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DESIGNING INNOVATIVE DIGITAL SERVICES FOR GOVERNMENT: A BUSINESS MODEL CANVAS ADAPTATION

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Abstract

E-government is not known for its progressive approach to the design of e-services. An action design research approach is taken for the development of a tool for helping e-service designers work in an innovative way. The theoretical grounding is in open service innovation, service-dominant logic and service design, and the research was conducted with the help of local government practitioners in Sweden. The resulting tool is an adaptation of the well-known business model canvas – the innovative digital service canvas. Other contributions include an approach to design science incorporating theory-based design principles, and the design principles themselves.

Keywords: digital services, e-services, innovation, action design research, design principles, business model canvas

1 Introduction

A feature of internet-enabled societies is the redesign of existing services into digital variants, where rapid developments in information and communication technologies (ICT) drive the move to on-line service (Taherdoost, Sahibuddin, & Jalaliyoon, 2014). ICT is thus an indispensable component of innovative and high quality service (Barrett, Davidson, Prabhu, & Vargo, 2015; Lusch & Nambisan, 2015). ICT's also enable the invention of entirely new services and new delivery mechanisms (for instance digital platforms such as the Android app store). However core governmental technologies have remained relatively stable without radical developments during the digitisation of service (Coreynen, Matthyssens, De Rijck, & Dewit, 2017). E-government has traditionally focused on providing digital variants of already existing services with some degree of service integration (for instance in the creation of national service portals), but with minor changes to back office work systems and with little room for innovation (Janowski, 2015). Despite extensive rhetoric about transformational government (Janowski, 2015; Stamati, Papadopoulos, & Martakos, 2011), and automation of some services (for instance tax calculation), digitalisation of public services has provided rather little that is innovative compared with private sector developments (internet communications, social media, online gaming) (Janowski, 2015; Rose, Flak, & Sæbø, 2018). 'Bureaucratic procedures and institutional frameworks exhibit pervasive institutional inertia, which renders transformation difficult' as do the variety of stakeholders involved, with only the limited design objective of 'putting public services online' in focus (Contini & Lanzara, 2009). Many government organisations 'lack the knowledge to achieve the necessary innovations because they depend on legacy systems or on vendors to develop systems' (Veenstra, Klievink, & Janssen, 2011), and the number of largescale failures is high (Gauld & Goldfinch, 2006). Even where a rather limited definition of service innovation is used - 're-bundling of diverse resources that create novel resources that are beneficial (i.e., value experiencing) to some actors in a given context;' (Lusch & Nambisan 2015 p.161) – it's clear that the government sector is comparatively poor at using digitalisation for transformative or innovative effect. Since the potential of digital service has developed rapidly, the design tools, methods and frameworks which government practitioners use to envision and develop digital services also need to develop. Conventional system development methods, for instance, are not focused on innovation, assuming that the existing manual

process will be automated (Rose, 2010). Participatory methods are recommended for government (Olphert & Damodaran, 2007) but not much used. Conventional business development methods such as the business model canvas (Osterwalder & Pigneur, 2010) don't focus on digital enablers and are targeted at for profit sector. Thus the problem domain we address concerns the difficulty of local government stakeholders in contributing to innovative service development. The objective for this research is therefore to build and test a methodological tool to help eGovernment practitioners design and develop innovative digital services.

The tool, an adaptation of the business model canvas (Osterwalder & Pigneur, 2010) was developed with the help of local government practitioners in Sweden. The method adopted is action design research (ADR) (Sein, Henfridsson, Purao, Rossi, & Lindgren, 2011), which combines elements of action research with a focus on the development of an artefact. Two cycles were employed, the first focusing on the derivation of theory-based design principles, the second on development and testing of the tool guided by the principles. The next section introduces ADR, and the two cycles are described, leading to presentation of the design principles, the tool and its evaluation by practitioners. These are followed by discussion and conclusions.

2 Action Design Research

The overall research method is Action Design Research (ADR) (Sein et al., 2011). ADR combines features of action research (appropriate because the research is conducted with local government practitioners) and design science (appropriate because the outcome is a designed artefact: a tool). It deals with two challenges: firstly, to address a practice problem in a specific organizational setting and secondly, to construct and evaluate an artefact (a low-cost development tool) that addresses the class of problems identified (designing innovative digital services for the public sector).

ADR specifies four iterative stages and seven principles (Figure 1).

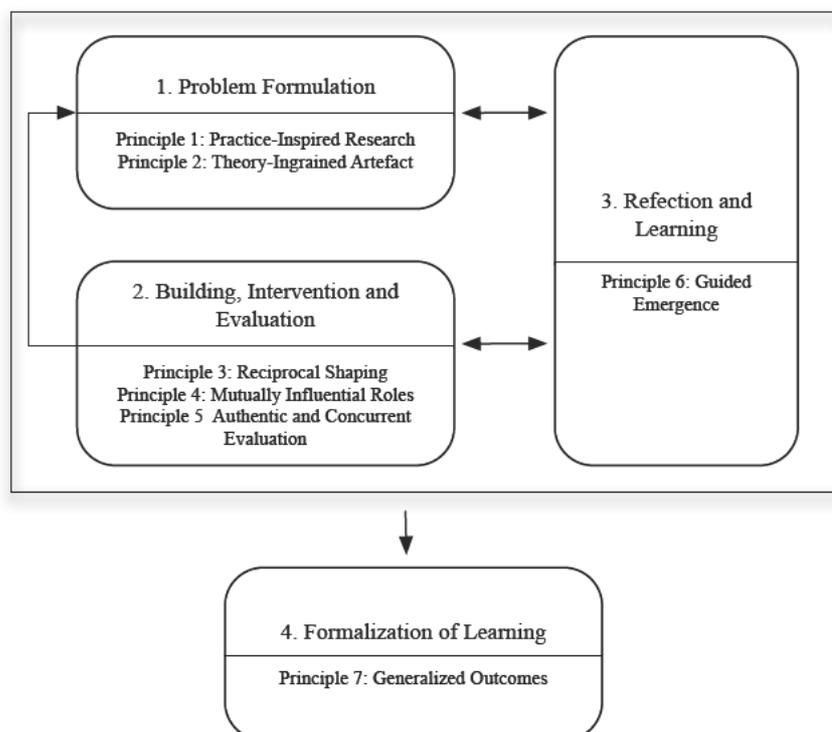


Figure 1. ADR stages and principles (Sein et al. 2011)

The problem formulation stage formalizes the identified practice problem, and includes these tasks:

- Identify and conceptualize the research opportunity

- Formulate initial research questions
- Cast the problem as an instance of a class of problems
- Identify contributing theoretical bases and prior technology advances
- Secure long-term organizational commitment
- Set up roles and responsibilities

Principle 1 (Practice-Inspired Research) requires the research to be grounded in an actual organizational situation typical of a class of problems. Principle 2 (Theory-Ingained Artefact) specifies that the designed artefact be grounded in theory, to structure the problem, to identify solutions, or to guide the design process.

Stage 2, Building, Intervention and Evaluation (BIE), concerns the iterative creation and evaluation of the IT-related artefact (in this case the method) through intervention in the problem organisation. The tasks performed are:

- Discover initial knowledge-creation target
- Select or customize BIE form
- Execute BIE cycle(s)
- Assess need for additional cycles, repeat

BIE may be IT-dominant (typically involving the design of a software system), or as in this case, organization-dominant. Principle 3 (Reciprocal Shaping) requires that the artefact is influenced both by the practice domain (the organisational situation) and research domain (researchers armed with theoretical constructs). Principle 4 (Mutually Influential Roles) is designed to ensure that both practitioners and researchers are involved in design and intervention. Principle 5 (Authentic and Concurrent Evaluation) distinguishes ADR from design science by requiring that evaluation of the artefact occurs continuously as it evolves.

Reflection and Learning (stage 3) should be a continuous process that runs parallel with problem formulation and BIE, including the following tasks:

- Reflect on the design and redesign during the project
- Evaluate adherence to principles
- Analyse intervention results according to stated goals

Principle 6 (Guided Emergence) embodies the idea that the design evolves through the interaction of theory and practice, researchers and practitioners, and particularly through feedback provided by concurrent evaluation.

The remaining stage is Formalization of Learning and tasks to perform are:

- Abstract the learning into concepts for a class of field problems
- Share outcomes and assessment with practitioners
- Articulate outcomes as design principles
- Articulate learning in light of theories selected
- Formalize results for dissemination

In this stage the research should move from specific-and-unique to generic-and-abstract, reflecting principle 7 (Generalized Outcomes). Sein et al. (2011) suggest three relevant forms of generalization: (1) generalization of the problem instance, (2) generalization of the solution instance, and (3) derivation of design principles.

2.1 ADR adapted for the innovative digital services case.

We used a two cycle approach. Cycle 1 involved the derivation of theory-based design principles following the process suggested by Rose et al. (2018). The resulting design principles were used to drive cycle 2, in which the business model canvas was adapted for use in designing innovative digital services.

The business model canvas (Osterwalder & Pigneur, 2010) is a well-known tool for designing new business areas (Google 169M hits, Google scholar 158,000 hits) which has already been used for services (Zolnowski, Weiss, & Bohmann, 2014). Both cycles were evaluated with the help of practitioner workshops, interviews and content analysis. Figure 2 gives the ADR adaptation.

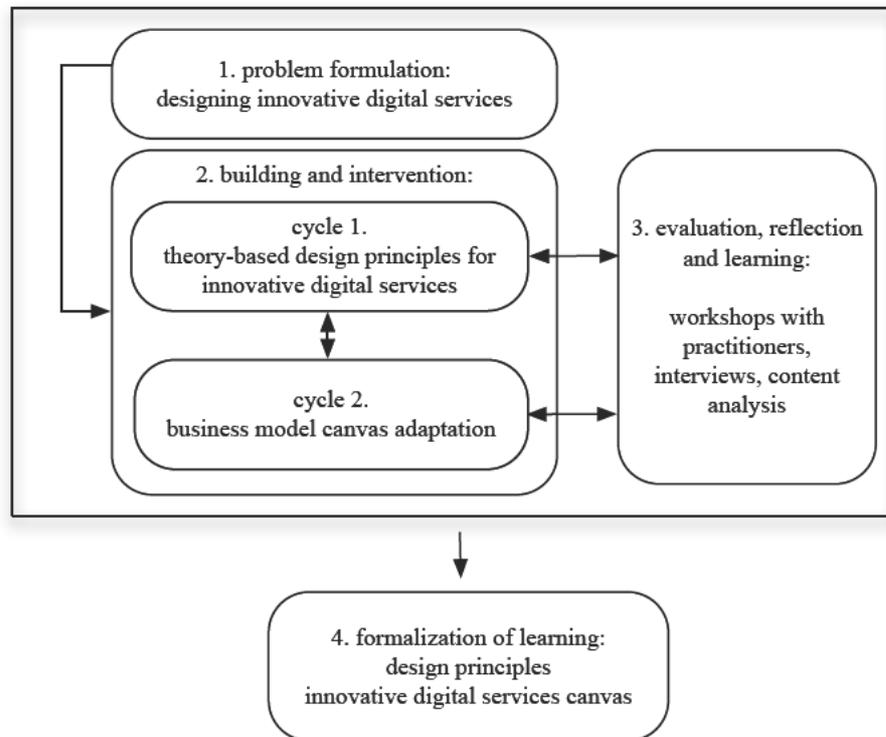


Figure 2. Adaptation of ADR for the innovative digital services project

3 ADR cycle 1: design principles

The research group used the process suggested by Rose et al. (2018) for deriving theory-based design principles. There are four steps: 1. formulate solution objectives, 2. identify kernel theories, 3. derive normative and prescriptive theory elements, and 4. refine and organize elements as theory-based design principles. The remainder of this section describes how these steps were operationalised.

3.1 Formulation of solution objectives

The six project researchers worked from the project description in a workshop and in follow up conversations to articulate common goals and objectives for the project. The description specifies the creation of a method for designing innovative digital services with both a customer/user and a supplier/developer perspective. An initial list of solution objectives was refined over several months. In a second step, the project's local government partners were asked to provide feedback in three workshops. In the finalised solution objectives the method should:

- SO1: Enable co-creation of digital service innovation
- SO2: Focus on the service in use
- SO3: Focus on experienced value
- SO4: Consider capabilities and resources of various actors
- SO5: Consider the components of the whole service, both manual and digital

3.2 Identification of kernel theories

The identification and justification of kernel theories are guided by the solution objectives. The solution objectives point at various scientific fields including (amongst others): (digital) innovation, service marketing, service science, e-services and parts of e-commerce and e-government. However, the number of contributions in these fields excludes literature review as a feasible selection technique so we decided to select seminal theories from these fields in such a way as to cover the solution objectives. Seminal theories make good kernel theories because of their many citations and secondary literatures, and a degree of acceptance and continuing development in their respective research communities. They also normally have a degree of spill over into practice, giving them high visibility - an important element of design-oriented theory work because it increases the chances of understanding and acceptance by practitioners. A workshop generated a list of relevant theory areas included: co-creation and open innovation, design and innovation, digital service innovation, service design, service-dominant logic, social sustainability and open design. A further workshop iterated and critiqued the theory choice before it was approved as a kernel theory for the design exercise. Based on the solution objectives, we selected the three kernel theories: service design, open innovation and service-dominant logic. Open innovation and service-dominant logic have prominent seminal contributors. For open innovation we investigated primarily the seminal works of Chesbrough (H. Chesbrough, 2006, 2011; H. W. Chesbrough, 2003), for service dominant logic, Vargo and Lusch (Vargo & Lusch, 2004, 2008, 2016). Service Design is a newer approach that builds on many contributions from several research areas, (e.g. user participation, user centredness, co-production). There was no obviously dominating contributor and we made a short literature review instead.

3.3 Derivation of normative and prescriptive theoretical statements

We made summaries of the principle tenets of the three theories and made two theory translations. In the first translation we adapted the theory tenets to our innovative digital service for government context, since none of the theories were originally focused here. In the second we took content which was not explicitly normative and gave it a prescriptive turn. For instance, Chesbrough's (2011) open service innovation framework requires managers to

- 'Think of your business (whether a product or a service) as an open service business in order to create and sustain differentiation in a commodity trap world.
- Invite customers to co-create innovation with you in order to generate the experiences they will value and reward
- Use open innovation to accelerate and deepen services innovation, making innovation less costly, less risky, and faster. Use open innovation to help you turn your business into a platform for others to build on.
- Transform your business model with open services innovation, which will help you profit from your innovation activities. If you succeed in building a platform business model, you can also profit from others' innovation activities as well'.

We transformed these instructions into our context as follows:

- Understand the digital service in its organisational context as a whole, rather than focus on the digital component of it
- Develop an integrated service platform focused at developing business needs
- Involve the user of the digital service in its design
- Use the principles of open innovation to support design work
- Transform the entire value proposition of the digital service, rather than simply automating an existing manual service

In this way we generated 22 prescriptive statements from the three theory areas which could inform our method design work.

3.4 Refinement and organization of statements as design principles

We compared the 22 theory-derived prescriptive statements and analysed *overlaps* and *convergence*. We could isolate groupings of statements with similar intent in these areas:

- Focus on user needs
- Co-creation involving multiple stakeholders
- Identifying service value (strategic benefit)
- Thinking innovatively (outside the box)
- Thinking holistically, keeping the whole service in view

We could also identify outliers and contradictions, for instance service dominant logic is more rooted in the theoretical language of private sector strategy (not really appropriate for our purpose), and open innovation was the only contributor to develop platform thinking. We resolved these in ways which seemed appropriate (for example we moderated the language of strategy so that it would also carry meaning in public sector organisations, and decided to omit platform thinking). We reviewed the principles with our local government colleagues in two workshops with follow-up questionnaires. The workshops focused on discussing the usability of the canvas and how it could be used both to improve existing services, as well as for developing new ones.

We arrived at the following set of design principles:

- Design Principle 1. Use operant resources (c.f. knowledge/open innovation) to develop competitive advantage and strategic benefit (public value)
- Design Principle 2. Since value is determined by the beneficiaries (service consumers), employ co-creation by stakeholders (including beneficiaries)
- Design Principle 3. Integrate all necessary resources in the service ecosystem
- Design Principle 4. The digital service should appear as an integrated package to the beneficiary, reflecting their life situation and interests and how they may be improved
- Design Principle 5. Transform the entire value proposition of the digital service, rather than simply automating the existing manual service
- Design Principle 6. Encourage innovation through openness (principally in the form of knowledge sharing) in the design and development process

3.5 Evaluation, reflection, learning

Three workshops were conducted during the course of the cycle, with representatives from the public sector and business development expertise. We were interested in getting a solid overall picture of how digital technology is viewed and applied when designing service. Therefore the CIOs (or equivalent) were selected as representatives. Besides the participating CIOs, two researches participated during the workshops. Each workshop followed the same basic procedure. First, a short interview was held. The interview aimed at understanding the current view of service development in the organisation as well as getting a mutual understanding of basic concepts used during the workshop in order to avoid misinterpretations. As an example, we raised questions such as: Do you consider yourself as a service organisation? Is there a formalised process for service development? How do you define service? How are users included in service development? The second part of the workshop aimed at introducing the proposed design principles via a hypothetical design scenario. We provided the representatives with concrete experiences and ideas of the proposed design principles. As an input to the discussion, the representatives were asked to identify an idea for a potential new service. Thereafter, we jointly designed the main characteristics of the proposed service with basic Service Design tools as a process-based customer journey with the main touch points of the service mapped out and explained. In doing so, we used graphical tools to illustrate the proposed service, e.g. whiteboards and digital representations. We then made an additional interview where we asked specific questions targeting the proposed design principles. The questions asked along with the design principles associated was:

- How do you perceive that every design scenario should be based on the users' needs for value? [DP1, DP4]
- How do you perceive that design should be based on co-production? [DP2, DP4]
- How do you perceive the visualisation of service as a sequence of activities where the whole is emphasised rather than individual parts? [DP3, DP5]
- How do you perceive coordinating several service providers in order to provide a more complete service offer for users? [DP3]
- How do you perceive that innovation may be promoted by viewing service as an orchestrated whole rather than individual services? [DP1, DP5, DP6]
- Furthermore, we also asked the participants about their general perceptions of the design principles in terms of upsides and drawbacks.

The workshops were recorded and transcribed before being analysed.

It became clear that the general level of experience of service development varied between the representatives regarding their general experience of service development as well as to what degree processes for service development could be considered as formalised. Furthermore, experience in using techniques promoting user centeredness and value co-creation varied between the representatives. The perceptions from the hypothetical design scenario was positive for all three representatives, as the following quotes show: *"It is great, exactly what we need"*, and *"I don't think you can work in any other way"*. To include the perspectives of several actors and to include the future users' perspective in service development is highlighted as a basic precondition that must be met. Positive attitudes towards the design principles were shared by the representatives, but the understanding for how the principles should be implemented differs. They shared a concern that service design could become long-winded and over-formalised in respect to the relatively few resources they had at their disposal. When responding to the question: "How do you perceive that every design scenario should be based on the users' needs for value? [DP1, DP4]" one representative simply said that their reality is far from what is being proposed. They seldom experience requests from citizens for new services and they don't seek for any further knowledge themselves: *"We never get any requests from the outside, it has never happened"* and *"We have not asked them and they haven't said anything"*. Another representative on the other side already had an existing development process in where the users' needs are incorporated. The same reasoning goes for the questions: "How do you perceive that design should be based on co-production? [DP2, DP4]" and "How do you perceive the visualisation of service as a sequence of activities where the whole is emphasised rather than individual parts? [DP3, DP5]", i.e. all three representatives considered such principles as important basic conditions in service development. One representative first and foremost saw these principles as positive in theory, whereas another representative already applied variants of these principles in their service development processes. Regarding the question: "How do you perceive coordinating several service providers in order to provide a more complete service offer for users? [DP3]" the representatives' perception was less positive. Instead, they pointed out that it easily gets too complex when including several actors and services. One representative pointed out the challenge of keeping service development simple in order to design a viable service journey instead of just adding more and more elements. Regarding the facilitation of innovation (How do you perceive that innovation may be promoted by viewing service as an orchestrated whole rather than individual services? [DP1, DP5, DP6]). All representatives underline the importance of such a principle.

A fuller description of this theoretically-oriented research is given in Rose et al. (2019 accepted).

4 ADR cycle 2: the digital service innovation canvas

As the kick off for the second cycle we conducted a workshop where various ways of implementing the design principles for digital service innovation design in the public sector were considered. We surveyed a variety of system and service design methods, and frameworks such as the Nylén & Holmström (2015).

In the light of feedback from practitioners we eliminated candidates involving difficult learning, specialised knowledge (e.g. UML) and long run times. The business model canvas¹ (Osterwalder & Pigneur, 2010) was chosen because of its simplicity and ease of use, its visual sophistication in relating important design elements, the short learning curve, it's clear association with innovation, its widespread use and familiarity through relevant communities of professionals, the existence of related modelling tools, and its previous adaptations for the service area. The researchers used a workshop to make the initial design of the canvas. The following transformations were made:

- The canvas was transformed to make it appropriate for the public sector. The commercial costs and revenue streams idea were replaced with investments and gains
- The canvas was transformed to suit the service context, with business model terminology replaced by service terminology throughout, for example customers were replaced with users
- A clear digital element was introduced, for instance in the key resources and service channels boxes
- A specific innovation component was introduced: key innovations

The transformation was continually checked for conformance with the theoretical design principles (see Table 1).

<i>Design principle</i>	<i>Canvas mapping</i>
1. Use operant resources (cf knowledge/open innovation) to develop competitive advantage and strategic benefit (public value)	Service value proposition, service provider gains and returns
2. Since value is determined by the beneficiaries (service consumers), employ co-creation by stakeholders (including beneficiaries)	Service development mode, service key partners, service user profiles
3. Integrate all necessary resources in the service ecosystem	Key resources, service channels
4. The digital service should appear as an integrated package to the beneficiary, reflecting their life situation and interests and how they may be improved	Service value proposition, key service activities, service channels
5. Transform the entire value proposition of the digital service, rather than simply automating the existing manual service	Service value proposition, service provider gains and returns, key service activities, service channels
6. Encourage innovation through openness (principally in the form of knowledge sharing) in the design and development process	Key innovations

Table 1. Design principles mapped to canvas development

The canvas with tested with the local government partners (see next section) and refined, and the final version is given in Figure 3.

¹ Visit the original version at https://en.wikipedia.org/wiki/Business_Model_Canvas

Service Name				
What is the name and the purpose of service?				
Service key partners Who are our key partners? <ul style="list-style-type: none"> • Other government agencies • Service developers • User representative groups 	Key service activities What are the principal activities/events in the service and how are they connected in a process? <ul style="list-style-type: none"> • Manual/digital • Provider/user • Support processes 	Service value proposition How does the service benefit its users? <ul style="list-style-type: none"> • Convenience • Access • Autonomy • Time-saving • Information, communication, transaction 	Service development model On what basic premises are service development founded? <ul style="list-style-type: none"> • Development processes • Participation and co-creation • Software development • Change agency 	Service user profiles What do we know about our users? <ul style="list-style-type: none"> • Who are the users? • What are their characteristics? • What needs do they have?
Triggers What motives or drivers are there for the service? <ul style="list-style-type: none"> • Political pressure/agendas • Citizen requirements • Societal • Technological development 	Key resources What key resources are included in the service? <ul style="list-style-type: none"> • Personnel and competences • Digital (platform, architecture, databases, user interface, network, IP, connecting systems) 		Service channels Which devices, operating systems, browsers will support the service? <ul style="list-style-type: none"> • Manual service • Mobile, tablet, laptop • Other channels 	Key innovations How is digitalisation viewed? <ul style="list-style-type: none"> • New technology • New service channels • New internal work processes
Service investments How much will it cost to develop, maintain and operate the service? <ul style="list-style-type: none"> • Software cost, hardware improvements, IP costs • How will the service be staffed, back office reorganization 			Service provider gains and returns What is the expected outcome from the service? <ul style="list-style-type: none"> • Internal efficiency, effectiveness, cost savings, regulatory compliance • Trust, policy input, democracy, feedback, inclusion 	

Figure 3. Digital service innovation canvas for the public sector

4.1 Evaluation, reflection, learning

Workshops were organised together with two local governments. In Sweden municipalities represents the government authorities closest to the citizens’ everyday life situation, by, for example, providing education, child care, and elderly care. IT service in municipalities is typically set up in in one of two ways: 1) run by a central IT department who manage the digital infrastructure in the municipality, or 2) run by an external IT partner. Regardless of which approach that is applied, the IT personnel serve the administrative units within the municipality. Each municipality was asked to bring representatives from both administrative and IT departments in order to achieve a solid overall picture, and to collect empirical data concerning the participants’ general impressions of using the canvas as well as to highlight anything that was missing or superfluous. The participating municipalities were of different size (55000 and 9000 inhabitants respectively) exhibited different levels of maturity in terms of digital services provided as today. If classified according to the four-step maturity model provided by Layne and Lee (2001), the larger municipality can be categorized as a hybrid between a vertically and horizontally integrated whereas the smaller municipality is less mature and can be categorized as catalogue. In the end, two representatives (CIO and IT-technician) participated from the smaller municipality whereas the larger one provided four participants (E-service coordinator, business developer from one administrative unit, systems specialist, and the IT manager). The workshops followed the same procedure with two researchers participating. One of the researchers acted as facilitator/moderator using the canvas to facilitate discussion while the other took notes. In addition, the workshops were video recorded in order to enable other researchers in the team to revisit them. Each workshop took two hours and included a brief presentation of the canvas. Prior to the workshop, each municipality was asked to select one of their existing digital services that should serve as a source of departure for working with the canvas. Thereafter, the participants were asked to select one planned but not yet existing digital service, which then was theoretically designed using the canvas. Follow-up interviews were conducted two weeks later, using a semi structured interview guide (Gillham, 2005). The interviews were recorded and transcribed before analysis. The respondents’ overall impression of the canvas was positive. It was seen as a structured support that enhanced the probability of capturing vital aspects when designing digital service, or as one respondent puts it: *“When you sit there and is about to design a service you almost always run out of time which means that you don’t ask those questions to the organisation. We know these things but still we won’t do it. When you sit there and get the service then it will always be time-consuming*

and you will not get it and you will not ask the questions for the activities. We know these things, but we do not. It's great to get reminders all the time". The respondents agreed that the canvas provides a clear image of the intended users of the service and better insights in the values offered by a service, as put by one of the respondents: "The user perspective. We keep on nagging about it but when it is the real deal we skip it anyway. Every reminder is good I think". At the same time, a clearer image of the users allows for a more constructive dialogue between involved stakeholders, exemplified by the following statements: "I could have use for this when I'm discussing with the business why they should or should not create a service" and "Then they (the administration) can see if we gain something from it or if it is a service just for the sake of it". The respondents emphasize the possibilities that arise when using the canvas as a basis for discussing what possibilities that emerge when providing service digitally. Furthermore, the canvas can also be used as a check list that prevents downsizing or neglecting important service aspects which in turn can act as an enabler for more innovative service provisioning instead, or as two of the respondents put it: "If the administration would have been here I definitely think they would have started to think. As it is now they just want to make a form digital" and "I have never seen such a complete picture, this is what I have been missing but without knowing it". It is clear that the major contribution from using the canvas seem to be a better and more structured base for discussion between the involved stakeholders. The canvas provides a better overall picture of the service of interest and that digital service development is so much more than just creating digital copies of previously existing services and forms, as the following quotes highlight: "When I sit down and talk to administrations I ask questions which I otherwise would have forgotten. This is how we should work, we must think about the processes first: do we need this service or are we just digitalising for the sake of it? I mean it's not certain that we need to make everything digital" and "In reality it is often the case that the administration has a form they want to digitize, they just want to change a name or get rid of a textbox".

Some shortcomings or possible drawbacks with the canvas were also been identified. The main concern with the canvas is that it might be too ambitious to use it for every new service project initiated. Both organisations and development initiatives can have a varying complexity, which makes some dimensions of the canvas more or less superfluous. It is clear that there is no general fix or one size fits all solutions, or as one respondent state: "If it is this hard then we just don't do it (the administration). There must be a balance. In the perfect theoretical world we could do like this every time. We spend four hours with four persons, but we don't have that time and space and then they (the administration) think its rubbish". The respondents also emphasize the need of some sort of support when using the canvas instead of jumping around between the fields when discussing a service, exemplified by one respondent: "What is needed is more of a checklist. How you thought about this and this? A process support which is clear and concrete". A variety of more detailed comments were used as a basis for revision of the canvas. We can conclude that the canvas is experienced as positive, primarily as a good base for discussion with administrations with little competence and insight in digital service delivery. Thus the canvas can be considered as an important enabler for more innovative service provisioning and mutual creation of value instead of a view of digital service as merely a digital version of already existing services/forms.

5 Discussion and conclusions

The objective of our research was to build and test a low cost methodological tool to help eGovernment practitioners to design and develop innovative digital services. The result was the digital service innovation canvas, an adaptation of the business model canvas driven by theoretically-oriented design principles. Table I and 2 explain the mapping of solution objectives and design principles to the canvas.

<i>Solution objective</i>	<i>Canvas mapping</i>
Enable co-creation of digital service innovation	Low cost, low learning curve, easy vocabulary workshop tool accessible to many stakeholder groups

Focus on the service in use	Key service activities, Service channels, Key resources
Focus on experienced value	Service value proposition, Service provider gains and returns
Consider capabilities and resources of various actors	Service key partners, Service user profiles, Key resources
Consider the components of the whole service, both manual and digital	Key service activities

Table 2. Mapping of solution objectives to canvas features

The development was conducted with the help of local government practitioners in Sweden. Evaluation showed that the resulting canvas serves as a useful base and starting point for discussion, helping them to develop overview understandings of service design from several different perspectives. These include value perspectives for both users and government, an integrated resource perspective, co-creation and partner perspectives, and an innovation perspective. The service user is kept in focus throughout, which is a known weakness in government service design initiatives, and the canvas encourages its users to go beyond simply automating an existing manual service – another known weakness. Other contributions include the design principles, which may be used to guide the development of other method components for service design, and our not limited to use in the public sector. In relation to design science research, we contribute by demonstrating a two-cycle action design research approach incorporating a specified way of developing theory-based design principles. The two cycle approach helps improve the traceability of the theory base through its transformation into a theory-ingrained artefact, whilst maintaining other ADR principles: practice-inspired research, reciprocal shaping and mutually influential roles (through the interaction of theory and practice, researchers and practitioners), authentic and concurrent evaluation (through workshops and interviews) and guided emergence (through the iterative cyclical process). The learning is formalised as design principles and canvas adaptation, and through the resulting research articles.

Although the results are promising, the empirical base is limited in relation to the target practitioner audience. Further trials and iterations are necessary to expand the empirical base for evaluation. We also need to include rather different types of co-creators in our workshops. It's also clear that the selection of different theoretical starting points can result in rather different artefact outcomes. We have not, unlike some design science researchers, set out to generate or test theoretical propositions, but rather to ensure that artefact development has a traceable theoretical component. We are not therefore able to reflect on the empirical justification of the theories used, only on how useful they are in the design context. Nor are we clear over how generalisable our results are to other countries with different e-government cultures and histories, and different approaches to service development. In future research we will seek further experience with the canvas in order to improve it, and also provide a version which is targeted at private sector service designers. We also see the need to provide further tools to help with more detailed design, and with technical design issues. We would also like to integrate the tool with a modeling language.

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