

Mind the gap: Citizens' expectations and public servants' perception about innovation characteristics.

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Abstract

Growing research in recent decades about public sector innovation has revealed that many innovations fail because they do not fully meet expectations of citizens. In this study we provide an explanation for this phenomenon. We show that public servants have a simplified view on expectations of citizens towards public sector innovations. Methodologically, we demonstrate this based on Q-sort exercises with both Swiss citizens (n=106) and Swiss public servants (n=33). We found discrepancies between citizens' expectations and public servants' perceptions about these expectations. We identify eight citizen groups representing each distinctive preferences regarding innovation characteristics (e.g., result-centric, trust-centric, certainty-centric, customer-centric, participation-centric). Though, our results reveal that public servants underestimate the heterogeneity of citizens' expectations when innovating. Most importantly, public servants neglect expectations of citizens related to their role as democratic participants (e.g., citizen involvement, impacts on public finances and rule of law). Our study provides insights into the discrepancies between heterogeneous expectations of citizens towards innovation and public servants' perception of what citizens want.

Keywords: Public sector innovation; innovation characteristics; Q-methodology; public organizations.

Evidence for practice:

- Innovation characteristics play a crucial role for citizens when deciding about using and supporting public sector innovations. Eight innovation characteristics have been explored: complexity, relative advantage, compatibility, trialability, observability, trust, adoption costs, and controversy. All innovation characteristics are relevant to at least certain citizen groups, whereas eight groups were identified: result-centric, trust-centric, certainty-centric, cost- and rule-of-law-centric, customer-centric, result-centric and certainty-oriented, participation-centric, and rule-of-law-centric and prestige-oriented.
- Citizens have heterogeneous expectations regarding innovation characteristics when deciding to adopt or not to adopt a public sector innovation. However, public servants do not fully grasp the heterogeneity of citizens' expectations. This might lead to the neglect of the expectations of parts of society in the PSI process. As a result, innovations are perceived illegitimate and lack support and adoption by certain groups.
- There is no dominant strategy to increase the likelihood of innovation adoption but rather a constant balancing of preferences. Thus, a profound understanding of expectations in society, in specific groups and regarding specific innovations and/or policy fields is necessary. Most importantly, public servants need to acknowledge the multiple perspectives citizens take when deciding about innovation adoption (e.g., user, taxpayer, voter) resulting in diverging and sometimes even conflicting expectations.

Introduction

Public sector innovation (PSI) is acknowledged both by scholars and practitioners as a vital factor of the governments' efficiency, effectiveness, legitimacy, and its problem-solving capacity (Damanpour & Schneider, 2009; De Vries, Bekkers, & Tummers, 2016; Demircioglu, 2020; Kaur, Buisman, Bekker, & McCulloch, 2022; OECD, 2019a; OECD, 2017; Osborne & Brown, 2013; Torfing & Ansell, 2017). PSI research recently has focused on internal and external attributes of public sector organizations (PSO) required to foster and deliver innovations – often referred to as “innovation capacity” or capability (Boukamel, Emery, & Gieske, 2019; Clausen, Demircioglu, & Alsos, 2020; Gieske, Van Buuren, & Bekkers, 2016; Kaur, Buisman, Bekker, & McCulloch, 2022; Meijer, 2019; OECD, 2019a). Although these studies make vital contributions to PSI scholarship, to date “there has been less empirical attention given to the influence of characteristics of the innovation itself” on a successful innovation process as De Vries et al. (2016, p. 158) conclude in their systematic literature review on PSI.

A major gap in the current PSI literature is that a “street-level” perspective of citizens is missing (Vigoda-Gadot, Shoham, Schwabsky, & Ruvio, 2008, p. 323). Most PSI studies focus on central/ federal or state level governments (Arundel, Bloch, & Ferguson, 2019; Demircioglu & Audretsch, 2017; Dockx, Verhoest, Langbroek, & Wynen, 2023; Lapuente & Suzuki, 2020). As a result, citizens' expectations towards innovations, their characteristics and their influence on the innovation process are unknown. This gap is unfortunate because a poor understanding of innovation characteristics and their respective relevance for citizens might lead to a “perceived illegitimacy of change” (Singler & Guenduez, 2023), and innovation failures (Dudau, Kominis, & Szocs, 2018). For instance, if citizens do not perceive the innovative solution as useful, or trustworthy, they are less likely to use or support the innovation. The innovation itself or certain characteristics are perceived as a barrier to innovation (Borins,

2001; Cinar, Trott, & Simms, A systematic review of barriers to public sector innovation process, 2019; Demircioglu, 2018; Mu & Wang, 2022).

Consequently, for successful innovations, PSOs need to design and implement innovations in a way that citizens expectations regarding innovation characteristics are met (Salge & Vera, 2012; Torfing & Triantafillou, 2016). This requires public servants to profoundly understand citizens' expectations towards innovation characteristics. Yet, little is known to date about those expectations and public servants' understanding of them. In other words, a research gap exists not only for research and practice (Walker, Chandra, Zhang, & van Witte, 2019), but also between citizens' expectations and public servants' perceptions about them.

Against this backdrop, we argue the need to further analyze how innovation characteristics influence the perceived legitimacy of innovations by citizens, and as a result the willingness to use and support innovations. Building on precedent analyses of innovation characteristics and Q-sort exercises with both citizens (n=106) and public servants (n=33) in Switzerland, we aim to explore the characteristics' relevance for citizens, and potential discrepancies between citizens' expectations and public servants' perceptions about these expectations. For this purpose, we refer to the characteristics of innovation inspired by Rogers' diffusion of innovation theory (2003) and further developed for the public sector by several authors such as Carter and Bélanger (2005) and de Vries et al. (2018). These characteristics are intrinsic attributes of innovations such as ease of use or relative advantage (Rogers, 2003), in other words, they refer to the innovation itself. They "may increase or decrease the likelihood of [the innovations'] adoption, and/or the feasibility of their implementation. These attributes may be objective, or may simply be perceived subjectively" (Misuraca, et al., 2020, p. 13).

Even though, certain studies have analyzed the relevance of innovation characteristics for citizens (Carter & Bélanger, 2005; Rana, Dwivedi, & Williams, 2015) and other studies their

relevance for public servants (Damanpour & Schneider, 2009), a systematic comparison of these two perspectives is lacking. To compare the two perspectives, we are guided by the service quality model by Parasuraman et al. (1985, p. 44) that describes a “consumer expectation - management perception gap”. This gap implies discrepancies between consumer expectations and management perceptions about them, and has been applied to the public sector in several studies (Menezes, Pedrosa, & Silva, 2022). For these reasons, it is well-suited as conceptual foundation for our research objective. With this in mind, we pose the following research question: Which expectations towards innovation characteristics do citizens have, and how do public servants perceive these expectations?

In answering this research question, we provide insights into the discrepancies between heterogeneous expectations of citizens towards innovation and public servants’ perception of what citizens want. In doing so, the study makes three major contributions to PSI literature: First, by further validating the innovation characteristics and their relevance for PSI from a citizens’ perspective, this study provides a holistic, bottom-up (e.g., citizen-based), and more comprehensive approach. Even though broadly acknowledged by scholars (Misuraca, et al., 2020), there is less empirical evidence for the relevance of innovation characteristics to citizens so far (De Vries, Bekkers, & Tummers, 2016). In doing so, the study further demonstrates the heterogeneity of citizens’ expectations towards innovation characteristics, and identifies eight citizen groups representing each distinctive preferences regarding innovation. Second, by identifying potential perception gaps between citizens and public servants through the lens of citizens and practitioners, this study aims to fill the gap between scholars and practitioners (Lidman, 2023; Walker, Chandra, Zhang, & van Witte, 2019). Such discrepancies might hinder public servants to design and implement innovation in a way that citizens’ expectations are met. Third, we contribute to a better understanding of the influence of innovation

characteristics for PSI, and reveal further research needs and practical implications for PSOs to increase innovation adoption.

The remainder of this study is structured as follows. In the next section we introduce PSI and innovation characteristics, give an overview about the current state of research, and present the concept for the perception gap. In the third section we present the methodological approach. In fourth section we outline the results. In the fifth section we discuss both theoretical and practical conclusions, and describe limitations and areas of further research. Last, we draw major conclusions from our study.

Theoretical background

Public sector innovation and its characteristics

PSI is defined as a process in which products or services, processes and institutional arrangements evolve that (1) are characterized by a significant differentiation from the organization's previous products, processes or institutional arrangements; (2) are new or novel to the organization; (3) and have been introduced on the market or brought into use by the organization and relevant partners in the state ecosystem, regardless of whether innovations are incremental or disruptive changes (Misuraca, et al., 2020; OECD, 2015; Vassallo, Banerjee, Zaman, & Prabhu, 2023; Vivona, Demircioglu, & Raghavan, 2021). In addition, relevant stakeholders must also perceive and acknowledge the innovation as described above (Schedler & Guenduez, 2023). Since our study is about citizens' perceptions of innovation, we focus on products or services that involve direct interactions between citizens and public administration (van der Wal, 2017) in contrast to processes and institutional arrangements.

As mentioned earlier, PSI adoption by citizens is influenced by the intrinsic characteristics of the innovation. If their expectations about the characteristics are not met (e.g., in the design or

implementation of a new service), citizen might perceive the innovation as illegitimate resulting in the denial to use or support the innovation (Singler & Guenduez, 2023), or simply the innovation fails (Dudau, Kominis, & Szocs, 2018). These findings are built on Rogers' diffusion of innovation theory (2003) which describes the personal decision process for adopting an innovation. He identifies five innovation characteristics that are relevant in this process: (1) complexity, (2) relative advantage, (3) compatibility, (4) trialability, and (5) observability. Several public administration studies have used these innovation characteristics (Carter & Bélanger, 2005; Damanpour & Schneider, 2009; Lee, 2004; Misuraca, et al., 2020; Rana, Dwivedi, & Williams, 2015). Scholars further developed the characteristics for the public sector and included (6) trust (Carter & Bélanger, 2005), (7) adoption costs (De Vries, Tummers, & Bekkers, 2018), and (8) controversy (Singler, 2023).

(1) Complexity (also referred to as ease of use) is “the degree to which an innovation is perceived as relatively difficult to understand and use” (Rogers, 2003, p. 257). Research findings show that the less complex an innovation is the more likely citizens will adopt the innovation (Carter & Bélanger, 2005). Complexity might be caused by the intellectual, procedural, or technical difficulty associated with understanding and using the innovative solution (e.g., if previous knowledge required) (Damanpour & Schneider, 2009). In literature reviews Cinar et al. (2019) and Rana et al. (2015) support the relevance of complexity for PSI highlighting among others technical difficulties as a major obstacle for adopters.

(2) Relative advantage is “the degree to which an innovation is perceived as being better than the idea it supersedes” and “is often expressed as economic profitability, as conveying social prestige, or in other ways” depending on the innovation and preferences of potential adopters (Rogers, 2003, p. 229). For instance, it pertains to the idea that a new system enables users to complete a task with greater effectiveness or efficiency compared to the existing system. Even though, scholars frequently find evidence for a positive relationship between perceived relative

advantage and intention to adopt an innovative solution (De Vries, Tummers, & Bekkers, 2018; Rana, Dwivedi, & Williams, 2015), there is also evidence that puts these results into perspective for the citizen perspective (Carter & Bélanger, 2005; Rana, Dwivedi, & Williams, 2015). These differences might be explained by the great heterogeneity of innovations and individuals (e.g., difference between public servants and citizens) (Damanpour & Schneider, 2009; Rana, Dwivedi, & Williams, 2015).

3) Compatibility is “the degree to which an innovation is perceived as consistent with the existing values, past experiences, and needs of potential adopters” (Rogers, 2003, p. 240). It is one of the most mentioned characteristics in PSI literature emphasizing the strong positive relationship between compatibility and intention to adopt innovations (Cinar, Trott, & Simms, 2019). Rogers (2003, p. 240) notes that “such compatibility helps the individual give meaning to the new idea so that it is regarded as familiar.” As such, the innovation can be “compatible or incompatible (1) with sociocultural values and beliefs, (2) with previously introduced ideas, or (3) with client needs” (2003, p. 240). More recent research also includes technical compatibility (e.g., existing devices or software) (Cinar, Trott, & Simms, 2019).

(4) Trialability is “the degree to which an innovation may be experimented with on a limited basis” as a mean “to dispel uncertainty about the new idea” (Rogers, 2003, p. 258). Thus, innovations which are less trialable have been found to be less likely to be adopted (Korteland & Bekkers, 2008; Rogers, 2003). Though, trialability is rarely analyzed in public management literature to date (De Vries, Tummers, & Bekkers, 2018).

(5) Observability is the degree to which the use and the results of an innovation are visible to others (De Vries, Tummers, & Bekkers, 2018; Rogers, 2003). Rogers (2003) suggests that the easier the use and its results can be observed and communicated to others, the more likely is a

broad adoption of an innovation. Like trialability, observability is rarely analyzed in public management literature (De Vries, Tummers, & Bekkers, 2018).

(6) Trust refers to the degree to which an innovation creates concerns about the adherence to rule of law principles (e.g., equal treatment, security, and privacy of personal data) (Bélanger & Carter, 2008; De Vries, Tummers, & Bekkers, 2018; Savoldelli, Codagnone, & Misuraca, 2014). The more concerns arise, the less likely citizens and public servants adopt an innovation (De Vries, Tummers, & Bekkers, 2018). This characteristic has gained importance due to the implementation of new technologies with potentially stark impacts on these principles such as artificial intelligence. Citizen acceptance of these technologies is highly dependent on how PSOs can create trust and transparency in the adherence to ethical and legal standards (Neumann, Guirguis, & Steiner, 2023).

(7) Adoption costs refer to the "costs of an innovation's implementation, with high costs decreasing an innovation's diffusion/adoption" (De Vries, Tummers, & Bekkers, 2018, p. 171). It has widely been examined in public management literature both from a public servant perspective (Damanpour & Schneider, 2009), and a citizen perspective (Rana, Dwivedi, & Williams, 2015).

(8) Controversy refers to the degree to which an innovation is affected by a political or ideological controversy, with strong controversy resulting in a decrease in innovation adoption (Singler, 2023). It is rooted in public policy literature stressing the need for consensus in public discourse to build legitimacy with all stakeholders (Cairney, 2019).

State of research and the context

As already indicated in the previous section, several studies use the innovation characteristics unchanged or with certain adjustments in their research on PSI and make vital contributions to

PSI scholarship (Carter & Bélanger, 2005; Damanpour & Schneider, 2009; Lee, 2004; Misuraca, et al., 2020; Rana, Dwivedi, & Williams, 2015). These studies examine the adoption of innovation either from a citizen or a public servant perspective, and conclude that innovation characteristics are relevant to innovation adoption by both groups (Cinar, Trott, & Simms, 2019). For instance, Damanpour and Schneider (2009, p. 511) found in their extensive study with public servants “that innovation characteristics increase the predictability of innovation adoption beyond the influence of environmental and organizational factors” in PSOs. The findings help understand how innovations within PSOs are adopted by leadership and staff. In contrast, Rana et al. (2015) conducted a meta-analysis of existing research on innovation adoption by citizens focusing on e-government initiatives. Likewise, the results support the relevance of innovation characteristics such as complexity and trust for citizen adoption. The results help public servants design and implement innovations in a way that citizens are likely to adopt them. While having explored each the public servant and citizen perspective separately little is known about whether public servants perceive citizen expectations about innovation characteristics correctly when designing and implementing innovations for them. Our study aims to close this gap (see figure 1).

Rogers’ diffusion of innovation theory and previous research on innovation characteristics in the public sector focus on the citizens as consumers or users. However, PSI and its adoption is also affected by other factors like politics and public opinion (Hartley, Sørensen, & Torfing, 2013; Misuraca, et al., 2020) in which citizens play a role as “democratic participants” or “coproducers” (Simonofski, Clarinval, Vanderose, & Dumas, 2021, p. 3). Thus, citizens’ perception of innovation characteristics must cover different citizens’ roles comprising customers/users, voters, taxpayers, co-creators and subjects of rights and duties. For instance, citizens might evaluate an innovation both by personal costs (user perspective), and the costs for society (taxpayer perspective). Against this backdrop, we conducted the study in

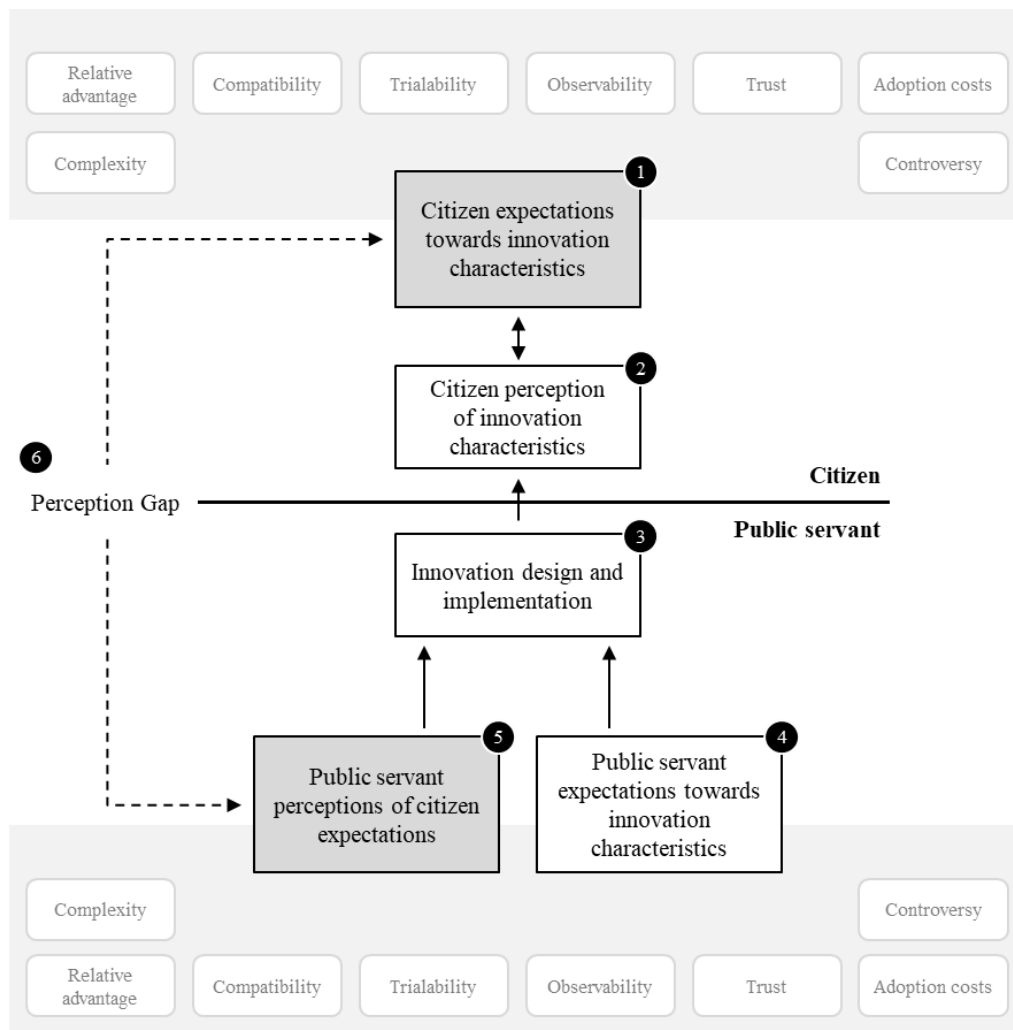
Switzerland. The Swiss institutional setting is marked by federalism, departmentalism, direct democracy and citizen participation, militia system, consensual system, and consociationalism, and requires many different actors to partake and consent – including citizens (Linder & Mueller, 2021). As a result, Swiss citizens are strongly and frequently engaged in various roles and on three state levels (e.g., quarterly public referenda on municipal, cantonal, and national level). This allows us to capture expectations towards innovation characteristics in the interplay of diverse citizen roles in an accentuated manner.

Accordingly, we incorporated the different above-mentioned roles in the definition of statements for this study. Table 3 gives an overview of the innovation characteristics, main sources, and statements defined for this study.

Conceptual foundation of perception gaps

This study analyzes potential perception gaps between citizens and public servants regarding innovation characteristics. The underlying concept for this objective is inspired by the service quality model developed by Parasuraman, Zeithaml and Berry (1985). It describes different gaps between consumers' expectations, perceived performance, and management perceptions of consumer expectations. For this study, we focus on one specific gap, the “consumer expectation - management perception gap” (Parasuraman, Zeithaml, & Berry, 1985, p. 44). This gap implies discrepancies between consumer expectations and management perceptions about them (Parasuraman, Zeithaml, & Berry, 1985). As outlined previously, we aim to analyze potential discrepancies between citizen expectations and public servant perceptions about these expectations. Figure 1 illustrates the conceptual foundation that has been drawn from existing literature (see previous section) and the model developed by Parasuraman, Zeithaml and Berry (1985).

Figure 1: Conceptual foundation.



Description

- 1 Citizens have expectations towards innovation characteristics which influence the likelihood that they adopt the respective innovation (Parasuraman, Zeithaml and Berry, 1985; Rana et al., 2015). For instance, citizens might expect great trustworthiness to adopt a new service.
- 2 Citizens perceive innovation characteristics and compare them with their expectations. Depending on the degree of how well their perception match with their expectation citizens are more likely to use and support the respective innovation (Parasuraman, Zeithaml and Berry, 1985; Rana et al., 2015).
- 3 Public servants design and implement innovations in a way that their own expectations towards innovation characteristics (Damanpour & Schneider, 2009) and citizen expectations as perceived by public servants are met (Parasuraman, Zeithaml and Berry, 1985; Rana et al., 2015).
- 4 Public servants have expectations towards innovation characteristics which influence the design and implementation of the respective innovation (Damanpour & Schneider, 2009). For instance, public servants might expect a new service to create cost-savings.
- 5 Public servants perceive citizen expectations towards innovation characteristics which they consider in the innovations' design and implementation (Parasuraman, Zeithaml and Berry, 1985; Rana et al., 2015).
- 6 As described by Parasuraman, Zeithaml and Berry (1985) we assume a perception gap implying discrepancies between citizens expectations and public servant perceptions about them. To date, little is known about this gap in PSI scholarship.

Methodology

This study applies the Q-methodology (Jick, 1979; Nederhand, Klijn, & Van der Steen, 2019; Stephenson, 1953; Stephenson, 1936) to both capture citizens' prioritization of innovation characteristics and public servants' expectations of citizens' priorities. Q-methodology is a quantitative interpretation technique based on the forced ordering of heterogeneous items and a subsequent inverted factor analysis (Stephenson, 1936). The items are self-referential statements that make an assertion about the research topic (Van Exel & De Graaf, 2005). This technique allows "to find qualitative 'order' even in domains where variability and disparity seem initially to have prevailed" (Watts & Stenner, 2005, p. 73) and can reduce social desirability bias (O'Reilly III, Chatman, & Caldwell, 1991). Whilst using a quantitative interpretation technique Q-methodology does not disregard that the results are socially constructed and reflect participants' and scholars' subjectivity (Dziopa & Ahern, 2011). In contrast to survey-based studies the selection of respondents is focused on population diversity and not on a representative population sample. Thus, respondents in Q-methodology are purposively sampled depending on the object under study (Brown, 2003; Webler, Danielson, & Tuler, 2009).

A main advantage of this method is, in contrast to other study designs, that it "takes a bottom-up approach to reveal individual differences beyond any prior assumptions", such as demographic or personality traits, and "generates evidence of individual differences based on the data per se" (Gao & Soranzo, 2020, p. 3). In other words, based on the collected data the inverted factor analysis first identifies groups of participants with similar responses. Only then scholars investigate for instance reasons for differences and commonalities (Gao & Soranzo, 2020). Additionally, participants' responses are based on a systematic comparison of statements presented simultaneously facilitating an accurate indication of subtle differences in their evaluation (Gao & Soranzo, 2020). As such, the method is well-suited for capturing

heterogenous perspectives and might result in counter-intuitive findings in comparison to other experimental or survey-based study results (Zabala & Pascual, 2016). Due to these advantages, public management and innovation literature scholars have applied Q-methodology (Guenduez, Mettler, & Schedler, 2020; Moellers, von der Burg, Bansemir, Pretzl, & Gassmann, 2019; Nederhand, Klijn, & Van der Steen, 2019; Rahim, Lallmahomed, & Ibrahim, 2011).

Concourse and Q-set

In the first step we derived manageable yet meaningful set of statements, which serves as approximation of all opinions about the topic under study, the so-called Q-set or Q-sample (Valenta & Wigger, 1997; Watts & Stenner, 2005). Unlike instrument development in survey-based research, there is no correct or universal procedure on how to determine the number, content, and wording of the statements (Stephenson, 1993). Further, the derivation of statements does not necessarily need to be theory-driven or comprehensive. More importantly, it needs to represent the topic under study in a broad and engaging way (Watts & Stenner, 2005). Against this background, Q-sets are derived from the so-called concourse that represents a large set of opinion statements about the object under study. The concourse might be based on qualitative interviews, existing literature or other methods or a combination of methods. For this study, we derived the statements from existing literature on innovation characteristics in the public sector. We focus on broader systematic literature reviews (Cinar, Trott, & Simms, 2019; De Vries, Tummers, & Bekkers, 2018; De Vries, Bekkers, & Tummers, 2016) and on studies focusing on innovation characteristics in the public sector (Carter & Bélanger, 2005; Damanpour & Schneider, 2009; Korteland & Bekkers, 2008; Rana, Dwivedi, & Williams, 2015). Next, the concourse must be reduced to a manageable number, such as to around 15 to 20 (Moellers, von der Burg, Bansemir, Pretzl, & Gassmann, 2019). We have derived 15 statements, which each represents one aspect of the eight innovation characteristics. These

statements form the Q-set of our study. As described by Rogers (2003), certain characteristics are more complex than others and comprise more than one aspect. Further, we reflect the different above-mentioned roles of citizens in the innovation process (i.e., user, democratic participant), which result in additional statements. Table 3 gives an overview of the innovation characteristics and a brief definition, the key sources, the statements. As outlined in the background section we have also incorporated statements that address citizens' perceptions as democratic participants (e.g., taxpayer). We have formulated 15 statements each for the citizen exercise and for the public servant exercise in order to capture potential differences between citizens' expectations and public servants' perceptions about these expectations. The statements are formulated as follows:

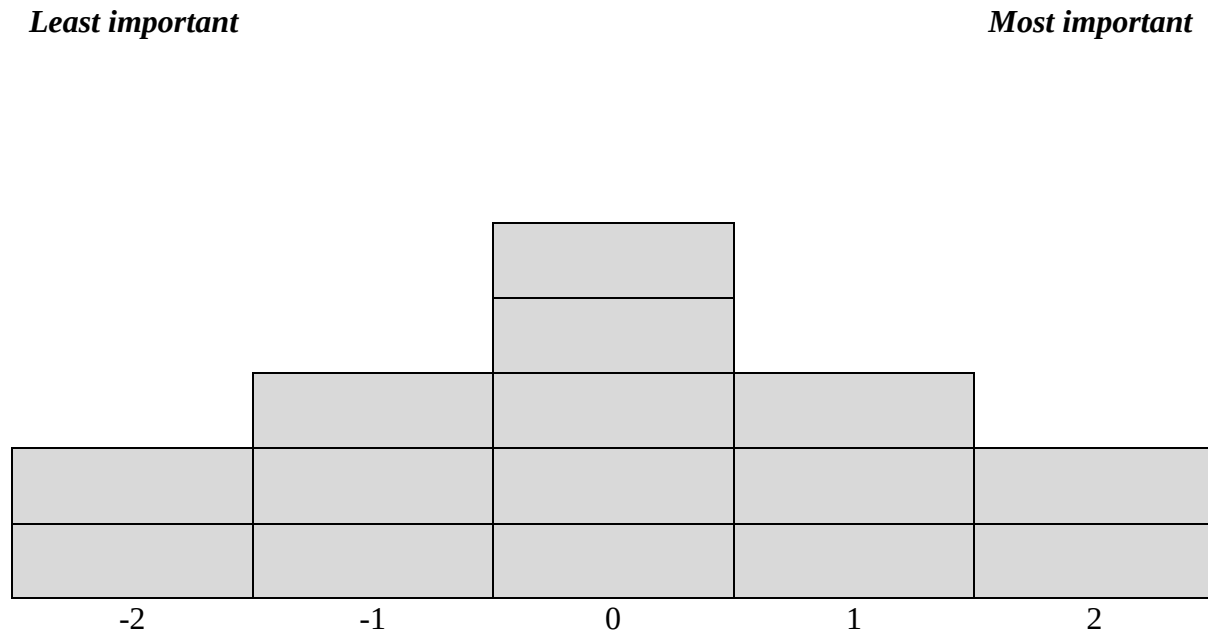
Statement in the exercise for citizens: I use and support a public sector innovation if the innovation is easy to understand and use.

Statement in the exercise for public servants: Citizens use and support a public sector innovation if the innovation is easy to understand and use.

Q-sorting

Secondly, we prepared the Q-sorting, the card-sorting exercise of statements. We used the online tool *Q-Sort Method Software* to set up the exercises, as done in other studies (Andrews, et al., 2020; Claassen, Bidet, Kim, & Choi, 2023). We included a simplified version of our definition of innovation, and specific instructions on how to do the sorting exercise online. The quasi-normal distribution for sorting the statements is shown in figure 2. Before publishing the exercises, we tested and calibrated both the comprehensibility of statements and the usability of the online tool with three public servants (one for each state-level) and four citizens (one for each participant group). The exercises were conducted in July 2023.

Figure 2: Applied quasi-normal distribution for the Q-sorting of 15 statements.



For recruiting of citizens as participants we engaged a professional poll organization. Scholars suggest participant sample sizes of between 12-40 people for Q-sort exercises (Brown, 2003; Webler, Danielson, & Tuler, 2009). Yet, to further ensure a broad diversity in our sample, we have defined and targeted the quotas presented in table 1 and strived for at least 25 participants each. These different groups based on year of birth and employment status receive different government services, and have distinctive relationships with the government and PSOs (e.g., tax payments, parenthood, education, care work, etc.). Moreover, broader age differences have been found to affect (among other factors) the willingness to adopt innovations (Madsen, Miller, & John, 2005). This approach helps combine different expectations towards innovation characteristics. In total, 106 participants responded the survey and all of them are Swiss nationals and residents. Approximately 55% of participants have education on tertiary level, 40% on secondary, and 5% on compulsory level (see table 1).

Table 1: Quotas for citizen exercise

Quota	Employment status	Year of birth	Number of participants
1	In training / education	1980-2005	28
2	Employed	1980-2005	26
3	Employed	1946-1979	26
4	Retired	1946-1964	26
Total	-	-	106

For the public servant exercise, we used two nonprobability sampling techniques (purposive and snowballing sampling) to ensure that participants are appropriate opinion leaders with well-developed views on the topic under study (Minichiello, Aroni, Timewell, & Alexander, 1995) and that opinions are given by managers who are in charge of innovation projects in the public sector (Laforet, 2013). Due to the distinct federalist institutional setting in Switzerland, innovation projects take place at different levels of government, and interactions between public servants and citizens differ in frequency, intensity, and topics. Therefore, we further strived for well-balanced representation of the three state-levels as demonstrated in table 2 and as suggested by other scholars such as Simonofski et al. (2021) who conducted a similar survey-based study in Belgium, likewise a federalist and multilingual country. In line with scholarship for Q-methodology (Brown, 2003; Webler, Danielson, & Tuler, 2009) we have strived for at least 25 participants in total. Overall, 33 public servants completed our survey. In contrast to the citizen exercise, we did not strive for 25 participant per quota assuming a greater inherent homogeneity among public servants compared to the citizen sample (e.g., employment status, occupation, educational background). Further, due to the purposive sampling we were able to ensure the integration of a diverse set of perspectives (i.e., gender, region, and occupation). Contrary to survey-based research, the objective in Q-methodology is not a representative and/or equally distributed sample but a diverse one capturing different perspectives (Zabala & Pascual, 2016).

Table 2: Quotas for public servant exercise

State-level	Number of participants
Federal level	10
Cantonal (regional) level	14
Municipal level	9
Total	33

Quantitative data analysis as basis for qualitative interpretation

Thirdly, we analyzed the responses by applying an inverted factor analysis which results in groups of respondents who tend to rank statements similarly (Stephenson, 1936). We followed a standard approach for Q-methodology (Watts & Stenner, 2005) starting with the reduction of data dimensionality by using a principal component analysis. Subsequently, we rotated the factors with the varimax method ensuring that the factors explain the maximum amount of study variance. We selected the factors by imposing two standard requirements in Q-methodology: (1) eigenvalues greater than 1.00 (Kaiser-Guttman criterion), and (2) cross-product of the two highest factor loadings exceeds twice the standard error (Humphrey's rule). Based on these calculations we have included eight factors for citizens explaining 78% of variance, and three factors for public servants explaining 65% of variance. Lastly, we calculated the z-scores in order to identify the distinguishing statements. The quantitative results are presented in the appendices in table 5 to table 11.

Table 3: Overview of innovation characteristics.

Innovation charact.	Short description	Key sources	Statements
Complexity	The degree to which an innovation is perceived as difficult to understand and use*	Davis (1989), Rogers (2003), Carter & Bélanger (2005)	(s1) Ease of use: Innovations need to be easy to understand and use.
Relative advantage	The perceived usefulness and benefits of an innovation relative to current tools or procedures*	Davis (1989), Rogers (2003), Rana et al. (2015)	(s2) Efficiency – user: Innovations need to save time and costs. (s3) Efficiency – authority: Innovations need to save time and costs for executing authorities (and eventually tax money). (s4) Effectiveness: Innovations need to deliver better results and quality (e.g., better education). (s5) Social prestige: Innovations need to have a positive impact on social prestige for those stakeholders who support/use them (e.g., “forerunner”).
Compatibility	The extent to which the innovation fits user needs and is in line with existing ways of working*	Rogers (2003), Rana et al. (2015)	(s6) Fit with needs: Innovations need to fit user/recipient needs. (s7) System compatibility: Innovations need to be compatible with previously introduced ideas and existing elements etc. (e.g., tools, procedures, values).
Trialability	The possibility to experiment with an innovation (e.g., pilot projects, trial versions)*	Rogers (2003), Korteland & Bekkers (2008), Rana et al. (2015)	(s8) Trialability: Innovations need to give the opportunity to try them out easily before implementation / usage.
Observability	The extent to which others (such as other organizations) can see the innovation being used*	Rogers (2003), Carter & Bélanger (2005), Rana et al. (2015)	(s9) Observability: The use and the related benefits of innovations need to be easily visible (e.g., in other organizations).
Adoption costs	The costs of an innovation’s implementation, with high costs decreasing an innovation’s diffusion/adoption*	Rogers (2003), Greenhalgh et al. (2004), De Vries et al. (2018)	(s10) Initial costs – user: Innovations need to have low initial/switching costs for users/recipients. (s11) Implementation costs – authority: Innovations need to have low costs of implementation for the executing authorities (and eventually for the public).
Trust	The degree to which an innovation creates concerns about the adherence to rule of law principles (e.g., equal treatment, security, and privacy of personal data), with strong concerns resulting in a decrease in innovation diffusion/adoption**	Savoldelli, Codagnone, and Misuraca (2014), Carter & Bélanger (2005)	(s12) General rule of law: Innovations need to adhere to rule of law principles (e.g., equal treatment). (s13) Security and privacy: Innovations need to ensure security and privacy of processed information.
Controversy	The extent to which an innovation is affected by a political or ideological controversy (e.g., social security, healthcare), with strong controversy resulting in a decrease in innovation diffusion/adoption	Cairney (2019), Singler (2023)	(s14) Institutional consent: Innovations need to be supported by a broad range of societal and political stakeholders (e.g., consent by all political parties). (s15) Involvement: Innovations need be developed in collaboration with the relevant stakeholders.

* As summarized by De Vries et al. (2018) / ** As partly summarized by De Vries et al. (2018)

Results

This section provides an interpretation of the factors we derived from the factor analysis representing each one group of public servants or citizens sharing priorities regarding innovation characteristics. It is worth highlighting that perceptions about a complex phenomenon are ambivalent, multi-layered, and decussating to a certain degree (Harthorn, Shearer, & Rogers, 2011). Likewise, the factors are neither unambiguous nor unique. Against this backdrop, the factors share some priorities, but also show major differences. Both are presented in table 4. In the following descriptions we focus on the major commonalities and differences between the factors respectively groups.

Public servants' perceptions about citizens' expectations

Group A1: Customer-centric

The customer-centric group of public servants perceives citizens' expectations towards innovation characteristics with a strong emphasis on personal advantages and customer experience. They expect citizens to adopt and support innovation if, compared to the previous product, they receive direct benefits (e.g., greater ease of use [s1], cost- and time-savings [s2]), their personal needs are better addressed, and there are only low efforts or costs to switch to the new product for them. In comparison public servants of this group do not expect citizens to prioritize benefits for the public (e.g., cost-savings for authorities [s3], better results like in education or security [s4]), institutional consent by relevant societal stakeholders [s14], and consistent adherence to rule of law principles such as equal treatment [s12].

Group A2: Trust-centric

The trust-centric group perceives citizens' expectations with a strong emphasis on the adherence to rule of law principles [s12], data protection [s13], participation and involvement

of citizens in the PSI process [s15], and institutional consent by relevant societal stakeholders (e.g., political parties, civil society, cantonal and federal bodies) [s14]. They highlight aspects related to the creation of trust in innovations. The actual effects like cost- and time-savings for citizens [s2] or authorities [s3] and better quality [s4] are perceived as being least relevant for citizens to adopt and support innovations.

Group A3: Result-centric

This group perceives citizens similar to the customer-centric group yet assumes a broader and more systemic understanding of desirable effects by citizens. Likewise, they expect citizens to adopt and support an innovation if it comes with personal advantages (e.g., cost-savings) [s2], a better fit with their needs [s6], and greater ease of use [s1]. Though, they do not perceive individual adoption costs as being relevant [s10]. Instead, compatibility with existing products or systems [s7], and effectiveness [s4], in other words, better results and quality of public services (e.g., in education or public safety) are emphasized.

Citizens' expectations

Group B1: Result-centric

Citizens in this group fit very well with the perceptions by public servants of group A3. They share most priorities regarding innovation characteristics, most importantly ease of use [s1], efficiency for users [s2], effectiveness [s4], and fit with personal needs [s6]. In comparison, effectiveness of public services [s4], and personal data protection [s13] are ranked slightly higher by citizens in this group than by the respective public servant group.

Group B2: Trust-centric

Citizens in this group fit very well with the perceptions by public servants of group A2. They share most priorities regarding innovation characteristics, such as the adherence to rule of law

principles [s12], data protection [s13], and institutional consent [s14]. In comparison, personal adoption costs [s10] are of low importance for citizens compared to the public servant group's perception.

Group B3: Certainty-centric

The certainty-centric group acts cautious and adopts and supports innovations if uncertainty and entry barriers are low due to system compatibility [s7], a great ease of use [s1], trialability [s8], observability [s9], and low adoption costs [s10]. They put strong emphasis on the opportunity to try out an innovation, and to observe the use by other persons and related benefits before they must decide for or against it.

Group B4: Cost- and rule-of-law-centric

This group of citizens is strongly oriented to costs related to innovations for both individuals [s10] and the public [s11]. Further, they value the adherence to rule of law principles [s12] and the protection and security of their personal data [s13]. They share this preference with the trust-centric group. In contrast, they de-prioritize characteristics related to citizen involvement [s15], and institutional consent [s14]. Moreover, ease of use [s1] and other customer-centric aspects are of low relevance for this group.

Group B5: Customer-centric

Citizens in this group fit very well with the perceptions by public servants of group A1. They share most priorities regarding innovation characteristics, most importantly ease of use [s1], efficiency for users [s2], fit with needs [s6], and observability [s9]. In comparison, personal adoption costs [s10], and data protection [s13] are of slightly lower importance, whereas social prestige [s5] and citizen involvement [s15] are of higher importance for citizens compared to the public servant group's perception.

Group B6: Result-centric and certainty-oriented

These citizens support and adopt innovations if they bring about more efficient and convenient solutions [s1, S2], and better results and quality of public services [s4] similar to the result-centric citizens. Like the certainty-centric group they further put emphasis on the opportunity to test and observe innovations before implementation [s8, s9]. They do not perceive system compatibility [s7], ease of use [s1], institutional consent [s14], citizen involvement [s15] or costs [s10, s11] as important innovation characteristics.

Group B7: Participation-centric

The participation-centric citizens emphasize their involvement in the PSI process [s8, s15]. They adopt and support innovations if they have participated in the design (e.g., focus groups, user tests) and decision process (e.g., public referenda, surveys). As a result of this participation, they expect innovations to address their personal needs [s6]. Further, this group highlights the adherence to rule of law principles [s12]. In contrast, aspects related to institutional consent [s14], ease of use [s1], system compatibility [s7], or personal savings in time and costs [s2] are de-prioritized.

Group B8: Rule-of-law-centric and prestige-oriented

Citizens in this group adopt and support innovations if they are convinced that rule of law principles [s12] and data protection [s13] are warranted – similar to the cost- and rule-of-law-centric group. Yet, instead to costs the citizens in the rule-of-law-centric and prestige-oriented group orient to social prestige [s5] that comes with the support and use of innovation (e.g., as a “forerunner”). By contrast, costs for citizens [s10] and the public [s11] are less important - likewise, better results and quality [s4], the fit with user needs [s6], and institutional consent [s14]. The emphasis on social prestige is unique to this group. In all public servant and citizen groups social prestige is ranked in the least important statements, except of the customer-centric group (B5) for which we found a medium relevance.

Table 4: Overview of groups and their most and least important statements.

Innovation characteristics	Complexity	Relative advantage				Compatibility		Trialability	Observability	Adoption costs		Trust		Controversy	
Statements	Ease of use	Efficiency – user	Efficiency – authority	Effectiveness	Social prestige	Fit with needs	System compatibility	Trialability	Observability	Initial costs – user	Impl. costs - authority	General rule of law	Security and privacy	Institutional consent	Involvement
Group A1: Customer-centric			L			H									
Group A2: Trust-centric					L								H		
Group A3: Result-centric		H			L										
Group B1: Result-centric		H			L										
Group B2: Trust-centric					L								H		
Group B3: Certainty-centric					L			H							
Group B4: Cost- and rule-of-law-centric					L					H					
Group B5: Customer-centric				L		H									
Group B6: Result-centric and certainty-oriented		H					L								
Group B7: Participation-centric						H								L	
Group B8: Rule-of-law-centric and prestige-oriented										L			H		

Legend: H = Highest ranked statement; L = Lowest ranked statement; Dark grey = Top 5 statements; Light grey = Medium 5 statements; White = Bottom 5 statements

Discussion

Summary

Table 4 summarizes the results and visualize the ranking of statements per each public servant and citizen group. This allows for identifying commonalities and differences between groups and overall tendencies towards the statements. In particular, the citizen groups result-centric (B1), trust-centric (B2), and customer-centric (B5) each have a matching pendant with public servants, whereas other citizen groups do not. With regard to statements, we observe a broad preference for ease of use [s1], efficiency for users [s2], fit with needs [s6], and security and privacy [s13], which is in line with previous studies on innovation characteristics and citizens (Carter & Bélanger, 2005; Rana, Dwivedi, & Williams, 2015). Others, especially social prestige [s5], are not as broadly preferred across the groups. Likewise, this supports previous findings (Carter & Bélanger, 2005) implying that social prestige is not as relevant for PSI.

Contributions and implications

This study makes at least three major contributions.

First, the relevance of innovation characteristics for PSI has been corroborated from a citizen perspective while demonstrating great heterogeneity. We found that each innovation characteristic is important to at least one citizen group to adopt and support PSI. These results support the characteristics' relevance suggested in previous PSI literature (Cinar, Trott, & Simms, 2019; De Vries, Bekkers, & Tummers, 2016; Misuraca, et al., 2020) – now from a citizen and street-level perspective. However, we also found a great heterogeneity in citizens' expectations that is reflected in the derivation of eight factors (i.e., groups) despite applying rather strict requirements for factor selection. On the one hand, this heterogeneity reflects the heterogeneity of society. On the other hand, it reflects the manifold roles citizens have in

society ranging from customers/users, voters, taxpayers, co-creators and subjects of rights and duties (Simonofski, Clarinval, Vanderose, & Dumas, 2021; Singler, 2023). Depending on their personal role focus they prefer different characteristics (e.g., customer-centric vs. cost-centric). In comparison, the business sector is not confronted with this degree of institutionalized variety. Further, the heterogeneity might be explained by preferences about the two logics of actions in public sector introduced by March and Olsen (1989) and applied on PSI for instance by De Vries et al. (2016). Certain characteristics and their statements can be attributed rather to the logic of consequence (e.g., efficiency [s2, s3], effectiveness [s4]), and others to the logic of appropriateness (e.g., trialability [s8], institutional consent [s14], involvement [s15]). Accordingly, we found groups that are rather oriented to the logic of consequence (e.g., customer-centric, result-centric), and others that tend to the logic of appropriateness (e.g., trust-centric, participation-centric). Yet, we also found intersections of these logics in the citizen groups (e.g., cost- and rule-of-law-centric, result-centric, and certainty-oriented).

Second, our results regarding innovation characteristics indicate a discrepancy between citizens' expectations and public servants' perceptions about them, as described in the service quality model of Parasuraman et al. (1985). Five out of eight citizen groups are not or only partly reflected in the public servant groups – i.e., certainty-centric (B3), cost- and rule-of-law-centric (B4), result-centric and certainty-oriented (B6), participation-centric (B7), and rule-of-law-centric and prestige-oriented (B8). In comparison, public servants perceive the expectations of the customer-centric (A1-B5), trust-centric (A2-B2), and result-centric (A3-B1) groups accurately. Overall, in our results no public servant group represents the relevance of characteristics for citizens related to efficiency and costs for the public [s3, s11], trialability [s8], observability [s9], involvement [s15], and social prestige [s5]. None ranks those characteristics in the upper third. This indicates an underrepresentation of citizens' roles as taxpayers, voters, and co-creators, and of the logic of appropriateness in the PSI process. Such

underrepresentation might lead to the neglect of the expectations of parts of society in the PSI process. As a result, innovations are perceived illegitimate and lack support and adoption as suggested by Singler and Guenduez (2023).

These results underpin the importance of user centrality in innovation design and implementation. Previous literature on public service design has emphasized its importance, as for instance Trischler and Westman Trischler (2022, p. 1253) who outline that the successful introduction of new services in public sector requires “a clear understanding of the user’s underlying beliefs, practices and needs because not all user groups are better off as a result.” Therefore, scholars suggest a new approach “that shifts public service design away from an expert-driven process towards enabling users as active and equal idea contributors” (Trischler, Dietrich, & Rundle-Thiele, 2019, p. 1595). Such a shift would help public servants (i.e., the experts) close the gaps, revealed by our study, between citizens’ expectations and public servants’ perceptions about them when innovating (e.g., when introducing a new service). Lastly, our results enrich the previous literature on user centrality in public sector by exploring the multiple perspectives citizens take in the innovation process. Thus, citizens are not only users, but also “democratic participants” (Simonofski, Clarinval, Vanderose, & Dumas, 2021), a circumstance that is particularly relevant in the Swiss setting marked by its distinct elements of direct democracy and militia system (Linder & Mueller, 2021). Thus, public servants need to capture the diverse and even sometimes conflicting expectations resulting from these multiple perspectives.

Third, our results help public servants to better understand citizens’ expectations about innovation characteristics. Building on this, they are supported in designing and implementing innovations that better meet expectations of citizens. However, our results also reveal heterogeneity that creates complexity for public servants when trying to address all different citizens’ preferences or deciding on how to compromise or prioritize. Given these differing

expectations, public servants must compromise (even when having unlimited resources) since certain innovation characteristics tend to oppose each other (e.g., data protection vs. efficiency). As a result, there is no dominant strategy to increase perceived legitimacy of innovations but rather a constant balancing of preferences. Thus, a profound understanding of general preferences in society, in specific groups and regarding specific innovations and/or policy fields (e.g., health, mobility) is necessary. PSOs, especially in the Swiss institutional setting marked by federalism, consensual system, and consociationalism (Linder & Mueller, 2021), cannot focus solely on the majority or most attractive customer segment but must reach at least a certain consensus to address all citizens. Even though not providing a dominant strategy to meet this challenge, our results provide the terms for structuring the discussion.

Limitations and future research

There are certain limitations to our results that require attention in future research. First, like interview- and survey-based methods Q-methodology relies on respondents' ability to accurately and honestly express observations and opinions about the topic under study (Sheppard, 2020). Therefore, responses might differ from behavior in real-life situations, or as Esterberg (2002, p. 95) concludes: "If you want to know about what people actually do, rather than what they say they do, you should probably use observation." Therefore, further research is needed to observe whether citizens behave the same as indicated in our results (e.g., in case studies). Second, our results even though reflecting a certain diversity are not representative to other countries, such as less democratic countries in which some citizens may avoid expressing their opinions. Further, the statements in our exercise addressed innovations in general but no specific product/service or policy field (e.g., tax declaration, healthcare services). Thus, it is possible that expectations differ in other countries or policy fields (Cinar, Simms, Trott, & Demircioglu, 2022). For instance, it might be possible that the participation-centric group is only of high relevance in countries like Switzerland with a long tradition of direct democracy.

Like most of other qualitative and quantitative studies, Q-methodology is bound to a specific context (Brown, 2003). Nevertheless, “by providing systematic insight into clusters of perceptions surrounding a specific topic, Q methodology allows scholars to develop new concepts and to advance the (existing) literature” as concluded in a systematic review about the use of Q-methodology in public management literature (Nederhand & Molenveld, 2020, p. 1). Likewise, due to providing a comprehensive and comparative approach, our results shed light on a less-researched topic and build the foundation for further studies such as various previous studies applying Q-methodology in the innovation literature (cf. Nederhand & Molenveld, 2020).

Conclusion

This study has explored innovation characteristics’ relevance for citizens, and potential discrepancies between citizens’ expectations and public servants’ perception about these expectations. We identified eight groups of citizens each representing distinguishing expectations towards innovation characteristics, and three groups of public servants each representing a distinguishing perception of citizens’ expectations. Our results corroborate the relevance of innovation characteristics for innovation adoption in the public sector from the perspective of citizens. We contribute to scholarship by identifying the heterogeneity between citizens regarding expectations for innovation characteristics that has not been explored to date.

Furthermore, we found discrepancies between citizens' expectations and public servants’ perceptions about these expectations. Our results reveal that public servants underestimate the heterogeneity of citizens’ expectations when innovating. Most importantly, public servants neglect expectations of citizens related to their role as democratic participants (e.g., citizen involvement, impacts on public finances and rule of law). Our study provides insights into the

discrepancies between heterogeneous expectations of citizens towards innovation and public servants' perception of what citizens want.

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Appendices

Q-sort exercise data

Table 5: Participants for public servant exercise (N=33) ordered by factor loadings.

Participant No.	A1	A2	A3
1	0.149	0.769*	0.125
2	0.412	0.661*	0.144
3	0.848*	0.161	0.173
4	0.356	0.479	-0.334
5	0.745*	0.410	0.221
6	0.574	0.415	0.616
7	0.021	0.667*	-0.023
8	0.485	-0.301	0.651*
9	-0.094	-0.014	0.895*
10	0.330	0.610*	0.172
11	0.748*	-0.285	-0.290
12	0.265	0.263	0.732*
13	0.611*	0.223	0.149
14	0.081	0.600*	0.283
15	0.849*	0.019	0.248
16	0.731*	0.334	-0.191
17	0.107	-0.056	0.948*
18	0.725*	0.264	0.198
19	0.415	0.554	0.408
20	0.612*	0.542	0.267
21	0.673*	0.235	-0.014
22	0.655*	0.024	-0.170
23	0.330	0.636*	0.269
24	-0.178	0.829*	-0.135
25	-0.114	0.768*	0.311
26	-0.183	0.297	0.683*
27	0.596	0.395	0.533
28	0.594	0.444	0.401
29	0.368	0.644*	-0.084
30	0.144	0.674*	-0.100
31	0.291	0.046	0.446
32	0.806*	0.282	0.364
33	0.786*	-0.131	0.284

* Significant factor loadings

Table 6: Participants for citizen exercise (N=106) ordered by factor loadings.

Participant No.	B1	B2	B3	B4	B5	B6	B7	B8
1	-0.139	0.123	0.336	0.682*	0.155	-0.085	0.239	0.183
2	0.153	0.525	0.026	0.316	-0.081	0.611	-0.314	-0.197
3	0.337	0.257	0.006	0.633*	-0.016	0.352	0.256	0.066
4	0.017	0.807	-0.163	0.216	-0.372	-0.211	0.183	0.033
5	0.552	0.050	0.442	-0.233	-0.112	0.538	0.038	0.241
6	0.630	0.060	0.377	0.052	-0.087	-0.047	0.139	-0.508
7	0.070	-0.087	0.368	0.014	-0.476	-0.105	-0.603	-0.016
8	0.239	0.238	-0.114	-0.422	-0.191	0.530	0.429	-0.032
9	0.058	-0.223	-0.078	0.005	0.649*	0.371	0.067	0.204
10	-0.019	0.866*	0.257	0.108	-0.025	-0.008	0.308	0.135
11	0.549*	-0.094	-0.031	-0.295	-0.016	0.124	0.156	0.213
12	-0.246	0.521*	-0.193	0.201	-0.114	0.063	0.049	-0.190
13	0.292	0.675*	-0.116	0.034	0.165	0.306	-0.382	-0.088
14	0.039	-0.032	0.215	0.259	-0.295	0.741*	-0.105	-0.192
15	0.384	0.201	0.295	-0.612	-0.011	0.127	0.343	0.068
16	0.626*	0.092	0.042	0.052	0.268	0.083	0.006	0.288
17	0.047	-0.210	0.606	0.107	0.115	-0.273	0.045	-0.022
18	0.059	0.242	0.216	0.060	-0.096	0.134	0.809*	-0.101
19	-0.556	-0.009	0.442	0.025	0.042	0.035	-0.147	0.380
20	0.641	-0.000	0.454	0.216	0.459	-0.065	-0.048	0.137
21	0.129	0.000	-0.046	0.184	0.660*	0.286	0.523	0.017
22	0.254	-0.120	0.803*	-0.112	-0.120	0.184	-0.125	-0.081
23	0.172	0.117	0.669*	-0.201	0.260	0.283	0.321	0.060
24	0.508	0.552	0.390	-0.253	0.293	0.079	-0.002	0.274
25	0.770*	0.093	0.007	0.184	0.016	-0.055	0.257	0.156
26	0.436	0.125	0.265	0.107	0.207	0.762*	0.105	-0.089
27	-0.183	-0.008	0.017	0.361	0.130	0.432	0.777*	-0.015
28	0.396	0.399	-0.029	0.564	0.117	0.463	0.004	0.096
29	-0.042	0.635*	0.355	-0.259	-0.228	-0.008	0.092	0.198
30	0.712*	0.347	-0.034	0.195	-0.174	0.079	-0.088	0.317
31	-0.111	0.562	0.321	0.383	-0.121	0.358	-0.248	0.216
32	0.745*	0.186	0.105	0.072	-0.117	0.265	0.184	-0.015
33	0.773*	0.250	0.279	-0.125	-0.019	0.199	0.084	0.054
34	0.502	0.154	0.176	0.763*	-0.143	-0.179	-0.006	0.034
35	0.370	-0.355	-0.296	0.083	-0.032	-0.151	0.564	-0.413
36	0.298	0.833*	-0.147	0.265	-0.075	0.234	-0.029	-0.102
37	-0.162	0.111	-0.000	0.864*	0.071	0.319	0.042	-0.068
38	0.212	0.758*	-0.146	0.273	0.260	-0.111	0.043	0.140

39	0.089	0.017	0.000	0.184	-0.373	-0.039	-0.183	0.553*
40	0.162	0.253	0.497	-0.033	0.710*	0.164	-0.138	0.176
41	-0.255	0.484	0.280	-0.396	-0.168	-0.105	0.026	-0.403
42	-0.142	0.682*	-0.130	0.032	-0.022	0.483	-0.019	-0.346
43	0.293	0.040	-0.609*	-0.444	0.156	-0.015	-0.051	0.030
44	-0.034	0.542	-0.063	0.472	-0.015	-0.036	0.485	-0.348
45	0.436	0.028	0.548	0.155	-0.177	0.177	0.079	0.242
46	-0.194	-0.216	0.761*	0.172	-0.126	-0.087	0.086	-0.386
47	0.407	0.761*	-0.184	-0.287	-0.127	0.181	0.056	-0.188
48	0.683*	-0.021	0.055	0.003	0.232	0.151	-0.145	-0.266
49	0.273	0.174	0.818*	-0.278	0.079	0.055	-0.018	0.209
50	0.448	-0.128	0.069	0.255	0.123	0.525	-0.211	0.183
51	0.105	0.529	0.274	-0.414	-0.116	0.225	0.116	-0.275
52	0.469	0.526	-0.426	-0.131	-0.068	0.303	0.209	0.036
53	0.198	0.480	0.531	-0.114	0.292	0.261	-0.205	0.133
54	0.689*	0.051	-0.033	0.028	-0.066	0.070	-0.097	-0.054
55	0.163	-0.134	0.742*	0.219	0.051	0.380	0.165	-0.386
56	0.281	0.534	0.064	0.194	-0.376	0.026	0.430	0.230
57	0.363	0.599	0.270	0.230	0.444	0.252	-0.144	0.230
58	0.109	0.075	0.145	0.255	-0.313	0.052	0.109	-0.670*
59	0.272	0.206	-0.223	-0.331	0.167	0.116	0.064	0.763*
60	0.226	0.188	-0.037	0.073	0.055	0.865*	0.062	-0.146
61	0.256	0.045	0.402	0.460	0.047	0.448	0.144	-0.028
62	0.017	-0.144	-0.742*	-0.045	0.188	0.214	0.238	-0.081
63	-0.083	0.790*	0.129	-0.031	0.089	-0.090	-0.028	0.202
64	-0.188	-0.220	0.542	0.255	-0.395	0.399	-0.366	-0.154
65	0.163	-0.230	-0.019	-0.191	0.367	0.437	0.122	0.186
66	0.372	0.356	0.083	0.209	-0.493	-0.093	0.259	0.129
67	0.384	0.465	-0.238	0.053	-0.212	-0.125	-0.045	-0.018
68	0.281	0.799*	0.214	-0.247	0.073	0.007	0.204	-0.060
69	-0.524	0.393	-0.008	0.252	-0.049	-0.647	-0.070	-0.072
70	0.150	-0.051	-0.205	-0.046	0.272	0.095	0.206	0.538*
71	0.654	0.176	-0.053	0.040	0.098	0.303	-0.478	-0.358
72	0.504	0.087	-0.215	0.286	-0.218	0.446	0.464	-0.243
73	-0.252	0.380	0.258	0.204	-0.600*	0.091	-0.111	0.059
74	-0.044	0.824*	-0.242	0.310	0.143	0.160	0.137	0.003
75	0.195	0.145	0.202	0.326	-0.706*	0.320	0.034	-0.047
76	-0.539*	0.284	-0.065	-0.019	0.061	-0.367	-0.061	0.195
77	0.268	0.345	-0.120	0.030	-0.456	0.469	0.176	-0.318
78	0.269	0.777*	-0.123	-0.105	-0.066	0.028	0.182	0.243

79	0.190	-0.070	0.126	-0.286	-0.700*	-0.117	-0.053	-0.031
80	0.088	0.071	0.195	0.227	0.102	0.684*	0.319	0.123
81	0.445	0.186	-0.172	-0.160	0.088	0.159	0.735*	-0.008
82	0.329	-0.030	0.386	0.210	0.272	0.018	0.507	-0.173
83	0.262	-0.047	0.823*	0.329	-0.072	0.209	0.118	0.028
84	0.248	-0.157	0.267	0.440	0.309	0.698*	0.079	-0.168
85	0.348	0.077	-0.614*	0.353	0.216	-0.078	0.018	0.124
86	-0.025	0.300	0.113	-0.160	-0.428	0.141	0.391	0.555
87	0.079	0.592	0.226	-0.063	0.625	-0.223	0.139	-0.269
88	0.207	0.654	-0.199	-0.405	-0.047	0.375	0.205	-0.176
89	-0.191	0.128	0.194	0.151	-0.098	0.335	-0.164	0.651*
90	-0.095	0.111	-0.226	-0.181	0.227	0.698	0.480	0.326
91	0.165	0.216	0.365	0.490	0.476	0.319	0.311	0.085
92	0.387	0.617	0.152	-0.115	-0.430	0.107	-0.262	0.172
93	0.172	0.193	0.251	-0.025	0.021	0.704	0.274	0.285
94	-0.110	0.499	-0.245	-0.164	-0.074	-0.005	-0.295	-0.323
95	0.705*	0.035	0.178	-0.304	0.138	0.201	0.429	-0.143
96	-0.011	0.096	-0.229	-0.141	0.010	0.173	0.023	-0.706*
97	0.043	0.253	0.132	-0.666*	0.337	-0.129	-0.077	0.135
98	0.390	0.170	0.371	0.440	-0.256	0.144	0.092	-0.107
99	0.138	0.170	0.568	0.093	0.297	0.621	-0.081	0.196
100	0.076	0.445	0.380	-0.202	-0.004	0.211	-0.145	-0.459
101	0.083	0.409	-0.242	-0.196	-0.085	0.701*	0.102	0.292
102	0.454	0.181	-0.129	0.040	0.388	0.546	-0.423	-0.212
103	-0.050	0.535	0.273	0.205	0.192	0.407	-0.169	-0.138
104	0.443	-0.060	0.365	0.483	-0.144	0.127	-0.308	-0.212
105	-0.337	0.501	-0.129	-0.088	-0.348	0.431	0.298	-0.382
106	0.758*	0.298	0.232	-0.107	-0.050	0.364	0.71	0.80

* Significant factor loadings

Table 7: Public servants – mean and standard deviations over the entire sample and groups' Z-scores.

No.	Statement (abbr.)	M	SD	VAR	A1	A2	A3
1	Ease of use	0.697	0.969	0.310	0.919	-0.072	1.236
2	Efficiency – user	0.758	0.922	0.501	1.218	-0.191	1.386
3	Efficiency – authority	-1.030	0.834	0.152	-1.295	-0.796	-0.341
4	Effectiveness	-0.303	0.870	0.531	-0.293	-1.005	0.768
5	Social prestige	-1.303	0.870	0.186	-0.845	-1.897	-1.459
6	Fit with needs	1.121	0.946	0.378	1.804	0.300	1.129
7	System compatibility	-0.333	1.064	0.849	-0.991	-0.260	1.224
8	Trialability	-0.455	0.742	0.174	-0.316	-0.946	0.065
9	Observability	0.182	1.029	0.433	0.743	0.206	-0.841
10	Initial costs – user	0.455	1.047	0.762	0.893	0.795	-1.006
11	Implementation costs - authority	-0.848	0.744	0.091	-1.091	-0.528	-1.224
12	Rule of law	0.182	1.029	0.687	-0.693	1.337	0.318
13	Security and privacy	1.061	1.099	0.841	0.400	2.090	-0.035
14	Institutional consent	-0.333	1.198	0.560	-1.114	0.694	0.050
15	Involvement	0.152	1.131	0.696	0.661	0.271	-1.271

Table 8: Citizens – mean, standard deviations and Z-score variance over the entire sample and groups' Z-scores.

No.	Statement (abbr.)	M	SD	VAR	B1	B2	B3	B4	B5	B6	B7	B8
1	Ease of use	-0.066	1.118	0.483	0.927	-0.283	0.809	-1.118	0.497	-0.826	-0.056	0.314
2	Efficiency – user	0.462	1.207	0.977	1.855	-0.230	-0.203	-0.148	1.655	1.768	-0.364	1.657
3	Efficiency – authority	-0.462	0.973	0.404	0.424	-1.166	-1.069	0.124	-1.312	-0.346	0.249	-0.497
4	Effectiveness	0.528	1.075	0.692	1.007	0.446	0.191	-0.659	-1.344	1.107	-0.305	-0.865
5	Social prestige	-1.264	1.101	1.156	-1.912	-1.777	-1.525	-1.555	0.303	-1.555	-1.166	1.279
6	Fit with needs	0.726	1.129	0.620	0.945	1.017	-0.012	0.092	1.660	0.753	1.530	-0.828
7	System compatibility	-0.019	1.124	0.669	0.200	0.276	1.138	-0.307	-0.777	-1.690	-0.859	0.226
8	Trialability	0.104	1.072	0.933	-0.429	-0.805	1.724	-0.202	-0.965	0.967	1.337	-0.391
9	Observability	-0.377	1.111	0.846	-1.350	-1.179	0.850	0.082	1.379	0.204	-0.976	-0.430
10	Initial costs – user	-0.085	1.108	0.800	-0.308	-0.212	0.760	1.937	-0.172	0.019	0.420	-1.368
11	Implementation costs - authority	-0.160	1.001	0.276	0.105	-0.643	-0.266	1.054	-0.119	-0.477	-0.364	-0.685
12	Rule of law	0.311	1.085	0.749	-0.291	1.219	-1.207	1.486	0.174	0.549	1.222	1.084
13	Security and privacy	0.717	1.062	0.605	0.474	1.584	0.768	0.968	-0.871	0.818	0.000	1.679
14	Institutional consent	-0.340	1.181	0.533	-1.090	0.826	-1.295	-0.592	-0.480	-0.656	-1.835	-1.048
15	Involvement	-0.075	1.171	0.603	-0.556	0.929	-0.662	-1.162	0.374	-0.634	1.166	-0.128

Table 9: Public servants and citizens – mean, standard deviations and Z-score variance over the entire sample.

No.	Statement (abbr.)	M	SD	VAR
1	Ease of use	0.115	1.132	0.523
2	Efficiency – user	0.532	1.152	0.847
3	Efficiency – authority	-0.597	0.972	0.361
4	Effectiveness	0.331	1.089	0.651
5	Social prestige	-1.273	1.051	0.925
6	Fit with needs	0.820	1.101	0.591
7	System compatibility	-0.094	1.118	0.727
8	Trialability	-0.029	1.031	0.787
9	Observability	-0.245	1.118	0.743
10	Initial costs – user	0.043	1.118	0.792
11	Implementation costs - authority	-0.324	0.991	0.344
12	Rule of law	0.281	1.073	0.741
13	Security and privacy	0.799	1.081	0.673
14	Institutional consent	-0.338	1.185	0.624
15	Involvement	-0.022	1.166	0.628

Table 10: Consensus statements of public servant and citizen groups (top five based on variance of Z-score).

No.	Statement (abbr.)	A1	A2	A3	B1	B2	B3	B4	B5	B6	B7	B8	VAR
11	Implementation costs - authority	-1.091	-0.528	-1.224	0.105	-0.643	-0.266	1.054	-0.119	-0.477	-0.364	-0.685	0.344
3	Efficiency – authority	-1.295	-0.796	-0.341	0.424	-1.166	-1.069	0.124	-1.312	-0.346	0.249	-0.497	0.361
1	Ease of use	0.919	-0.072	1.236	0.927	-0.283	0.809	-1.118	0.497	-0.826	-0.056	0.314	0.523
6	Fit with needs	1.804	0.300	1.129	0.945	1.017	-0.012	0.092	1.660	0.753	1.530	-0.828	0.591
14	Institutional consent	-1.114	0.694	0.050	-1.090	0.826	-1.295	-0.592	-0.480	-0.656	-1.835	-1.048	0.624

Table 11: Differentiating statements public servant and citizen groups (top five based on variance of Z-score).

No.	Statement (abbr.)	A1	A2	A3	B1	B2	B3	B4	B5	B6	B7	B8	VAR
5	Social prestige	-0.845	-1.897	-1.459	-1.912	-1.777	-1.525	-1.555	0.303	-1.555	-1.166	1.279	0.925
2	Efficiency – user	1.218	-0.191	1.386	1.855	-0.230	-0.203	-0.148	1.655	1.768	-0.364	1.657	0.847
10	Initial costs – user	0.893	0.795	-1.006	-0.308	-0.212	0.760	1.937	-0.172	0.019	0.420	-1.368	0.792
8	Trialability	-0.316	-0.946	0.065	-0.429	-0.805	1.724	-0.202	-0.965	0.967	1.337	-0.391	0.787
9	Observability	0.743	0.206	-0.841	-1.350	-1.179	0.850	0.082	1.379	0.204	-0.976	-0.430	0.743

Q-sort exercise design

A. Statements for public servant exercise

Citizens use and support a public sector innovation if...

1. the innovation is easy for citizens to understand and use. [*Ease of use*]*
2. the innovation saves citizens time and money. [*Efficiency – user*]
3. the innovation relieves the public budget financially. [*Efficiency – authority*]
4. the innovation delivers better results and quality (e.g., better schooling, higher public safety). [*Effectiveness*]
5. the use and support of the innovation brings about social prestige for the citizen (e.g., as a “digital forerunner”). [*Social prestige*]
6. the innovation addresses the needs of citizens. [*Fit with needs*]
7. the innovation is compatible with other applications and systems that citizens use. [*System compatibility*]
8. citizens can try the innovation before they must decide for or against it. [*Trialability*]
9. citizens have already observed the use of the innovation (and its benefits) by other people. [*Observability*]
10. the first use of the innovation involves low costs and effort for the citizens (e.g., opening an account, software installation). [*Initial costs – user*]
11. the introduction of the innovation does not involve any major costs and expenses for the public budget. [*Implementation costs – authority*]
12. citizens have confidence that rule of law principles will be preserved by the innovation (e.g., equal treatment). [*Rule of law*]
13. citizens have confidence that the innovation will ensure security and privacy of their personal data. [*Security and privacy*]

14. political parties and other societal actors such as science, associations or civil society support the innovation. [*Institutional consent*]
15. citizens were involved in the development of the innovation (e.g., through referenda, consultations, surveys, working groups). [*Involvement*]

B. Statements for citizen exercise

I use a public sector innovation and support it if...

1. the innovation is easy for me to understand and use. [*Ease of use*]
2. the innovation saves me time and money. [*Efficiency – user*]
3. the innovation relieves the public budget financially. [*Efficiency – authority*]
4. the innovation delivers better results and quality (e.g., better schooling, higher public safety). [*Effectiveness*]
5. the use and support of the innovation brings about social prestige for me (e.g., as a “digital forerunner”). [*Social prestige*]
6. the innovation addresses my needs. [*Fit with needs*]
7. the innovation is compatible with other applications and systems (e.g., smartphone applications) that I use. [*System compatibility*]
8. I can try the innovation before I must decide for it or against it. [*Trialability*]
9. I have already observed the use of the innovation (its benefits) by other people. [*Observability*]
10. the first use of the innovation involves low costs and effort for me (e.g., opening an account, software installation). [*Initial costs – user*]
11. the introduction of the innovation does not involve any major costs and expenses for the public budget. [*Implementation costs – authority*]

12. I have confidence that rule of law principles will be preserved by the innovation (e.g., equal treatment). *[Rule of law]*
13. I have confidence that the innovation will ensure security and privacy of my personal data. *[Security and privacy]*
14. political parties and other societal actors such as science, associations or civil society support the innovation. *[Institutional consent]*
15. I was involved in the development of the innovation (e.g., via referenda, consultations, surveys, working groups). *[Involvement]*

** The statement reference in brackets was not part of the survey but is here mentioned for readers' information.*