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Collaboration by design – on the use of value modeling in social innovation projects

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Abstract

Nowadays, many innovation projects are based on the collaboration of multiple parties to co-create value. Unfortunately, the collaboration is not always without problems, not the least when financial and legal concerns come into the picture. Value modeling approaches such as e3-value have proven to be useful in the collaborative design of new value networks, but they are limited by their focus on the exchange of value rather than co-creation. In this paper, an extension to e3-value in the form of "value encounters" is introduced and applied to the problem of how to support open innovation projects. Value encounters are defined as interaction spaces where a group of actors meet and derive value by each one bringing in some of its own resources. Value encounter models can be adopted by innovation groups for the collective unfolding and reflexive understanding of their own innovation process in all its phases, including the newly envisioned practices that adopt the technology. Each phase is a value encounter in its own, and translation is required when moving from one to another. In addition, the value model is a basis for developing and selecting adequate communication structures for each phase. The paper describes the main components of an innovation support method based on value encounter modeling and its application in a running Social Innovation project around contract design.

Keywords: value modeling, Language/Action Perspective, social innovation, practice research

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1 Introduction

Social innovation is about "the relationship networks and collaboration processes around new ideas that meet unmet needs" (Murray et al, 2010). Its goal is to improve societies' capacities to solve its problems. Mulgan gives a comprehensive overview of what social innovation entails: according to Connected Difference Theory, social innovation concerns (1) new combinations or hybrids of existing elements; (2) cutting across organizational, sectoral or disciplinary boundaries, (3) creating compelling new social relationships. To realize such innovations, they go through different stages: from the generation of ideas through prototyping and piloting, to scaling up and learning (Mulgan, 2007). In social innovation, a critical role is played by the 'con-

nectors' – the brokers, entrepreneurs and institutions that link together people, ideas, money and power – who contribute as much to lasting change as thinkers, creators, designers, activists and community groups. In the rest of this paper, we will use the term "innovation" as shorthand for "social innovation, but the results apply to any kind of innovation that involves multiple organizational stakeholders (e.g. open innovation – Chesbrough, 2003).

The business literature proudly presents examples of successful social innovation projects, but it is also true that many fail and end up with disappointing results for some or all of the the contributors. Open innovation projects can be unsuccessful for several reasons. Vanhaverbeeke et al (2008) argue that the benefits of the extended flexibility, so characteristic of open and also social innovation, do not materialize automatically. Flexibility does also mean uncertainty, which can easily lead to defensive behavior and lack of trust and turn the project failure into a self-fulfilling prophecy. Uncertainty also increases in multidisciplinary teams when knowledge transfer creates semantic problems (Swan et al, 2007). Chesbrough gives several case studies of successes, but also failures in open innovation. For instance, GO, a start-up software company that aimed at collaboration with Microsoft, but was too open and unable to protect itself when Microsoft went away with the knowledge and started its own product line. One could say this is a legal patent problem, but the question is whether a patent would have helped. According to Chesbrough, "while small companies should obtain as much protection as they can afford, there is no substitute for a good business model to protect IP" (Chesbrough, 2006:41).

In addition to the economic-political intricacies, innovations may fail for social reasons. Innovation is more than invention. Drawing on the Language/Action Perspective and the pioneering work of Drucker, an innovation is defined by Denning & Dunham (2006) as happening when a group or community has adopted a new practice. *Practice* includes habits, routines and other forms of embodied recurrent actions that as such resist radical change. According to (Hillgren et al, 2011), mutual trust relationships are critical to achieve social change, and social innovation projects easily fail if they are not based on long-term commitments.

Our research objective is not empirical – to analyze the innovation failures and successes –, but a design question: to develop and evaluate IS tools that increase the chance of success. Our solution approach starts with the recognition that a social innovation project can be considered as a design process on two levels. First, there is the obvious design of a new artifact and/or practice. Second, at the same time, the participants design their own collaboration. This collaboration includes at least an IP strategy and a profit distribution model. Design is often an iterative process of representation and reflection in some context (Goldschmidt, 1991; Weigand, 2010; see Fig. 1), and hence can profit from adequate modeling support. Hence, our more specific research objective for this paper is to develop modeling support for innovation projects. We focus on the second design level, assuming that for the first level – design of an artifact – there are already plenty domain-specific modeling tools available (e.g. IS analysis and design methods in the case of IT artifacts). However, the second design level is still poorly supported, although it is often the most difficult and risky part. Innovators tend to focus on the idea and see the collaboration as secondary. Or, when they are concerned about it, they don't see it as a collaborative design effort but as something to be determined (and fought for) by legal advisors. These are not productive strategies. There may be several reasons for this behavior, but according to a

preliminary investigation that we had with experience experts, lack of appropriate tools is one of them.

The background of this paper is a Social Innovation project that aims at developing a tool for Innovative Contract Design. The approach described in this paper has been used as input for the initial development of an online "innovation platform" that has been further developed in collaboration with future users during a Living Lab phase.

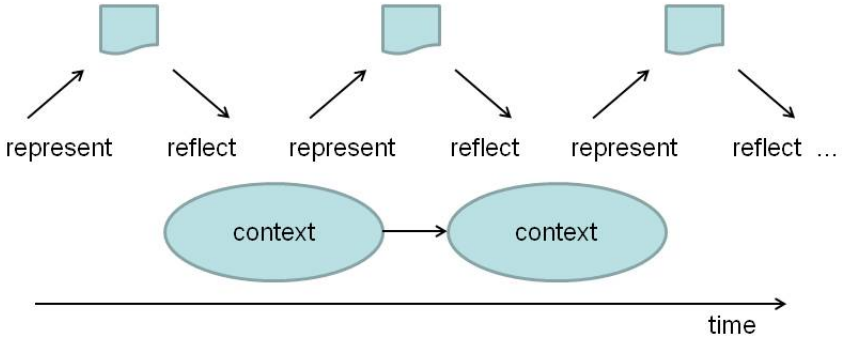

Figure 1: The role of representation in an iterative design process.

The structure of the paper is as follows. As innovation is about changing practices, Section 2 provides relevant background in the innovation and practice research literature. Section 3 recaptures the e3-value theory and the value encounter modeling approach. In section 4 and 5, we develop modeling support for innovation on two levels: the value level, using value encounters, and the communicative level, using collaboration patterns. The modeling support is still under construction, but as an illustration and preliminary evaluation, the approach is applied in section 6 to the Innovative Contract Design project itself. We end up with some conclusions.

2 Practice research and innovation

According to Denning & Dunham (2006), innovation is about changing practices. The change requires other practices itself. The framework proposed by Denning contains seven practices of innovation: sensing possibilities, envisioning new realities, offering new outcomes, executing plans and actions, adopting new practices, sustaining integration, leading and, as a cross-cutting concern, attending to somatics. Each has a particular structure of conversations and actions. In this section, we provide a brief overview of practice research and other relevant social science research on innovation, in particular Actor-Network Theory.

One of the key publications to introduce the use of the 'practice lens' for the study of technologies in the IS domain has been Orlikowski (2000), which draws on Giddens' structuration theory to propose the use of "… a practice lens to examine how people, as they interact with a technology in their ongoing practices, enact structures which shape their emergent and situated use of that technology. Viewing the use of technology as a process of enactment enables a deeper understanding of the constitutive role of social practices in the ongoing use and change of technologies in the workplace" (Orlikowski, 2000: 404). For Giddens, the appropriate unit of study in the social sciences is neither the experience or action of the individual actor, nor the ex-

istence of any form of social totality, but the intermediate category of social practices across space and time (Giddens, 1984:2). Simple examples are "greeting", "cooking" or "business meeting". These practices contain several actions, of multiple actors, but these actions, like "tapping water", typically derive their meaning from the overall practice rather than the other way round. This is one point on which practice theories differ from individualist theories that relate the identity of particular actions to the intentions of the actors performing them. A second feature of the practice is that it only exists in its actual (repeated) performance. Bourdieu and Giddens differ somewhat in their further description of a practice. For Bourdieu, practices are carried out in a specific domain or *field*, and produced by dispositions (*habitus*). These dispositions assume a *practical logic* that categorizes objects in the environment based on related actions (as in the pragmatist tradition). Furthermore, Bourdieu argues that practice generally follows the logic of maximization of *capital*, where capital is taken in a broad sense, not only economic. For both Bourdieu and Giddens, structures are the "medium and result" of practices (Giddens, 1984:25). For Giddens, the emerging structure that organizes practices is composed of *rules* and *resources*. Rules should not be read here as explicit formulations, but as "ways of going on". Resources are, by definition, the medium through which social power is exercised, that is, "the capacity to bring about changes when doing so depends on the actions of others" (Giddens, 1979:93).

Both Giddens and Bourdieu contest the adequacy of representationalism; in that respect, they concur with philosophies like pragmatism and Heideggerian phenomenology and IS approaches such as the Language/Action Perspective (Winograd & Flores, 1996). A key feature of Giddens is that the knowledgeability of human agents is always bounded (Jones & Karsten, 2008). This underlines the usefulness of IS tools and methods that help actors to increase their self-knowledge, without pretending to be objectively complete. Still, according to Schatzki (1997), both thinkers tend to over-intellectualize practices. To remedy this weakness, Schatzki proposes to let the behavior of agents depend on *practical understanding* (based on sign exchange), explicit *normative rules* (that certainly do not determine all behavior, but do play a role) and what he calls *teleo-affectivity*, which is about emotions and attitudes (not seen as autonomous attributes of the agents as such, but as relations to objects in the environment, e.g. a person that annoys me).

For IS research, the practice lens is relevant in two ways (cf. Jones & Karsten, 2008). First, because it allows "deeper understanding of the constitutive role of social practices in the ongoing use and change of technologies in the workplace", as Orlikowski put it. For our present study, this means that supporting innovation projects should not only focus on the development of an artifact (e.g. a software tool), but also on its potential use. And not only its use in isolation, but also on its use as part of a social practice that gives meaning to this particular usage, e.g. a joint-venture that offers a new service. And not only on its use within a practice, but also on the social practice that enables the transfer and adoption of the artifact, e.g. a research project between university and industry (for a practice perspective on the transfer of knowledge see Swan et al, 2007). This is the first application of the practice lens. In addition, and going beyond Orlikowski, IS research should be interested in the role of technology in social practice and social practice evolution. In particular, what is the specific role of information and representation within practices, and what is the supportive role of IS technology in that respect? We see openings for this second re-

search interest in Schatzki's notions of *signs* and *rules*, but also by complementing the practice lens with Latour's Actor-Network-Theory (ANT).

ANT proposes a socio-technical account of innovation. Actants (human or non-human) become strong and credible by *networking*, i.e., connecting to other actants. These networks exist on various levels. The solidity results from a structure where each point mediates between two networks, "one that it simplifies and another that simplifies it" (Callon, 1987:97; Tatnall & Gilding, 1999). As far as innovation is concerned, ANT differs from diffusion approaches like (Rogers, 1995) by insisting on the fact that artifacts are not just disseminated unaltered, but in each step are *translated*, on the basis of the interests of the mediating actor or network in question. Relating this to Denning's chain of innovation practices, we can say that each of these practices must serve the interests of the actors involved at that moment, that is, ensure that the benefits (as realized or as expected) increase the costs.

In most theories, innovation is seen as disruptive. Alternatively, the notion of performativity (Feldman, 2000) claims that innovations in practices should not be seem as something special, as they happen continuously because actors continuously evaluate and try to optimize their performance by introducing variations. These two views are not necessarily incompatible. It suggests an approach of translation where the receiving network is not viewed as a passive target to be acted upon, but as partner. Translation is a co-creation.

In conclusion, we can say that practice research is a useful background theory when developing innovation support and helps to better position the modeling methods and tools.

3 Value Encounter modeling and analysis

When the goal is to develop modeling support for innovation processes, a good starting-point is the value modeling approach e3-value that has been used for modeling collaborative business networks for quite some time. In this section, we review e3-value as well as some relevant extensions that have been proposed recently. In section 3.5 value modeling is confronted with practice research, leading to a new positioning of this method.

3.1 Value modeling

There exist a number of approaches, languages, and ontologies for business modeling (Andersson et al, 2006). One of these is e3-value (Gordijn & Akkermans, 2000) that focuses on value exchanges in value networks. e3-value is partly included in the business canvas method of (Osterwalder & Pigneur, 2010)

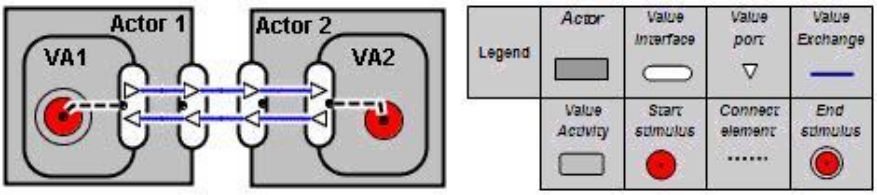

Figure 2: Basic e3-value modeling.

The *e3-value value ontology* aims at identifying exchanges of resources between actors in a business case. It also supports profitability analyses of business cases. The ontology was designed to contain a minimal set of concepts and relations to make it easy to grasp for its intended users. e3-value includes a graphical notation for business models. The basic concepts in e3-value are actors, resources, value ports, value interfaces, value activities and value transfers (see Fig. 2).

An *actor* is an economically independent entity. An actor is often, but not necessarily, a legal entity, such as an enterprise or end-consumer or even a software agent. A set of actors can be grouped into a market segment. A resource (also called *value object*) is something that is of economic value for at least one actor, e.g. a car, Internet access, or a stream of music. A *value port* is used by an actor to provide or receive resources to or from other actors. A value port has a direction: in (e.g., receive goods) or out (e.g., make a payment), indicating whether a resource flows in to or out from the actor. A *value interface* consists of in and out ports that belong to the same actor. Value interfaces are used to model economic reciprocity and bundling. A *value exchange* represents one or more potential trades of resources between these value ports. A *value activity* is an operation that can be carried out in an economically profitable way for at least one actor. The *e3-value value ontology* aims at identifying exchanges of resources between actors in a business case. It also supports profitability analyses of business cases. The ontology was designed to contain a minimal set of concepts and relations to make it easy to grasp for its intended users. e3-value includes a graphical notation for business models. The basic concepts in e3-value are actors, resources, value ports, value interfaces, value activities and value transfers (see Fig. 2).

According to Allee's approach to value network modeling (Allee, 2002), a distinction must be made between tangible and intangible exchanges of resources. Tangible exchanges are established and explicitly regulated in contracts. They correspond to exchanges of economic resources in e3-value. Intangible exchanges such as knowledge are established informally and their terms are not present in contracts, but according to Allee they are as important. Allee's approach can complement standard e3-value, but must be made a bit more precise. A distinction must be made between intangible exchanges, and intangible resources. In the former case, we are talking about exchanges that are not regulated in the contract. That does not mean that what is exchanged is intangible. In fact, in our view, exchanged resources are always tangible, even if the exchange is (using Denning's term) somatic. Intangible resources such as knowledge can be affected by (tangible) exchanged resources such as a presentation, an forum discussion or site visits.

3.2 Value Encounter Modeling

Although e3-value has been useful for modeling new business networks, its focus on value *transfers* makes it less appropriate for exploring value *co-creation* (Prahalad & Krishnan, 2008). Innovation collaborations often involve more than two actors. Although an e3-value analysis helps to clarify the value that each actor draws from other parties in terms of value that they receive, the model does not identify the value that the stakeholders draw from the collaboration as such. The same is true for the resources that they bring in. The e3-value model breaks up the collaboration into bilateral value exchanges. This approach is fitting from a purely economic perspective, as contracts are most often made between two parties, but it can obstruct a holistic un-

derstanding of the collaboration and the value that is created in the collaboration. To address these shortcomings, the notion of value encounter modeling has been proposed in (Weigand, 2009a).

When addressing a certain value network, value encounter modeling postpones the question of who is exchanging value to whom, but focuses on the value creation first. A value encounter is an interaction space between multiple actors where each actor brings in certain resources; these resources are combined then in such a way that value is created to all of them. Value encounters can be connected to each other, when an activity in one encounter reinforces the activity in another encounter. The value encounters and their relationships form a complex adaptive system. We use the same e3-value tool to model value encounters; value encounters are depicted like actors, but with dotted lines.

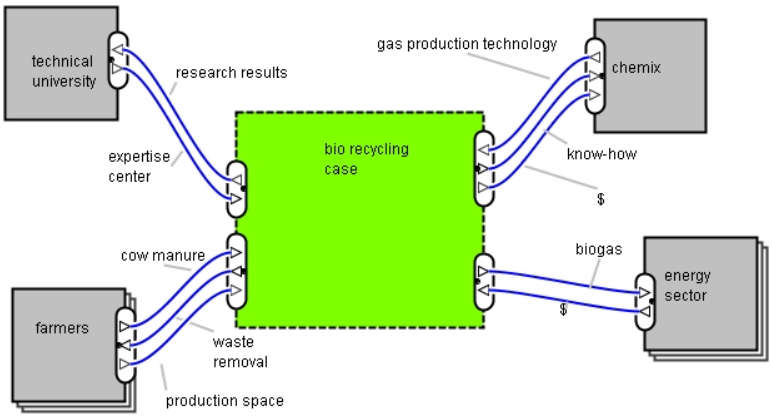

Figure 3: Example initial value encounter model (ecological project).

Fig. 3 is a simple example of an initial value encounter model, depicting a possible ecological innovation project of a university, farmers and industry. The university has ideas for more efficient biogas production. The figure shows what actors bring in, e.g., the chemical company brings production technology and aims to learn new production methods. The farmers can bring in the cow manure and aim to remove their waste against lowest costs. They are willing to provide space in their farm to produce the biogas on site. The situation in this example may be a starting point for discussion: it shows that all parties bring in something and expect something, but how these are related is unclear. Should farmers buy the technology? Who is responsible for the transport? It is also not clear when the contributions and profits are expected (in which stage of the project). According to e3-value, a network must be sustainable by being profitable for all actors. In the value encounter approach, each value encounter must be profitable for all actors involved (cf. Section 2, the contribution of ANT). So value encounter modeling is an iterative process that starts with an initial model that represents what each actor wants to bring in and get out, and ends with a model that includes the links between these value objects, via value activities, in such a way that each actor perceives a positive balance on his value interface. Some more quality objectives can be defined for value encounters, as we will see below, but individual profitability is the most basic.

3.3 Value Encounter Analysis

An initial value encounter model provides a global overview that is a handle for reflection and analysis (Weigand & Jayasinghe Arachchige, 2010). First of all, the value encounter can be analyzed by modeling the value activities in the encounter and how they are linked among each other and to the value exchanges. This analysis shows where input is missing, or expected output is not generated. The value activities do not contain process details, only the main steps (creation of value). By modeling the activities in the encounter, we don't need to decide yet which actor will be responsible for them. At the end of the day, they may be assigned for instance to one of the actors who hires others, or assigned to a new start-up or joint venture.

FINANCIAL - How is the money distributed over the partners? - What is the expected profitability for each actor (short-term, long-term)? - What institutional form is taken to distribute the money?	**OPERATIONAL** - How is the value activity to be characterized (pattern)? - How is the value activity supported (technology)? - What are the goals and metrics? - How is the optimization ensured? - How are responsibilities assigned?
KNOWLEDGE - Is knowledge gained from available data? - Are core competencies systematically maintained? - Is knowledge acquired also explored? - Is there a healthy mix of explicit and implicit knowledge? - Is there an optimal use of standards?	**SOCIAL** - Is the social network actively developed? - Are social networks maintained systematically? - How is the social network explored - Is there a healthy mix of formal and informal contacts? - What is the contribution of the network to social capital of the environment?

Figure 4: The Value Analysis Model (Weigand & Jayasinghe Arachchig, 2010).

Secondly, the value encounter can be analyzed from different perspectives. We distinguish four aspects. Which aspects are most relevant differs from case to case:

- profitability analysis (finance)
- knowledge management
- social network (social capital) management
- operational management

A framework in the form of pertinent questions per aspect is recaptured in Fig. 4. Note that profitability analysis and contract design need to be performed in combination. A value encounter model does not show how the money is distributed exactly, which would be needed for the profitability analysis. This depends on the way the multi-party collaboration is broken up into bilateral contracts. Fairness is an important

quality variable in sustainable value networks that should play an important role in this breaking up.

To support the value encounter analysis, aspectual models, using the same diagram technique, can complement the core value network model, for instance focusing on the knowledge aspect (only modeling the knowledge resources and how they are influenced by exchanges) or the social network (only modeling the actors and adversial or collaborative links between them). These aspectual models are not worked out in this paper.

3.4 Value Context Modeling

Often value creation can only be realized in the right context, for example, a certain governmental regime. The contribution of this regime is like a catalyst in chemical reactions: it does not participate actively, but without it, the reaction would not take place. The relevance of *context* has been recognized in economics before, in particular in the theory of *country-specific resources* (CSRs) and *clusters* (Arnould, 2008). Clusters share many characteristics of networks but are differentiated by co-location and active efficiencies. The notion of value encounter allows us to model a geographical unit or cluster not so much as a resource but as a space in which resources are put on the table in order to co-create value. It makes sense to view innovation as an attempt either to *develop completely new value encounters* (which typically needs a long line of investment) or to *build on and extend* already existing value encounters. In the course of time, these value encounters grow and adapt and as such they represent a long history of economic as well as social investments. Such an approach is not only interesting in view of physical environments but also of virtual environments. For example, a social network site as Facebook facilitates value encounters on which companies can capitalize in order to build new business models (Weigand, 2009b).

Context is relevant on the level of tangible resources, on the level of knowledge and on the level of legitimization and social values. This full context can be modelled in one or more aspectual Value Context diagrams, again to support collaborative reflection. To continue the example of Fig. 3, the relevant legitimization context may be a national or European environmental policy and/or a farmer association in which environmental issues are already on the agenda for some time. The resource context includes the transport infrastructure in the region and the knowledge infrastructure ongoing research projects on biogas.

3.5 Value Modeling and Practice Research

The e3-value modeling approach was not based on practice research, and at first sight, might look incompatible by its use of formal conceptual models and its focus on economic value, rather than emerging structures and everyday social routines. Yet we claim that integration of the two is feasible and in fact beneficial to both.

First, we observe that the value modeling approach to innovation differs from traditional IS design approaches by not focusing on the technical artifact and its functional properties, but on new value configurations that are enabled by the technology. In other words, it assumes that the “technology-in-use” (Orlikowski, 2000) is not something that is only discovered after the more or less successful introduction of the technology, out of the scope of the developers, but as a major object of interest right from the start. The way this usage is described and analyzed goes far beyond the use

case diagrams (UML) as used in traditional IS design. It is fully in line with e3-value to state that the success of an innovation is not in the right functioning of the technology in accomplishing specific tasks, but in the sustainability of a network of new practices that adopt the technology. The focus on the value *network* (rather than on individual agency, as e.g. in the business canvas method of (Osterwalder & Pigneur, 2010) aligns with the ANT perspective.

By definition, the value modeling approach highlights value. Although this term is not commonly used in practice theory, the assumption behind practices is that they are *meaningful* constellations of actors, doings and resources. The meaning that they have for actors stems from their social character, from the fact that at least some actors are beneficiaries that derive value from the performance (within a larger system in which all are beneficiaries at some point). As we have seen, it is central to Bourdieu's view that agents exchange, accumulate and compete for capital that is valued in the field. He is interested in how cultural or symbolic capital are transformed into/exchanged for material capital or vice versa. So value transfer is inherent to practices, and a practice lens may very well profit from a value modeling spectacle. It must be admitted that there is a difference in emphasis. For value modeling, the economic profitability for all actors is essential, the other factors adding to that, e.g. in terms of long-term sustainability; whereas in the sociological accounts of Giddens and Bourdieu, the economic aspect is secondary. However, nothing forbids us to integrate these two aspects.

So value modeling can be seen as a tool to support practice research, but it may also benefit from some of the practice theory insights. For instance, from Giddens' claim that value is contextual and reliant on the social practices within a certain field (cf. Edvardsson et al, 2012). The implicit norms and schemas that determine what is valuable within a certain field change over time in interaction with the actual performances. This recognition can help to better position value modeling. Rather than seeing the value object in a value model as an objective economic reality, the value models should be seen as social constructions that evolve over time, as explicitation of the implicit value schemas. The contextuality is recognized in the use of the *Value Context Model* that relates the value encounter as such with the wider social context. Furthermore, value modeling assumes that actors engage in value exchanges and value activities for economic-rational reasons (although it does not require that the actors are completely aware of these reasons). From practice theory, we can learn that the bulk of actual human performance is highly routinized and embodied and knowledgeabilty is bounded. Although this does not invalidate the value models as such (on the contrary, it stresses its potential usefulness), it should be taken into account when thinking about the creation or change of value activities as practices. In particular, it suggests complementing the value models with communication models that give particular attention to the translation between practices. Communication models are also needed because value modeling abstracts from the way coordination is achieved, and hence from the role of signs and prescriptive rules (Schatzsky). We will return to the communication models in Section 5.

4 The Value Encounter structure of innovation phases

If the purpose of value modeling for innovation projects is first of all the increased self-knowledge, the scope of the model should be the complete innovation project,

not only the business model for the exploitation. In this section, we describe how value encounter modeling can support this comprehensive modeling.

The aim of an innovation project is to develop a new product and/or transform a practice, so somehow the innovators must come to a shared understanding of new practice(s) or the exploitation of the new product (which is also always in the context of a practice). This new practice can be described on several levels. A Value Encounter model addresses the economic level. This can be used as a concise representation of the contributions of each party in terms of the *capabilities* they bring in and the *value* these have for the collaboration, as well as the value extracted from the collaboration for each party. The values are related to the capabilities (or stakeholder resources) on the one hand, and the value activities in the value encounter on the other.

This exploitation model can consist of a single value encounter, as in Fig. 3, but in most cases this is too simple, for more than one reason. First, modern electronic intermediaries such as Facebook and Google typically offer two (or more) levels of service quality to target different consumer segments (Kakihara, 2010), or provide a free service to the large public and a paid service to specific customers. So exploitation is not homogeneous. Different collaboration and profit models run in parallel and should reinforce one another (Chesbrough, 2006). So the primary Value Encounter model will typically consist of several value encounters, and particular attention is to be given to the relationships between them. In the bio recycling example of Fig. 3, one could think of distribution of gas production technology as one value encounter, and a research collaboration between university and industry as supported by an EC grant, as another. Innovation projects should be encouraged to explore these kinds of multi-level strategies.

There is a second reason why a single value encounter is not sufficient. As we have seen, innovation projects go through several stages such as initiation and development. When modeling the initiation phase as a value encounter, in fact the participants involved in the initiation are agreeing reflexively on their desired collaboration process, again, from an economic perspective. For instance, an important concern is who owns the ideas generated in the initiation session, and what are other parties allowed to do with them. But it already starts with delimitation of who is at the table (identification of actors) and their capabilities. Coming back to the example of Fig. 3, parties should split up the model into an initiation value encounter and an exploitation value encounter, and should decide on who is involved where. Another question is whether the parties should see the initiation as investment or whether they are paid for their involvement. Modeling *all* stages, although not necessarily in full detail, can help the stakeholders to keep a global overview of their current situation as well as the issues that will be worked out later. According to experience experts consulted in our project, this will contribute to trust building.

The actors involved in the exploitation are not necessarily the same actors as involved in the initiation. They may be completely different. That gives a particular relevance to the links between the initiation and exploitation value encounter. Basically, there is a flow of ideas (in some tangible form, e.g. a prototype artifact) in one direction and a financial flow and/or knowledge in the reverse direction, but many variations are conceivable.

Besides initiation and exploitation, more value encounters may be distinguished, depending on the domain. In (De Moor, 2013), a Social Innovation Collaboration (SIC) model is presented that is based on practical experience and that distinguishes a

core community, a user network, a developer network and a stakeholder network. The core community corresponds to the initiation encounter; the others somehow contribute to the core, e.g. by generating feedback.

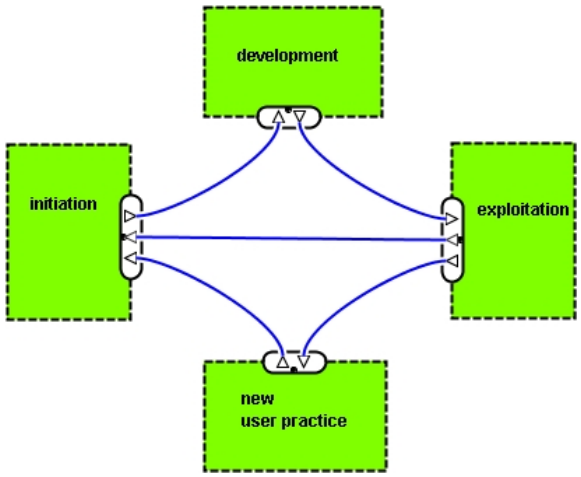

Figure 5: Value Encounter Network template, modeling four important phases. Phases are linked by means of value transfers.

Fig. 5 presents a Value Encounter Network model where four encounters are distinguished. Between initiation and development, there is typically a "requirements document" transfer, whereas "product" or "tool" is something transferred from development to exploitation. The exploitation feeds the new user practice (in our example, the first line of users are the farmers that adopt another way of waste disposal, and a second line of users can be the consumers buying the gas for their eco-cars, for instance); the users here may provide feedback both before and after the introduction of the change. Finally, the link between exploitation and initiation may be a financial one, e.g. in the form of royalties. Following ANT, we assume that in fact each phase is a transformation step that carries the innovation through, if the agents in that phase are successful, or stop it. That there is one final "new user practice" is a simplification; it is more realistic to assume that there is a chain of practices, largely beyond the horizon of the initiators. The link from the user practice back to the initiation is included in order to remind the participants to think about how feedback is going to be used and how a cycle of innovation can be established rather than a single shot.

We claim that it is important to pay attention to the economic aspects of these encounters, and not only on the coordination aspect (or tool support); and not only for the exploitation, as e3-value does, but for *all* encounters. The economic aspect considers both stimulation (how to deliver value to the actors?) and trust management (how to protect value of the actors?). The Value Encounter Model expresses the basic structure of the economic aspect; specific terms are represented as annotations. Currently we only provide a free text format, but we aim to provide the users with a library of "best practice" rules from which they can start.

The Value Encounter Network Model shows linkages between the encounters, but it is not necessarily linear. In the classical linear model, innovation is represented by a pipeline of sequential processes that starts at scientific research and ends with commercial applications. This model has been criticized and a family of *second* gen-

eration models emerged in which more attention was paid to the reversing of information in the linear process chain, starting at the market. Hence, science was replaced by the market as source of innovation. Processes, however, were still largely seen as sequential steps. In the last decade *third* generation models were introduced that are less linear. Still, they often represent some kind of a *chain*, causing science and market to be far away from each other. Berkhout et al (2007) have proposed a fundamental deviation from previous innovation models, replacing the familiar chain architecture by a cyclical architecture: 'the circle of change', that views innovation in the interplay of four areas: science & technology, product development, market and society. Although the details of this model are beyond the scope of this paper, we want to note that the Value Encounter model fully supports a non-linear structure and these four areas have a direct correspondence with the four encounters in Fig. 5 (to be more precise, each value encounter can be seen as embedded in the corresponding area). There is sometimes an intrinsic ordering between (activities within) the value encounters, e.g. implementation follows design, but in principle, all value encounters run in parallel and with their own inherent dynamics.

5 The Communicative Action structure of Value Encounters

Value models focus on the economic aspect and abstracts from implementation details. From a practice theory, this is unsatisfactory, as practices only get real when they are embodied. In this section, we therefore propose to complement the value models with communication pattern modeling, as already promised in section 3.5.

Communicative action is aimed at the *coordination* of activities. To model this aspect, we draw upon the Language/Action Perspective and its basic unit, the communicative workflow loop (Winograd & Flores, 1986). Each communicative workflow loop consists of three stages: initiation, execution, and evaluation. Building on this concept, De Moor (2009) has developed the notion of “collaboration patterns”, and one important subtype, the “communication patterns”. The communication patterns extend the communicative workflow loops by including the supporting tools and tool owners as well. For instance, a wiki tool can support digital communication between developers. The patterns aim to capture lessons learnt about how to make these tool functionalities “actionable”. At the same time, the term “pattern” expresses the routine character of aggregated action performances, a key notion of practice research.

Another useful concept from the Language/Action Perspective is the distinction between success layer, discussion layer and discourse (Van Reijswoud, 1996). The *discussion* or failure layer is typically entered after a breakdown of the success layer, and is aimed at resolving the problem or cancelling the collaboration in question. The *discourse* layer stands for the discussion about fundamental norms and values when the discussion layer fails. However, it is also possible for a group to start at the discourse level in order to anticipate and prevent future breakdowns. This is a good strategy for social innovation projects where trust building is crucial. Note that the three levels contain quite different kinds of conversations, often with different actors involved. Hence it makes sense to assign them to different value encounters. The value encounter of discourse typically combines face-to-face and virtual meetings; as

the aim is to arrive at a shared normative framework, the somatic body language afforded by face-to-face meetings is often indispensable. A "discourse" value encounter within a domain (a professional community) may support several innovation projects simultaneously and over time. The actors in the innovation project, in particular in the initiation encounter, should be stimulated to design discussion and discourse encounters or identify existing encounters that can serve this purpose, so that future breakdowns, which will always occur and should not be avoided at all costs, can be handled constructively. In the biogas example of Fig. 3, it makes sense to think of an advisory board with representatives of the agricultural sector and scientific experts as well as a farmer community. The collaboration pattern for the first one can be based on traditional physical meetings, whereas the second one may consist of a combination of virtual environments (web forum) and physical conferences.

The communicative structure of value encounters is not the same as but closely related to the *social structure*. From a social network point of view, each value encounter is a certain cluster or clique bound together by the communicative ties between the actors (cf. Denning & Yaholkovsky, 2008). These clusters (i.e., the value encounters) are connected, but transferring information from one cluster to another is not trivial as it typically involves a semantic shift, and this is where boundary spanners or (social agents acting as) bridges play an important role – the weak ties. A research question not further pursued in this paper is how social network analysis can complement the communicative design.

Although the communicative structure can be modeled in several ways, the use of speech-act based approaches (LAP) helps to separate the "what" from the "how", on two levels. First, they distinguish the intention of a message, e.g. request, from its expression and medium. Secondly, the initiation and evaluation parts coordinate the execution, which means that from a production point of view, the core of a collaboration pattern is what is achieved in the execution. This distinction provides the possibility to abstract from the coordination and only consider the achievement. In the value encounter approach these achievements are basically the value transfers and value activities. This identification provides the bridge between the value model and the coordination model. Four remarks must be made about the alignment of value and communication level:

- In general, there are many means to achieve a certain goal, that is, many collaboration patterns that coordinate a certain value activity. So a choice has to be made depending on contextual factors and extra-functional considerations.
- The collaboration patterns achieving the value activities constitute a primary process. This process may be complemented with supporting processes, e.g. for planning, that may require their own collaboration patterns. These patterns are indirectly linked to the value level.
- In innovation processes, design plays a central role. The value activities in the first phases are typically design activities, and the value objects created are typically design artifacts (Hevner et al, 2004) that can range from concepts and definitions to fully implemented systems.
- Although there are many possible collaboration patterns, a few invariants should be highlighted. Essential in all cases are the notions of *commitment* and *evaluation*. Executions are based on and legitimized by preceding commitments. In general, it increases trust and effectiveness when commitments are explicitly recorded

and stored. Evaluation has to follow the execution. In an innovation team that brings together different disciplines and perspectives, it is important to agree in advance, not only on that there is an evaluation and who is involved in it, but also on the criteria, even if it is only on a high level. Because of the central importance of commitment and evaluation, we urge the participants to agree on these aspects (for each value activity) even if no collaboration pattern has been adopted yet.

6 Case study: Innovative Contract Design

To illustrate the use of value encounter modeling for social innovation, we apply it here to our own project, the project Innovative Contract Design. The model in Fig. 7 is not only a gross simplification of the real situation, but also just a snapshot, as the innovation group's vision developed over time.

6.1 Value encounter modeling and analysis

At the top, the initiation phase is modeled as a value encounter in which the Social Innovation Lab and the city participate, the latter being a sponsor, together with university staff and a student-assistant. The main value activities have been idea generation (starting with a Blue Sky session), setting up a user group and preparing the Living Lab. For the sake of simplicity, we have only modeled the first value activity. The goal of the Innovative Contract Design project is to develop a tool to support innovation projects, in particular by helping them in the negotiation process preceding the legal contract set up. The support takes the form of modeling (value encounter models, collaboration models), "best practice" patterns and templates, process advice and record keeping.

The project has chosen for a development phase in which future users are actively involved, by means of Living Labs. The Living Lab is supported by a wiki-based prototype, and for the tool development a separate "development" value encounter is distinguished where the developer gets paid on an hourly rate. The Living Lab has a double purpose. On the one hand, its goal is knowledge building, for both the academic parties (constructive feedback on the tool) and the industrial participants (knowledge about innovation management). There is no monetary payment, the idea is that the knowledge development is rewarding in itself for all parties. The second purpose, not included in the figure, for some of the industrial participants is to make use of this session for their own (just started) innovation project. These projects are not included in this picture.

The initial model contains a single exploitation encounter, where the tool (further developed and maintained by an ICT company) is put to use in facilitation sessions. The facilitator offers his professional facilitation service. In other words, the business model is not based on the selling of the ICD tool, but on the accompanying services. The innovation projects supported in this way are assumed to contribute to the economic development of the city. This expectation motivates the city to provide initial financial support, and perhaps a second time in a new cycle.

An alternative to this configuration is that the ICT company is replaced by a community. The community is supposed to develop domain-specific knowledge in innovative contract negotiation using an *open source model*, which means that exploi-

tation parties have a non-exclusive right to use the tool and the knowledge contained in it but not to commercialize it as a product.

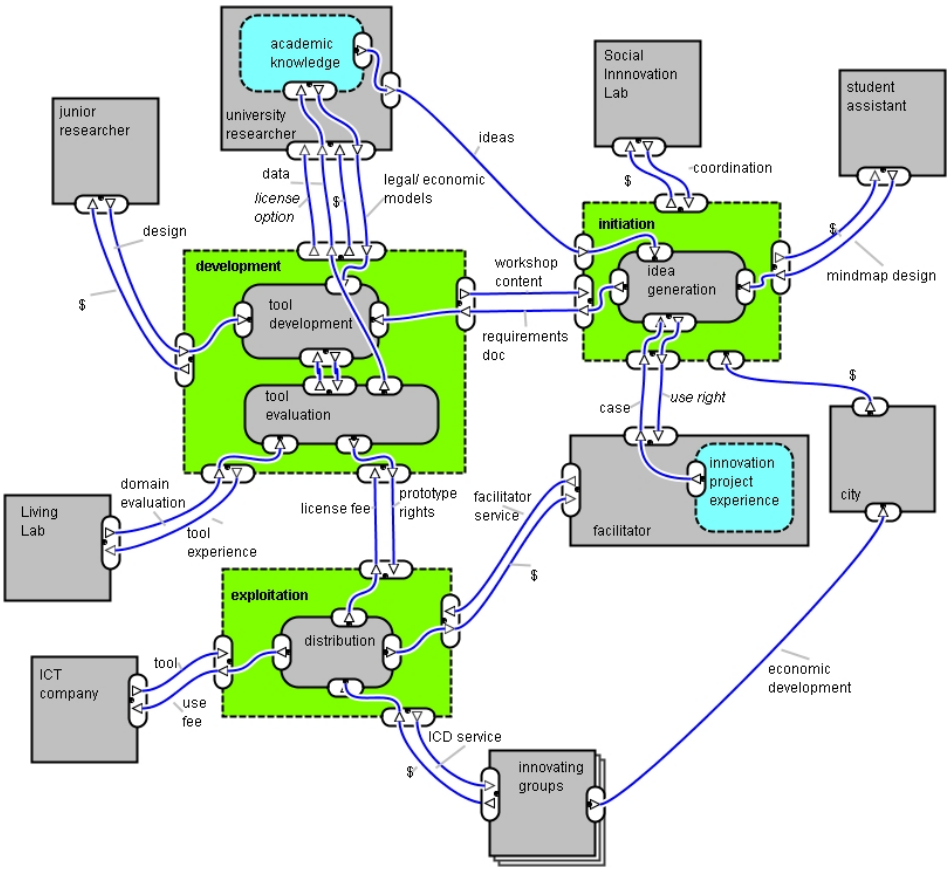

Figure 7: Example Value Encounter Model. The actors are represented as gray solid boxes, the value encounters as green dashed boxes. The rounded dashed boxes are resources.

For some of the actors, the intangible resources are included. For instance, the facilitator brings in his innovation project experience (resource) in the form of a running case (value object) that contributes to the idea generation (value activity). The value model helps to describe the contribution in a more precise way than it usually is in informal speech.

Some of the value objects in the figure need to be defined better, in particular use right and license option (written in italics). The proper treatment of rights (IPR) is a critical element in innovation and a major source of dispute. One of the goals of the ICD tool is to help the users to be more aware of the rights and show them what alternatives exist in dealing with rights in innovation. As a first step, the value model helps to archive the claims that actors make and that are acknowledged by the other parties. This feature is already considered quite useful by practitioners. A second step, not completely worked out yet, is that users can draw on a standardized vocabulary of rights and related terms in denoting value objects. This urges the participants to be specific. A third step is the development of value network templates for distribution

models, e.g. in open source innovation. These templates are modelled using the standardized vocabulary.

A model such as the snapshot example above provides a good overview of the project which helps to build trust among stakeholders. At the same time, reflection reveals some obvious gaps. Analysis of the model helps to identify and address these gaps. For instance, is the prototype free to use, or is the prototype going to the ICT company (in other words, are the prototype and the tool two different artifacts with different rights, or not?) The model also shows inconsistencies. For instance, certain actors expect a monetary reward in the development encounter, but there is no monetary inflow. Although not all issues have to be solved at once, the model helps to put them, or keep them, on the agenda.

The value encounter model also provides a starting point for communication design. For each value encounter and the value activities in it, collaboration patterns can be suggested based on a matching between the encounter properties and the pattern application conditions. In turn, the collaboration patterns suggest communication tools that can be applied, e.g. a shared wiki for tool development and mind-mapping tools for the idea generation. In addition, a communicative analysis can be made of the whole network. One question here is whether there should be an encounter to support the discussion layer. How will disputes be resolved? Furthermore, it seems good to introduce a community encounter with a discourse function, and the question can be raised when this community should start or get involved. This question is related to the point of context: the model so far suggests that the innovation is introduced in a vacuum; it does not identify contexts on which it builds. It is worthwhile to prompt the innovation group to identify these contexts and think about how they can contribute to the innovation process (at which encounter and by what kind of communication). Examples of context are “the scientific world” and the “regional economy”.

6.2 Reflections

If the illustration has shown us something, it is that the value encounter model can quickly get complicated. Innovation projects *are* complicated – that is why the models are needed. This complexity can be mitigated by abstraction and aggregation. On the basis of our first experiences we suggest to have one global Value Network model that only contains value encounters and actors, and a couple of Value Encounter models in which the value transfers and value activities are modeled in detail, per encounter. These core models can be further complemented by other models, as described in section 4 and 5, on a per need basis, as innovation projects are all different. Aggregation can also be put to use by taking the graphical models as summaries only, and using other formats, such as tables, for the details. For instance, a table that zooms in on value transfers. It contains a column for the resource that the provider draw on, the value object itself, the co-creation activity in which this value object is used, and the resources in the value encounter affected by that activity. Furthermore, each of these can be typed. The value object can be further specified by means of quality attributes. It is not feasible to put all these details in the graphical model.

Although the models can get complicated, our experience so far confirms their conceptual relevance. Value models complement the well-known project management tools such as time charts. The model does not only allow to *represent* the innovation project in terms of value but, because of its modeling rules (e.g., each encounter must be profitable) and analysis questions, also stimulates the *reflection*. The graphical

format, even if it is only as a summary, makes it accessible to all participants and fosters collaborative work.

A lesson that we learned so far is that participants like to see examples or templates that show them alternatives that they can choose from. It is not necessary to start from a template, but after a first round in which the participants have expressed their initial ideas, choices have to be made, for instance, on the profit distribution model (open source? joint-venture?). Rather than reinventing the wheel participants like to relate to a "best practice", even if they don't follow it strictly.

When supporting innovation groups by means of modeling tools, we should distinguish the support *of* meetings and the support *for* (or between) meetings. The facilitator should plan in advance the models he would like to develop in the meeting, and prepare them properly. The facilitator is responsible for managing the models and the modeling process. For that reason, the ICD tool is planned to have two interfaces: one for the group itself and one for the facilitator.

A second lesson that we learned from the Living Lab underlines the importance of preparation. Innovation groups differ enormously in how far they are in their collaboration. The ICD tool is only useful when it helps the group to make a next step from where they are at that moment. Hence, the facilitator should prepare the meeting by means of interviews and by modeling the current stage in advance. In the group meeting, this model can be validated first – do the participants recognize it as their situation? – and then be taken as a starting point for a next step.

7 Conclusion

Social innovation has a great potential for helping society address its problems. Currently, IT support for innovation is limited and fragmented. In this paper, a combination of value encounter modeling and collaboration patterns based on communicative action is proposed as a core component of an integrated tool set that is currently under development. Modeling, or sketching, is a proven method in design. However, the modeling tools described in this paper do not consider the innovation itself (the idea, the product) but the practices of developing the innovation and the practices in which they will be used. As such, it does not aim to achieve a better understanding of the innovative idea, for which traditional modeling approaches can be used (e.g. an architectural blueprint in the construction world, or system design models in the IS field), but a better self-understanding of the innovation group and its own collaboration processes. Although the development of business models is far from new in the innovation field, we claim that our method is the first that covers the whole process, from initiation to exploitation, from both a communication and a value creation point of view. The method draws upon several existing modeling techniques in both domains, but uses them (for the first time, as far as we know) in an integrated way. Our method draws on e3-value but extends it in some critical ways:

- e3-value does not talk explicitly about value creation but assumes that value is created in the economic exchange (as in neo-classical economics). In our approach, value is created in co-creation, when actors put their resources together to create something new and/or achieve economies of scope. In the latter perspective, a traditional market exchange is a special kind of value encounter (yes, actors

bring in resources), a successful kind so far in our economy but also very limited by its narrow focus on ownership transfer.

- e3-value focuses on the business model: the sustainability of the value network to be developed. It is possible to project a couple of periods, with different parameters e.g. for sales, but these are all part of the same exploitation. In our approach, there is not one value network but a chain or perhaps cycle of them, as innovation goes through various phases (translations, in terms of ANT). This has important consequences. Sustainability is still relevant but should be addressed holistically, taking the whole chain into account. Moreover, as innovation projects are open-ended and we can only know or foresee part of the chain, the economic viability gets an element of uncertainty in it (as in real-option analysis versus classical Net Present Value calculations). Because of that uncertainty, the sustainability analysis should not only look at economic viability but also at the *potential* of a certain scenario to foster future innovations, e.g. in terms of strategic knowledge resources or in terms of network strength. This openness to the future is missing in the traditional concept of sustainability. Yet we claim that it is critical for success that each phase (encounter) is considered profitable at that moment. Innovation management must provide a solution to this tension. Value modeling can contribute by introducing "options" (as in real-option theory) as value objects, corresponding to what the participants expect to gain in the future. This is still to be worked out.

The modeling approach introduced in this paper is currently applied in a Social Innovation project in the Netherlands. The ICD tool will be developed further on the basis of the Living Lab results, in cooperation with actual users.

Social innovation projects serve a societal purpose, but they can also be seen as a research method. From a pragmatist perspective, scientific knowledge is not a detached conceptualization in an ideational realm, but as something derived from action and something that must be useful for action (Goldkuhl, 2004). If that is the case, innovation projects are ideal platforms for scientific research. This has been recognized already for some time in the IS field, and it is also getting more accepted in other disciplines. Hence we would like to further develop the ICD tool into a useful research instrument as well.

References

Alle, V (2002) A Value Network Approach for Modeling and Measuring Intangibles. White paper presented at Transparent Enterprise, Madrid, November 2002

Andersson B et al (2006) Towards a Reference Ontology for Business Models. In *Proc. ER'06* (Embley, D, Olive A and Ram S, Eds.), Springer-Verlag

Arnould E J (2008) Service-dominant logic and resource theory, *J. of the Academy of Marketing Science*, 36, pp.21-24

Berkhout A, Van de Duin P, Hartmann D, Ortt R (2007) *The Cyclic Nature of Innovation: Connecting Hard Sciences with Soft Values*, Advances in the Study of Entrepreneurship, Innovation and Economic Growth, Vol. 17, Elsevier, Amsterdam

Bourdieu P (1990) *The logic of practice*, Stanford University Press

Callon M (1987) Society in the Making: The Study of Technology as a Tool for Sociological Analysis. In *The Social Construction of Technological Systems* (Bijker W, Hughes T and Pinch T, Eds.), The MIT Press, pp.85-103

Chesbrough H (2003) *Open Innovation. The New Imperative for creating and profiting from technology*, Harvard Business School Press

Chesbrough H (2006) *Open Business models. How to thrive in the new innovation landscape*, Harvard BusinessSchool Press

Denning P J, Dunham R (2006) Innovation as language action, *Commun. ACM* 49, 5 pp.47-52

Denning P J, Yaholkovsky P (2008) Getting to "we.", *Commun. ACM*, 51, 4, pp.19-24

Edvardsson B, Skålén P, Tronvoll B (2012) Service Systems as a Foundation for Resource Integration and Value Co-Creation. In *Special Issue – Toward a Better Understanding of the Role of Value in Markets and Marketing*, (Vargo S , Lusch R, Eds.), Review of Marketing Research, Volume 9, pp.79-126

Feldman M S, (2000) Organizational Routines as a Source of Continuous Change. *Organization Science* 11(6): pp. 611-629

Giddens A (1979) *Central problems in social theory*, Univ of California Press, Berkely

Giddens A (1984) *The constitution of reality*, Univ of California Press, Berkely

Goldkuhl G (2004) Meanings of Pragmatism: Ways to conduct information systems research. In *Proc of the 2nd Int Conf. on Action in Language, Organisations and Information Systems* (ALOIS-2004), Linköping University

Goldschmidt G (1991) The Dialectics of Sketching, *Design Studies* Vol. 4, pp.123-143

Gordijn J, Akkermans J, van Vliet J (2000) Business modeling is not process modeling. In *Conceptual modeling for e-business and the web*, LNCS, Vol. 1921. Springer-Verlag

Hevner A R, March S T, Park J, Ram S (2004) Design Science in Information Systems Research, *MIS Quarterly*, 28(1), pp.75-105

Hillgren P-A, Seravalli A, Emilson A (2011) Prototyping and Infrastructuring in design of social innovation. *Co—Design* Vol. 7, Nos. 3–4, 2011, pp.169–183

Jones, M, Karsten, H (2008) Giddens's structuration theory and information systems research, *MIS Quarterly* 32 (1), pp.127-157

Kakihara M (2010) Dynamic Revenue Model Design in the Online Services Business: Two Cases in Japan. In *Sustainable e-Business Management* (Nelson M L et al., Eds.), Springer-Verlag LNBIP 58, pp. 1–12

Moor A de (2009) Collaboration Patterns as Building Blocks for Community Informatics. In *Proc. Community Informatics Research Network Conference*, Prato, Italy, Nov 4-6, 2009

Moor A de (2013) Creativity meets Rationale: Collaboration Patterns for Social Innovation. In *Creativity and Rationale: Enhancing Human Experience by Design* (Carroll J, Ed.), Springer, Human-Computer Interaction Series, 2013, pp.377-404

Mulgan G (2007) *Social Innovation: what it is, why it matters and how it can be accelerated*, The Young Foundation, London

Murray R, Caulier-Grice J, Mulgan G (2010) *The Open Book of Social Innovation.*, Social Innovator Series. NESTA & Young Foundation

Orlikowski W J (2000) Using Technology and Constituting Structures: A Practice Lens for Studying Technology in Organizations, *Organization Science*, 11, 4, pp.404-428.

Osterwalder A, Pigneur Y (2010) *Business Model Generation*, Wiley

Prahalad C/K, Krishnan M S (2008) *The New Age of Innovation: Driving Cocreated Value Through Global Networks*, McGraw Hill

Reijswoud V van (1996) The Structure of Business Communication; Theory, Model and Application, PhD Thesis, Delft University of Technology.

Rogers E M (1995) *Diffusion of Innovations*, (4th edition). The Free Press, New York.

Schatzki Th, (1997) Practices and Actions – A Wittgensteinian Critique of Bourdieu and Giddens, *Philosophy of the Social Sciences* 27(3), pp.283-308

Swan J, Bresnen M, Newell S, Roberston S (2007) The Object of Knowledge: The Role of Objects in Biomedical Innovation, *Human Relations*, 60(12), pp.1809-1837

Tatnall A, Gilding A (1999) Actor-Network Theory and Information System Research. In *Proc. 10th Australasian Conference on Information Systems*, 1999, pp.995-966

Vanhaverbeke W, Van De Vrande V, Chesbrough H (2008) Understanding the advantages of open innovation practices in corporate venturing in term of real options, *Creativity and Innovation Management* 17, pp.251–258

Weigand H (2009a) Value encounters – Modeling and analyzing co-creation of value. In Software Services for e-Business and e-Society (Godart C, Gronau N. Sharma S and Canals G, Eds.), Springer-Verlag, pp. 51-64

Weigand H (2009b) Value Modeling for the Pragmatic Web – the Case of Social Advertising. In *Proc. 5th Int. Conf. on Semantic Systems (I-Semantics 2009)*, Graz, Austria, September 2009

Weigand, H (2010) How to Design Things with Words – a Communicative Perspective on Design Research. In *Information Systems Systems, Signs & Actions An International Journal on Communication, Information Technology and Work* Vol. 4 (1), pp. 23–37

Weigand, H, Jayasinghe Arachchig J (2010) Value network analysis for the pragmatic web: A case of logistic innovation. In *Proc. of the 6th Int. Conf. on Semantic Systems (I-SEMANTICS 2010)* (Paschke A, Henze N and Pellegrini T, Eds.) ACM, New York, pp.1-8

Winograd, T, Flores F (1986) *Understanding Computers and Cognition: A New Foundation for Design*, Ablex Publishing

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