

Multi-Stakeholder Business Models: Designing Out Wicked Problems

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The paper is a part of an ongoing study, labelled as “Designing out wicked problems” - a design science research (DSR) study with the purpose of developing, implementing, and evaluating a methodology framework for designing multi-stakeholder business models. The objective of the current paper is to evaluate the business model design framework within a DSR framework. The research is conducted as three-year case study at three sites: The Danish police, with a key player in the Danish energy sector, and the municipality of the Danish capital, Copenhagen. The research method is action research, with a structure of planning-action-evaluation process conducted with the case owners - as well as design science methodology, where an artifact (the multi-stakeholder business model design concept) is created, evaluated and altered to improve its functionality. The finding of this study is that the maturity of the application domain - the type of problem the concept is trying to solve - as well as of the concept itself, is low. The conclusion is thus that the knowledge contribution of the study is of a unique invention character which will lay the foundation for further evaluation and research.

Keywords: business models, design science, wicked problems, multi-stakeholder initiatives, co-creation, strategic visualization

Introduction

These years, emerging challenges and opportunities within areas such as healthcare, tourism, energy, crime prevention and more, are disrupting the models for how value is created - for welfare providers as well as for businesses. The challenges and opportunities are best described as wicked problems being “ill-formulated” with “many clients and decision makers with conflicting values” as defined by Rittel and Webber (1973).

These wicked problems are pushing the development of new business models for creating value that include a much higher degree of external engagement, in which the customers, citizens, patients, and clients can co-design and co-create solutions (S. Degnegaard & R. Degnegaard, 2016, p. 24). However, literature is scarce when it comes to showing how to design these multi-stakeholder endeavors let alone formulating a well-grounded theory for the relations between wicked problems and design (Buchanan, 1992).

During the course of this overarching three-year study, in which this paper is a part, a concept for designing multi-stakeholder business model has been developed, implemented in the case owner organizations and described (S. Degnegaard & R. Degnegaard, 2016).

The aim of the current paper is to determine what type of knowledge contribution this business model design concept is in a design science research (DSR) understanding. The paper is based on the case study with the municipality of Copenhagen, the third case in the case study research.

The insights from this research have implications for practice in setting a trajectory for a focused approach for designing new business models in multi-stakeholder settings. The study has furthermore implications for research in illustrating how research in new emerging business models needs to be closely linked to practice.

Hypothesis

The hypothesis of the paper is that the concept for designing multi-stakeholder business models is of such a novel kind that it can be categorized as an “invention knowledge contribution” within a DSR framework. The concept is developed by the research team, not as a linear deductive extraction but as an ever evolving prototype, emerging from a fuzzy web of creativity, years of experience, a broad academic foundation and articulated needs from clients and case owners over the years. It has its foundational roots in design science, co-creation, design thinking, change management, and strategic visualization as well as contributes to each of these fields.

Wicked Problems - A Definition

Design theorist, Horst Rittel, defined in 1973 together with Melvin Webber, the term *wicked problems* as the primary type of problems that designers address (Rittel & Webber, 1973). Wicked problems have “no definitive conditions or limits” (Buchanan, 2012, p. 16) and the scope of the solution design to tackle wicked problems is thus almost universal. Rittel and Webber defined 10 properties that defined wicked problems, here summed up by Buchanan (2012, p. 16):

- (1) Wicked problems have no definitive formulation, but every formulation of a wicked problem corresponds to the formulation of a solution;
- (2) Wicked problems have no stopping rules;
- (3) Solutions to wicked problems cannot be true or false, only good or bad;
- (4) In solving wicked problems, there is no exhaustive list of admissible operations;
- (5) For every wicked problem, there is always more than one possible explanation, with explanations depending on the *Weltanschauung* of the designer;
- (6) Every wicked problem is a symptom of another, “higher level” problem;
- (7) No formulation and solution of a wicked problem has a definitive test;
- (8) Solving a wicked problem is a “one shot” operation, with no room for trial and error;
- (9) Every wicked problem is unique;
- (10) The wicked problem solver has no right to be wrong - they are fully responsible for their actions.

Four Pillars of Theory and Practice

The first theoretical pillar for this study is design science (Simon, 1996; van Aken, 2004; Huff, Tranfield, & van Aken, 2006). Design science can be seen as a complimentary knowledge base to traditional deductive science. In deductive science, the purpose is to explain and describe phenomena or “what is” (Huff et al., 2006). Design science can be seen as prescriptive science, where purpose is to explore “what can be” (Huff et al., 2006). Medicine, engineering science and management science can thus be seen as descriptive sciences (van Aken, 2004).

DSR literature is these years undergoing a further striving to provide rigorous knowledge contribution as well as relevance for the field of application, in the case of this study, within management. This current movement towards a more rigorous design science provides new frameworks such as “grounded technological rules” - or what can be described as tested know-how (van Aken, 2004, p. 228), DSR evaluation framework (Venable, Pries-Heje, & Baskerville, 2016) and concepts for positioning and presenting DSR (Gregor & Hevner, 2013). These contributions become handles for ensuring relevance for practice without losing the academic rigor (MacLean, MacIntosh, & Grant, 2002; Huff et al., 2006; Kieser & Leiner, 2009).

The second pillar of academic literature for this study is co-creation. Co-creation as both practical and theoretical fields is experiencing a tremendous growth these years (Degnegaard, 2014; Ramaswamy & Ozcan, 2014). In academia, the field originated from co-creation of shared meaning within therapy and intervention, but covered later four other streams: marketing, technology, innovation, and design (Degnegaard, 2014). Especially, the marketing stream has gained foothold, also thanks to Venkat Ramaswamy and C. K. Prahalad’s seminal book, *The Future of Competition: Co-creating Unique Value with Customers*. Here foundational design principles for value creation through co-creation are laid out in the DART-model: Dialogue - between equal partners, Access - to information and tools, Risk assessment - taking informed choices, and Transparency - disappearance of asymmetry between, in the marketing logic, companies and consumers.

This emerging field of co-creation literature offers approaches for working with vast amount of complexity in multi-stakeholder processes, such as designing new business models. Here, co-creation methodologies and literature support designing framework for solutions in an evolving and dynamic way, adapting to the ever-changing reality of organizations. This falls in line with the emergence of new generation of business models: challenge focused business models (S. Degnegaard & R. Degnegaard, 2016, p. 24) (see Figure 1).



Figure 1. Three generations of business models. Source: own elaborations.

Traditionally, the focus of value creation was the product or the service, meaning that organizations could improve their competitive advantage by altering internally driven factors: price, quality, time to market, etc.. Within the last decade, we have seen a shift in focus to also encompassing the experience of the user/client/patient/citizen. Here, organizations no longer can rely on internally steering handles but have to reach out of the organization in order to provide experienced value for the client. Now we see an additional layer evolving in the focus for value creation of business models which is solving massive or complex challenges that exceed far beyond a single organization. Now, we see a new shift taking place, a shift where value creation no longer is tied only to a certain quality and a certain experience of use, but also how the organization, product, or experience is linked to a larger societal purpose, challenge, or opportunity, what the author refers to as a challenge focused business model. When shifting focus towards societal challenges, organizations create value for their user/client/patient/citizen through the co-creation of solutions with other actors in society (S. Degnegaard & R. Degnegaard, 2016).

The third foundational pillar of this study is design thinking. It can be argued that design thinking, despite an ever growing body of both academic literature and business articles, still lacks a clear definition as a concept (Johansson-Sköldberg, Woodilla, & Çetinkaya, 2013, p. 121). There are a number of attempts to define design thinking, from the creation of artefacts to reflexive practice and creation of meaning (Johansson-Skjöldberg et al., 2013, p. 124), however in this study design thinking leans towards the definition of problem-solving, or more specifically, a “human-centered approach to problem solving that derives from a thorough discovery process followed by iterative circles of prototyping, testing and refinement” (Brown, 2008, p. 88).

The fourth pillar or field of knowledge is strategic visualization, a not yet mature concept, neither in practice nor academic literature. Strategic visualization is the use of dynamic large-scale imagery for strategic purposes, such as strategizing, visioning, and organizational processes. In a yet more complex business landscape, the “importance of representational artefacts such as visualizations of complex business challenges and multi-stakeholder processes has been accompanied by growth in the popularity and application of new decision-making and problem-solving approaches” (R. Degnegaard, S. Degnegaard, & Coughlan, 2015, p. 13). The facilitated sessions of strategic visualization allow for collaborative engagement in which all participants can co-design solutions and gain common ground of complex matters.

The Business Model Design Concept

This study introduced the second prototype design for developing multi-stakeholder business model to handle wicked problems, shown here in Figure 2 below. It consists, besides a decision phase, of four phases: mapping shared challenge, co-creation analysis, involving external stakeholders, and engagement phase.

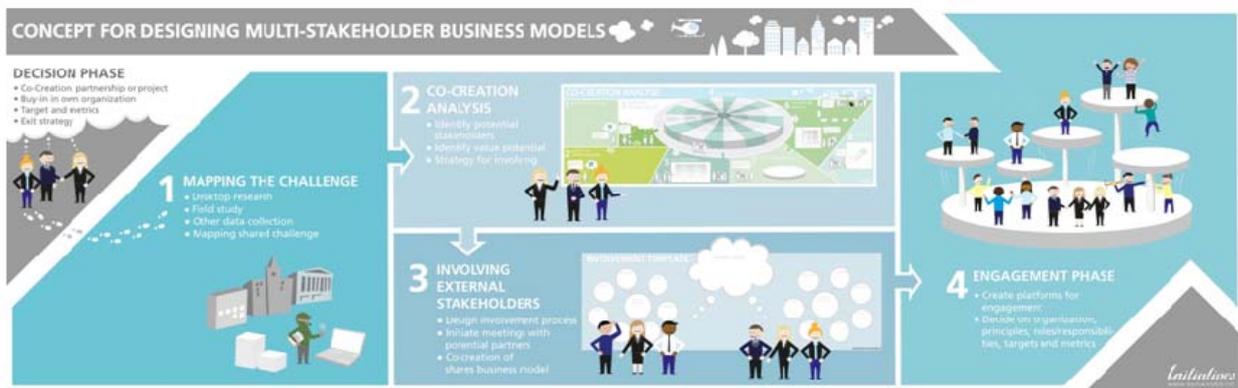


Figure 2. Concept for developing multi-stakeholder business models.

The concept works as a roadmap for designing engagement platforms that serves as gears in the multi-stakeholder business model machinery.

The concept framework is constructed as a 1+4 phase process that entails a number of tools, developed upon and inspired by four different practical and theoretical strands: design thinking, co-creation, strategic change management, and strategic visualization. Each perspective provides a unique contribution to the framework’s interwoven texture. To detangle it can best be seen as an academic exercise in hindsight, however below are highlights of the most important contributions to give a high level understanding of the origin of the concept.

Design thinking provides the point of departure: human beings. What does the wicked problem look like - not from an organization’s resource perspective - or “the law of the instrument” as formulated by Abraham H. Maslow (Maslow, 1966, pp. 15-16)¹ - nor from the system’s perspective - what is formally correct or false, but from an experienced level: How is the problem perceived by the users, clients, customers, managers, leaders, etc.. In order to depart from the level of experience, a solution design process needs to start from an outside-in perspective. Design thinking offers mindset and tools to do exactly that by creating empathy with users, patients, etc. (Brown, 2008, p. 87), and by enabling a reframing of the challenge thus helping stakeholders look at their challenge not as an entity but as a piece of a larger jigsaw puzzle - a wicked problem - and thereby expanding the stakeholder crowd.

The co-creation perspective contributes with a new way of creating value (Prahalad & Ramaswamy, 2004, p. 5). Value is in a co-creation setting seen as dynamic. For each stakeholder, the value potential of the solution design is unique and it furthermore changes over time (Degnegaard, 2014, p. 109). The concept therefore encompasses this dynamic by focusing on each of the stakeholders’ value potential without losing sight of the overall societal contribution of the solution, what Michael Porter refers to as “creating shared value” (Porter, 2011, p. 64) but without “business trade-offs”. Co-creation furthermore requires the ability to lead peer-to-peer dialogues (Prahalad & Ramaswamy, 2004). The concept therefore introduces an involvement process that helps the actors lead conversation in an open and eye-level manner.

Strategic visualization is the red thread throughout the concept. When handling wicked problems in a multi-stakeholder setting, the involved experience that there are too many moving parts to keep track of (Degnegaard, forthcoming). Strategic visualizations enable the involved partners to have an overview of complexity, be able to communicate clearly and engage external stakeholders in the challenge (S. Degnegaard & R. Degnegaard, 2016) without losing themselves in details, internal battles and sub-planning.

The glue of the concept is the practical design constructed as a continuum of iterations allowing researchers and case owners to refine the tools to fit the purpose at hand.

Table 1
Detailed View of the Concept for Creating Multi-stakeholder Business Models

	Phase 0 Decision	Phase 1 Mapping	Phase 2 Analysis	Phase 3 Involvement	Phase 4 Engagement
Tasks	Decision (whether co-creation or not), buy-in, project design, set targets	Field study and data collection, synthesis, design criteria for solution	Reframe challenge and co-creation analysis	Design involvement process, reach out to potential partners, co-create shared perspective	Create platforms for action
Tools	1. Communication kit 2. Decision tree 3. Strategic anchor 4. CC readiness self-assessment 5. CC value anchors 6. CC target and metrics 7. CC project plan 8. CC exit strategy	1. Field study analysis 2. Empathy building 3. Data collection 4. Synthesis workshop 5. Strategic visualization 6. Design criteria	Co-creation analysis tools: 1. Reframing 2. Envisioning 3. Stakeholder value potential analysis 4. Idea stretching 5. Value/impact grid 6. Co-creation platform 7. Think big - start small	1. Involvement template 2. Strategic visualization	1. Kick off material 2. Organizational structures 3. Project plan 4. CC target and metrics 5. Impact evaluation

¹ The law of the instrument is the perception that is you hold a hammer then the problem most likely looks like a nail.

Introduction to the Case

This study investigates the usage and application of the business model design concept for guest service in the municipality of Copenhagen. In January 2015, the municipality was - from a commercial foundation - handed over the responsibility of driving and developing guest service, also known as tourist information, throughout the city. However, it became clear that the commercial business model on which it originally had been build - selling advertising products from a physical location in the city - was eroding. The reason for this was many-fold, as shown in Table 2 below.

Table 2

Trends That Affect Guest Service

Global trends	Disrupting trends within tourism	Local trends in guest service in Copenhagen
Digitalization in all age groups - leading to diminished need for physical encounters	Increasing numbers of "silent travelers" (not in contact w. tourist information)	Less visitors - Decreased numbers of visitors in the tourist information (despite more visitors overall)
Trust building through social media - meaning less need for personal guidance (e.g., in a tourist office)	Authenticity - Guests want authentic experiences - not predesigned packages for the masses	Less sale to partners - Decreasing revenue from sale of advertising packages since tourism actors are seeking more unique channels to communicate authentically
From passive consumers to active co-creators (e.g., less and less tourists choose the "follow-the-umbrella"-packages)	Explores - A growing number of travelers don't see themselves as "tourists" anymore - rather as explores	Less sale to tourists - Provision of sale of tickets will disappear when digitalized in a few years/months
Shared economy and shared responsibility - (digital) platforms offer a place to operate diminishing the role of the mediator/broker/guide, etc.	SoMe - Social media dominance provides real-time trending places/events and introduces an unseen pace - it becomes hard to "keep up" with the tourists' wishes	Higher expectations - New expectations to a guest service to be on the forefront: expectation of sharing the "whole" city - including small and trending events

Both global trends, changes within the tourist industry and local trends impacted the current business model, making it unable to sustain. But the problem was this: Even though the responsible in the municipality's civil service specialists were able to formulate what they wished for - a business model setup in which many actors would share the responsibility of delivering guest service on many platforms to the visitors of Copenhagen, they did not know how to make that happen. The politicians referred to the business community as expected sponsor of the future guest service activities, since they are the ones who gain from the tourists, however leading tourism actors had made it clear that business was thriving and they saw no need for exceeded funding, since they were already buying advertising packages in the tourist information. Furthermore, there were no incentives or interest to fund a new guest service setup that also would benefit non-commercial or smaller actors that could not pay.

According to Aravni Elisabeth Jacobsen, Head of Division, Culture and Leisure, City of Copenhagen:

Our business model is built on a commercial set up. As a partner, you buy an exhibition package in the tourist information. Whoever buys, gets exposure. But as a public player we need to show and unfold the city as a whole. Also non-commercial partners are important here. And this we cannot do on our own. We have to create a holistic experience that is delivered hand in hand by both public and private partners.

With this wicked problem as backdrop, the researcher used the multi-stakeholder business model design concept to replace the existing business model with a new sustainable one, designed to fit the current and emerging reality. And after approximately one year of going through the steps: thoroughly mapping the challenge, analyzing the co-creation potential and evaluating potential co-creation partners, involving potential partners and finally engaging relevant partners on platforms for collaboration, the high level overview of the machinery in the new business model looked like this, as shown in Figure 3.

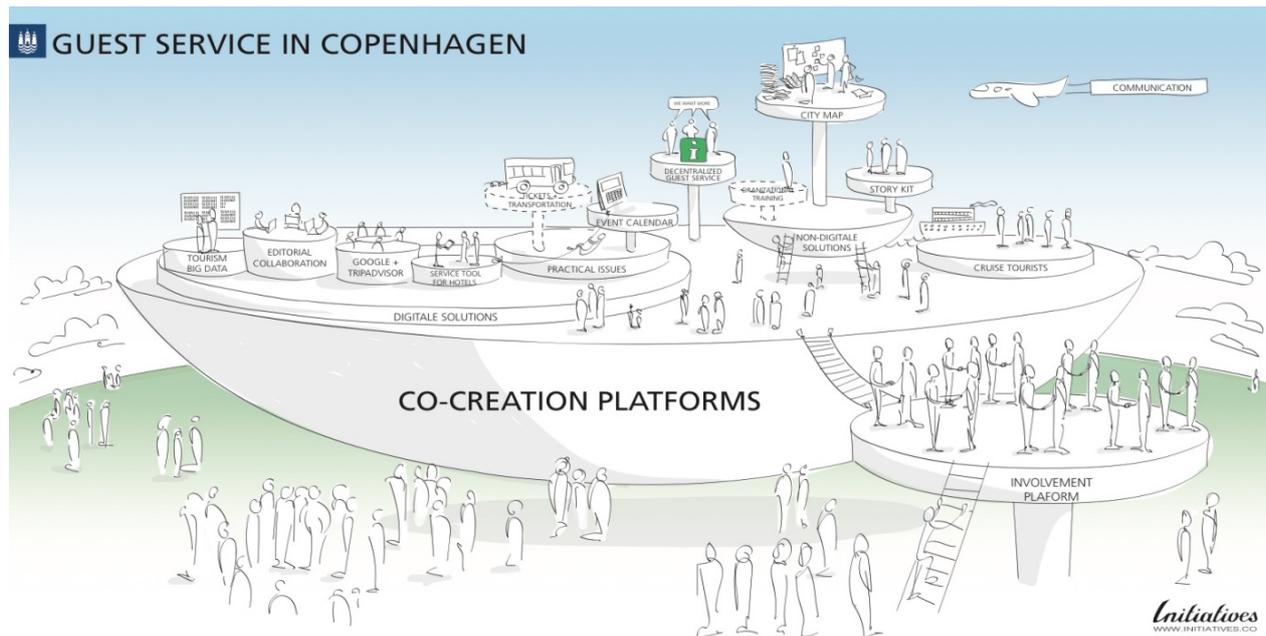


Figure 3. Multi-stakeholder business model for guest service in Copenhagen.

A Wicked Problem is a Design Problem

The character of the problem was that of a wicked one, being “ill-formulated, where the information is confusing, where there are many clients and decision makers with conflicting values, and where the ramifications in the whole system are thoroughly confusing” (Buchanan, 1992, p. 15).

One part of the problem was the backdrop: that neither the perspectives of the many actors nor the background for the problem were not fully understood and formulated. As shown in Table 2, the problems were all symptoms of higher level problems, which, in this study, were explained from a certain point of view linked to tourism. The problem undoubtedly entails several other possible explanations, leaving the problem formulation unstoppable on one hand and corresponding with formulation of a solution on the other hand.

The other part of the problem was how the solution scope should be designed (see Figure 3). The problem seemed to contain an infinite potential of solutions with an infinite number of possible activities, none of which could be tested prior to execution. No solution could be right or wrong - only appropriate or less appropriate. The wicked problem was in other words a design problem - only approachable through a solution design.

A Complex Solution Design

The business model design is thus a complex solution design that offers a structured and focused approach to handle the wicked design problem at hand. It encompasses design thinking tools for mapping the wicked backdrop of the problem and for narrowing the infinite possible solution scope through design criteria for solutions. It entails co-creation methods that accommodate the dynamic value potential of the actors and strategic visualization that help create overview of the subject matter, communicate it and create engagement around it. And it provides a way of working simultaneously on three levels of engagement that the overarching study has found to be essential in order to succeed: The inter-societal level - connecting the effort to a societal agenda, the inter-organizational level - connecting external actors around the effort, and an inter-personal level - connecting as human beings as traditional incentive structures no longer are at play (Degnegaard, forthcoming).

DSR Framework

To illustrate what kind of knowledge contribution this study provides, the DSR knowledge contribution framework (see Figure 4 below) presented in Shirley Gregor and Alan R. Hevner's article *Positioning and Presenting Design Science Research for Maximum Impact* (Gregor & Hevner, 2013) will be used to clarify the class of problem at hand.

The DSR knowledge contribution framework has been developed to help design science researchers frame their research in order to clarify how DSR contributes and "relates to human knowledge" (Gregor & Hevner, 2013, p. 338). DSR, with its close inductive knitting between application and research, is a young research paradigm where "authors, reviewers and editors struggle to present and interpret DSR work" (Gregor & Hevner, 2013, p. 338) and where academic recognition of DSR as a legitimate research field is fairly recent.

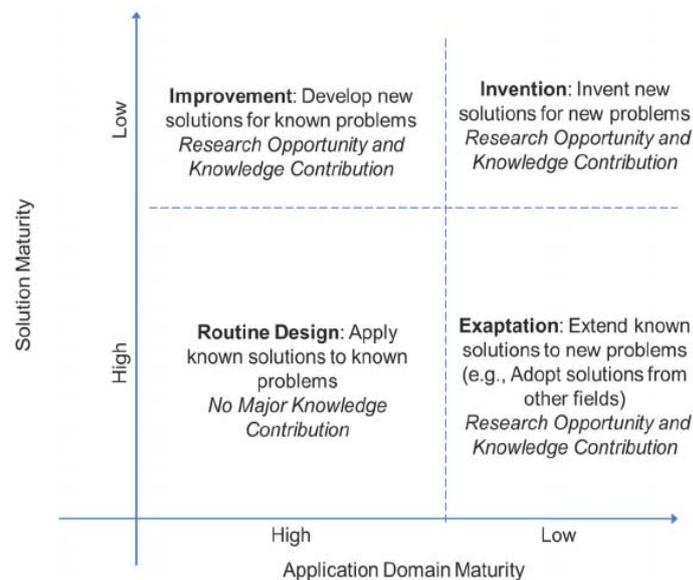


Figure 4. DSR knowledge contribution framework (Gregor & Hevner, 2013).

The x-axis shows the application domain maturity, i.e., how mature or known the problem is. The y-axis shows the solution maturity, i.e., how mature or known the solution is. Knowledge in the invention quadrant typically flows "from prescriptive to descriptive" as Gregor and Hevner (2013, p. 346) pointed out. The artifact, being physical object or a model is invented and since an object for other researchers investigate and describe it - however, in this current case and until now, by the same researcher. In this quadrant, both problem and solution are new, and maybe even "the idea of the artifact itself is new" (Gregor & Hevner, 2013, p. 346). Knowledge contributions in this quadrant are rare. Most knowledge contributions of DSR will be found in the Improvement or Exaptation quadrant.

In the improvement quadrant, knowledge contributions aim to create "better solutions in the form of more efficient and effective products, processes, services, technologies, or ideas". Here, the researchers must apply an innovative artifact or concept to a known problem in order to investigate the improvement. In the Exaptation quadrant, the researchers' knowledge contribution is the application of a known solution to a new problem field. The solution and knowledge about it are thereby extended and tested within a new problem field.

Discussion

The business landscape, for both private, public, and third sector players, is ever changing, which requires consecutive adaption. Therefore, if we look at the problem as a relatively linear replacement of a business model A with a business model B, the problem field is the realm of strategizing for competitive advantage and thus known and mature. However, as described, the generation of challenge focused business models is young (S. Degnegaard & R. Degnegaard, 2016) and the pace with which change is happening is unseen (Huy & Mintzberg, 2003). This means that leaders and managers are faced with a new form of problem field in which they see their traditional managerial technologies and concepts fall short (Degnegaard, forthcoming). And since wicked problems per definition always are unique in their contextual composition (Rittel & Webber, 1973, p. 164), we can conclude that we are at “low” on maturity axe.

Many of the parts in the concept for designing multi-stakeholder business models are known (see Table 1) - borrowed or further developed from other methodologies such as change management, co-creation, and design thinking. Other parts are new constructions, for example, stakeholder value potential analysis, co-creation readiness self-assessment, and involvement template, which have been constructed specifically to meet needs in this or previous research cases. The new methods have since been tested, iterated, and conceptualized to meet general needs when designing multi-stakeholder business models. The methods work as tested, grounded rules (reference) to create the best possible preconditions for the activities in each phase of the process.

Despite known elements in the machinery of the concept, a visual process tool to support and guide the design and deployment of a multi-stakeholder business model is to the researcher’s knowledge unseen. It can therefore be argued that the application domain maturity is “low”.

Conclusion

Concluding that the solution domain maturity is low and the application domain maturity both are in the “low” category, the knowledge contribution of this DSR study is framed within the upper right quadrant: Invention: New solutions for new problems. According to Gregor and Hevner (2013, p. 345), the inventions process “can be described as an exploratory search over a complex problem space that requires cognitive skills of curiosity, imagination, creativity, insight, and knowledge of multiple realms of inquiry to find a feasible solution”. This research can be seen as DSR if the artifact, concept, or model can be applied and evaluated in the real world. The knowledge contribution from an invention will typically be of instantiation level (Gregor & Hevner, 2013) but can later on generate descriptive knowledge about its use in practice.

The knowledge contribution is an invention in the sense that the concept for designing multi-stakeholder business models is a new solution design, both in form and content, and that the wicked problem per se is new. But moreover, it is exactly in the juxtaposition of the two domains that the actual invention lies - that a concept of designing multi-stakeholder business models may be used as the solution design for otherwise untamable, wicked problems.

Relevance to Real-Life Practice

The multi-stakeholder business model described and tested in this study has been developed over the course of the last three years on various research cases, from crime prevention in vulnerable neighborhoods and

cybercrime², over conversion to green energy (S. Degnegaard & R. Degnegaard, 2016) to, in this case, designing a multi-stakeholder business model for guest service in the capital of Denmark. These cases cover both challenges as actual societal problems to challenges as untapped potential and possibilities for the society. The concept transcends in other words problem fields, sectors, and types of actors, be that public, private, or third sector.

Relevance to Academia

The knowledge contribution to academia entails several perspectives. From the perspective of wicked problems, which, according to Richard Buchanan (1992, p. 16), “has remained only as a description of the social reality of designing rather than the beginning of a well-grounded theory of design”. Through this contribution of a complex solution design to tackle wicked problems, researchers can take a deeper dive into understanding wicked problems as design problems.

From a co-creation perspective, the concept can expand the idea of shared value as something that happens primarily through co-creation of products, services, events, and experiences to co-creation of shared value on a societal level - a solution design for systems level challenges, something that academia so far only has touched lightly (Degnegaard, 2014).

From a DSR perspective, the concept for designing multi-stakeholder business models offers a genuine proposal of what Joan van Aken suggests as design knowledge like a guide book for tourists: “Such a book contains a lot of tested solutions, [...] but travellers are still ‘agents’ trying to satisfy their preferences in the design of their journey, and they still have to react to the many surprises that occur enroute” (Huff et al., 2006, p. 417). David Tranfield supplements him by saying: “Such a guide book is based on a lot of field research but iscontinually tested and updated by its readers” (Huff et al., 2006, p. 417). In other words, design knowledge contributions should both strive for relevance, rigor and tested artefacts on one hand while on the other hand should be living knowledge contributions: adaptive, ever changing and responsive to new research in the field.

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