

How to create value in a public sector context? Exploring the co-design approach

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Abstract

In the public domain, design thinking is increasingly expected to create value by including service users in the fundamental aspects of these services. However, in order to create value, the design approach needs to be 'translated' into an applicable framework, appropriate for the public domain. Therefore, we first explore what kind of value is supposed to be generated within the public domain. Subsequently, by focusing on well-known contributions from the design literature, we review what can be learned from design approaches for value creation with users. Then, we examine what kind of specific characteristics of the public domain needs to be taken into consideration, when one aims to apply a design-oriented approach in the public domain. Ultimately, we conclude how the design approach, can be made applicable within the public domain. In doing so, this paper aims to formulate stepping stones for both academics and policy makers alike.

Keywords: Value creation; co-design; service-dominant logic; heuristic framework

1. Introduction

As a response to the 'flawed' governance mode of New Public Management (NPM), many authors have argued that a new mode is required to effectively address the needs of citizens (Rhodes, 1996; O'Flynn, 2007; Bryson et al. 2014; Osborne et al. 2015). This 'new' mode is coined as New Public Governance (NPG). Within NPG, value is considered less tangible and much more related to legitimacy (i.e. supported by all involved actors), rather than effectiveness. Consequently, in NPG value creation is encapsulated in the *process* of service or product delivery, rather than in the product itself (Gronroos, 2006). One might argue that because of this processual orientation, within NPG, a 'service-logic' may fit much better than a 'goods-logic', since in a service-logic, the interaction between provider and user as the key-determinant for value creation is emphasized. Key-aspect within NPG is that value of public goods and services is *co-created* with citizens.

To address these co-created efforts, various concepts have been introduced (Bovaird, 2007; Ansell and Gash, 2008; Bason, 2010; Emerson et al. 2012; Torfing, 2012; Brandsen and Honigh, 2015; Voorberg et al. 2015). These literature bodies have all grown substantially in order to address (specific parts of) this renewed attention for organizing public services and policy as a collective effort. Our starting point in this paper is that, although vast and rich, these bodies of literature only limitedly provide stepping stones to *how* value creation for efforts in the public domain can be achieved. Lessons from *co-design*, might help us to understand how value creation in public service delivery can be organized. In the field of public policy and management, we can witness a rise of interest from both academics and practitioners for co-design in public service and public policy delivery (Buchanan, 1992; Cross et al. 1992; Howlett, 2014). Examples include policy labs where actors from different backgrounds develop policy advice in collaboration (Bason, 2016); as well as social innovation and living labs where innovative solutions for problems are formulated together with citizens (Gascó, 2016; Tonurist, Kattel, & Lember, 2015). Given the infant phase of our understanding of co-design, this paper aims to offer a heuristic framework accomplishing value creation for Public Organisations. This paper therefore answers the question: *How is co-design to be organized to create value in a public sector context?*

2. Value creation within a Service-Dominant Logic

By means of a starting point, to understand the conception of value creation within a service-dominant logic, we refer back to the work of Vargo and Lusch (2004; 2008; Lusch and Vargo 2006). Their argument was that in order to develop competitive advantages, a company should invest heavily in relationships with (potential)

customers and make sure that as many feedback opportunities are created in order to fully adapt a product to the desires of these customers (Vargo and Lusch, 2004). They proposed a framework, consisting of 10 foundational premises (FPs) about what they argue to be the 'Service-Dominant' logic (S-D logic). Within this logic, value creation is the result of the interactions during the production process with consumers. To further elaborate on this notion of value creation, Lusch and Vargo (2006) have stressed the orientation on *interaction* as elementary for value creation. I.e. by stressing that the customer is always a co-creator of value (FP 6) and that a service-centered view is inherently customer oriented and relational (FP 8). Created value is relational and the result of a fertile collaboration, during the design and production process. Therefore, in order to create economic competitiveness, for every company it is fundamental to incorporate interaction with end-user/beneficiaries/customers in every step of the design and production process of a product (Payne et al. 2008). Doing so, allows producers to relate to the preferences of their potential customers in every step of the production process. Hence, the production process becomes a *co-creation* process with end-users, in which an organization creates as much channels for feedback and dialogue between (potential) customers and the organization as possible (Prahalad and Ramaswamy, 2004; Payne et al. 2008; Vargo and Lusch, 2008). These channels can be considered the *services* that enable the exchange between different parties.

However, applying the S-D logic to the public domain, requires some altering. For instance, where in the private domain companies can focus on the target group who is most profitable to them, public organizations have to take into account different user groups and sometimes even incompatible service groups (Gronroos, 2008). In our next section we elaborate on this alteration.

3. Applying the S-D logic to the public domain – a matter of co-creation with citizens

First, we need to establish what value implies, as the result of co-creation between service-users and public organizations in a public context implies, if not competitive benefits. To prevent the discussion on value creation to become too abstract we propose to conceptualize this in line with Osborne (2018) who argues that *public organizations do not create value for citizens – they can only make a public service offering. It is how the citizen uses this offering and how it interacts with his/her own life experiences that creates value* (p. 228). For instance, in the healthcare sector, doctors can subscribe a remedy (service offering), but it is up to the patient how to deal with this subscription and whether it makes sense for him in his particular context (value creation) (Edvardsson et al. 2011; Elg et al. 2012). Hence, value creation for public organizations is always the result of a form of collaboration between service users and service provider. Therefore, it is *always* a co-created effort. The literature on (value) co-creation, offers some illustrations of how value as a co-created effort may be achieved in a public context. For instance, Gebauer et al. (2010) showed how by applying the S-D logic the Swiss Railroad Services changed into an integrated system, where customers are motivated to become active participants in improving the services. Hardyman et al. (2015) argued how a lack of S-D orientation in the British National Health Care policy disables health care institutions to actively engage with patients to improve health care services. Within the S-D logic, these services are to be co-created *with* people, thereby including the needs of these end-users much sooner in the design process of the service. The notion of value as a co-created effort is appealing for public organizations, since it not only allows for innovation in technical services (like railway services), it also creates collective responsibility for that services. Hence, co-creation involves a transfer of risk for public organizations to a network of actors, involved in the service delivery (Payne et al. 2008). However, how one could actually organize such a collaboration, so that value in use is the result of this collaboration is still a question left to answer.

One of the more promising answers to this 'how' question seems to lie in the literature on design and co-design. Co-design consist of a collaborative effort between customer and service provider to create a service or product (Prahalad and Ramaswamy, 2004) and a "*collective creativity as it is applied across the whole span of a design process*" (Steen et al. 2011; p. 53). Co-design as a strategy for public service delivery is not new (see Bovaird and Loeffler, 2012; Farr, 2013, 2016), but the literature lacks conceptual and methodological focus. However, as the interest for design approaches as a strategy for value creation in the public sector grows, the need for an enhanced understanding of how co-design works and how it can be applied to a public sector context also increases (Bason, 2016; Howlett, 2014).

4. Learning from Design approaches

In order to understand what authoritative principles and practices are for co-design, we consulted the literature on design. To conduct our analysis in a more systematic way, and not just consult the records we found most interesting, we have analysed the twenty most cited contributions from the journals *Design Issues* and the journal *Design Studies* (see for an overview, the appendix I and II), resulting in a review of 40 records of two leading journals in design sciences. In our analysis we asked ourselves with each record two questions.

- 1) *How is design defined, in terms of user involvement?*
- 2) *How can the design process be discerned in terms of user involvement?*

4.1 How is design defined, in terms of user involvement?

Our selected articles showed a variety of how design can be conceptualized, in terms of user involvement. Various authors define design as a sense-making process (Schön & Rein, 1995) which is based on various discourses (Blizzard & Klotz, 2012; Dorst & Cross, 2001; Norman & Verganti, 2014) by deliberation and reasoning (Kolko, 2010a; Norman & Verganti, 2014; Xenakis & Arnellos, 2013). Other aspects of this social character involve, design as a learning process (Gerber & Carroll, 2012), linking technical aspects to social aspects (Morelli, 2002) or consensus building (Manzini, 2014). In a similar vein, Bjorklund (2013) approaches design as a social construction of what accounts as a problem. Her point of departure is that what accounts as solution is based on what the perceived problem is. As such, finding a useful solution to a problem is depending on how the problem is framed and how many people can be convinced about this frame. Mentioning the element of social construction brings us to Moreno et al (2014) and Ozkan and Dogan (2013). They consider designing as a process of association. This is what they call *analogical reasoning*. Analogical reasoning is the process of association between situations from one domain to another, made possible through the establishment of relations or representations. In short: problem solving is about recognizing the problem situation what the potential solution is to that problem. Ozkan and Dogan (2013) consider this as the fundamental cognitive process in design.

Other authors have approached this social notion of design from a more abstract level. Defining it as a systematic inquiry to define shared goal, purpose, value and meaning in products developed by humans (Bayazit, 2004; Cross, 2001; Kolko, 2010b). This inquiry should be considered as a circular process of deconstructing, deviating, design, integrating and deliberation (Scott, Bakker, & Quist, 2012).

Others have specifically stressed the relationship between consumer and producer. Both Sangelkar et al (2012) and Wilkinson and De Angeli (2014) speak in that regard of *universal design*. Universal design implies looking for products that can be used by all users without any adaptation or stigmatization. An example of such a product is the gradual ramp to access buildings. The fact that it is a *gradual* ramp, allows both pedestrians and wheelchairs to use it. Wilkinson and de Angeli (2014) speak in that regard about how design can be *mainstreamed* to be accessible to everyone. Participatory aspects in design are in this regard attempts to involve and better understand product users. This is a necessary element to come to appropriate user friendly products.

If we attempt to bundle these conceptualizations and to come up with a specific definition of design, we argue that design can be defined as: *An interactive process between at least provider and consumer/user; in which the design process is an analogical learning process; that leads to products aimed at serving the needs of its users in terms of outcomes.*

4.2 How can the design process be discerned in terms of user involvement?

When we try to distill what phases can be distinguished in a design process, in a general sense we can identify the elements as reflected in table I. Below we elaborate on each phase.

Table 1 Phases and characteristics of design process

Phase	Conditions/characteristics
Problem framing	<ul style="list-style-type: none"> - Led by the needs of customers/users - Collaborative process with all stakeholders - Empathizing with the issue and the stakes
Development of prototypes	<ul style="list-style-type: none"> - Contains multiple sub-phases - Goal-oriented - Aimed to serve multiple target groups - Aesthetically appealing - Low-fidelity
Testing of prototype	<ul style="list-style-type: none"> - Information is shared with everyone - Test in multiple contexts - Consumer friendly - Give consumers tools to measure it's effect
Reflection	<ul style="list-style-type: none"> - Part of every phase of the design process - Essential to come to product refinement - Initiates the start of a new cycle

1. Problem framing

The design process starts with the formulation of a problem or need to initiate the design process. This process is predominantly led by the needs of the client or customer. As Farrell and Hooker (2013) mention, the design process starts with a brief from a client, or employer i.e. someone who formulates a question or demand. Fundamentally this phase is primarily a collaborative process in which, to Blizzard and Klotz (2012), stakeholders and members of the design team should define commonly shared visions and aims (p.467). Scott et al (2012) therefore mention that the identification of user needs are a function of *involvement in practices*. Bjorklund (2013) assesses that problem framing is the key asset of designer's expertise, i.e. specifying what should be designed in order to serve the needs of the user.

Empathizing is then important to relate the design to the people the problem affects. A technical understanding of the issue is not enough; we have to understand the feelings and emotions of involved actors to understand what the problem actually means for them, in order to find a solution that suffices (Bayazit, 2004; Kolko, 2010c; Norman & Verganti, 2014). This process of problem framing is a process of continuous exploration and demarcation.

2. Developing a prototype

In the second phase, in order to solve or confront the problem a *possible* solution needs to be found. In order to do that a prototype is developed. To Ranscombe et al. (2011) this development process is characterized by four different stages: 1) ideation, in which a hand sketch is made with low levels of details; 2) realization, in which more details are offered and maybe displayed in a digital model; 3) refinement, digital models with a high level of detail; 4) scale modelling, the actual producing of the prototype.

Other authors have revealed other conditions. For starters, the prototype should be goal-oriented. Blizzard & Klotz (2012) argue that the design should be based on the principle of the fundamental desired outcome. This implies that the prototype should be designed with the end-user in mind and then worked upstream. In order to do that, Vallet et al (2013) highlight that this development contains the same creativity techniques - e.g. brainstorming, brain writing or using morphological boxes – as during the phase of problem orientation.

To make the prototype as valuable as possible, Sangelkar et al. (2012) advocate to pursue universal design whereby the prototype is designed in such a way that it can serve multiple target groups. In addition, some authors have stressed that the prototype has to *look* attractive as well (H. Wilkinson, Gallagher, & Smith, 2012; Xenakis & Arnellos, 2013). Especially when it comes to products with a not so popular image, such as a wheel chair. However at the same time, Gerber and Carroll (2011) argue that *low-fidelity* prototyping is a key practice for design practitioners to construct critical knowledge about design, ideas and how to make decisions (p. 67). Low-fidelity implies that the prototype is clearly a try-out, which will be used to gather information and not the definitive product. All involved stakeholders should feel the liberty to comment on the prototype in order to establish a mutual learning effect. As such, various authors have stressed that if this is not the case that in the first phase consumers or users can express their wishes and that subsequently the designer comes up with the prototype. In addition, the development of the prototype should be conducted in collaboration with the user as well (e.g. Scott et al., 2012; H. Wilkinson et al., 2012; Xenakis & Arnellos, 2013).

3. Testing of prototypes

Our record selection revealed a small number of grab-holds. In the first place, Blizzard and Klotz (2013) argued how it is evidential that all information should be shared with every stakeholder. To them this aspect should be characteristic for the entire design process. However, we argue that sharing of information is of particular importance for the phase of prototype testing. Reason is that when a prototype is tested in multiple contexts (which is preferable if it is to serve multiple target groups), much can be learned from sharing the results with members from those different target groups. Therefore, it is important to exchange the results. In that regard, Wilkinson and DeAngeli (2014) stress the importance of appropriateness of such a prototype, saying that “*design must not only consider how usable or user-friendly a product is but also how people feel when using that product or how that product, in turn makes them feel when using it*” (p. 623).

In a similar vein, Gerber and Carroll (2011) highlight that also in this phase, designers should make it as easy as possible for test subjects to test the prototype. They mention, that individuals are more likely to experience mastery experiences when large tasks are broken down into moderate size tasks.

4. Reflection

This phase is not so much the end of the design trajectory, but the start of multiple iterations, aimed at repeating previous phases. That is why Scott et al. (2012) mention that design is a *circular* process of deconstructing, deviating, designing, integrating and deliberation. In this phase, the prototype is reflected upon and lessons are drawn for the refinement of the prototype. To Wilkinson and DeAngeli (2014) reflection is not so much a separate phase, but is inherently related to every aspect of the design process. They emphasize that it is important to capture user information and feedback at every stage, while there is input from all involved stakeholders. Either, implementing at the end of the production stage or making it an inherent part of all the design phases, reflection is considered essential in order to come to product or service refinement (Cascini, Fantoni, & Montagna, 2013).

We argue that transferring these ideas and principles may be inspiring for the public domain, but cannot be ‘copied and pasted’ without any translation/adaptation. Main reason is that product/service design in the private domain serves a competitive goal, which is usually absent in the public realm. In our next section we elaborate on this argument and we propose a way forward to overcome these issues.

5. Challenge of implementing design for public organizations

The first challenge lies in the public nature of public organizations themselves. Andrews et al. (2011) talk in that regard about the level of ‘publicness’. They distinguish three key dimensions of publicness. First, there is the dimension of *ownership*. While in the private sector, ownership is in the hands of entrepreneurs or shareholders, in the public domain, property rights are vague and diffuse (Boyne, 2002). As a consequence, it is expected that in public organizations there is less urgency for innovation (what a co-design approach essentially is), due to the lack of direct financial benefits and the ambition to gain competitive advantage. Second, there is the dimension of *funding*. Based on public choice theory (Niskanen, 1971) the basic idea is that organizations that receive their revenues from a political sponsor are inherently unresponsive to service and product users. As a result, effectiveness and consumer satisfaction are likely to be lower if these consumers not directly pay for these goods and services. Third, public organizations are *politically controlled*. In general, this implies that the duty to be accountable does not lie first and foremost with the end-users but

to politically elected officials. This results in audits, inspections, performance reports and of course limits to budgetary autonomy.

The second challenge, refers to the organizational environment in which public organizations operate. Boyne (2002) argues that this environment is *complex*; with a variety of stakeholders; operating within networks of interdependent organizations; rather than independent organizations; which simply can pursue their own objectives. Consequently, public organizations are *permeable*, meaning that they are easily influenced by external pressures, due to their duty to be responsive to public needs. In contrast, private organizations can act relatively independent in terms of policy formulation and their implementation process. Furthermore, due to the political climate in which public organizations operate, their environment is much more *instable* than private organizations. Political will may change overnight, creating sometimes a much more short time-horizon. Last, due to the absence of competitors, there is an *absence of competitive pressure*.

The third challenge concerns the organizational goals and the values that public organizations pursue (ibid p. 100-102). Public organizations are to pursue distinctive goals, such as equity and accountability that are less dominant in the private domain. Furthermore, it is also believed that public organizations are less materialistic than private organizations. Instead of aiming to meet the demands of individual customers, public organizations have a mission, a vocation aimed at enhancing public welfare. However, on the other hand it is also believed that there is lack organizational commitment in the public domain, due to the inflexibility of personal procedures and a weak link between performance and rewards.

The last challenge relates to the nature of the user in the public domain. During the high-tide days of New Public Management, it was a popular idea to consider citizens as customers of public organizations. However, with the shift to the New Public Governance paradigm (Rhodes, 1996; Dunleavy et al. 2006; Osborne, 2006), the role of citizens is reinterpreted from consumer to that of a problem-solver and co-creator, “who is actively engaged in creating what is valued by the public and is good for the public” (Bryson et al. 2014; p. 446). Consequently, end-users are in the public domain by definition part of collaboration structures to produce those goods and services (Bovaird et al. 2015).

When looking at the design process, as identified in section 4, with these issues in mind, we argue that there are four important considerations to keep in mind when one wishes to apply a design approach in the public domain.

Consideration 1: Involvement of target group vs. involvement of end-users

As argued in section 4, the design process is a process, led by the needs of clients and customers. In the public domain, this implies that an as large variety of stakeholders as possible is involved in the design process. That is different from the private sector, where organizations can focus on their specific target group. Given the complex environment and the duty of public organizations to be permeable, having a legitimate problem definition goes beyond the specific target group of a public organization. Legitimacy is granted by a larger network of stakeholders.

In addition, our four identified issues reveal a potential paradox for public organizations when adopting a design approach. Just as the design process in the private domain, the inclusion of end-users is the key element in the design process, in order to effectively address their needs. But in the public domain, public policy and services are initiated that supersede the interests of individual end-users (e.g. climate adaptation policy; legal detention services; or rules regarding the use of public spaces). Sometimes in practice this may imply that the individual needs may contradict collective needs. In the public domain, public organizations are not allowed to focus on the target group that will give them the highest turnover, but are obliged to serve other groups as well. Therefore, characteristic in the public domain is that in some policy areas needs of target groups may contradict the wishes of individual end-users.

Consideration 2: Demands of target group vs. demands of external environment

Another consideration for public organizations involves their organizational structure i.e. based on funding and politically control. The fact that public organizations are part of public accountability (Bovens, 2005) as the hallmark of democratic governance, may very much determine the room for exploration and experimentation. Especially when it comes to prototype testing and the number of iterations that may follow to refine the prototype, the required space to organize this process may be very much determined by factors, such as the wishes of an alderman or political pressure in general. The hierarchical nature of the relationship between

political institutions and the public sector, may complicate for public organizations the desire to let the needs of end-users determine the goods and services. For instance in social security, political considerations can very well influence the choice whether services are more punitive or prevention oriented.

Consideration 3: The bureaucratic nature of public organizations vs. the need for innovation

Public organizations are not known for their ability to innovate. One of the explanations for this, may be encapsulated in the legal culture in which the public organization is embedded (Damanpour, 1991; Kelman, 2008). The willingness to share resources and knowledge is often frustrated by the boundaries (or the absence) of legal mandates. Innovation that cross these jurisdictions are particularly difficult to get adopted (Feller and Feller, 1981). Hence, policies are path dependent, i.e. policy formulation is like a tree. From the same trunk, many different branches occur, but they all build forth on that one trunk (Pierson, 2000).

Consideration 4: Inclusion for competitive advantage vs. inclusion for legitimacy

The last consideration we can synthesize is the reason why end-users are included in the design process. For private organizations, this is essentially the only way to enhance competitive advantages (Lusch and Vargo, 2006). However, for public organizations, within the NPG-paradigm, involving end-users has become an 'appropriate' way (March and Olsen, 2004) to develop public goods and services.

6. The way forward: co-design in the public sector

Although still following the principles of 'regular' design (e.g. divergence and convergence during phases of problem framing, development and testing of prototypes), co-design requires a 'participatory mindset' (Sanders, 2008). The participatory mindset finds its fundament in the conviction that 'all people are creative' and are to be considered 'experts in their own experiences,' (Naranjo-Bock 2012). Hence, they should be involved in designing products, services and policies that relate to those experiences (Cabinet Office 2016). The usual role of external experts in policy and public service delivery is challenged (Blomkamp, 2018; Howlett and Migone, 2013). However, our argument here is not that in order to come to value in a public sector context, the voice of experts should be overruled by the voices of end-users, but that they should be both actively involved in the iterative phases of design process. Thereby, adding another dimension to co-creating value in co-design processes. To illustrate, Coleman et al (2014) showed how the Delphi-method allowed them to bring together experts, governmental officials and locals to collectively address the issue of water quality in Lake Champlain Basin. Our argument is that in co-design lived experience is to be treated as *a* type of expertise in co-design, *next* to expert knowledge.

Therefore, given the considerations as identified in section 5, our reinterpretation of the definition of co-design by Prahalad and Ramaswamy (2004) for co-design in the public domain leads to the following definition: *Co-design in the public domain refers to the collaborative effort between end-user and provider to create value of new services or products that is appropriate to the needs of the end-users.*

Based on this participatory mindset and the considerations as presented in section 5, we propose an adaptation of the design phases as presented in section 4, for co-design in the public domain. These adaptations are schematically shown in figure II, as opposed or added to the conditions/characteristics as shown in table 3. The quadrant at the front schematically displays the characteristics as we derived from the design literature. The quadrant at the back depicts the adaptations required for implementation in the public domain.

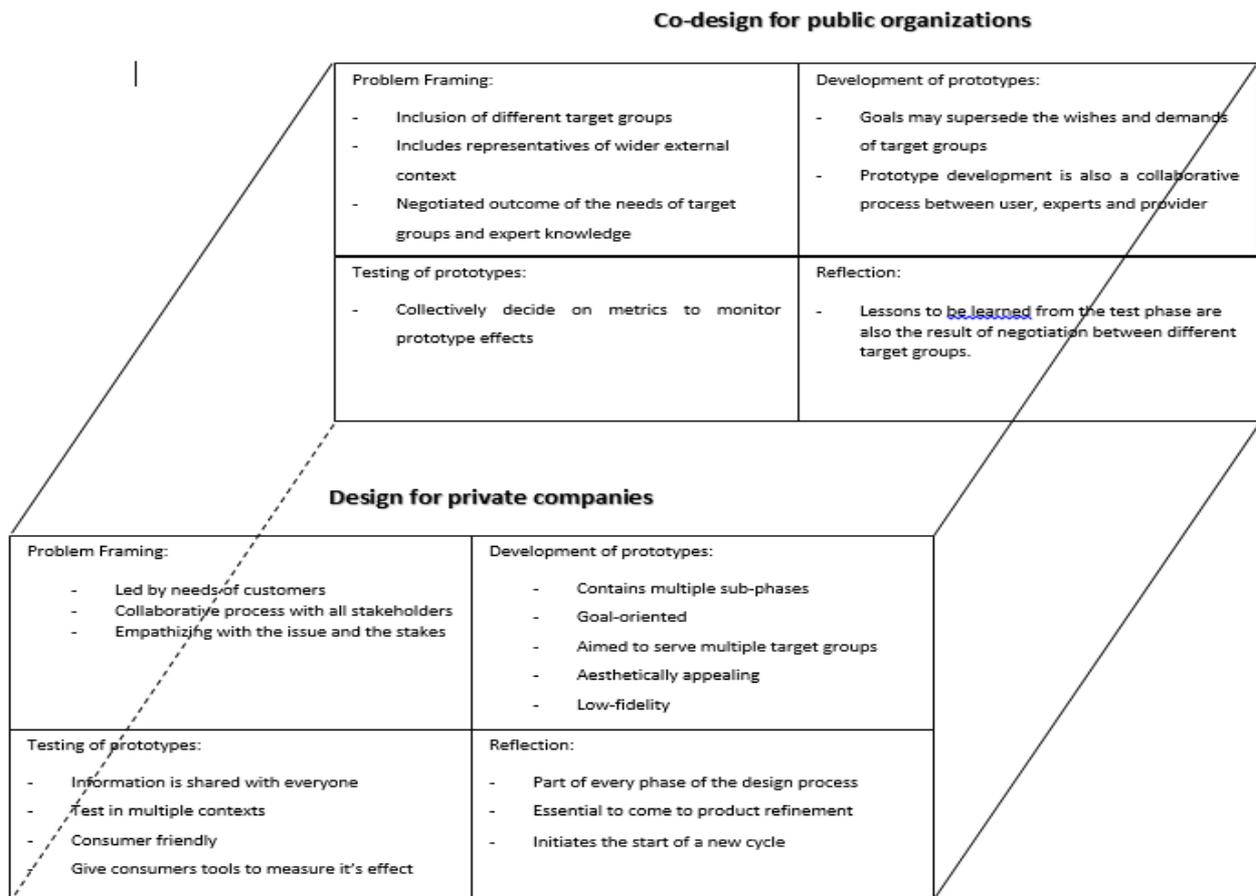


Figure 1 adapted co-design framework public organizations

1. Problem framing in co-design

In co-design in the public domain, the initial phase is the most important phase, since it sets the tone for the rest of the co-design process. The ultimate goal here is to empathize with the different stakeholders and their experiences with the problem at hand (Bayazit, 2004; Norman & Verganti, 2014). However, the argument here is that for public organizations the responsibility for empathizing goes beyond the first line of end-users. Therefore, preferably, all possibly affected target groups should be involved in this stage. The diversity of people's needs, perspectives and desires as the root of design is addressed by various authors (Margolin & Margolin, 2002; Oosterlaken, 2009; Scott et al., 2012; Secomandi & Snelders, 2011). As a consequence, the potential value-in-use is substantial, since not only direct users are involved, but ideally also target groups affected by the design and experts on the matter at hand. However, since public organizations cannot just rely on the preferences of the end-users, this phase requires tact and a lot of social skills, especially when participants are not necessarily interested in the design approach. This was shown by Askew et al. (2010), who illustrated the challenge of co-designing with drug addicts. That is why Evan Hirsch – industrial designer for PopCap Games, Microsoft and Walt Disney Studios – argued that the process of problem framing in the public context is the most challenging aspect of design. Given the political environment in which this process takes place, it might be very helpful to involve politicians and political officials into this process as well. When the process of problem definition is finalized and subscribed as well by political officials, the definition is 'democratically anchored' (Sorensen and Torfing, 2005), which can be a major element for the continuation of the co-design process.

2. Development of prototypes

In order to develop prototypes, techniques and measures used for 'regular' product and service design are very useful for the public domain as well. In fact, the earlier mentioned aim for *universal* design might even be of bigger importance in the public domain, since every effort of a public body is aimed at serving as many citizens possible. However, in line with the problem framing phase, it is important to keep in mind that public

organizations may be confronted with goals that may supersede the interests of individual citizens. For instance, with an issue like soil subsidence, the interests of local farmers probably contradict the interests of inhabitants living in the area. Therefore, having a goal-oriented prototype as Blizzard & Klotz (2012) argued, means something different for public organizations. However, we also believe that a design approach may form a way out, out of these potential deadlock situations. Waardenburg et al (forthcoming) show an example how this was a successful approach for developing a coaching program for public professionals dealing with crime-fighting.

Furthermore, in the public domain, we argue that one should take notice of the available design space and – more importantly - the boundaries that have to be taken into account (Howlett et al. 2015). Issues like policy legacies, the administrative tradition, existing rules and regulations can seriously limit the existing design space. Therefore, design in the public domain very often involves institutional redesign i.e. creating the space that is necessary for design to be effective (Peters, forthcoming).

3. Testing of prototypes

During this phase, for public organizations on the one hand we can stay closer to the design literature. For instance, as shown in section 4 also here it is stressed that, prototypes should be stressed in multiple target groups (Blizzard and Klotz, 2013). The user friendliness of the prototype, as argued by Geber and Carroll (2011) and Ranscombe et al. (2011) may even be more important in the public sector, since the prototypes are to be tested within more target groups than just the first line of end-users. By using prototypes that are characterized by *low-fidelity* (Gerber and Carroll, 2011) it is clear to involved actors that this involves a pilot or try-out. By labelling it as such, it may create the room to experiment and therefore to manoeuvre between different interests. Based on our considerations, we add to this phase, specifically for public organizations that it is important to collectively decide on the metric system, used to analyse the results of the prototypes. Also it is important to conclude together when a prototype is successful or not. These two conditions are to make sure that the results of the prototype are considered legitimate, which is the entire point of using a co-design approach.

On the other hand prototyping in a public context can be really problematic because of characteristic public principles like equality and legality, which public organizations have to take into account. Testing out an intervention in real-life is quite problematic in a relationship between governments and citizens that is surrounded by all kinds of guarantees and prescriptions. That implies that we need tailor-made principles when it comes to prototyping in a public context (e.g. the principle of informed consent). This point is illustrated by Bridge (2012), showing how co-design can be a way to successfully address the desire for personalisation and tailoring in Australian health and welfare programs.

4. Reflection

“Critique is oxygen for design” (Evan Hirsch 17-11-2018). That is no different for co-design in the public domain (for instance Drake and Washeck, 1998). However, given the multiplicity in context of public organizations (Boyne, 2002), organizing feedback loops can be more challenging to organize, since this might involve political confirmation or support from other institutional bodies. Furthermore, it is important to acknowledge that since every crucial aspect of the co-design phase involves consultation and negotiation with the design-group, this is not different for the reflection phases. I.e. what lessons should be drawn from the test phases and in which direction the prototype should be further developed is a collective decision. Also here, organizing that many feedback loops can be quite challenging. As Wilson (2009) showed in co-design in Child Protection in Australia, it required specific meetings and mentoring efforts to facilitate this feedback. However, since from the start of the design process, a network of stakeholders are represented in the design group, strategic decisions are legitimate.

7. Conclusion: value creation in co-design

In this paper, our goal was to explore how value creation in public sector context can be enhanced by adopting a design perspective. In doing so, this paper sought an answer to the question: *How is co-design to be organized to create value in a public sector context?*

To answer this question, we concluded that co-design in the public domain refers to: *the collaborative effort between user and provider to create value of new services or products that is appropriate to the needs of end-users*. Based on the literature on design we identified four key-aspects of the design process, i.e. 1) problem

framing; 2) development of prototypes; 3) testing of prototypes; 4) reflection. Considering 4 major issues for applying these aspects in the public domain, we have translated this framework into a heuristic framework applicable in the public domain. In general terms, we argue that since co-design involves the involvement of many more stakeholders than 'just' end-users, much more emphasis is placed on legitimizing each step and each decision by a broad network of actors. By no means have this makes co-designed an easy approach for innovation in the public domain, but it may help to enhance the legitimacy of public services and goods and thereby set the stage for allowing value-in-use (Gronroos, 2008) to be an integral part of goods and service delivery in the public sector. Although this paper only brings together several literature streams, we hope that it allows other academics to apply it in concrete empirical settings. Hopefully, this paper is a first step to create a more elaborate understanding of how co-design as a manifestation of the S-D logic may come to being in the public domain.

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Appendix I: Articles included in review – Design studies

	Author(s)	Title	Focus of study
1.	Bjorklund	Initial mental representations of design problems: differences between experts and novices	Product design
2.	Blizzard & Klotz	A framework for sustainable whole systems design	System design
3.	Cash et al.	Methodological Insights from a rigorous small scale design experiment	Design research
4.	Chai et al.	Understanding Design Research: A bibliometric analysis of design studies	Design process
5.	Demirkan & Afacan	Assessing creativity in design education: analysis of creativity factors in the first-year design studio	Design education
6.	Dong et al.	Investigating design cognition in the construction and enactment of team mental models	Collaboration design
7.	Farrell & Hooker	Design, science and wicked problems	Design research
8.	Gascini et al.	Situating needs and requirements in the FBS Framework	Product design
9.	Gerber & Carroll	The psychological experience of prototyping	Job design
10.	Hsiao et al.	An Online Affordance evaluation model for product design	Product design
11.	Koutsabis et al.	On the value of virtual worlds for collaborative design	Collaboration design
12.	Moreno et al.	Fundamental studies in design-by-analogy: a focus on domain-knowledge experts and applications to transactional design problems	Design methods
13.	Nikander and Liikanen	The preference effect in design concept evaluation	Design research
14.	Ozkan & Dogan	Cognitive strategies of analogical reasoning in design: differences between expert and novice designers	Architectural design
15.	Pucillo and Gascini	A Framework for user experience needs and affordances	Product design
16.	Ranscombe et al.	Visually decomposing vehicle images: Exploring the influence of different aesthetic features on consumer perception of brand	Product design
17.	Sangelkar et al.	User activity - product function association based design rules for universal products	Product design
18.	Scot et al.	Designing change by living change	Behavior-based design for sustainability
19.	Valet et al.	Using eco-design tools: an overview of experts practices	Eco-design
20.	Verhaegen et al.	Refinements to the variety metric for idea evaluation	Product design
21.	Wilkinson & DeAngeli	Applying user centred and participatory design approaches to commercial product development	Product design
22.	Wiltchnig & Ball	Collaborative problem - solution co-evolution in creative design	Collaboration design
23.	Xenakos & Arnellos	The relation between interaction aesthetics and affordances	Product design

Appendix II: Included in review – Design Issues

	Author(s)	Title	Focus of study
1.	Bayazit	Investigating Design: A Review of Forty Years of Design Research	Design Research
2.	Buchanan	Design Research and the New Learning	Design Research
3.	Chapman	Design for (Emotional) Durability	Behavior-based design for sustainability
4.	Dorst	Design Problems and Design Paradoxes	Design Research
5.	Cross	Designerly Ways of Knowing: Design Discipline Versus Design Science	Design Research
6.	Fallman	The Interaction Design Research Triangle of Design Practice, Design Studies, and Design Exploration	Design Research
7.	Julier	From Visual Culture to Design Culture	Design Research
8.	Findeli	Rethinking Design Education for the 21st Century: Theoretical, Methodological, and Ethical Discussion	Design Education
9.	Kolko	Abductive Thinking and Sensemaking: The Drivers of Design Synthesis	Design process
10.	Manzini	Making things Happen: Social innovation and Design	Collaboration design
11.	Margolin and Margolin	A “Social Model” of Design: Issues of Practice and Research	Design process
12.	Margolin	Design, the Future and the Human Spirit	Eco-design/system design
13.	McCoy	Information and Persuasion: Rivals or Partners	Graphic design
14.	Morelli	Designing Product/Service Systems: A Methodological Exploration	Product/service design
15.	Oosterlaken	Design for Development: A Capability Approach	Social design/system design
16.	Norman and Verganti	Incremental and Radical Innovation: Design Research vs. Technology and Meaning Change	Design Research
17.	Secomandi and Snelders	The Object of Service Design	Service Design
18.	Swann	Action Research and the Practice of Design	Design Process
19.	Tromp et al	Design for Socially Responsible Behavior: A Classification of Influence Based on Intended User Experiences	Behavior-based design
20.	Wai and Siu	Users Ceretive Repsonses and Designer Roles	Design Research