



# Investigating Effects of Co-creation on Outcomes of Public Service Innovation – A Comparative Analysis at the National and Local Government Level in Norway

Stefanie Gesierich<sup>1</sup>

Scandinavian Journal of  
Public Administration  
Vol. 27 No. 2 (2023),  
p. 22 – 38

<https://doi.org/10.58235/sjpa.v27i2.10966>

## Abstract

Co-creation in public service innovation is a prominent research field, but few have empirically investigated its effect on the outcomes of innovation. This paper contributes with empirical-based knowledge on the effect of participatory user involvement and other user-oriented methods on public innovation outcomes in different contexts. By employing qualitative comparative analysis (QCA) based on a survey of innovation activities of Norwegian public administration agencies, this article identifies several configurations for local and national authorities that lead to successful service innovations. The main finding suggests a positive relationship between user input and positive effects on service outcomes. However, local and national government levels differ regarding the use of input factors and methods of user involvement. The study contributes to our understanding of the effect of co-creation in different contexts and provides insights into when and how co-creation with users is a useful tool in public service innovation.

---

<sup>1</sup>**Stefanie Gesierich** is a PhD candidate at the Inland School of Business and Social Sciences at the Inland Norway University of Applied Sciences. Her research interests include public administration, public innovation, and co-creation.

E-mail: [stefanie.gesierich@inn.no](mailto:stefanie.gesierich@inn.no)

---

## Keywords:

co-creation outcome effects;  
public service innovation;  
user involvement;  
design thinking;  
QCA

## Introduction

Co-creation in recent years has transformed from being a loosely formulated idea to becoming a top-down-initiated innovation strategy, with particular prominence in the Scandinavian countries (Breimo & Røiseland, 2021; KMD, 2020; Torfing, Sørensen, & Røiseland, 2020). Furthermore, co-creation and collaborative innovation have been argued to be a new innovation paradigm in both the private and the public sector (Hartley, Sørensen, & Torfing, 2013; Venkatram Ramaswamy & Ozcan, 2014; Stoyan et al., 2011). Despite a lack of consensus regarding the concept's content (Jukić, Pevcin, Benčina, Decman, & Vrbek, 2019; Røiseland & Lo, 2019), it is common to characterise co-creation as the involvement of end-users and other relevant stakeholders in the development of innovation (Voorberg, Bekkers, & Tummers, 2015). Consequently, co-creation is by definition a process of collaboration (Sørensen & Torfing, 2011) in which service users and service providers form partnerships in order to jointly create a public innovation. This is also the understanding of co-creation applied in this study.

Co-creative innovation as a concept influences expectations concerning public service production and management. Public organizations are expected to align themselves in the direction of continuous, user-centred improvement and renewal (Holmen, 2020) by collaborating across organizational structures and different levels of government (KMD, 2020; KMD & KS, 2019). Researchers have pointed out that local governments are particularly pressured by a combination of rising expectations for service delivery and societal problem solving along with scarce public resources. Consequently, local governments have to turn to co-creation as a tool for enhancing innovation in order to make ends meet (Bentzen, Sørensen, & Torfing, 2020; Holmen, 2020; Holmen & Ringholm, 2019). It is therefore interesting to investigate whether municipal

services differ from state services regarding user involvement in innovation processes.

Even though co-creation is being advocated as the new innovation paradigm, we still have very little empirical data on the use of co-creation practices and the effect of co-creation on the outcome from innovation (Steen, Brandsen, & Verschuere, 2018; Verleye, 2015; Voorberg et al., 2015). Nonetheless, the overall literature on co-creation of public services is optimistic with respect to its presumed effects. Proponents claim that close collaboration between service providers and citizens provides opportunities not only for improving efficiency and quality of public services, but also for enhancing democratization and trust in government (Røiseland, 2016; Steen et al., 2018). Leading scholars agree that, so far, the research on co-creation in public services has been more focused on which factors influence the emergence of co-creation instead of assessing and measuring its impact (Callens, 2022; Torfing, Sørensen, & Røiseland, 2019), and there have been few quantitative studies that have tested the assumption of positive effects of co-creation on innovation (Krogh, Sørensen, & Torfing, 2020). In particular, more research is needed on conditions under which co-creation leads to successful innovations, for instance, the degree and the way in which stakeholders are involved (Krogh et al., 2020; Torfing, Sørensen, et al., 2020; Voorberg et al., 2015).

To address these research gaps, the article presents findings from a comparative analysis which identifies and examines configurations (combinations of input factors) that are linked to positive effects on four outcomes categories from service innovation, namely: service quality, user experience of the service, user access to information and safety of citizens and residents. Using data from a survey of public administration managers responsible for innovation projects in the Norwegian public sector, the study explores how the combinations of innovation input factors differ regarding the level of government (national and local). This is, to the author's knowledge, the first study of the effects of co-creation on innovation outcomes in the Scandinavian context that is based on configurational theory. Thus, the study contributes to further advance research on the linkages between co-creation and public sector innovation outcomes in different contexts, and the insights may provide guidance to policy makers as well as public sector officials.

The article continues to identify four input factors that can be associated with co-creation, namely the inclusion of user input through participatory and user-oriented methods, the degree of external assistance, and the use of design thinking during innovation development. The following section explains these four input factors and their connection to the concept of co-creation in more detail and formulates hypothesis related to the importance of these input factors at local and national government level respectively. Next, the methodological approach (QCA) and source of data is explained. Subsequently, results from the analysis are presented and discussed in light of the theoretical expectations. The conclusion summarizes the key findings of the study and provides insights into implications for managers and suggestions for future research.

## **Co-Creation and Public Service Innovation**

The concept of co-creation emerged originally in the private sector as a strategy for enhancing production and value creation in businesses (Prahalad & Ramaswamy, 2004a, 2004b), but it has also been recognized as a useful approach in the context of the public sector that primarily produces services through processes in which service users play a central role (Agger & Lund, 2017; Bentzen et al., 2020; Farr, 2013, 2016). Even though citizen participation has a strong tradition in the Scandinavian welfare states, cooperation with users of public services was traditionally based on rules and rights, which largely allowed for the use of professional judgment. Users should have influence by being heard and included in decisions as a supplement to the representative democracy (Rønning & Solheim, 1998). In contrast to traditional understandings of public participation, co-creation focuses more on including diverse forms of knowledge to create solutions to complex problems rather than on democratic representation and empowerment (Lund, 2018). The recently renewed interest in the inclusion of public service users in the development of such services as co-creating partners can be

linked to the uprise of the collaborative governance paradigm which recognizes that the complexity of modern societal challenges cannot be solved by public organizations alone (Chris Ansell & Gash, 2008; Røiseland & Vabo, 2016). Co-creation can be seen as the “constitutive principle” (Christopher Ansell & Torfing, 2021b, p. 4) of collaborative governance.

There is no common agreement among scholars on one definition of co-creation or on the difference between co-creation and other concepts of user involvement such as co-production, co-design, or collaboration (Jukić et al., 2019; Nabatchi, Sancino, & Sicilia, 2017). Several diverging definitions of co-creation do exist, but they usually involve a collaboration with relevant stakeholders, for example, users, through active participation in a joint effort of problem-solving or task-solving and value-creation (Venkatram Ramaswamy & Ozcan, 2014, p. 14; Torfing et al., 2019; Voorberg et al., 2015).

Co-creation challenges the traditional role perceptions of citizens as well as of politicians and public officials. Co-creation activities typically involve operations that are in conflict with the characteristics of traditional public administration such as functional division, hierarchy, and management through command and control (Torfing, Sørensen, et al., 2020). Therefore, management support and support from politicians cannot be taken for granted. Some politicians might see their power diminished by the process of co-created policy making, and public managers and employees might experience user input as a threat to their roles as professionals and experts (Bentzen et al., 2020; Jenhaug, 2020). Furthermore, researchers have pointed out that the user’s ability to contribute actively and equally in co-creative activities is a prerequisite for the co-creation of value (Osborne, Radnor, & Strokosch, 2016; Skålén, Karlsson, Engen, & Magnusson, 2018). Public services might target user groups with limited possibilities to contribute actively to co-creation processes, for instance due to cognitive impairments, language barriers and more (Bast, Røhnebæk, & Engen, 2021). This has to be acknowledged as a particular circumstance in the context of public service innovation and might influence the way in which user involvement can and should be applied.

### **Participatory user involvement and user-oriented methods**

It is possible to distinguish between participatory user involvement, when users participate actively and directly through participation in brainstorming sessions, idea generation workshops, focus groups, or one-on-one conversations, and user oriented methods such as research of user behaviour through analysis of data on the experience of users with previous or similar services or real-time studies using observational techniques (Sanders & Stappers, 2008; Stickdorn, Hormess, Lawrence, & Schneider, 2018; Trischler & Scott, 2016). The idea of active user involvement through “participatory design” is based on the assumption that if you want to create usable services you should involve the people who are going to use them (Ind & Coates, 2013). Participatory design techniques and methods aim at encouraging users and other stakeholders to contribute with their own experiences and ideas by using a collaborative team approach that allows non-designers to become equal members of the design team (Trischler, Dietrich, & Rundle-Thiele, 2019). Trischler and Scott (2016) analysed three complementary methods for identifying user experience and found that observational techniques alone were not sufficient to understand the user experience. Instead, a combination of the use of observational techniques together with active participation of users through in-depth interviews and collaborative workshops showed the best results. However, as Agger and Lund (2017) point out, the way in which citizens are perceived influences the roles they are offered in public service innovation. The client role is still the dominating view of citizens in large parts of the public sector, for instance, in health care, where patients are frequently seen as passive receivers who lack the capacity to contribute (Agger & Lund, 2017). This perception may limit the use of participatory user involvement approaches. In addition, participatory methods of involving users are more resource intensive than non-participatory methods due to the need to orchestrate collaborative interactions between different actors (Torfing et al., 2019). Consequently, managers might prefer non-participatory methods in order to save resources.

### **Assistance from external sources**

Recent developments in co-creation theory emphasize external relationships as an important factor in the development of public service innovation (Chen, Walker, & Sawhney, 2019; Torfing & Ansell, 2017; Torfing, Cristofoli, Gloor, Meijer, & Trivellato, 2020). The main argument for including multiple external sources in the innovation process is that the diversity and plurality of insights fosters creativity and enables innovation. Multiple inputs including all relevant stakeholders are particularly relevant in the context of the public sector due to the public's right to fair process and equality before the law (Hartley, 2013; Moore, 1995). Individual user input in innovation processes can have a subjective and particularistic character, and some users might have ideas for innovation that cut across the needs of other groups, while other stakeholders might be more articulate or hold greater access to power and influence compared with others (Hartley, 2013). Therefore, innovation in the public sector must consider different motivations and needs. However, the diversity and plurality of insights that might foster innovation might also lead to tensions and dissonance that undermine the intended benefits from such collaboration (Isaksen, 2020; Røhnebak, 2021; Steen et al., 2018; Wegrich, 2019). It is therefore interesting to analyse whether input from multiple external sources during the innovation process is an important factor in successful public service innovation.

### **Design thinking**

Design thinking has increasingly gained traction as a fruitful approach to public sector innovation (Junginger, 2016; Lewis, McGann, & Blomkamp, 2020; McGann, Blomkamp, & Lewis, 2018). Co-creation is often part of design thinking, which refers to the way designers identify needs, frame problems, generate ideas, develop prototypes, and test solutions (Brown, 2008). Design thinking is an acknowledged approach to innovation and problem solving that emphasizes user or human-centredness (Beckman & Barry, 2007; Micheli, Wilner, Bhatti, Mura, & Beverland, 2019). Theories of innovation stress that innovation is not a linear, sequential process, but instead involves many interactions and feedbacks in the form of knowledge creation and use (Bason, 2018). In addition, innovation is based on a learning process that draws on multiple inputs and requires ongoing problem-solving (OECD/Eurostat, 2018). The integration of “use knowledge” into the idea-generation process has been shown to be an important prerequisite for service innovation (Skálén et al., 2018). Design thinking recognizes that user requirements cannot be clearly known *ex ante* but can only be truly understood through an iterative process that includes ideation and development (co-design) as well as testing and post-implementation research (Arundel et al., 2018; Stickdorn et al., 2018). Using design thinking in service innovation involves the systematic application of design methodology and principles to public services with the goal of designing those services from the perspective of the user. Opening up the innovation process through design techniques adds new types of knowledge to the process and helps realize outcomes for those who might profit from the innovation (Bason & Austin, 2021). The most important elements in the process include conducting research to identify challenges, conducting research to identify different types of users, brainstorming or idea generation to identify solutions, developing a prototype, and pilot testing (Tschimmel, 2012). Design thinking methods are still not very commonly used methods in public innovation. The most common involvement of users involves low-level participation where knowledge flows in one direction from the citizen to the innovating entity. It is thus possible that co-design is relatively rare, with the involvement of users being greatest at the research and post-implementation stages (Arundel et al., 2018).

### **The context of governance**

The Scandinavian countries have a reputation for being pioneers in design thinking and service design (Mureddu & Osimo, 2019; Sanders & Stappers, 2008). Data from the Co-Val survey shows that Norway is more likely than the average (of six European countries) to draw on businesses and sources linked to co-creation, such as design firms, innovation labs, or living labs (Arundel & Es-Sadki, 2019). The concept of co-creation does not represent something

new in the context of public governance in Scandinavia. On the contrary, looking at local municipalities as an arena for collaboration and resource integration has historically been seen as a common way of governing in the Scandinavian countries (Bentzen et al., 2020; Røiseland, 2016; Røiseland & Lo, 2019). The MEPIN survey of approximately 2000 public sector managers in the Nordic countries found that between 28.1% (Sweden) and 40.0% (Iceland) of managers obtained useful information for their innovations from users (Bugge, Mortensen, & Bloch, 2011). However, there are different forms of co-creation and not all of them are frequently used. For instance, the direct involvement of individual citizens in discussions about how to solve problems in their local community is not that common and could be considered a threat to the value of equal treatment. Furthermore, co-creation in the form of an equal collaboration between public actors, citizens, and organizations would in fact be considered a breach of the representative tradition of public governance in local municipalities (Røiseland & Lo, 2019). Nonetheless, examples of experimentation with task oriented, time limited collaborative arenas, where citizens and elected politicians come together in an equal joint effort to solve specific tasks or problems, do exist (Røiseland & Lo, 2019).

## Hypothesis

The involvement of users has been assumed to have a positive effect on innovation outcome. The idea is that involving end-users and other relevant stakeholders widens the knowledge base and brings new perspectives into the innovation process which leads to better products and services and more efficient delivery (Venkat Ramaswamy & Guillard, 2010, p. 71). However, some researchers also point out that value can not only be co-created but also co-destroyed (Meijer & Thaens, 2020; Skarli, 2021; Steen et al., 2018). It is therefore important to investigate when and how the involvement of users contributes to the success of innovations in the public sector.

Furthermore, there is reason to assume that configurations for successful service innovations might differ by level of government (national or local). Co-creation is said to be more prevalent at the local government level in comparison to the national level because of a greater proximity between service users and public agencies (Christopher Ansell & Torfing, 2021a; C. K. Ansell & Torfing, 2014). In addition, local municipalities are particularly pressured by a combination of rising expectations for service delivery and scarce resources, for instance in the field of health and welfare services. Thus, it can be expected that participatory and user-oriented methods are more important for service innovations at local municipality level in comparison to national government level. Co-creation is assumed to be more effective when integrated as part of a design thinking methodology. However, using design thinking systematically requires knowledge and trained personnel. It could be expected that such competencies are not yet equally distributed among local public organizations and national agencies. Thus, the success of using design thinking as a framework for public service innovation might depend on the input of additional resources. Because local municipalities often are smaller than national government agencies it can be assumed that they are more dependent on assistance from external sources in order to succeed with innovation development. Hence, the hypothesis is that local municipalities are more dependent on a combination of user involvement and user orientation methods as well as the input of additional resources and assistance from external sources compared to national government organizations.

## Method and Data

The current study employs fuzzy set QCA (fsQCA), a configurational method that allows for a detailed analysis of how causal conditions (the factors that are addressed theoretically above) contribute to high levels of positive effects on service innovation outcomes, which means that the interplay between these single conditions explains the outcome, not single conditions in isolation. In other words, the recipe is more important than each of the ingredients (Ordanini, Parasuraman, & Rubera, 2014). In contrast to more conventional techniques for analysing systematic fit in a particular configuration, QCA assumes complex causality and uses cases

instead of variables to establish causal relations (Schneider & Wagemann, 2010). Hence, QCA allows us to investigate whether public service organizations follow different configurations of innovation input factors, including different types of resources. Causality in QCA is inferred from a dialogue between empirical, theoretical, and case-based knowledge (Rutten, 2020). Thus, QCA is particularly suited for small and medium-sized samples (10–100 cases) like the one in this study (Ragin, 2014). Familiarity from the cases in this study is derived from the individual case descriptions as well as an extensive preliminary explorative data analysis including various combinations of conditions that are in coherence with theoretical expectational relevance. The conditions that are included in the final model were consistently identified in configurations with good fit according to accepted parameters of fit in QCA, namely consistency and coverage. Consistency resembles the notion of significance in quantitative research and measures the degree to which a configuration is a consistent subset of and therefore sufficient for the outcome. Coverage provides a measure of empirical relevance, and the analogous measure in statistical models would be  $R^2$  (Legewie, 2013).

The analyses were performed by using the fsQCA 3.0 software. Ragin (2000) recommends checking for necessity prior to the analysis of sufficiency because necessary conditions can appear to be logically redundant from the perspective of sufficiency. A condition is necessary if, whenever the outcome is present, the condition is present as well. For necessity analysis, a consistency benchmark of at least 0.90 is recommended (Greckhamer, Furnari, Fiss, & Aguilera, 2018). None of the five conditions included in the analysis reached high enough consistency levels to be identified as a necessary condition.

The analysis of sufficiency explains which configurations of conditions are sufficient to produce the outcome. The first step is constructing a data matrix known as a truth table. Each row of this table is associated with a specific combination of conditions, and the full table thus lists all possible combinations. The empirical cases are sorted into the rows of this truth table on the basis of their values on these conditions (Fiss, 2011). Truth table rows without empirical basis were dismissed in this study. In a second step, the number of rows is reduced in line with (1) the minimum number of cases required for a solution to be considered and (2) the minimum consistency level of a solution. For sufficiency analysis, the accepted consistency benchmark is 0.80 for raw consistency (Charles C Ragin, 2000). In this study, the minimum level of consistency in the analysis of sufficiency was set to 0.90 and the minimum number of cases for a solution to be considered was set to 1, which is the default option in the fsQCA software. This resulted in a truth table consisting of 32 configurations to be analysed.<sup>1</sup> The presentation of the results in this study is concentrated on the parsimonious solution because this solution includes only the most important conditions that cannot be left out from any solution and because it is independent from theoretical assumptions.

## Data collection

The data used for this article originated from the Co-Val project (<https://www.co-val.eu/>), which was conducted as part of the Horizon 2020 project on co-creation of value in public services and are linked to a large-scale survey of public administration managers responsible for innovation projects in six countries. The complete questionnaire is available in the report “D2.7 Preliminary survey results” (Arundel & Es-Sadki, 2019). The survey focuses on the use of inputs from external sources, user-involvement, and design thinking in innovative projects in order to produce policy-relevant knowledge of co-creation activities.

The sample for this study used the Norwegian data from the Co-Val survey and consisted of 94 service innovation cases from local municipalities as well as national agencies and ministries in Norway. The sample was split 50/50 between municipalities and national ministries or agencies. The response rate for Norway was 48.1%, but not all of the respondents answered all of the relevant questions for this study. Cases with missing replies were removed from the analysis, leaving 85 relevant cases of service innovations that are approximately evenly distributed between the local and national government level.

National government services covered by the survey include, for instance, inspection activities; planning, operation, and management of public roads and infrastructure; grant

management for the cultural sector; flood, landslide, and avalanche alerts; and accreditation and approval of foreign education and training. Local government services covered by the survey include, for instance, schools and libraries, health care, social work and child welfare, special education for children, water and sewage services, nursing homes for the elderly, and day care for small children. Users of local public services are, compared to users of national government services, more often individuals (citizens and residents) whereas users of national public services more often are other organizations and businesses.

The survey target population consisted of public sector managers within national and municipal governments who were likely to be actively involved in the development and implementation of service innovations for citizens, residents, or businesses. The population of eligible managers was identified using organograms available on government websites. Following other research on public sector innovation, the top management level was excluded in order to ensure that respondents were actively involved in innovation projects (Wagner, Rau, & Lindemann, 2010; Walker, Berry, & Avellaneda, 2015).

Respondents were asked to only respond for their area of responsibility, defined as their work unit. The organization was the government entity that employed the respondent and could be an agency, ministry, or department within a municipality or national government. Respondents were asked to describe their most important service innovation in the previous two years that was partly or entirely developed by their work unit followed by several questions that focused on this most important innovation. Those questions concerned several inputs and methods used during the development of the most important innovation. This approach has been used in innovation surveys in both the private and public sectors (OECD/Eurostat, 2018). A focus on a single innovation can obtain better quality data for innovation inputs and outputs because it does not require the respondent to make averaged estimates for multiple innovations. The survey also contained qualitative descriptions of the individual innovations provided by the respondents. Innovation was defined as a new or improved service or process that differs significantly from the work unit's previous services or processes. The descriptions were used to classify each innovation as either a service or process-only innovation. This way the classification of the innovations did not depend on the respondent's knowledge. However, service- and process innovations are often closely related. The analyses for this article were restricted to service innovations because they contain the main part of the reported innovations in the survey (64%). Due to confidentiality concerns, the exact case descriptions cannot be revealed in this paper. Examples of innovations involve for instance the development of competence and systems to detect bullying in kindergartens, or the development of a certification system for nursing homes which has led to improved services for the residents.

### **Operationalization and calibration of conditions and outcome**

The study applies QCA, which allows researchers to calibrate partial memberships in sets using values in the interval between 0 (no membership) and 1 (full membership). A fuzzy score of 0.5 means neither in nor out of the set and is the point of maximum ambiguity. The outcome variable "positive effects on outcome from service innovation" consists of four service outcome categories including user experience of a service, user access to information, safety of employees or individuals (citizens, residents, etc.), and service quality. Respondents were asked to assess the effects of their most important service innovation on these outcomes, and it was possible to report either positive, neutral, or negative effects. In the context of this study, we are interested in positive effects on outcome from innovation. Full membership in the set "high level of positive effects on service outcome" was achieved when all four outcome categories showed positive results.<sup>2</sup>

Respondents were asked about five methods for obtaining user input, which were separated into participatory methods and user-oriented methods. The condition "participatory methods" consists of three participatory methods for obtaining user input: in-depth one-on-one research with users, focus groups with users, and the participation of users in brainstorming workshops. The condition "user-oriented methods" consists of two methods for obtaining information on

user experience: analysis of data on the experiences of users with previous or similar services, and real-time studies of how users experience or use a prototype of the innovation.

The survey included a question on any input in the form of assistance, advice, technology, or other forms of input from outside the work unit in the development of the innovation. Possible sources were other government organizations, universities and research institutes, businesses and consultants, design firms, innovation labs and living labs, and ICT firms and software suppliers. The five sources were aggregated into one condition representing the degree of “assistance from external sources”. The survey had further questions about the methods that were used to develop the most important innovation and included five methods that are part of a design-thinking process, namely conducting research to identify challenges, conducting research to identify different types of users, brainstorming or idea generation to identify solutions, developing a prototype of the innovation, and pilot testing of the innovation. All design thinking methods were aggregated into one condition representing the degree of “design thinking” used during the development of the innovation. The conditions of “level of government” (national/local) and “input of extra resources” (additional funding and/or additional staffing) were transformed into binary conditions.

## Results

### Descriptive results

Table 1 shows descriptive statistics for all single variables used to construct the QCA conditions for local and national service innovations. There were significant differences between the national and local government level for most of the included variables. Overall, respondents from national government organizations reported much higher use of methods to obtain input from users in service innovation compared to respondents from local municipalities. For instance, 61% of service innovations at the state level included one-to-one in-depth conversations with users to identify challenges or unmet needs, whereas only 22% of service innovations in local municipalities used this kind of user involvement method. The use of assistance from external sources was also more prevalent at the national level in comparison to the local level. In particular, the use of businesses and consultants (78% versus 21%) and the use of providers of specialized software or ICT equipment (73% versus 32%) was much more widespread on the national government level compared to local municipalities. The use of design thinking methods was more equally distributed between national and local public organisations but was still higher on the national level for all except one of the reported methods. Both government levels reported high percentages regarding the use of brainstorming or idea generation to identify solutions (90% versus 71%) as well as pilot testing of the innovation (78% versus 71%). The biggest difference regarding the use of design thinking methods between the national and local government level was in the development of prototypes (63% versus 38%). The input of extra funding during innovation development was significantly higher on the state level (63% versus 38%), whereas the use of extra staff during innovation development was relatively rare on both government levels (7% versus 11%). All percentages were significantly higher for the national government level in comparison to the local government level except for the variables “input from universities or public research institutes”, “research to identify the challenges for the innovation”, and “input of extra staff during innovation development”.



*Table 1 Descriptive frequencies for all variables used in the QCA analysis by level of government*

<i>Variables</i>	<b>National ministries or agencies</b>	<b>Local municipalities</b>
N	38	47
<b><i>Participatory user involvement</i></b>		
One-to-one in-depth conversations with users to identify challenges or unmet needs	61%	22%***
Focus groups with users to identify challenges or unmet needs	63%	35%**
Inclusion of users in brainstorming or idea-generation workshops	79%	48%**
<b><i>User-oriented methods</i></b>		
Analysis of data on the experience of users with previous or similar services or processes	82%	50%**
Real-time studies of how users experience or use a prototype of this innovation	50%	20%**
<b><i>Assistance from external sources</i></b>		
Other government organizations	49%	23%*
Universities or public research institutes	24%	28%
Businesses, including consultants	78%	21%***
Design firms, innovation labs, or living labs	32%	19%
Providers of specialized software or ICT equipment	73%	32%***
<b><i>Design thinking</i></b>		
Conduct research to identify the challenges for this innovation	18%	21%
Conduct research to identify different types of users for this innovation	28%	12%
Brainstorming or idea generation to identify solutions	90%	71%*
Development of a prototype of this innovation	63%	38%*
Pilot testing of this innovation	78%	71%
<b><i>Input of extra resources</i></b>		
Extra funding	63%	38%*
Extra staffing	7%	11%

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  for differences between the national and local government level

Table 2 shows the percentage of reported positive effects on outcomes for four types of service outcome by level of government. Respondents from national ministries or agencies reported slightly higher percentages of positive effects on service innovation outcomes than respondents from local municipalities. However, both government levels reported high percentages of positive effects on service innovation outcomes except for the outcome category “safety of citizens and residents”.

*Table 2 Percent reporting each type of positive service outcome by level of government*

<b>Positive outcome</b>	<b>National ministries or agencies</b>	<b>Local municipalities</b>
N	38	47
Service quality	82%	81%
User experience of a service	79%	72%
User access to information	84%	62%*
Safety of citizens and residents	34%	28%

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  for differences between the national and local government level

### QCA results

Table 3 illustrates all configurations that lead to a high level of positive effects on service outcomes from innovation. There are nine configurations in total of which two are related to the national government level, two are related to the local government level, and five configurations for which the level of government doesn't matter, which means they would work for both government levels. All except one configuration for national government level include one or more of the four co-creation related input factors which are described in the theoretical part of the paper.

Table 3 QCA results for a high level of beneficial service innovation outcomes

Configurations	National		Local		Both				
	1	2	3	4	5	6	7	8	9
Participatory		●		●	●			●	●
User oriented			●	●			●	●	●
External assistance	●		●			●			●
Design thinking		●					●	●	
Extra resources				●	●	●	●		●
Raw coverage	0.313	0.226	0.104	0.089	0.230	0.174	0.205	0.280	0.147
Unique Coverage	0.088	0.002	0.009	0	0.038	0.016	0.028	0.002	0
Consistency	0.895	0.925	0.977	0.818	0.888	0.972	0.956	0.945	0.874
Total Coverage = 0.67 Solution Consistency = 0.87									

\*Notes: Black circles “●” indicate high levels of a condition. Empty circles “○” indicate low levels of a condition. Blank cells indicate an irrelevant (“don’t care”) condition where the presence of the condition does not matter.

To summarize, the analysis identified the following solutions paths (combination of factors/configurations that lead to the outcome):

1. National government level with low level of external assistance,
2. National government level with high level of participatory user involvement and low level of design thinking methods,
3. Local government level with high level of user-oriented methods and high level of external assistance,
4. Local government level with low level of participatory user involvement, high level of user-oriented methods and extra resources,
5. Both government levels with high level of participatory user involvement and no extra resources,
6. Both government levels with high level of external assistance and no extra resources,
7. Both government levels with low level of user-oriented method, high level of design thinking and no extra resources,
8. Both government levels with high level of participatory user involvement, high level of user-oriented method, and low level of design thinking,
9. Both government levels with low level of participatory user involvement, high level of user-oriented methods, low level of external assistance, and extra resources.

The overall solution consistency (0,87) and coverage (0,67) are high, which means that the results can be interpreted as being a good fit with the outcome (high level of positive effects on service outcomes) and are representative for the cases that went into the analysis. To check for the robustness of those findings, I conducted sensitivity analyses according to common QCA practice. Specifically, I varied the crossover point in the calibration of condition and outcome and the consistency threshold (between 0.8 and 0.9). Minor changes were observed, but the results remained substantially unchanged.

## Interpretation of the Findings

This chapter summarizes the main findings of the analysis in light of the theoretical expectations and objective of the paper. The main findings are:

1. User input is an important ingredient in successful public service innovation.

Most of the identified configurations include high levels of participatory user involvement and/or user-oriented methods (six out of nine). This suggests a positive relationship between user input and public service innovation outcome.

2. User orientation, external assistance as well as extra resources more important at local government level compared to national government level.

The majority of the configurations (5–9) showed no differences regarding the level of government (level of government is a “don’t care” condition). This means that local and national public organizations have more common than distinctive paths to successful service innovations. However, the four configurations (1–4) in which the level of government does matter seem to indicate that local municipalities depend more on user orientation, external assistance as well as extra resources compared to national government organizations. This is partly in line with the theoretical expectations formulated in the hypothesis in chapter 2. However, the differences are less profound than expected. In addition, participatory user involvement was expected to be more important at local government level because of a closer proximity to users in the daily service delivery. This was not supported by the analysis.

3. The presence of one or two input factors is sufficient to produce the outcome.

The results show that it is possible to concentrate on either participatory user involvement, external assistance, or design thinking in public service innovation management. A combination of several input factors is possible in many cases but is not necessary to reach positive effects on service outcome. A high degree of design thinking only occurs in one of the configurations and not in combination with either method of user involvement or external assistance, which could indicate that these conditions substitute for each other to some degree.

4. User oriented methods have to be combined with other input factors to be sufficient for the outcome.

Non-participatory, user-oriented methods such as the analysis of data on user experience or the observation on user experience in test trials seems to be the most common form of obtaining input from service users, particularly at the local government level, but occurs only in combination with other input factors. In other words, user-oriented methods are not a sufficient innovation tool alone but must be combined with either high levels of participatory user involvement, external assistance, or extra resources in order to be successful.

5. Input of extra resources during innovation development less important than expected.

The input of additional resources during the development of the innovation only occurs in 2 of the 9 configurations and should be absent in three configurations, which means the absence of extra resources is more often sufficient for the outcome than its presence, but most of the time the absence or presence of the condition does not matter. The two times that extra resources are present in the configuration, a low level of participatory user involvement and a high level of user-oriented methods are present as well, which could indicate that the input of additional staff or funding is only useful in combination with high levels of user involvement and user orientation. The relatively low relevance of additional resources during innovation development is somewhat surprising in light of the theoretical expectations.

## Discussion and Conclusion

In summary, the findings presented here suggest that user input is an important ingredient in public service innovation. The finding regarding differences in the use of co-creation related

activities between levels of government is somewhat surprising. Local municipalities are expected to have an advantage over public organizations on the national level when it comes to user involvement because of a closer proximity to users (Christopher Ansell & Torfing, 2021a; C. K. Ansell & Torfing, 2014). Furthermore, researchers have pointed out that local governments are particularly pressured by a combination of rising expectations for service delivery and societal problem solving and scarce public resources. Consequently, they must turn to co-creation as a tool for enhancing innovation in order to make ends meet (Bentzen, Sørensen, & Torfing, 2020; Holmen, 2020; Holmen & Ringholm, 2019). Instead, the reported percentages were significantly higher in cases of innovations on the national government level for almost all of the co-creation related activities included in this study. Interestingly, even though the reported use of all input factors was much higher at the national government level, the difference between levels of government was much less distinct in the analysis on outcome effects. This could indicate that local municipalities are better at utilizing their input factors. Another interpretation of this finding could be that it is better to concentrate on a few activities and methods in comparison to a combination of multiple input factors. The QCA shows indeed that high levels of either one of the input factors is sufficient to produce successful service innovations. In other words, high levels of several input factors can be combined, but that will not make a difference for the outcome. This supports co-creation theory, which points to transactional costs connected to the necessity of orchestrating collaborative interactions between multiple actors (Steen et al., 2018; Torfing et al., 2019). Thus, “the more the better” might not apply for co-creation activities in public service innovation. However, non-participatory methods alone are not sufficient to produce the outcome and must be combined with other factors. This supports the findings of other empirical studies showing that observational techniques alone are not sufficient to understand the user experience and should be combined with participatory methods (Trischler & Scott, 2016).

The findings of this study suggest further that successful service innovation at the local municipality level relies more often on non-participatory user-oriented methods than on participatory user involvement. This is somewhat unexpected because they provide services in close proximity to users (like schooling, elderly care, and health care services). A possible explanation for this could be that high levels of participatory user involvement might be deemed inappropriate in cases of service innovations targeting vulnerable users, for instance, children or people in dementia care. The client role is still the dominating view of citizens in large parts of the public sector, for instance, in health care where patients are frequently seen as passive receivers who lack the capacity to contribute (Agger & Lund, 2017). These kinds of services are usually provided by local municipalities. Furthermore, the strong focus on equal treatment as a value of public conduct in the Scandinavian countries (Røiseland, 2016; Røiseland & Lo, 2019) might hinder direct involvement of individual citizens in discussions about how to solve problems in their local community. This perception might limit the use of participatory user involvement approaches in local public services, which often target individual users. However, a high level of participatory user involvement also appears in two configurations where the level of government does not matter and can therefore not be interpreted as a purely national government strategy.

The overall pattern revealed more common features than differences between levels of government regarding configurations that lead to successful service innovation. In fact, public services are highly interconnected and demand close collaboration between levels of governance. This has been acknowledged by the Norwegian government and the Norwegian Association of Local and Regional Authorities (KS) who recently released a cooperation agreement on innovation and sustainable development in the public sector (KMD & KS, 2021). Placing the user at the core of public services requires collaboration and coordination across organizations and government levels (KMD & KS, 2019). Thus, it is likely that in the process of this effort innovation methods will become more homogenous across different public organizations and levels of government.

Finally, the results of this study show that the input of additional resources (such as personal or funding) is either irrelevant or counterproductive in most of the identified

configurations except in combination with user-oriented methods. This finding is somewhat surprising because it is not in line with the theoretical expectations that participatory methods of involving users are more resource intensive than non-participatory user-oriented methods due to the need to orchestrate collaborative interactions between different actors (Torfing et al., 2019). Instead, the findings support the resource integration argument (Frow, Nenonen, Payne, & Storbacka, 2015; Skålén et al., 2018) that proposes that involving users and other relevant stakeholders in the innovation process, and subsequently integrating their resources into it, can also lead to cost reductions and thus reduce the need to allocate additional staff and funding to the innovation process (Jonas, 2018, pp. 50,51).

## Managerial Implications

Despite the prominence of co-creation in innovation theory and policy documents, it is still far from being an established, wide-spread approach. Instead, co-creation activities in public innovation are often ad-hoc and experimental (Christopher Ansell & Torfing, 2021). This study contributes with insights that can be used by public managers to facilitate service innovation processes by use of co-creation activities and to integrate such activities into the institutional and administrative routines of public sector innovation. In an extension of the empirical and managerial contribution, the paper contributes to the understanding of differences between the levels of government regarding combinations of input factors that lead to successful public service innovation.

This study shows further that it is not necessary to combine high levels of user involvement, input from external sources, and design thinking in order to achieve high levels of positive service innovation outcome. One of these input factors, when combined with no extra resources, is sufficient to produce successful service innovations. This suggests that public managers are advised to concentrate their efforts on specific co-creation activities. However, non-participatory user-oriented methods, like research on user experience, should be combined with one of the other input factors applied in the study in order to constitute a successful innovation strategy. At the same time, this study also shows that the inclusion of user input does not depend on the input of extra resources. For those in charge of managing and facilitating innovation processes, this is valuable knowledge. This study is based on a broad variety of public service innovation cases that cover different sectors and types of innovations. Given the variety and number of possible pathways to successful service innovation that were discovered in this study, public managers may choose and apply those combinations of methods they judge to best fit their given context.

## Limitations and suggestions for future research

Generalizing the findings regarding government levels in this study to contexts outside of the Norwegian public sector could be problematic. The scope and organization of public services are influenced by history, culture, legal tradition, and other important contextual aspects that differ across countries and welfare systems and make comparisons difficult (Wolman, 2008). However, keeping the contextual importance in mind, inferences might be drawn to countries with similar public sectors like Norway, such as the other Scandinavian countries.

QCA is an exploratory method that produces indications as to which configurations of co-creative innovation configurations are associated with high levels of positive effects on service innovation outcome in a given context. To reach a deeper understanding of the underlying processes, more qualitative research is needed. For instance, a possible way of following up the findings from this study could be through in-depth interviews with public innovation managers who have experience with one or several of co-creation methods mentioned in the survey.

This study by no means claims to assess the value of co-creation in public innovation processes. On the contrary, the author acknowledges the multifaceted nature of public value co-creation in the form of democracy, quality, and efficiency as well as new solutions to public challenges (Agger, Tortzen, & Rosenberg, 2018). The findings of the current study are limited to the four service-related outcome categories “service quality”, “user experience of a

service”, “user access to information”, and “safety of citizens and residents” and rely on the evaluation of public managers for these outcome effects. Despite these limitations, this article is an important supplement to the dominantly normative and case-oriented co-creation literature. In order to establish an evidence-based foundation of co-creation in public service innovation, more quantitative and comparative research on the relationship between collaborative methods and innovation outcomes is needed.

## References

- Agger, A., & Lund, D. H. (2017). Collaborative Innovation in the Public Sector—new perspectives on the role of citizens? *Scandinavian Journal of Public Administration*, 21(3), 17-38.
- Agger, A., Tortzen, A., & Rosenberg, C. (2018). Hvilken verdi skaber vi med samskabelse. *Professionshøjskolen Absalon*.
- Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of public administration research and theory*, 18(4), 543-571.
- Ansell, C., & Torfing, J. (2021a). Co-creation: the new kid on the block in public governance. *Policy & Politics*, 49(2), 211-230.
- Ansell, C., & Torfing, J. (2021b). *Public Governance As Co-Creation : A Strategy for Revitalizing the Public Sector and Rejuvenating Democracy*. Cambridge, UNITED KINGDOM: University of Cambridge ESOL Examinations.
- Ansell, C. K., & Torfing, J. (2014). *Public innovation through collaboration and design*(Vol. Volume 19).
- Arundel, A., Desmarchelier, B., Es-Sadki, N., Lagunes, H., Nordli, A. J., Magnussen, S., . . . Strokosch, K. (2018). *Mapping & Instruments Providing Data On The Co-Creation Of Public Services* (0705F01). Retrieved from <https://www.co-val.eu/public-deliverables/>
- Arundel, A., & Es-Sadki, N. (2019). *D2.7 Preliminary Survey Results*. Retrieved from <https://www.co-val.eu/public-deliverables/>
- Bason, C. (2018). *Leading public sector innovation : co-creating for a better society* (Second edition. ed.). Bristol: Policy Press.
- Bason, C., & Austin, R. D. (2021). Design in the public sector: Toward a human centred model of public governance. *Public Management Review*, 1-31.
- Bast, A., Rønnebak, M. T., & Engen, M. (2021). Co-creating dementia care: manoeuvring fractured reflexivity in service design. *Journal of Service Theory and Practice*.
- Beckman, S. L., & Barry, M. (2007). Innovation as a learning process: Embedding design thinking. *California management review*, 50(1), 25-56.
- Bentzen, T. Ø., Sørensen, E., & Torfing, J. (2020). Strengthening public service production, administrative problem solving, and political leadership through co-creation of innovative public value outcomes? *The innovation journal*, 25(1).
- Breimo, J. P., & Røiseland, A. (2021). “Samskaping” i norsk offentlig sektor: Endringer, opportuniste eller symbolpolitikk? *Academic Quarter| Akademisk kvarter*(23), 36-48.
- Brown, T. (2008). Design thinking.
- Bugge, M., Mortensen, P. S., & Bloch, C. (2011). *Measuring Public Innovation in Nordic Countries : report on the Nordic Pilot studies Analyses of methodology and results*(Vol. 40/2011).
- Callens, C. (2022). User involvement as a catalyst for collaborative public service innovation. *Journal of public administration research and theory*, 20, 1-13.
- Chen, J., Walker, R. M., & Sawhney, M. (2019). Public service innovation: a typology. *Public Management Review*, 1-22. doi:10.1080/14719037.2019.1645874
- Farr, M. (2013). Citizens and the co-creation of public service innovations. In *Handbook of Innovation in Public Services*: Edward Elgar Publishing.
- Farr, M. (2016). Co-production and value co-creation in outcome-based contracting in public services. *Public Management Review*, 18(5), 654-672.

- Frow, P., Nenonen, S., Payne, A., & Storbacka, K. (2015). Managing co-creation design: A strategic approach to innovation. *British Journal of Management*, 26(3), 463-483.
- Hartley, J. (2013). Public and Private Features of Innovation. *Handbook of Innovation in Public Services*, 44-59. doi:10.4337/9781849809740.00011
- Holmen, A. K. T. (2020). Innovasjon som nytt styringsparadigme i en kommunal hverdag? In E. Willumsen & A. Ødegård (Eds.), *Samskaping - for helse og velferd*. : Universitetsforlaget.
- Holmen, A. K. T., & Ringholm, T. (2019). *Innovasjon møter kommune*. Oslo: Cappelen Damm akademisk.
- Ind, N., & Coates, N. (2013). The meanings of co-creation. *European Business Review*, 25(1), 86-95. doi:10.1108/09555341311287754
- Isaksen, K. (2020). Det knirker mye mer enn jeg trodde. *Norsk sosiologisk tidsskrift*, 4(5), 275-290. doi:10.18261/issn.2535-2512-2020-05-02
- Jenhaug, L. M. (2020). Employees' resistance to users' ideas in public service innovation. *Australian journal of public administration*, 79(4), 444-461. doi:10.1111/1467-8500.12415
- Jonas, J. M. (2018). Stakeholder Integration in Service Innovation. In. Wiesbaden: Wiesbaden: Springer Fachmedien Wiesbaden.
- Jukić, T., Pevcin, P., Benčina, J., Decman, M., & Vrbeč, S. (2019). Collaborative Innovation in Public Administration: Theoretical Background and Research Trends of Co-Production and Co-Creation. *Administrative Sciences*, 9, 90. doi:10.3390/admsci9040090
- Junginger, S. (2016). *Transforming Public Services by Design: Re-orienting policies, organizations and services around people*: Routledge.
- KMD. (2020). *Meld. St. 30 (2019–2020) En innovativ offentlig sektor — Kultur, ledelse og kompetanse*
- KMD, & KS. (2019). *One digital public sector. Digital strategy for the public sector 2019–2025*. Retrieved from <https://www.regjeringen.no/en/dokumenter/one-digital-public-sector/id2653874/>
- KMD, & KS. (2021). *Samarbeidsavtale om innovasjon og oppfølgingen av bærekraftsagendaen 2021-2023*. Retrieved from <https://www.regjeringen.no/contentassets/af5f250db7ec449589e4c71c5c724006/samarbeidsavtalen-ferdig.pdf>
- Krogh, A. H., Sørensen, E., & Torfing, J. (2020). Samskabelse af innovative offentlige løsninger. In *Samskaping: Sosial innovasjon for helse og velferd* (pp. 45-65): Universitetsforlaget.
- Legewie, N. (2013). *An introduction to applied data analysis with qualitative comparative analysis*. Paper presented at the Forum Qualitative Sozialforschung/Forum: Qualitative Social Research.
- Lewis, J. M., McGann, M., & Blomkamp, E. (2020). When design meets power: Design thinking, public sector innovation and the politics of policymaking. *Policy & Politics*, 48(1), 111-130.
- Lund, D. H. (2018). Co-creation in urban governance: From inclusion to innovation. *Scandinavian Journal of Public Administration*, 22(2), 3-17.
- McGann, M., Blomkamp, E., & Lewis, J. M. (2018). The rise of public sector innovation labs: experiments in design thinking for policy. *Policy Sciences*, 51(3), 249-267.
- Meijer, A., & Thaens, M. (2020). The Dark Side of Public Innovation. *Public Performance & Management Review*, 1-19. doi:10.1080/15309576.2020.1782954
- Micheli, P., Wilner, S. J., Bhatti, S. H., Mura, M., & Beverland, M. B. (2019). Doing design thinking: Conceptual review, synthesis, and research agenda. *Journal of Product Innovation Management*, 36(2), 124-148.
- Moore, M. H. (1995). *Creating public value: Strategic management in government*: Harvard university press.
- Mureddu, F., & Osimo, D. (2019). *Co-Creation of Public Services - Why and How*.

- Nabatchi, T., Sancino, A., & Sicilia, M. (2017). Varieties of participation in public services: The who, when, and what of coproduction. *Public administration review*, 77(5), 766-776.
- OECD/Eurostat. (2018). *Oslo Manual 2018: Guidelines for collecting, reporting and using data on innovation*. Retrieved from Paris/Eurostat, Luxembourg: <https://www.oecd-ilibrary.org/content/publication/9789264304604-en>
- Ordanini, A., Parasuraman, A., & Rubera, G. (2014). When the recipe is more important than the ingredients: A qualitative comparative analysis (QCA) of service innovation configurations. *Journal of Service Research*, 17(2), 134-149.
- Osborne, S. P., Radnor, Z., & Strokosch, K. (2016). Co-Production and the Co-Creation of Value in Public Services: A suitable case for treatment? *Public Management Review*, 18(5), 639-653. doi:10.1080/14719037.2015.1111927
- Prahalad, C. K., & Ramaswamy, V. (2004a). Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3), 5-14. doi:<https://doi.org/10.1002/dir.20015>
- Prahalad, C. K., & Ramaswamy, V. (2004b). *The future of competition : co-creating unique value with customers*. Boston, Mass: Harvard Business School Press.
- Ragin, C. C. (2014). *The comparative method : moving beyond qualitative and quantitative strategies*.
- Ramaswamy, V., & Gouillart, F. J. (2010). *The power of co-creation: Build it with them to boost growth, productivity, and profits*: Simon and Schuster.
- Ramaswamy, V., & Ozcan, K. (2014). *The co-creation paradigm*.
- Rutten, R. (2020). Applying and Assessing Large-N QCA: Causality and Robustness From a Critical Realist Perspective. *Sociological Methods & Research*, 0(0), 0049124120914955. doi:10.1177/0049124120914955
- Røhnbæk, M. T. (2021). Competing institutional logics in collaborative innovation: A case study. *Nordisk välfärdsvetenskaplig forskning*, 6(2), 105-119. doi:10.18261/issn.2464-4161-2021-02-03
- Røiseland, A. (2016). User choice—blessing or curse? Exploring democratic participation in Swedish and Norwegian local governments. *Scandinavian Journal of Public Administration*, 20(4), 27-51.
- Røiseland, A., & Lo, C. (2019). Samskaping—nyttig begrep for norske forskere og praktikere? *Norsk statsvitenskapelig tidsskrift*, 35(01), 51-58.
- Røiseland, A., & Vabo, S. I. (2016). *Styring og samstyring : governance på norsk* (2. utg. ed.). Bergen: Fagbokforl.
- Rønning, R., & Solheim, L. J. (1998). *Hjelp på egne premisser?: om brukermedvirkning i velferdssektoren*: Universitetsforl.
- Sanders, E. B.-N., & Stappers, P. J. (2008). Co-creation and the new landscapes of design. *Co-design*, 4(1), 5-18. doi:10.1080/15710880701875068
- Schneider, C. Q., & Wagemann, C. (2010). Qualitative Comparative Analysis (QCA) and Fuzzy-Sets: Agenda for a Research Approach and a Data Analysis Technique. *Comparative Sociology*, 9(3), 376-396. doi:<https://doi.org/10.1163/156913210X12493538729838>
- Skarli, J. B. (2021). Creating or Destructing Value in Use? Handling Cognitive Impairments in Co-Creation with Serious and Chronically Ill Users. *Administrative Sciences*, 11(1), 16. Retrieved from <https://www.mdpi.com/2076-3387/11/1/16>
- Skålén, P., Karlsson, J., Engen, M., & Magnusson, P. R. (2018). Understanding Public Service Innovation as Resource Integration and Creation of Value Propositions. *Australian journal of public administration*, 77(4), 700-714. doi:10.1111/1467-8500.12308
- Steen, T., Brandsen, T., & Verschuere, B. (2018). The dark side of co-creation and co-production: seven evils. In *Co-production and co-Creation* (pp. 284-293): Routledge.
- Stickdorn, M., Hormess, M. E., Lawrence, A., & Schneider, J. (2018). *This is service design doing: applying service design thinking in the real world*: " O'Reilly Media, Inc."



- Sørensen, E., & Torfing, J. (2011). Enhancing collaborative innovation in the public sector. *Administration & Society*, 43(8), 842-868.
- Torfing, J., & Ansell, C. (2017). Strengthening political leadership and policy innovation through the expansion of collaborative forms of governance. *Public Management Review: Special issue: Political Innovation. Guest editor: Eva Sørensen*, 19(1), 37-54. doi:10.1080/14719037.2016.1200662
- Torfing, J., Cristofoli, D., Gloor, P. A., Meijer, A. J., & Trivellato, B. (2020). Taming the snake in paradise: combining institutional design and leadership to enhance collaborative innovation. *Policy and Society*, 1-25. doi:10.1080/14494035.2020.1794749
- Torfing, J., Sørensen, E., & Røiseland, A. (2019). Transforming the Public Sector Into an Arena for Co-Creation: Barriers, Drivers, Benefits, and Ways Forward. *Administration & Society*, 51(5), 795-825. doi:10.1177/0095399716680057
- Torfing, J., Sørensen, E., & Røiseland, A. (2020). Samskaping–fra ide til strategi. *Stat & Styling*, 30(04), 28-30.
- Trischler, J., Dietrich, T., & Rundle-Thiele, S. (2019). Co-design: from expert-to user-driven ideas in public service design. *Public Management Review*, 21(11), 1595-1619.
- Trischler, J., & Scott, D. R. (2016). Designing Public Services: The usefulness of three service design methods for identifying user experiences. *Public Management Review*, 18(5), 718-739. doi:10.1080/14719037.2015.1028017
- Tschimmel, K. (2012). *Design Thinking as an effective Toolkit for Innovation*. Paper presented at the ISPIM Conference Proceedings.
- Verleye, K. (2015). The co-creation experience from the customer perspective: its measurement and determinants. *Journal of Service Management*, 26(2), 321-342. doi:10.1108/Josm-09-2014-0254
- Voorberg, W., Bekkers, V., & Tummers, L. (2015). A Systematic Review of Co-Creation and Co-Production: Embarking on the social innovation journey. *Public Management Review*, 17(9), 1333-1357. doi:10.1080/14719037.2014.930505
- Wagner, S. M., Rau, C., & Lindemann, E. (2010). Multiple informant methodology: A critical review and recommendations. *Sociological Methods & Research*, 38(4), 582-618.
- Walker, R. M., Berry, F. S., & Avellaneda, C. N. (2015). Limits on innovativeness in local government: Examining capacity, complexity, and dynamism in organizational task environments. *Public Administration*, 93(3), 663-683.
- Wegrich, K. (2019). The blind spots of collaborative innovation. *Public Management Review*, 21(1), 12-20. doi:10.1080/14719037.2018.1433311
- Wolman, H. (2008). Comparing Local Government Systems across Countries: Conceptual and Methodological Challenges to Building a Field of Comparative Local Government Studies. In (pp. 87-103). London.

## Appendix

Table 4: Calibration values for conditions and outcome

Outcome/conditions	Calibration values
Positive effects on service innovation outcomes (four variables)	0 = 0, 1 = 0.25, 2 = 0.49, 3 = 0.75, 4 = 1
Participatory user involvement methods (three variables)	0 = 0, 1 = 0.33, 2 = 0.67, 3 = 1
User oriented methods (two variables)	0 = 0, 1 = 0.51, 2 = 1
Assistance from external sources (five variables)	0 = 0, 1 = 0.2, 2 = 0.4, 3 = 0.6, 4 = 0.8, 5 = 1
Design thinking (five variables)	0 = 0, 1 = 0.2, 2 = 0.4, 3 = 0.6, 4 = 0.8, 5 = 1

## Notes

<sup>1</sup> The truth table is too comprehensive to be displayed here but can be attained by request to the author.

<sup>2</sup> Details regarding the calibration of outcome and conditions can be found in table 4 in the appendix.