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Published in:
Public Management Review

Published: 01/01/2020

Document Version:
Post-print, also known as Accepted Author Manuscript, Peer-reviewed or Author Final version

Publication record in CityU Scholars:
[Go to record](#)

Published version (DOI):
[10.1080/14719037.2019.1645874](https://doi.org/10.1080/14719037.2019.1645874)

Publication details:
Chen, J., Walker, R. M., & Sawhney, M. (2020). Public service innovation: a typology. *Public Management Review*, 22(11), 1674-1695 . Advance online publication. <https://doi.org/10.1080/14719037.2019.1645874>

Citing this paper

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Public Service Innovation: A Typology

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Acknowledgement: We thank Nordic Innovation for their financial support (P 11041) and Ash Center at Harvard Kennedy School for sharing the innovation applications at the Innovations in American Government Awards Program (IAGAP). The study was also supported by a National Research Foundation of Korea grant funded by the Korean Government (NRF-2017S1A3A20676360). Prior versions of this manuscript were presented at Academy of Management Annual Meeting 2015 and Public Management Research Conference 2015.

Public Service Innovation: A Typology

Abstract

Existing classifications of public service innovation are largely derived from a private sector perspective and an internal orientation, overlooking their public value and collaborative nature. In this article, we present a typology for defining and classifying innovation in public service organizations that comprises two dimensions: “innovation focus” (three public value creation processes of strategy, capacity and operations), and “innovation locus” (internal and external). Together, these result in six types of innovation: mission, policy, management, partner, service, and citizen. A preliminary assessment is presented. The implications of the typology for understanding public service innovation are discussed.

Key words: Public service innovation, public value, innovation focus, innovation locus, innovation typology

8710 words (excluding references and online supplementary material)

Introduction

Public service innovation (PSI) is widely researched by scholars and governing bodies (Bloch and Bugge 2013; Borins 2014; Moore and Hartley 2008; Walker 2008; Windrum 2008). The PSI imperative has gained momentum in recent years. Transparency, technological change, and citizen collaboration have become more salient, increasing the co-production of services and placing public service organizations (PSOs) and users on a more equal footing in the search for public value (Ansell and Torfing 2014; Lusch and Nambisan 2015). The field has generated new ideas such as collaborative innovation (Ansell and Torfing 2014; Hartley, Sørensen, and Torfing 2013). However, an adequate framework for understanding and measuring PSI in PSO is still missing (Koch and Hauknes 2005; Bloch and Bugge 2013).¹ Rarely have public administration scholars tried to accommodate all of the innovative possibilities that demand such attention.

Various classification schemes for PSI have been proposed, but they suffer from several limitations, notably that they do not reflect the characteristics of PSOs. First, they build from a private sector perspective and place a strong emphasis on manufacturing and products, overlooking the nature of public services and the objective of public value (Damanpour and Aravid 2012; Osborne, Radnor, and Nasi 2013). Public value is the desirable outcome relating to the quality of individual and collective life for citizens shaped by the normative consensus of society, policies, and governance (Moore 2013; Yang 2016; Geuijen et al 2017). Second, extant classifications typically have an internal orientation and do not capture the shift to collaborative innovation and changes in governance and co-production that signal the importance of relationships beyond the organization (Ansell and Torfing 2014; Hartley, Sørensen, and Torfing 2013). Further, some existing typologies are developed without clear overarching criteria to classify innovation (Bekkers, Edelenbos and Steijn 2011; Hartley 2005) and as a result, suffer overlap among different

types of innovation. Hence, it is hard for scholars to make sense of the innovation literature and for managers to pursue innovation activities comprehensively because they offer conflicting advice on the different types of PSI activities.

This article contributes to the understanding of PSI by presenting an integrative framework, and specifically a typology of PSI. While a PSO can innovate in many ways, which are often intertwined, creating hybrid forms of building blocks (Moore and Hartley 2008; Torugsa and Arundel 2016), we develop a typology by classifying the building blocks for analytical purposes. The typology is built from two dimensions of organizational behaviour that leads to innovation: the process of public value creation or “innovation focus,” and the innovation setting or “innovation locus.” First, building on public value literature along with an adaptive behaviour framework, we identify three processes of public value to classify innovation by its focus: strategy, capacity, and operations (Miles and Snow 1978; Moore 1995). Second, we classify innovation activity as having a locus that is either internal (i.e. on dimensions endogenous to the organization boundary) or external (i.e. on dimensions exogenous to the organization) (Benner and Tushman 2015; Hargrave and Van de Ven 2006). By classifying PSIs via the three innovation foci and two innovation loci, we develop a new typology that consists of six types of innovation: mission, policy, management, partner, service, and citizen.²

The typology can provide insights and guides in different ways. By distilling the multi-faceted phenomenon of innovation into discrete, memorable building blocks, the typology removes some of the confusion surrounding overlap among concepts in the innovation types literature and provides a set of common vocabularies to effectively describe different types of innovation and to explore the relationship among them. The typology can help scholars to identify innovation opportunities systematically, paying more attention to understudied innovation types such as

mission and citizen innovation. The typology can also guide scholars to examine the effects of environmental, organizational and innovation features on the adoption and diffusion of these innovation types and the effects of innovation on organizational design, performance, and governance. Using the typology as a theoretical foundation, scholars can develop hypotheses to predict circumstances in which certain PSI would be more desirable. Before presenting our typology, we define PSI and examine the existing classifications on PSI.

Defining public service innovation

While there is no universally accepted definition of innovation, most scholars agree that innovation involves the generation and realization of novel ideas (Van de Ven 1986; Hartley 2005; Torugsa and Arundel 2015; De Vries, Bekker and Tummars 2016). PSI is still “undertheorized and under-researched” and is just emerging from studies dominated by the private sector (Moore 2005; Hartley, Sørensen, and Torfing 2013). To understand PSI better, we need to articulate the unique feature of its current context and of PSO from private sector organizations.

Traditionally organizations largely innovated alone due to their independence. In the current, more connected and interdependent world, organizations more and more innovate with others in an ecosystem. Because a PSO is embedded in an ecosystem, it needs to coevolve with other organizations to meet its goals. As in a biological ecosystem, a PSO ecosystem is a network of actors including numerous stakeholders such as citizens, civil society, public partners, private partners, users, and internal members who deliver public services (Bason 2010; Moore 1993). The need to resolve wicked problems requires organizations to work together (Weber and Khademian 2008; Geuijen et al. 2017); the shifting mind-set and practices such as open innovation allow organizations to recognize and achieve benefits of collaboration (Mergel 2017). Along with the changing context, scholars have observed the shifting paradigms or ideological conceptions of

governance and public management from traditional public administration to New Public Management (NPM), and to recently New Public Governance (NPG), which, in turn, requires new innovation strategies (Hartley, Sørensen, and Torfing 2013). Particularly, collaborative governance emphasizes collaborative innovation of multi-actors across organizations to create public value (Hartley 2005; Hartley, Sørensen, and Torfing 2013). PSI is typically introduced into an ecosystem through an interface between an organization and its stakeholders. Therefore, we need to analyse PSI in light of its unique set of relationships within the ecosystem. Hence, innovations can occur within organizational boundaries and among separate organizations in a multi-party ecosystem (Benner and Tushman 2015; Lusch and Nambisan 2015).

The purpose of a PSO has been oriented toward the creation of public value, a defining feature that is different from the objective of a private organization towards private value. However, public value remains a multifaceted and contested concept (Hartley, Parker and Beashel 2019; Yang, 2016). Moore (1995) and Bozeman (2007) champion two main views, which “have not been formally integrated, reconciled, or at least accommodated in some way to date” (Bryson, Crosby, and Bloomberg 2014, 13). Moore (1995, 10) equates “managerial success in the public sector with initiating and reshaping public sector enterprises in ways that increase their value to the public in both the short and the long run.” Jorgensen and Bozeman (2007, 357) argue that this definition of public value is more of an example of “quality public management” and that public “values” should be understood relationally because value is defined by society as a whole and through policy and governance. Recently, Moore and his colleagues (2013; Geuijen et al. 2017) have explicitly extended public value concept to include human rights, safety, and welfare of individuals and national interests. To reconcile the two conflicting views, public value refers to desirable outcomes relating to the quality of individual and collective life for citizens shaped by the

normative consensus of society, policies, and governance (Geuijen et al. 2017; Jorgensen and Bozeman 2007; Moore 1995; Yang 2016). This definition combines the managerial orientation towards public value found in the work of Moore, with Bozeman’s societal or policy orientation values emphasizing a normative consensus. Put another way, public value creation within a PSO results in the development and implementation of innovation. The resultant innovations are used in the collective political process to deliver public values in which a “normative consensus” is developed, which regulates the expectations that clients and citizens have for the public sector, the institutions that allow society to function in an orderly way (e.g. the rule of the law), and the obligations the public sector can impose on its clients and citizens. For example, when a municipality works with its citizens and service providers to develop innovative approaches to curb-side recycling, it is combining user convenience and concern with sustainability in a way that is integrated with its pre-existing capacity to offer sanitation services. When an education authority innovates in its curriculum, it is implementing new strategies for student success. When a government offers innovative pathways for communication and transparency to its citizens, it promotes the foundational values of democratic governance. Each of these examples involves PSO using public value creation and adaptive behaviour to develop an innovation, which when implemented delivers public values.³ Building on our discussion of ecosystems, some of these innovations can be developed and implemented within the organization, while others are explicitly defined by interaction with the ecosystem.

Hence, we define PSI as *the development and implementation of a novel idea by a PSO to create or improve public value within an ecosystem*. This definition emphasizes three attributes – novelty, development and implementation, and ecosystem – and one outcome – public value. First, *novelty* refers to any new idea relative to the adopted PSO. Novelty is a multifaceted concept that

can be applied to various adopters and is typically relative to the adopted organization (Damanpour and Aravind 2012; Torugsa and Arundel 2016). Different degrees of novelty from distinct perspectives have been used to classify innovation, such as incremental vs. radical innovation. Second, we include *development* and *implementation* to highlight that innovation is a process and must have been introduced to ecosystem members in some form to affect relationships (Damanpour and Aravind 2012; Piening 2011), distinguishing it from, creativity – the development of novel and useful ideas. Third, we situate the innovation process within an *ecosystem*, in which different actors engage in mutual value creation or co-creation (Lusch and Nambisan 2015). Finally, we emphasize *public value* as the process of innovation development and implementation and as an intended outcome of PSI (Bozeman 2007; Bryson, et al. 2014; Moore 1995).

Existing classifications of PSI

To classify PSI, we review the existing typologies, cataloguing their insights and limitations from two perspectives. First, Moore and Hartley (2008) report that the main difficulty in developing a typology for governmental innovation has been the reliance on understanding innovations already developed for the private sector because they primarily examine process and product innovations (see Damanpour and Aravind 2012). Therefore, we examine if the typology is located in the private sector or public services literature. Second, PSI has been informed by the major themes that influence governance arrangements in PSO: the internally oriented NPM and recently the external oriented NPG. Thus, we also examine the orientation of the typologies.

In undertaking this review, we identified literature from the Web of Science (filter for Public Administration) using the search term *innovate* AND (typolog* OR taxnom* OR classif* OR type* OR dimension*)*, resulting in 352 articles. We supplemented this search with a

comprehensive review of the literature cited in De Vries, Bekkers and Tummers (2016) and the key authors working with innovation types (Bekkers, Damanpour, Hartley, Moore, Walker, etc.). We identified seven studies that examine systems of classification, rather than only one or two innovation types, and be the founding article for different classification systems.⁴ Table 1 provides a summary of these typologies in terms of the origin and orientation (see online supplementary materials Appendix 1 for full descriptions).

[Table 1 here]

Private Versus Public Service Origin

Many of the PSI typologies are derived from studies of private firms, focusing on product and process innovation, and are profit-oriented. Drawing upon a private sector framework has some validity because public managers may adopt innovations from it, and reform programmes such as the NPM have sought to make government more like business (Bryson, Crosby, and Bloomberg 2014) following entrepreneurship orientation (Swann 2017). These studies assume that both public service and private organizations engage in organizational change in ways that are at least analogous to one another. The problem with this is that they differ their publicness and the extent of political or economic control (Bozeman 1987; Moore 2000; Rainey 2009). As a result, we interpret the value of PSI through a lens that is designed to measure different objectives and outcomes within different contexts.

The majority of the classifications are derived from a private sector orientation (Table 1). These schemes are typically deductive, working from the premise of existing innovation typologies. For example, Bloch and Bugge (2013) adapt the OECD's private sector innovation model to the public sector and identify product and process innovation. The way that Walker (2006, 313) refers to service innovation as being "concerned with *what* is produced" suggests the influence of goods-

dominant logic wherein the PSO is analogous to a factory producing services and policies for public consumption. De Vries, Bekker and Tummers (2016) continue this theme identifying product or service innovation.

Moore's classification scheme is tailored to PSI, emphasizing that PSOs provide services primarily through programmes. For example, strategic innovations which "seek to redefine the basic purposes of core technologies of an organization" (Moore 1995, 234). The typology is oriented toward fulfilling the mission of an organization, not only in how programme innovation is defined as "new ways of using an organization's resources to accomplish its overall mission" (Moore 1995, 233), but also hierarchically with strategic innovation being accomplished by varying the amounts of the other two types of innovation: program and administrative.

Services have long been characterized as different from products because of three characteristics: intangibility, simultaneous production and consumption, and coproduction (Lusch and Nambisan 2015; Normann 1991; Osborne, Radnor, and Nasi 2013; Vargo and Lusch 2004). Recent research suggests that in the new service economy, the traditional goods-dominant logic is being replaced by a service-dominant logic (SDL) in which service – a process of applying one's competence to benefit others – rather than goods is viewed as fundamental to economic exchange and the customer as the co-creator of service provision (Vargo and Lusch 2004). Based on this SDL, the local department of transportation, for example, is not viewed as a provider of a physical traffic-regulating infrastructure, but as a provider of a service, to wit, safe transportation that is distributed by traffic signals and roads. The SDL was extended to the PSO by Osborne, Radnor, and Nasi (2013) and labelled "public service-dominant logic".

No prior PSI classification scheme has explicitly drawn upon SDL nor included its three characteristics above. However, the frameworks recognize the service characteristics of PSOs and

the innovations they develop. For example, frameworks of De Vries, Bekker and Tummers (2016) and Walker (2006) while drawing upon a private sector tradition, identify the importance of service innovation and note the two SDL characteristics of intangibility and simultaneous production. Windrum (2008) also makes explicit reference to services, drawing upon evidence and theory from the literature to build his taxonomy.

Internal Versus External Orientation

Perhaps, partially due to product orientation and the independence of organizations throughout history, innovation typologies typically rely on an internal orientation (Damanpour and Aravind 2012). The application of NPM and neo-Weberian driven logic to PSI are also strongly orientated towards management practices and the role of entrepreneurial leaders, giving them an overtly internal and inward facing orientation, leading in Hartley, Sørensen, and Torfing (2013, 825) toward a “focus on single services and organizations”. For example, while Moore’s (1995) typology focuses on public service, it is inward-looking.

However, corresponding to situating innovation within an ecosystem, external orientation is becoming increasingly important due to the complexity of modern, wicked problems that require cross-sectoral collaboration and the advancement of information technology which facilitate communication and collaboration among actors (Geikem et al. 2017; Xie 2014). Further, Osborne and his colleagues (2013, 2016) application of SDL to public service management emphasize the active role of the user or citizen as the necessary condition of public service delivery. As a result, an external perspective is central to the study of PSOs because collaboration, networking, partnership, and co-creation or co-production are central features of the NPG in the delivery of public services (Ansell and Torfing 2014; Hartley, Sørensen, and Torfing 2013; Torfing 2019; Wang et al. 2018).

The external orientation approach is widely reflected in public administration practices and research. Many countries have promoted public-private partnerships (PPP) to overcome the limitations of traditional public procurement. For example, by 30 Sept 2016 China has launched more than 10,000 PPP projects to build infrastructure and deliver public services (Wang et al. 2018). Similarly, collaborative innovation among different organizations is proposed to be a possible means to tackle many complex, wicked problems PSOs face, such as the 2015 Syrian Refugees (Geikem et al. 2017). In fact, collaboration was a key characteristic of innovation among the Innovations in American Government Awards Program (IAGAP) semi-finalists: external collaboration grew as a characteristic from 28 percent of the semi-finalists between 1990-1994 to 67 percent in 2010 (Borins 2014). Hartley, Sørensen, and Torfing (2013) catalogue a typology of innovative institutional designs that include partnerships, governance, and external networks. The growing emphasis on external innovation is now a critical facet of PSI.

However, an external orientation needs to be balanced by ongoing internal innovation as PSOs search for solutions to problems within their organizations because external orientation also has limitations in solving the challenges of public problems. For example, Williams, Kang, and Johnson (2016) illustrate that the co-production of public services can negatively affect public value resulting from the resource misuse in service delivery.

Walker (2006) explicitly recognizes the external nature of innovation, identifying ancillary innovation. Systemic innovations are inductively built from the case studies in Windrum's (2008, 10) taxonomy and include "interacting with other organizations and knowledge bases." Similarly, De Vries, Bekkers and Tummers (2016) and Windrum (2008) include externally orientated governance, conceptual, and policy innovations. However, they also suggest that an ecosystem is a necessary but secondary support to the primary work of service and policy production rather than

being part of the institutional context in which PSI is situated. In short, the majority of innovation types reviewed are primarily internally orientated.

Developing a typology of public service innovation

To develop a PSI typology that focuses on the attainment of public value and overcomes our concern over prior classifications, we combine innovation focus with innovation locus. We classify innovation by its focus or the three processes of creating public value (strategy, capacity, and operation) from the adaptive behaviour literature so that our typology is oriented to the nature of PSOs. We also classify innovation by its locus, which embraces both an internal and external orientation. Innovation focus and locus are key organizational behaviours that capture decisions on where a PSO will innovate, for example, operationally with an external focus or strategically with an internal focus.

Innovation Focus

The typology builds upon the concept that an organization has three foundational issues related to its creation of value (Bryson 2011; Miles and Snow 1978; Moore 1995). We contend that how an organization creatively addresses these issues constitutes the three basic organizational design processes of its innovation – the innovation focus.

Moore (1995, 38-52) argues an organization creates public value in three processes: the authorizing, institutionalizing, and operating process. As public authority is always engaged in the change of PSOs, it must be guided by political agreement on what is good for society rather than what is good for citizens as clients. Because of competing interests and reasonable principles to distribute services, politicians always debate through the authorizing process and a new agreement can deliver a different type of value (Moore 1995). The authorizing process itself also creates one aspect of public value independently from the value delivered (Moore 1995). In delivering services

to citizens, a PSO accumulates its experience, creates effective operating practices, and develops new organizational structure and partnership. All these operational capacities are an investment to the PSO in the institutionalizing process (Moore 1995). Finally, a PSO needs to balance the effective, efficient production and fair distribution of its services of benefits, and costs in the operating process. Application of strategic choice to public organizations has shown alignment across these behaviours, resulting in positive outcomes (e.g., Edwards, Poister, and Pasha 2016; Walker 2013).

Moore's three value creation processes appear to address the three problems in Miles and Snow's adaptive cycle to align the organization with its environment: entrepreneurial, administrative, and engineering problems (Miles and Snow 1978, 459-460). The *entrepreneurial problem* involves the development of a concrete definition of an organization's domain. The *administrative problem* primarily concerns rationalizing and institutionalizing the activities that successfully solve its organizational problems. The *engineering problem* involves the creation of a system that operationalizes the management's solution to entrepreneurial problems. An innovation is a new solution to one or more of these problems. While Miles and Snow's framework originates from case studies of both private and public service organizations (e.g. health care sector), their framework is widely studied among PSO (for a review see Walker 2013).

Building from the public value literature we specify three innovation foci: strategy, capacity, and operations. The *strategy focus* involves the authorizing process for an organization in defining its domain, mission, and guiding principles working with/out stakeholders (Poister, Pitts and Edwards 2010). The authorising process can be distinguished into the internal and external process. To innovate internally, this process involves the organization's response to the requirements of political actors, such as the politicians who draft political mandates, and boards of governors that

specify the organizational mission. For example, during the reform of the Finnish education system by prioritizing equality over performance does not necessarily involve stakeholders. To innovate externally, an organization has to engage multiple stakeholders in the ecosystem to accommodate their needs and obligations (Bryson, Crosby and Bloomberg 2014). This process creates a polyarchic structure, which through its role as a decision-making authority improves stability in the economic, political, and social environment. Innovation in strategy focus develops mission and policy that embody the benefits and obligations of the stakeholders. Implementing such an innovation means reaching an agreement among the various stakeholders in the ecosystem and documenting the agreement. Innovation in strategy focus is the creative solution to organizations' entrepreneurial problems.

The *capacity focus* involves instituting a process that provides an organization with the administration, structure, expertise, management, technology, and resources necessary to accomplish its politically mandated mission (Poister, Pitts and Edwards 2010). This includes the capacity of management to effectively bring the workforce together, change the processes that enable employees to fulfil their roles, look at resources and revenues more broadly, and to partner with organizations (e.g. PPPs). This cumulative experience and operating capability are valuable for society. The capacity of an organization is "rooted in its ability to adapt its specific methods to new aspects of environmental change and its ability to produce new things potentially valuable to the society" (Moore 1995, 52). This creates a two-fold understanding of the importance of having an organizational infrastructure: it enables the organization to achieve its goals efficiently and effectively and to be adaptable and innovative. To maintain its capacity, a PSO will seek to improve its internal organizational procedures and external relationships with partners. Innovation in capacity focus is the creative solution to organizations' administrative problems.

The *operations focus* involves the process that an organization uses to put its strategic decisions and policies into action for the sake of its mission. An organization can launch new programs or services or can reorganize its resources to improve existing ones. The operations focus can be solely focused on the organization in service innovation or may require other stakeholder involvement in citizen innovation. In the former, a public administrator can innovate in this area by offering new services that better facilitate the political mandate represented by the organization's mission statement or promised by policies by their office alone. In the latter, managers can develop collaborative platforms to invite citizen engagement in service delivery, in which citizen has transitioned from a passive recipient of services to an active co-creator of services. For example, when a local police force designs and regulates a neighbourhood watch program, they are providing a platform that both fosters transparency and increases their capital value by leveraging the abilities of residents. Innovation in operations focus is the creative solution to organizations' operations problems.

In short, the authorization process ensures that an organization's mission reflects the desires of legitimate political authority and defines the type of services offered. To maintain its capacity, an institution seeks to improve its administrative procedures and relationships with partners. To ensure mission effectiveness, an organization seeks to improve its operating value (Moore 1995).

Innovation Locus

The typology also builds upon the concept of innovation locus, reflecting the latest change to the innovation phenomena and research, spanning the gap between the narrowly concentrated innovations within an organization to the broadly distributed innovations among organizations. We build upon Hargrave and Van de Ven's (2006) perspective of the innovation locus that sees organizations zoom out on multiple actors in the external field and zoom in on a single actor in the

internal field. Similarly, Benner and Tushman (2015) argue that if knowledge creation and innovation is distributed among independent external actors, the associated innovation boundary is fundamentally different from those when such knowledge is held within an organization.

An organization can direct its efforts in two ways when engaging in innovation activities (Bason 2010). First, an organization can direct its activities internally, defining its purpose and intentions, and creating the infrastructure and programs and services to actualize those intentions. Second, an organization can direct its activities externally and collaborate with other organizations and users to leverage their infrastructures and competencies, or to co-create public value with the citizens. A PSO must transition any in-house development to its clients and have the option of relying on partners in that process (Hartley, Sørensen, and Torfing 2013).

By internal, we mean an innovation that can be accomplished by the focal organization alone. This does not mean that other groups do not have input or that external inventions are not considered, but rather that the nature of these innovations is such that they are within the capability of the focal organization. A PSO may locate its innovative efforts internally when dealing with contentious topics, issues of privacy, security, and private interests (Hartley, Sørensen, and Torfing 2013). An internal focus involves what an organization is, how it operates, and what it primarily offers. Management attempts to answer the important question of what its purpose is and how it might improve its strategy, capabilities, and services. Innovation in this area would include changes within an organizational boundary, whether at the strategic or capacity level, or embodied in a concrete operational offering.

By external, we mean outward-looking innovative processes that are contingent on the involvement and contribution of stakeholders outside of the focal organization, a necessary requirement to implement an external innovation. An external locus involves the ways an

organization collectively interacts with others by imposing obligations on citizens, seeking partnerships with other organizations, and facilitating co-creation with the citizens. While both internal and external innovation may involve external actors, external actors' contribution is the defining feature of external loci. The main question that management must address is how to actualize its purpose within the ecosystem. The internal locus of innovative activity is necessary due to the nature of organizational change. Even in a political environment where change occurs through debate and dialogue between stakeholders outside of the immediate organizational environment, development occurs at the organizational level. At the same time, an external focus is necessary because implementing innovations in PSOs can occur above the organizational level (Borins 2014; Moore and Hartley 2008; De Vries, Bekkers and Tummers 2016).

The Six Types of Public Service Innovation

Through defining PSO innovative behaviour by the three innovation foci and two innovation loci, we develop a new typology including six types of innovation (Table 2).

[Table 2 here]

When an organization directs its activities toward strategic questions concerning its purpose, it begins by developing its values internally by engaging in *mission innovation*. This process can lead to PSI in the mandated purpose politicians and senior managers envision for an organization. Mission statements that articulate such a purpose are thus supportive of the public value processes. The organization directs its strategy processes outward by putting into practice *policy innovations* that define new benefits to, and impose new obligations on its clients, the citizens, and other organizations to address typically wicked societal problems (Moore and Hartley 2008; De Vries, Bekkers and Tummers 2016). Policy innovation will, following Torfing and Ansell (2017, 42), “realize ambitious new political agendas” that better reflect its political mandate and increase its

ability to offer benefits to its citizens. Managers may retain the same mission statement, but they can expand their understanding of it, allowing them to offer policies that are not traditionally assumed to be a part of their purpose. The organization may then direct its strategic activities to the ecosystem by introducing new benefits, regulations, and obligations to its clients and its partners, which may result in new problem-solving strategies, policy tools, and governance structures (Torfing and Ansell 2017).

When an organization develops its capacity, it promotes organizational productivity and suggests more intangible and relational values to its clients and partners, such as responsiveness and openness (Jørgensen and Bozeman 2007). Internal capacity is generated through the adoption of *management innovation*: “the generation and implementation of a management practice, process, structure, or technique that [...] is intended to further organizational goals” (Birkinshaw, Hamel, and Mol 2008, 829). Borins (2014) and Walker, Damanpour, and Devece (2011) note the two-dimensional nature of management innovation. First, the technological dimension reflects the use of new management and information systems to advance operating system efficiency. Second, the administrative dimension adopts a new organizational structure, management systems, and processes to make the work of management more effective. Conversely, when an organization develops its capacity externally, it is engaging in *partner innovation*. By forming alliances, an organization can expand its own competencies by accessing the competencies of its partners (Hartley, Sorensen and Torfing 2013). Rather than adding an administrative function, an organization can collaborate with another organization that already has that function in place.

To ensure mission effectiveness, an organization must seek to improve its operations, which include service and citizen innovation. *Service innovation* is the concrete way an organization applies all other innovations, from mission to partner innovation, or to a particular benefit

experienced by its clients. Whether through the promotion of human dignity, sustainability, or national stability (Jørgensen and Bozeman 2007), service offerings are the visible result of PSI. A PSO can innovate by offering existing or new services to new users and vice versa to better facilitate the mandate represented by the organization's mission statement or promised by its policies (Osborne 1998; Walker 2006). *Citizen innovation* involves collaboration between citizens and public sector managers, including outreach channels to promote public-sector activity and platforms designed by managers to facilitate citizen co-creation. If a citizen, whether as a client or taxpayer, becomes involved in the innovation process, then the role of that citizen has transitioned from being a passive recipient to an active co-creator of services (Simmons and Brennan 2017). While service innovation is directed inward, citizen innovation is directed outward because it provides a way for that same mission statement to be influenced by the people it is designed to serve.

Illustration of the PSI typology

Data and Coding Protocol

The data from the IAGAP (<https://ash.harvard.edu/innovations-american-government-awards>) has been coded to illustrate the typology. We compare these results with those of Torugsa and Arundel (2016), of De Vries, Bekkers and Tummers (2016), and of our literature review. Torugsa and Arundel (2016) adopted Windrum's (2008) innovation framework to investigate innovation types of Australian government employees, De Vries and her colleagues (2016) systematically review all innovation studies between 1990 and 2014, and we systematically review all studies on PSI framework.

IAGAP was used because it is one of the preeminent programs devoted to recognizing and promoting excellence, innovation, and creativity in the public sector in the USA. IAGAP serves

as a catalyst for bringing creative solutions to some of the government's most urgent challenges. As IAGAP has no themes and applicants vary every year, we believe the applicants in one year may largely represent situations of PSI in the USA. Thus, we randomly chose 207 applicants in 2010 as our sample. The initial coding protocol was based on the typology's theoretical foundation and definitions of each type of innovation. The protocol was pretested and fine-tuned on 39 applications. Two rounds of coding were conducted by the first author and three graduate assistants. First three coders coded the cases independently, compared their coding results, and refined the coding protocol. In the second round, another new coder coded 24 cases independently. Across the two rounds of coding inter-rater reliability stood at 87.5 percent and a full agreement was reached in a further coding.

The final coding protocol focused on five steps (Please see Appendix 2 in the online supplementary material for details.) First, we asked, "If the activity is novel, useful and implemented," to ensure that the focus is on innovation. Second, we clarified its unit of analysis. Third, we clarified and documented the core idea of the innovation activity in a government initiative. Fourth, the type of innovation was identified by classifying the processes to create public value or the innovation focus (strategy, capacity, and operations), and two innovation loci (external- vs. internal-organization). Lastly, we asked: "This example cannot be classified any type of innovation (yes or no)." Using this protocol coders could assign all 207 innovation examples into only one type of innovation by first specifying the core idea and distinguishing this from peripheral ideas following the hierarchical coding procedure. This provided evidence that the typology seems to be collectively exhaustive.

Results

Table 3 shows the overall distribution among different types of innovation. Innovation locus was

more internal (63%) than external (37%). Focus was predominately driven towards capacity (50%) with fewest cases in the strategy category. The smallest number of cases were for mission (6%) and citizen (7%) innovation. Most attention was directed toward management innovations (32%).

We found that our coding results have a similar distribution to all three comparisons in terms of innovation orientation, the most and least studied innovation types. For example, Torugsa and Arundel (2016) show that most of 4369 Australian government employees' innovations are internal, administrative and organizational were the most frequent and policy the least. Out of 222 innovation types from 183 studies, De Vries, Bekkers and Tummers (2016, 164) found most of innovations studies are also internally oriented: 47% on process innovation a related term to our management innovation, 22% on product/service innovation, and 2% on conceptual innovation – a term similar to mission innovation. They have only found 13% governance innovation – development of new forms of governance such as collaboration with private partners to address societal problems, which may be viewed as an external innovation, but they note governance innovation has captured more attention recently as 65% of these studies published in the recent five years. They concluded, “governance and conceptual but also inter-organizational innovations have not been thoroughly investigated” (De Vries, Bekkers and Tummers 2016, 164)

Different from our case, De Vries and her colleagues (2016) have 16% innovation types unspecified, suggesting their framework is not comprehensive. Similar to their results, if we use existing innovation typologies in Table 4 to code the applications in 2010 IAGAP, we believe we will also have some unspecified innovation cases. We also found Table 4 similar to Table 3 in terms of the percentages of all six types, innovation focus, and innovation loci. While each comparison has its own strengths and weaknesses, together the consistency in the three sets of comparisons provides some evidence to support our typology.

[Table 3 and 4 here]

Discussion

Our typology represents a step towards building a comprehensive classification of PSI. By presenting six types of innovation, the typology achieves economy of memory and describes structure and relationship among the innovation activities. Prior to drawing out research implications, we discuss how our typology advances knowledge of the nature of PSI in two ways: its relationship to existing classifications and multidimensional innovation initiatives.

The relationship with existing classifications

The typology moves beyond existing classifications by comprehensively capturing the range of adaptive behaviours in PSOs and the internal and external orientation across these behaviours. We undertake a holistic assessment of the existing classifications using our framework (Table 4) and make three observations in relation to focus, locus, and coverage. First, bar Bloch and Bugge (2013), all the reviewed classifications include innovations in strategy, capacity, and operations, of which Hartley (2005) and Windrum (2008) are the most comprehensive. At the strategy level, the authors offer eight innovation types out of a possible 14, equally shared between mission and policy. At the capacity and operation level, all authors include management and service innovations or their variant, reinforcing our concerns that these classifications are built from the product-process dichotomy derived from research on private firms.

Secondly, Table 4 confirms the strong internal orientation of prior typologies. Similar to De Vries Bekkers and Tummers (2016) in which 71% innovation are internally oriented, 19 of the possible 21 cells in Table 4 in the internal locus innovation types (mission, management, and service) are occupied, whereas only eight are for external innovation types. For example, both partnership and citizen innovation are included in only two of the seven typologies. Existing

typologies, therefore, present an unbalanced situation, which bare costs for practice and research.

Third, some prior classifications suffer from similarity and overlap between types, which have costs for the current accumulation of knowledge on PSI. This is partly because they are developed without some explicit overarching criteria to classifying innovation. For example, Hartley (2005) lists seven innovation types without any criteria of classifying them: position innovation overlaps with product innovation or service innovation; rhetorical innovation overlaps with strategic innovation. Bekkers, Edelenbos, and Steijn (2011) provide another similar example. Conceptual, governance, and rhetoric, and institutional innovation types, found in three articles, are multidimensional innovations and are examples of overlaps between types. De Veries, Bekkers and Tummers (2016, 153) refer to governance innovation as “development of new forms and processes to address specific societal problems,” but use an example of “collaboration with private partners” – partner innovation. Windrum’s (2008) typology is explicitly based on two dimensions, but they are non-orthogonal and adopted from the private and public sector literature, respectively, so that different types of innovation overlap, neglecting citizen innovation. This suggests that our typology is more comprehensive, covering the range of innovation types suggested in the articles reviewed. It maintains the important typology characteristics of mutual exclusiveness and has internal homogeneity.

Multidimensional innovation initiatives

It is important to clarify the relationship between innovation initiative and its building blocks. The PSI typology lays the building blocks for understanding innovation as a multidimensional construct. Without being able to deconstruct PSI into its building blocks, it will be hard to understand the antecedents and consequences of innovation initiatives nor make comparisons

across initiatives, leaving innovation initiatives untraceable. We believe this framework can serve as a helpful analytical tool to focus on the different building blocks of innovation or work with various innovation types to build an “innovation initiative” that is multi-dimensional.

While scholars traditionally assume that each type of innovation is “discrete and implemented independently of other innovation types,” (Bloch and Bugge 2013; Torugsa and Arundel 2016, 393), an innovation initiative would span the different innovation loci and foci in hybrid forms since public organizations have been undergoing for decades to blend internal and external operations and different innovation processes. Turogsa and Arundel’s (2016) catalogue of innovations in Australian workgroups indicates that over half of all reported innovation initiatives included two or more innovation types. An innovation initiative can include interdependent building blocks, where the introduction of one element requires an improvement in other (Borins 2001; Turogsa and Arundel 2015). Hartley and Moore (2008, 10-11) note this phenomenon: “In practice, any particular change may have elements of more than one type of innovation. For example, congestion charging in London may be characterized as an innovation which includes a new strategy, service, organizational arrangements, rhetoric, and user relationship. Therefore, we should consider innovations, particularly radical or complex ones, to be multidimensional, specifying the dimensions (and the size of innovation in those dimensions) in the interests of systematic comparison.” Classifying this innovation using our PSI typology suggests that this is primarily a policy innovation. Hartley and Moore note on several occasions that congestion charging was an innovation at the strategic level, involving multiple external partners and which required the adoption of management, service, and citizen innovations. New practices, procedures, and behaviours can be related to missions, partnerships, management, or services in developing innovations in strategy, capacity, or operation. Complex or multidimensional innovations need

detangling.

The nature of these inter-relationships has been noted in studies of innovation adoption and of the consequences of innovation (Damanpour, Walker, and Avellaneda 2009). The intertwining of innovation types has been called configurational (Walker 2008), hybrid form (De Veries, Bekkers and Tummers 2016), and multidimensional (Hartley 2005). Configurational and synchronous perspectives presume that real benefits arise when different innovation types are linked together in complex ways, with their adoption bringing harmony to an organization (Damanpour, Walker, and Avellaneda 2009). The typology is able to capture the multidimensional nature of innovation in PSO by clearly articulating the six pure innovation types and their definitions and characteristics. For example, Walker's (2008) analysis of the adoption of a number of innovation types suggests that service innovations could form configurations with external partnership innovations but would not likely be associated with management innovations. Further conceptual development is required to identify the configurational relationships among the innovation types proposed here.

Research implications

Our innovation typology has several research implications: provides a systematic view of innovation to guide future research, identifies individual innovation opportunities to examine their adoption characteristics, and points out the potential relationship among innovation.

We believe an innovation typology can guide scholars to take a comprehensive view in identifying innovation opportunities. To generate new insights, researchers should not merely focus on the most popular innovations: the lack of a comprehensive framework may constrain their thinking. Instead of focusing on the well-known management and service innovation, scholars should pay more attention to the less-studied innovation types such as innovations in mission,

citizen, and policy (see Torfing and Ansel 2017 on the latter). With clearer understanding of PSI, there are opportunities for future research where innovation types are the dependent variable – the study of adoption and diffusion, environmental, organizational and individual antecedents and the management of innovation – to understand the characteristics of innovative PSOs and as an independent variable – the study of consequences (Cucciniello and Nasi 2014). The study of consequences can be multifaceted. In a narrow sense, it can include assessment of organizational outcomes – did an innovation result in improvements in public service performance relating to the quality of individual and collective life for citizens. Such an assessment can also be broad, tracing ways in which the implementation of innovation shaped the normative consensus of society, politics, and governance.

This typology also gives researchers flexibility as one can focus on only one component but be aware or control for other components that might influence innovative behaviours; or evaluate whether PSOs follow different pathways or configurations of the six building blocks to engage in PSI, using fuzzy set/Qualitative Comparative Analysis that aims to identify causal conditions of a phenomenon (Ragin 2008).

Our typology extends research on collaborative innovation by specifying three types of external oriented innovation. Indeed, externally oriented innovation has become increasingly important due to the requirement, motivation, technological possibility, and human awareness. For example, the need to collaborate arises from technological and task complexity that no single organization can address the wicked problem alone and from the SDL that places the user or citizen central to ensure that a full solution is found to their problems – as reflected in writings on collaborative innovation and networked governance (Hartley 2005; Hartley Sørensen and Torfing 2013; Bryson, Crosby and Bloomberg 2014). However, while providing some guiding principles,

these studies seem to focus on collaborative innovation as one whole. Based on innovation focuses, we classify collaborative innovation into three types and argue each type raises different characteristics, antecedents, outcomes, and associations with public value. Because most studies on external orientation or collaborative innovation are theoretically driven or case studies, to conduct empirical studies on collaborative innovation is a promising research opportunity.

The initial assessment of our typology permits their operationalization. Take the example of mission innovation, defined as “the introduction of a new worldview, or mission, or principle for the organization as a whole”. Measurement items can be designed for a new worldview, mission, and principle. In relation to each item, it would be possible to ascertain the year an innovation was introduced and implemented and the degree of novelty. Novelty can be captured on the incremental-radical scale. Appendix 3 in the online supplementary material describes our approach to the operationalization of the innovation types, including potential measures in more detail. Researchers can use these measures to study individual types of innovation, the relationship among them, and the ways they lead to public value.

Limitations

Our study has several limitations. Notably, validation is required to ensure that the framework captures the variety of PSI. In this article, we illustrated the utility of the typology based on American governmental organizations, and various examples from Western democracies. However, would the classification systems be robust in Asian or Latin American contexts, among non-profit organizations or state-owned enterprises? Having established this, studies can then examine the key questions of innovation adoption, diffusion, innovative characteristics of organizations, the management of innovation and its consequences. Finally, our innovation typology is static. As the nature of PSI evolves over time, the typology may update to reflect these

changes.

Conclusion

Existing innovation typologies are largely derived from a private and internal orientation or without some explicit overarching criteria, as such these typologies neither fully capture the unique nature of innovation phenomena in PSOs nor reflect the recent trend on collaborative innovation. To address these limitations, we theoretically classify PSI by two orthogonal dimensions: different public value creation processes or innovation focus and internal vs. external innovation locus. We believe this typology is important because it removes some conceptual overlap among innovation types in the literature, captures the unique nature of PSI, reflects the new trend on external orientation, and provides a comprehensive framework with a set of common vocabularies to help scholars and practitioners to understand, describe, and discuss innovative behaviour. Further, it assists with the identification of innovation opportunities by pointing out the less-studied innovation types such as mission and citizen innovation. The typology can also guide scholars and practitioners to study innovation phenomena in PSOs in terms of the antecedents and consequences of each innovation type, and the relationship among different innovation types. As a holistic framework for defining PSI, we believe it will have important research implications.

Notes

¹ The unit of analysis in this article is organization. Public administration and management also consider wider processes of innovation in society. For example, the introduction of the concept “social capital” in welfare policy has implications for PSO but is not the focus of this article unless a specific PSO adopted an innovation related to social capital.

² Scholars have adopted different language when discussing system to classify innovation, including categories, dimensions, and types (Damanpour and Aravind 2012; Hartley 2005). As De Vries, Bekkers and Tummers (2016, 152) note, these “terms are often used interchangeably”, thus in this article, we use the term types.

³ For ease of communication, we refer to public value and public values as public value because value/s are “qualities and standards that have a certain weight in the choice of action” (van der Wal 2008).

⁴ For example, Walker’s (2006) typology builds upon and expands a typology initially developed by Damanpour and Evan (1984) which is, therefore, not reviewed here. Similarly, Wu, Ma, and Yang (2013) build off this typology and add governance innovation. Torugsa and Arundel (2015) analyse a survey that drew on Windrum (2008).

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Table 1 Characteristics of Existing Public Service Innovation Classifications

	Origin		Orientation	
	Private sector	Public service	Internal	External
Moore (1995)	Partial	Primary	Primary	Partial
Hartley (2005)	Primary	Partial	Primary	Partial
Walker (2006)	Primary	Partial	Primary	Partial
Windrum (2008)	Partial	Partial	Primary	Partial
Bekkers, Edelenbos and Steijn (2013)	Partial	Partial	Primary	Partial
Bloch and Bugge (2013)	Primary	Partial	Primary	Partial
De Vries, Bekkers and Tummers (2016)	Primary	Partial	Primary	Partial

Table 2 A Typology of Public Service Innovation

		<i>Innovation locus</i>	
		Internal	External
<i>Innovation focus</i>	Strategy	Mission innovation	Policy innovation
	Capacity	Management innovation	Partner innovation
	Operation	Service innovation	Citizen innovation

Table 2 A Typology of Public Service Innovation (Continued)

Innovation	Definition	Example	Source
Mission	The introduction of a new worldview, mission or purpose for the organization as a whole.	New worldview: The Finnish education system in which equality is prioritized over performance constitutes a new worldview.	Sahlberg (2014)
Policy	The introduction to the stakeholders of new benefits and obligations for the organization as a whole to solve societal problems.	Local Task Committees: New methods for local councillors to focus on policy development in collaboration with local stakeholders.	Torfining and Ansell (2017, 45)
Management	The introduction of new management practice, process, structure, or technique to improve the organization's ability to further organizational goals.	Innovation lab: LEF Future Centre, Department of Public Works and Water Management (NL), allows civil servants to work with facilitators to tackle pressing problems and generate new solutions	Bason (2010, 99)
Partner	The establishment of new partnerships to improve the organization's ability to further organizational goals.	Contracting: Contracting with community groups at the Child Protection Services (CPS) of the Massachusetts Department of Social Services (U.S.A.) "to access a wider set of capacities and resources than the agency possessed".	Moore and Hartley (2008, 8)
Service	The introduction and delivery of new services to achieve organizational goals.	Medical Island Alert: Health officials developed electronic methods for patients to remotely access and receive medicine while being monitored by a doctor	Bason (2010, 105)
Citizen	The establishment of new platforms to facilitate citizen collaboration to achieve organizational goals.	City Repair: citizens and communities co-design and transform public places into sustainable, community orientated urban spaces in Portland, Oregon	Nambisan and Nambisan (2013, 34)

Table 3 Distribution of Different Types of Innovation (%)

		Locus				Total
		<i>Internal</i>		<i>External</i>		
Focus	<i>Strategy</i>	Mission	6	Policy	12	18
	<i>Capacity</i>	Management	32	Partner	18	50
	<i>Operation</i>	Service	25	Citizen	7	32
			63		37	100

N=207

Table 4 Comparison among Innovation Typologies for Public Services

	Strategy		Capacity		Operation	
	Internal	External	Internal	External	Internal	External
	Mission	Policy	Management	Partner	Service	Citizen
Moore (1995)	Strategic	-	Administrative	-	Policy or Program	-
Hartley (2005)	Strategic	Governance, Rhetoric	Process	-	Product, Service	Position
Walker (2006)	-	-	Organizational Process	Ancillary	Service	-
Windrum (2008)	Conceptual	Policy	Administrative & Organizational	Systemic	Service, Service Delivery	-
Bekkers, Edelenbos and Steijn (2013)	Conceptual	Governance, Institutional	Organizational & management, Process Technological	-	Product or service	-
Bloch and Bugge (2013)	-	-	Organizational		Product, Process	Communication
DeVries, Bekkers, Tummers (2016)	Conceptual	Governance	Process (administrative & technological)		Product or Service	-
Number of occurrences	5 (19)*	4 (15)	7 (26)	2 (7)	7 (26)	2 (7)

*Number in parentheses is the percentage of one type of innovation out of the total number of innovation types.

Online Supplementary Material

Appendix 1: Definitions of innovation types in the PSI typologies

Table S1a Bekkers, Edelenbos and Steijn (2013, 15-16)

Innovation	Definition
Product or service	focused on the creation of new public services or products
Technological	that emerge through the creation and use of new technologies
Process	focused on the improvement of the quality and efficiency of internal and external business processes
Organization and management	focused on the creation of new organizational forms, the introduction of new management methods and techniques, and new working methods
Conceptual	These innovations occur in relation to the introduction of new concepts, frames of reference or even new paradigms that help to reframe the nature of specific problems as well as their possible solutions.
Governance	These innovations occur in relation to the introduction of new concepts, frames of reference or even new paradigms that help to reframe the nature of specific problems as well as their possible solutions.
Institutional	which are fundamental transformations in the institutional relations between organizations, institutions and other actors in the public sector, and more specifically in public administration

Table S1b Bloch and Bugge (2013, 143)

Innovation	Definition
Product	The introduction of services or goods that are new or significantly improved compared to existing services or goods in your organization
Process	The implementation of a method for the production and provision of services and goods, that is new or significantly improved compared to the existing processes in your organization
Organization	The implementation of a new method for organizing or managing work that differs significantly from the existing methods in your organization
Communication	The implementation of a new method of promoting the organization or its services and goods, or new methods to influence the behaviour of individuals or others

Table S1c Hartley (2005, 28)

Innovation	Definition
Product	New products (for example new instrumentation in hospitals).
Service	New ways in which services are provided to users (for example on-line tax forms)
Process	New ways in which organizational processes are designed (for example administrative reorganization into front- and back-office processes; process mapping leading to new approaches).
Position	New contexts or users (for example the Connexions service for young people).
Strategic	New goals or purposes of the organization (for example community policing; foundation hospitals).
Governance	New forms of citizen engagement, and democratic institutions (for example area forums; devolved government).
Rhetorical	new language and new concepts (for example the concept of congestion charging for London, or a carbon tax).

Table S1d Moore (1995, 233-234)

Innovation	Definition
Policy or Program	These innovations define new ways of using an organization's resources to accomplish its overall mission
Administrative	These innovations involve new methods for organizing, accounting for, or controlling the organization's operations
Strategic	These innovations seek to redefine the basic purposes or core technologies of an organization

Table S1e Walker (2006, 313-314)

Innovation	Definition
Service	New services offered by public organizations to meet an external user or market need
Organizational process	<p>Involves management and organization that changes relationships among organizational members and affects rules, roles, procedures and structures, communication and exchange among organizational members and between the environment and organizational members. "How" service is rendered.</p> <p>Marketization innovations involve modifying the organization's operating processes and systems to increase the efficiency or effectiveness of producing and delivering its services to users</p> <p>Organization innovation is innovation in structure, strategy, and administrative process</p>

Technological	Innovation associated with changes in physical equipment, techniques, organizational systems and communication.
Ancillary	Reflects the shift to partnership and networking in the delivery of modern public services.

Table S1f Windrum (2008, 8-10)

Innovation	Definition
Service	The introduction of a new service product or an improvement in the quality of an existing service product
Service delivery	New or altered ways of delivering to clients, or otherwise interacting with them for the purpose of supplying specific public services
Administrative and organizational	The introduction of new organizational structures and routines through which front office staff produces services in a particular way and/or back office staff supports front office services
Conceptual	The development of new world views that challenge assumptions that underpin existing service products, processes, and organizational forms
Policy	The introduction of new thought or behavioural intentions associated with policy belief systems
Systemic	New or improved ways of interacting with other organizations and knowledge bases

Table S1g De Vries, Bekkers and Tummers (2016, 153)

Innovation	Definition
Process innovation	Improvement of quality and efficiency of internal and external processes
Administrative process innovation	Creation of new organizational forms, the introduction of new management methods and techniques and new working methods
Technological process innovation	Creation or use of new technologies, introduced in an organization to render services to users and citizens
Product or service innovation	Creation of new public services or products
Governance	Development of new forms and processes to address specific societal problems
Conceptual innovation	Introduction of new concepts, frames of reference or new paradigms that help to reframe the nature of specific problems as well as their possible solutions

Appendix 2: Coding Protocol for Classifying Public Sector Innovation

We will first ascertain whether an application constitutes an innovation. Then we will narrow down the possible categories by ascertaining the level of analysis, the core idea of the innovation, different innovation focus to create public value, and its locus.

1. **Was the activity an innovation?** An innovation is the development and implementation of a novel and useful idea. *Novel* is relative to the adopting organization. *Useful* means that the act must potentially create or improve public value. Public value means an improvement in the rights, benefits, and welfare of citizens through improved policies and governance. *Implementation* means that the innovation must be more than an idea and have been introduced to ecosystem members in order to affect relationships.

2. **What specific organization implemented the activity?** The specific organization tells us the unit of analysis. Further, is the innovator federal, state, municipal, town, or a department within these levels? This especially affects external innovations. For example, a state government, by its nature, manages the work of state agencies. A state government innovation that collaborates with various agencies under it would not constitute a partner innovation.

3. **What was the core novelty?** Most innovation cases will be complex programs that involve different types of innovative activity. When this is the case, we need to distinguish the core innovative idea from the peripheral ideas of the program. Ask, what novel activity, if removed, would significantly reduce the outcome or impact of the innovation? Also ask what activity facilitates other activities? Please briefly describe the core *novel* idea.

4a. Did the core innovation involve an authorizing process that politicians and civil servants engage in to balance the needs of various stakeholders to define the organization's mission and its embodiment of benefits and obligations to stakeholders? The implementation of strategy innovation is to reach an agreement among various stakeholders and document the agreement.

- Did the core innovation change in the worldview, purpose, or mission of the organization? If yes, then this was an example of *mission innovation*.
- Did the core innovation define new obligations or benefits for groups or members that are external to the innovating organization? If yes, then this was an example of *policy innovation*.

4b. Did the core innovation involve an institutionalizing process that improves the organization's ability to deliver public value to its stakeholders?

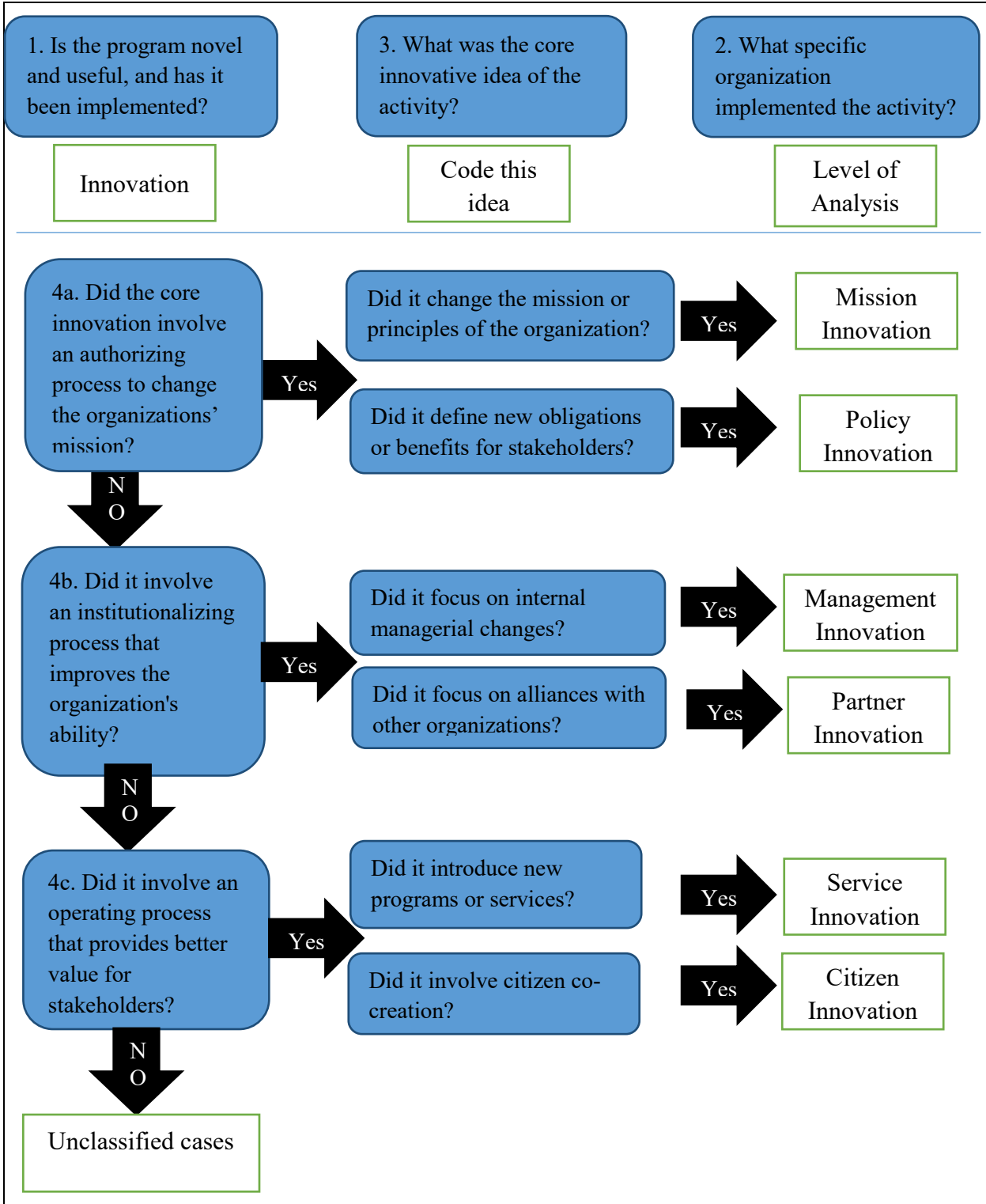
- Did the core innovation improve the organization's ability through internal new management practice, process, structure, or technique? If yes, then this was an example of management innovation.
- Did the core innovation improve the organization's ability through partnering with specific organizations? If yes, then this was an example of partner innovation.

4c. Did the core innovation involve an operating process that an organization concretely provides better public value to its stakeholders?

- Could the organization provide new public value alone? If yes, then this was an example of service innovation.
- Did the core innovation involve citizen co-creation or co-production? If yes, then this was an example of citizen innovation.

5. This example cannot be classified as any type of innovation (Y=yes vs. N=no)

Figure S1 Roadmap for Classifying Public Sector Innovation



Appendix 3: Operationalizing the PSI Typology

The successful matching of the innovation typology with the Ash Center cases offered validity to the constructs and permits their operationalization. The measures of the six types of innovation were developed from the definitions and examples given. The research instrument shown in table S3a ensures that each of the elements in the typology is included as a separate measure to capture the facets of the innovation type. Table S3b gives the example of mission innovation to show the instrument could be operationalized in a survey. Measurement is suggested to be binary (yes/no) and refer to a fixed period of time. “Introduce” refers to the decision to accept an innovation in the organization. “Implement” suggests that an innovation has been made concrete. Thus, it refers to the actual innovation use, either through a pilot or the allocation of resources (human and financial). This approach replicates the International City Managers Association survey used by Damanpour and Schneider (2009).

To move beyond the binary assessment of whether an innovation is in use, a measure of the novelty is proposed as a useful guide to the magnitude of the innovation (Zaltman, Duncan and Holbek, 1973). The degree of novelty is captured on the incremental-radical scale and operationalized using a 7-point Likert scale. The innovation’s novelty can range because the newness level may vary from organization to organization, and can vary by innovation type, type of organization and jurisdiction—governments within a country or between countries.

Operationalization also needs to include consideration of the unit of analysis and the target respondents. PSO are the unit of analysis. However, PSOs vary in terms of structure and complexity, which can include publicness (the degree of political control) (Bozeman 1987), structure (single and multi-purpose), policy area, level of government and sub-units. For example, local governments are responsible for the management and delivery of key public services that

range from picking up garbage and cleaning the streets, to the provision of schooling and care for the elderly and vulnerable. Because local governments are at the coalface of public services, they often lead the development and implementation of innovative solutions to problems that they face. Higher levels of government, whether regional or central, face different challenges. For example, central governments' focus is not just on the service to citizens but extends to foreign policy.

PSO have typically large quantities of employees. This raises questions about who the most appropriate person is to survey when operationalizing the typology. Surveying a single person in a large organization or sub-unit may not capture the range and complexity of organizational life. Research has shown that chief executive officers manage upwards and outwards, and may not have a clear grasp on the full range of activity in their organization (Moore 1995). Other studies have shown that the recall of senior executives is poor, therefore they do not necessarily make the best respondents (Golden 1992). Members of the senior management team that have a view of the operations across the whole organization may make the best single or elite respondents.

One approach to solve these problems is to undertake a multiple informant survey. This captures internal organizational variety in a compatible format from informants from several managerial levels or "echelons" (Phillips 1981). Careful choices need to be made about the appropriate echelons to survey and the ways in which data is subsequently aggregated. Surveying managers at the corporate level or senior management team, chief officers of policy areas and middle managers has been recommended for complex multipurpose public sector organizations (Enticott, Boyne, and Walker 2009).

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Table S3a Measures of PSI

Mission innovation: The introduction of a new worldview, or mission, or principle for the organization as a whole.

M1. New worldview (i.e. fundamental or paradigm shift in the assumptions of the organization: putting equality, diversity or sustainability at the core of everything)

M2. New mission (i.e. change rationale of existing or composition of beneficiary to expand the scope of the current mission)

M3. Change principles (i.e. change of priority of efficiency vs. fairness, or change the way of defining equality)

Policy innovation: The introduction to the stakeholders of new benefits and obligations for the organization as a whole to address specific societal problems

G1. Defined new benefits (i.e. changes in a welfare regime, enhancements in sustainability, improvements in health care)

G2. Imposed new obligations on citizens (i.e. no texting when driving, new taxation, use of social media)

G3. Imposed new regulations (i.e. new environmental protection, new water usage code, access to control substances by youths, etc.)

Management Innovation: The introduction of a new management practice, process, structure, or technique to improve the organization's ability to further organizational goals.

MI1. New managerial practices (i.e. supply chain management, business re-engineering, knowledge management, quality management, risk management, corporate social responsibility, quality of work life, etc.).

MI2. New organizational structure (i.e. first use of decentralization, integration or disintegration of departments)

MI3. New process (i.e. first use of a new system of employee responsibilities, team work, education/training systems, etc.).

MI4. New technique (i.e. adoption of new information technology, social media such as Twitter, Facebook, etc.).

Partner Innovation: The establishment of new partnerships to improve the organization's ability to further organizational goals.

P1. New methods of organizing external relations through the use of alliances or partnerships (i.e. strategic alliances, public-private, public-nonprofit partnerships, etc.).

P2. New methods of organizing external relations through the use of outsourcing, sub-contracting or privatization.

P3. New network with partner organizations (i.e. working with a number of other public, private or nonprofit organizations simultaneously).

Service Innovation: The introduction and delivery of new services to further organizational goals.

S1. New services to new users (i.e. a new need emerged from a new client group)

S2. Existing service to new users (i.e. our existing services were provided to new clients through geographical expansion)

S3. New services to existing users (i.e. new needs were identified and services provided to existing users)

Citizen Innovation: The establishment of platforms to facilitate citizen collaboration to further organizational goals.

C1. New channels for citizens to provide feedback (i.e. call centers, website, social media, customer relations management, etc.)

C2. New platforms to facilitate citizen engagement in service delivery (i.e. provision of assistance and advice to ensure citizens can engage in service provision,)

C3. Service provision by citizens with support of my organization (i.e. citizen participation, shared decision-making with provision by government)

C4. Service production with citizens that it would have traditionally generated alone (i.e. jointly producing services, coproduction)

Table S3b Illustration of Approach to Operationalizing Instrument

Part 1 Innovation

The below questions ask if your organization has introduced and implemented in calendar year 20XX any **innovations**. Introduced refers to the decision to accept an innovation in the organization and implementation refers to the actual use of the innovation, be this through a pilot or through the allocation of resources (human and financial) to the innovation.

Mission innovation: The introduction of a new worldview, or mission, or principle for the organization as a whole.

Example: A librarian expands the library’s mission statement to include the needs of pupils who are unaccompanied by adult patrons (i.e. latchkey kids) and offers afterschool educational programs to these new beneficiaries. The state of Oregon introduced a Statewide Land Use Program that promoted a new worldview on land use that has become “a way of life in Oregon.”

During calendar year 20XX, did your organization introduce and implement: (Please check the appropriate boxes)

	Yes	No	If yes: Please indicate if innovation is incremental (1) radical (7)						
M1. New worldview (i.e. fundamental or paradigm shift in the assumptions of the organization: putting equality, diversity or sustainability at the core of everything)	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
M2. New mission (i.e. change rationale of existing or composition of beneficiary to expand the scope of the current mission)	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7
M3. Change principles (i.e. change of priority of efficiency vs. fairness, or change the way of defining equality)	<input type="checkbox"/>	<input type="checkbox"/>	1	2	3	4	5	6	7