), which created an online application for computerised cognitive behaviour therapy (CCBT) that facilitates self-administered treatments	Health professionals involved in conceptual phase, patients involved in testing phase	Representative healthcare professionals (1), psychiatrist (3), GP (1), medical specialist (1), technical specialist (1)
		S4	Partnership between public hospitals, ICT and telecom companies, physicians, which created an AI-application that helps to diagnose eyesight related problems in uncooperative patients	Health professionals involved in conceptual phase, patients involved in testing phase	Medical specialists (3)
Estonia	Eastern-European adm. regime Etatist Social Health Ins.	E1	Partnership between ministry, government agencies and public authorities, ICT companies, private health care providers, physician associations, hospital associations, individual physicians, which created a central registration tool, as part of the national patient portal, which allow patients to book appointments with healthcare providers.	Various health care providers (public and private) involved in different phases of the process	Representatives of public and private healthcare providers (3)
		E2	Partnership between ministries, public health insurance authority, government agencies, physician association, interest groups, which created a new service that integrates patients' applications for disability, rehabilitation services, and general aids.	Representatives of user organizations and target groups involved in conceptual phase and children and parents involved in testing phase	Representatives of user organizations and target groups (3)
		E3	Partnership between ministry, public health insurance authority, colleges, network of healthcare providers, ICT companies, several health care organizations, which created a voice command app with digitalised guidelines that facilitates the execution of specific procedures by the healthcare provider	Health care providers (public and private) involved in conceptual phase, individual nurses involved in testing phase	Nurses (2)
Denmark	Nordic adm. regime National Health Service	D1	Partnership between a regional government, municipalities, public hospitals, ICT company, representatives of health professionals, which created an e-learning tool that allows healthcare staff to learn about dysphagia.	Health care providers involved in conceptual phase, individual nurses and social workers involved in testing phase	Healthcare professionals (3)
		D2	Partnership between public hospital, ICT company, health professionals, which created a mobile app for patient reported outcomes	Nurses involved in the conceptual phase and the testing phase of the project	Nurses (3)
		D3	Partnership between a public hospital, university, ICT and health service companies, patient associations, health professionals, which created a mobile app for patients with osteoporosis that communicates the results of bone scans	Clinical staff, GPs and patients involved throughout the project	Patient organizations (2), healthcare professional (1)

Table A4: Relative ranking of distinguishing statements for 'service consultants'

Statements	***Service consultants***	*Co-designers*	*Hands-off supporters*
The users should be well-informed by the partnership because the innovation can then be easily accepted	**3**	0	1
Users should be involved because they can have alternative views, useful for the other partners	**2**	1	0
Users want to be involved primarily to indicate what they perceive as an exquisite end product	**0**	-1	-1
Users should tackle user issues themselves instead of waiting for others to do it	**0**	-2	-1
The partnership should primarily align the different goals of the involved users and the other partners	**0**	1	2
The main role of the partnership is to provide the resources to develop proposals of the users	**-1**	0	0
The principal concern of the partnership is letting involved users voice what quality they expect from the innovation	**-2**	2	0
Involved users especially want to be recognized as partners	**-2**	-1	0
The majority of users is there predominantly to listen to what the partners have to say	**-3**	-2	-2

Table A5: Relative ranking of distinguishing statements for ‘co-designers’

Statements	***Co-designers***	*Service consultants*	*Hands-off supporters*
Equal contributions of users and other partners (co-creation) is the only way to create relevant innovations	**3**	-1	-1
Users and the other partners should jointly define the problem and the solution	**2**	1	-1
A crucial task of the partnership is to ensure joint decision making between the involved users and the other partners	**2**	1	0
The principal concern of the partnership is letting involved users voice what quality they expect from the innovation	**2**	-2	0
Users should set and guard the direction for the innovation process	**0**	-1	-2
Involved users have to advise the partnership about how to increase user satisfaction	**0**	2	1
The users should be well-informed by the partnership because the innovation can then be easily accepted	**0**	3	1
Just like a company asking its customers about its products, the partnership needs to consult the users about their preferences	**0**	2	1
The partnership actors are there to make sure that the input of the users and other actors certainly does not go against the regulative framework (e.g., legislation)	**-1**	0	2
Users best leave development of innovations to others	**-3**	-2	0

Table A6: Relative ranking of distinguishing statements for ‘hands-off supporters’

Statements	***Hands-off supporters***	*Service consultants*	*Co-designers*
Users should be involved primarily to create support for the innovation	**3**	-1	-1
The partnership should primarily align the different goals of the involved users and the other partners	**2**	0	1
The partnership actors are there to make sure that the input of the users and other actors certainly does not go against the regulative framework (e.g., legislation)	**2**	0	-1
Involved users especially want to be recognized as partners	**0**	-2	-1
Users best leave development of innovations to others	**0**	-2	-3
A crucial task of the partnership is to ensure joint decision making between the involved users and the other partners	**0**	1	2
Users and the other partners should jointly define the problem and the solution	**-1**	1	2
Users can best define problems ánd solutions	**-2**	0	1
Users know best how to develop and organize service delivery	**-3**	-1	-1

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