EXPLORING COLLABORATION IN A NETWORKED INNOVATION PROJECT IN INDUSTRY

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ABSTRACT

The growing complexity caused by the increasing need to design product-service systems has forced companies to shape innovation networks. Networked innovation requires different stakeholders to design product service systems collaboratively. As a result, stakeholders do not only have different disciplinary backgrounds, but they also come from different organizations. This paper presents the findings of an explorative study in which we investigated how networked innovation differs from 'normal' innovation projects within a single company when it comes to collaboration. Based on a thematic analysis of a retrospective case study of a successful networked innovation project, we developed a conceptual model that represents the most important themes concerning collaboration in innovation networks. Finally, we reflected upon this model by comparing it to our literature review on collaborative design in multidisciplinary teams, which resulted in directions for future research.

Keywords: networked innovation, collaboration

1 INTRODUCTION

Products are increasingly accompanied by services. Instead of developing a single product, companies often decide to develop complex product-service systems. The mobile phone is a prime example. Where the first mobile phones were just meant to make phone calls, over time many functions were added; text messaging, an alarm clock, a calendar, an MP3 player, a camera, etc. Looking at today's mobile phones, they can be used to surf the Internet, download applications, read books, etc. This requires not just a single phone to be developed, but a whole product service system is needed to enable the user to use the full functionalities of the mobile phone. By developing such a product service system different stakeholders need to share knowledge about hardware, software, and services. This development requires increased capabilities to manage knowledge across different disciplines, departments, and companies. Identifying, formalizing, storing, accessing, sharing and using such heterogeneous assets becomes more complex than ever, much because the stakeholders involved in the design of product service systems have different backgrounds, competencies, and communication methods.

We expect that the design of product service systems has raised the collaboration problems, as described in the literature on multidisciplinary design teams, to a another level. This is because design teams of product service systems are asked to solve really ill-defined problems which do not have a clearly defined solution space. These design teams have the ability to apply almost all different types of knowledge that they think are necessary for the design of the product service system, since they are not limited to the knowledge available within their organizationa boundaries. Solving the ill-defined problems requires moving back and forth between problem solving and predictions, to nurture creativity and to encourage radical thinking between the different stakeholders [1]. Furthermore, stakeholders have difficulties with the creation of effective knowledge flows, mainly because they normally lack a shared history of working together, a shared knowledge base, or methods/techniques to create, store, and share information and experiences [1]. In this context, the problem of understanding "what knowledge to share", "how to share it", and "whom to share with" is even more challenging than in traditional product innovation processes. Engineers and designers are asked to become "knowledge workers" and "knowledge brokers", interacting with several product stakeholders at a time, in spite of different organizations, departments, and functions [1], [2]. They have to do their design job in this complex network.

The complexity of such a network will be explained with the help of an example: the development of electric vehicles. *BetterPlace* is a provider of electric vehicle networks and services. They provide services for enabling adoption and use of electric vehicles in which they build and

operate the infrastructure and systems to optimize energy access and use. To enable a successful and, in the end, compelling service, *BetterPlace* needs to provide an integrated solution to electric transportation. *BetterPlace* works together with governments, businesses, and utility companies, such as A123 Systems, Renault, and the Automotive Energy Supply Corporation to accelerate the transition to sustainable transportation.

Not only is there a need to develop electric cars, long-lasting batteries, charge spots, battery switch stations, driver services, additional electricity generation, and transmission or communication systems also need to be designed [3]. This results in a complex network of stakeholders, in this example there is a need for: a car manufacturer, a battery developer, but also an operator for battery charge stations, and local government support. All stakeholders in the network need to collaborate, depend upon each other, need to be fully committed to develop a sustainable solution and, in the end, strive for a successful implementation of electric mobility.

The collaboration in multidisciplinary teams is understood, but there is a lack of understanding about this process in networked innovation teams. We expect that the themes influencing collaboration in networked innovation differ from a multidisciplinary team within a company, since the differences and interests differ much more from an innovation project that is executed within one company. This paper aims to create an understanding of what the themes are when it comes to collaboration within a networked innovation team from a product development perspective.

To fulfil this aim, we first did a literature review on networked innovation to focus our research. To get an understanding of the possible themes influencing collaboration in networked innovation teams we reviewed the literature on multidisciplinary teams working on innovation. The literature review formed the basis for our study in which we were interested in the themes that influence collaboration in a networked innovation project from a product development perspective. To gain this insight we interviewed the team members that were involved in the Senseo project, working at Philips. The interview transcripts were analysed with a thematic analysis to form (sub-)themes that influence collaboration in a networked innovation project. The themes led to a conceptual model which is presented in the discussion.

2 TOWARDS NETWORKED INNOVATION

This study addresses networks of companies that decide to open up to outside relationships to innovate together. In this section, we explain in more detail what we mean with networked innovation. The approach of innovating together as such is not new, but it has recently been popularized under the label of ‘open innovation’ [4]. Open innovation, as described by Chesbrough, represents that valuable ideas can come from inside or outside the company and can go to market from inside or outside the company as well. For the development of product service systems, as described in the introduction, a network of stakeholders is needed. This approach places external ideas and external paths to market on the same level of importance as that reserved for internal ideas and paths to market during the closed innovation era [4]. Open innovation is the use of the purposive inflows and outflows of knowledge to accelerate the internal innovation, and expand the markets for external use of innovation, respectively [5]. However, the market does not always drive new ideas. A distinction should be made between inbound and outbound innovation [5], [6]. Inbound open innovation refers to inward technology transfer. It describes the practice of leveraging the discoveries of others because firms need not rely exclusively on their own R&D. Outbound open innovation refers to outward technology transfer, and it suggests that firms can look for external organizations with business models that are suited to commercialize a technology exclusively or in addition to its internal application. In this context, Enkel *et al.* (2009) describe three kinds of processes:

- The outside-in process of open innovation: enriching the companies’ own knowledge base through the integration of suppliers, customers, and external knowledge sourcing.
- The inside-out process of open innovation: earning profits by bringing ideas to market, selling IP, and multiplying technology by transferring ideas to the outside environment. Companies that establish the inside-out process as key, focus on externalizing their knowledge and innovation in order to bring ideas to market faster than they could through internal development.
- The coupled process: co-creation with (mainly) complementary partners through alliances, cooperation, and joint ventures during which give and take are crucial for success. Companies that establish the coupled process as key combine the outside-in process (to gain external knowledge) with the inside-out process (to bring ideas to market) and, in doing so, jointly

develop and commercialize innovation [7].

We are interested in this coupled process. In the development of product service systems, the different companies have the knowledge to come to innovation together, where all companies benefit and contribute; they jointly develop innovations. In the literature the term open innovation often focuses on the innovation project itself, whereas we are focusing on the collaboration. Companies executing this type of projects we spoke to, all refer the fact that the innovation project is not open at all. They are actively searching for the right partner(s), in order to form a network that will execute and benefit from the innovation project collaboratively. To emphasize this, we decided to use the term '*networked innovation'*.

3 MULTIDISCIPLINARY TEAM COLLABORATION

In order to get a first grip on the themes that influence collaboration in networked innovation projects, we reviewed the literature on multidisciplinary design teams executing an innovation project.

Badke-Schaub (1999) researched in a holistic manner what factors influence teamwork within a company in engineering practice. The most important factors she found are: (the lack of) experience, the communication, the demand for quality, the availability of information, the coordination of duties, the novelty of the task, the group climate, time pressure and power [8].

Much can be learned by looking specifically at the integration of knowledge between actors in multidisciplinary design teams. For integrating knowledge, a design team needs a shared understanding [9] and common knowledge [10], [11]. Similarity in languages [9], [12], the commonality of vocabulary, and the effectiveness of (design) communication [10] influence the creation of this shared understanding. Design communication is often jargon laden and is therefore difficult to understand for outsiders. It is different from speaking a foreign language, since the actors are familiar with the words. Even so, the meaning of the same words may differ when used by actors from different disciplines. During design communication, these differences have consequences for tuning processes between the actors, for appointments about which tasks they have to do, for the view actors have on the status of the project, etc [9]. Since design communication is about an object that does not yet exist, it is about representing possible future realities. Representing reality inherently means that reality is abstracted. In (service) design this is mostly done by drawings and prototypes. Whether they represent a spatial configuration, a static topology, or the dynamics of a flow process, they symbolize only the essential features of whatever they try to convey. In order to transfer their domain knowledge properly actors from different disciplines need different forms of abstraction [13], [14]. The correct reading of drawings requires both knowledge of the jargon that the drawer uses as well as an understanding of the context and the moment in use. This can be difficult since actors may have different mental models. Badke-Schaub *et al.* (1999) found five different types of mental models; on the task, the process, the team, the competences, and the context. Different mental models will hamper the creation of a shared understanding because each team member refers to his/her own background. They are unaware of doing this and they are unaware of a difference in each other's background [15]. Other personal characteristics that influence collaboration are: variation in routines [10], shared behavioural norms [10], the styles in which people organize their thinking and action [16] and negotiation skills [17].

Aspects within the team can also influence collaboration, such as the active approach and involvement of sub teams [9], group sizes [10], [17], multiple groups [11], the active use of minutes of meetings and efficient data management systems [9]. The quality of project documentation, the division of labour, the rigor of project planning, the controllability of product quality [9], as well as, IP management [7] also influence collaboration.

Finally, the literature also shows that organizational aspects have an impact on collaboration. These are the organizational culture [10], company hierarchies [10], [11], organizational routines [7, 10] bureaucracy [10], organization context [16], the organization of resources and the allocation of tasks and responsibilities [9], horizontal or vertical subdivisions [17], and environmental circumstances [10].

This section showed a condensed summary of the literature review executed on factors that influence collaboration in multidisciplinary teams. Most studies focused on teams that operate within one company. We expect that many of these aspects also have an influence on collaboration in innovation projects with stakeholders from different companies with different backgrounds, goals and perspectives. Added to these, we expect other factors will occur in networked innovation teams due to

the growing complexity in organization of the network as well as the content to be designed. This knowledge, however, cannot extensively be found in literature. We therefore conducted an explorative study in practice. In this exploratory study, we interviewed practitioners that executed networked innovation projects in practice, to identify the issues they faced in a networked innovation project. This literature review formed a basis to set up our exploratory study.

4 EMPIRICAL EXPLORATION

The aim of this study is to create an understanding of the themes that influence collaboration in networked innovation teams from a product development perspective. In order to get a better understanding of collaboration in networked innovation teams in practice, we conducted a case study in which we studied the development project of the Senseo coffeemaker. Philips and Sara Lee developed the Senseo coffee maker collaboratively. Philips is world leading in healthcare, lifestyle and lighting. Headquartered in the Netherlands, Philips employs approximately 116,000 employees in more than sixty countries worldwide [18]. Sara Lee is marketing coffee systems in around fifty countries and develops these systems in collaboration with a few partners. Sara Lee is one of the main out-of-home coffee providers, serving more than one million customers in the world. They sell their coffee under the brand name Douwe Egberts. From its headquarters in The Netherlands, Sara Lee manages, besides their coffee and tea businesses, the worldwide Household and Body Care operations, the non-US Bakery businesses and the European Meats operations. Sara Lee Corporation employs 137,000 people worldwide [19].

The coffee from a Senseo is made with a coffee pod. Coffee pods are pre-packaged ground coffee beans encapsulated in their own filter and available in several blends. Sara Lee had the knowledge about coffee, while Philips had the technical knowledge about coffee machines. The first Senseo was launched in the Netherlands in 2001. In 2007 more than five million Senseo's were sold in the Netherlands, which means that 75% of households had a Senseo [20].

We selected this case because of the different knowledge bases of the companies, Philips developing electronic consumer goods (technical) and SaraLee as a fast moving consumer good company. Although the Senseo has proven successful in the market, the joint innovation process had its hurdles. Because of that it would be interesting to learn about the development process and the themes that influenced the collaboration during the development and how they dealt with this themes influencing collaboration to make it a success. Taking a restrospective case, the development of the Senseo took place ten years ago, ensures we can learn about the biggest themes influencing collaboration during the innovation process, as the respondents are more free to speak and time has filtered out minor themes infleuncing collaboration.

4.1 Data gathering

Since we wanted to gain insight in themes influencing the collaboration a product development company experienced, we chose to research the product innovation project from different perspectives. We collected data by interviewing seven participants from Philips who were involved in the Senseo project. The interviewees were selected through snowball sampling [21]. The functions of the interviewees were: Customer researcher (1)[1], Business Unit manager (2), R&D manager (3), Project leader (4,5), Category manager (6), and a Division manager (7). They were involved in different stages from the early exploration to commercial introduction.

The oral interviews lasted between ninety minutes and two hours. They were recorded and transcribed for further analysis. In the semi-structured interviews with open questions we asked the interviewees about their experience with networked innovation, the collaboration, the performance of the teams, and how they experienced all these aspects. To let the interviewees talk openly about their experiences without influencing them, we choose for semi-structured interviews.

4.2 Data analysis

The next step was data analysis. As we were interested in the content of the interviews and the themes that influenced the collaboration experienced by the interviewees, we chose for a thematic analysis, a method in which the content is the exclusive focus. Our emphasis is on what is said (the content of speech) instead of how it is said and/or the conversation between the interviewee and interviewer.

[1] Reference to the interview

Their experience and their view on the project was of main importance. Consequently, in the transcripts, 'messy' spoken language was converted to improve readability [22].
To do this, we chose 'Framework' as a method for the thematic analysis of our qualitative data. This method involves a number of distinct, though highly interconnected, stages: (1) Familiarization, (2) Identifying a thematic framework, (3) Indexing, (4) Charting, (5) Mapping and interpretation [21]. For each stage we explain what it includes and how it was applied in our study.
1) Familiarization: Familiarization of the data involved immersion in the data: listening to tapes, reading transcripts, and studying observational notes. During the familiarization phase, we did not only gain an overview of the richness, depth and diversity of the data, but we also started the process of abstraction and conceptualization. While reviewing the material, we made notes, recording the range of responses to questions we asked ourselves, jotting down recurrent themes and issues which emerge as important to the respondents [21].
2) Identifying a thematic framework: After reviewing the selected material, we returned to these research notes and attempt to identify the key issues, concepts, and themes according to which the data could be examined and referenced. That is, we set up a thematic framework with eightteen sub-themes (e.g. reasons for networked innovation, different goals, expectations and interests, cultural differences) within which the material was sifted and sorted [21].
3) Indexing: The thematic framework with the eighteen sub-themes constructed in the previous phase was systematically applied to all interviews with the use of Nvivo 9. This was an iterative process in which the sub-themes merged, sub-themes split in two or more sub-themes and new sub-themes were created. For example, we initially created the sub-theme *"different goals, expectations and interests"*. To be more precise in our analysis we split this sub-theme into the more specific sub-themes; *"different goals regarding the content"*, *"different goals regarding the process"*, *"expectations regarding commitment"*, and *"expectation regarding complexity"*. In the end all interviews were coded with the final sub-theme list [21].
4) Charting: After applying the thematic framework to the individual transcripts, we captured the whole data set visually, by considering the range of attitudes and experiences for each sub-theme. The data was taken from their original context and rearranged according to the appropriate thematic reference. In this phase we made a description of all sub-themes supported by explanatory quotes [21].
5) Mapping and interpretation: When all data was sifted and charted according to sub-themes, we began to pull together key characteristics of the data, and map the data set as a whole. In this phase we took the sub-themes to further deepen the sub-themes and analyze how they were related to find associations and how they eventually influenced each other. For example, the sub-theme *'different goals regarding the content'* is related to the theme *'company identity'*. For this reason we decided to make the sub-themes *'goals regarding the content'* and the sub-theme 'company sulture' sub-themes of the theme *'project identity'*. In this stage the names of the themes were adjusted to clearly describe the content and to describe all (sub-)themes in the same way. The analysis of the sub-themes resulted in four themes, containing all sub-themes. For example, '*Creating a project identity'* is one of the themes containing the following sub teams; *'creating a project culture'*, *'setting project goals'*, *'executing project management'*, *'setting up a project structure'*, and *'setting up an innovation process' and 'solving agreement issues'[21]*.
Having the four themes it would be relevant to know how they are related and to build a conceptual model. To do this we discussed the themes to see how they differed and how they are related. During the discussion we took in account our strategic design background and the knowledge available to us working in we have in the product innovation management department. This resulted in a conceptual model, which is presented in the discussion.

5 RESULTS

This section of the paper describes the (sub-)themes resulting from the analysis. The sub-themes based on at least two interviews are explained. Behind the sub-theme the number of references is presented. A reference is a piece of an interview belonging to the sub-theme.

5.1 Sub-themes influencing collaboration in networked innovation

In this section, we show the sub-themes that we created during the data analysis. We provide a definition of each sub-theme and in addition we provide insights from the data.

1. *Creating a project culture (18 references): This sub-theme is about the cultural differences (e.g. language, processes, approaches, ways of working) of the two different companies, which could lead to misunderstanding.*
   The differences have lead to misunderstanding while collaborating. Philips, for example, was centralized and very process driven with several checks and balances to guarantee a certain quality, while Sara Lee was a fast mover and very decentralized and was experienced as less process driven by Philips. The differences were often more subtle and not easily recognizable. Time and effort was needed to get the difference to the surface and to learn about the differences.
2. *Setting up a project structure (10 references): This sub-theme comprises the adjustment of the companies' structures.*
   The structure of both companies were not aligned, which required for an adjustment of both company structures to level the responsibilities and authority to make decisions. The alignment leads to a situation in which all levels had a sparring partner.
3. *Developing a business model (5 references): Creating agreement upon the sharing of the total financial benefits.*
   The business model and how profits were shared was an important and difficult point of discussion during this collaboration. In the end, both companies agreed to penetrate the market with a low price for the coffee machine where Philips received royalties for each coffee pod sold.
4. *Creating chemistry between team members (6 references): This sub-theme is about the value of the personal chemistry between the team members.*
   The chemistry between people was mentioned as important for the success of this project. As soon as this was missing communicating was getting more difficult.
5. *Setting project goals (23 references): This sub-theme is about defining the common values that the innovation project needs to represent.*
   Although the companies agreed on the general goal they had different focus point that could lead to different solutions all attaining the same general goal. This caused friction in the collaboration, even after several years of collaboration. For example, after several years of collaboration Philips wanted to produce a more premium Senseo, made of aluminum. This was the opposite of the view of Sara Lee. With aluminum, the curved line, representating the visual identity, could not be kept which was of main importance for the brand identity. This led to much discussion and caused tension in the collaboration.
6. *Executing project management (4 references): This sub-theme includes the time to market, quality, and budget decisions.*
   Both companies had different ideas about the time to market, the quality and budget decisions. At some point quick market introduction was more important for one company, whereas high quality was more important for the other company and the other way around.
7. *Defining the project content (9 references): Defining the complexity and the status of the project.*
   During the process it became clear that the companies had a different idea about the complexity of the project. Due to the lack of knowledge it took two month before it became clear that it was much more complex than expected and needed more effort to make it a success.
8. *Trusting each other (23 references): This sub-theme comprises the trust that knowledge is used in an appropriate manner and trust in the abilities of the other company.*
   There were two kinds of trust needed, trust that the information was used in an appropriate manner, and trust that the other company had enough expertise. By developing an innovation alone, a company has full control. In this project the success was partly dependent on another company. Before giving away that part of the responsibility, the company had to fully trust the other company. Regarding the second kind of trust, in this project companies were cautious to share knowledge. A reason for this caution was that they did not want to make the competitor wiser than necessary. Aditionally, during the collaboration there was a circulation of people within the project at both companies. Later additions to the team often required trust to build up again and brought previous agreements back up for discussion.
9. *Setting up an innovation process (17 references): This sub-theme is about the adjustment of the companies' innovation processes to the innovation process that was used in the Senseo project.*
   Both companies needed to adjust their process and took the lead at some points where the other had to follow. For example, early in the process a project manager at Philips had much freedom to follow SaraLee. If Philips had required that it should fit their processes it would not have been

successful. The freedom and flexibility at this stage have been important to make it possible to follow Sara Lee at this stage. By releasing the companies' processes it was important not to lose sight of the strengths of the methods used by the companies.

10. *Solving agreement issues: The different organizational project levels experienced different issues while collaborating.*
    As soon as a lower organizational project level could not reach agreement a higher organizational project level discussed the issue. Because the higher organizational project levels did not have the daily interaction it was easier to take a step back and decide on the best solution. Besides the lower organization project levels have their responsibilities within the project but are assessed within their own company, consequently they will keep to their company values.
11. *Dealing with project commitment (6 references): Dealing with the expectations of the companies regarding project commitment.*
    By committing to the project, the companies had expectations regarding to the commitment (effort and budget) of the other company. During the collaboration this was experienced as not satisfactory and consequently put pressure on the collaboration. At the start of the project, when Philips was not fully aware of the complexity of the project, Philips did not assign full capacity to the project. At the same time they were very critical of the quality of the design so far. This combination put the collaboration under pressure.
12. *Introducing project agreements (6 references): The timing of the introduction of agreements was experienced as decelerating and frustrating.*
    The introduction of agreements and lawyers during the process was experienced as decelerating and frustrating. At some points it was necessary to agree without the help of agreements and lawyers to get these back later in the process.
13. *Creating equal benefits between the two companies (8 references): Developing the project content so that it is beneficial for the two companies.*
    An important aspect in this project was that both companies had equal benefits (e.g. market share, brand awareness), advantages or profits. As soon as there was an unbalanced situation the collaboration got stuck. During the collaboration both companies needed to make many concessions and they were only willing to do that because there was a balance of the benefits. For example, at some point Sara Lee wanted to enter the German market and wanted to use the Senseo to achieve this. For Philips it would have been easier to do this with another company, but because of their agreement and the win-win situation for both of them, they decided to continue with Sara Lee.
14. *Communicating with the parent company (15 references): This sub-theme comprises the communication between the team members and their mother company.*
    The parent companies did not always understand why there was such slow progress or why budgets were exceeded. Decisions regarding the process or the content had to be defended within their own company. To proceed, it was sometimes necessary to cross company hierarchies or to not ask permission beforehand, but ask foregiveness afterwards.
15. *Using team members capabilities (5 references): This sub-theme is about the capabilities the team members in a networked innovation team need to collaborate successfully.*
    Team members needed certain capabilities to function in this networked innovation team. For example, the flexibility not to interfere with the other company's tasks. Another necessary quality was the ability to cross company hierarchies and daring to work unorthodoxicly and have this tolerated within the organization. They also needed the drive, entrepreneurship and believe that the project would be successful. A good project leader needed to have two skills; the skill to make a good project planning (hard quality) and the skill to create a strong team (soft qualitywhere team members could build on each other, give 200%, and not had double agendas. In this project the team members had a project leader and a functional leader within their own company, who had conflicting agendas. It was the project leader's task to create a good balance these agendas and to avoid double agendas.

5.2 Themes influencing collaboration in networked innovation

As explained earlier, the different sub-themes described in the previous section were categorised in four themes (see Figure 1). Based on the content of the sub-themes they were grouped which resulted in four themes. The first author defined the themes and the other authors checked this themes.

(1) *Creating a project identity:* This theme comprises the project's culture, goals, structure, process, approach and way of working.
(2) *Agreeing on the benefits for both companies:* This theme comprises the benefits for both companies regarding for example the business model, as well as the importance of equal benefits.
(3) *Managing expectations*: This theme contains the expectation of both companies at the start of and during the iproject.
(4) *Managing team:* This theme is about the team members' capabilities and the trust necessary to collaborate.

6 CONCLUSION AND DISCUSSION

Having the four themes and their sub-themes we connected the themes to each other, by defining the relationships between the themes. The four themes and the relations have led to the conceptual model that Figure 1 shows.

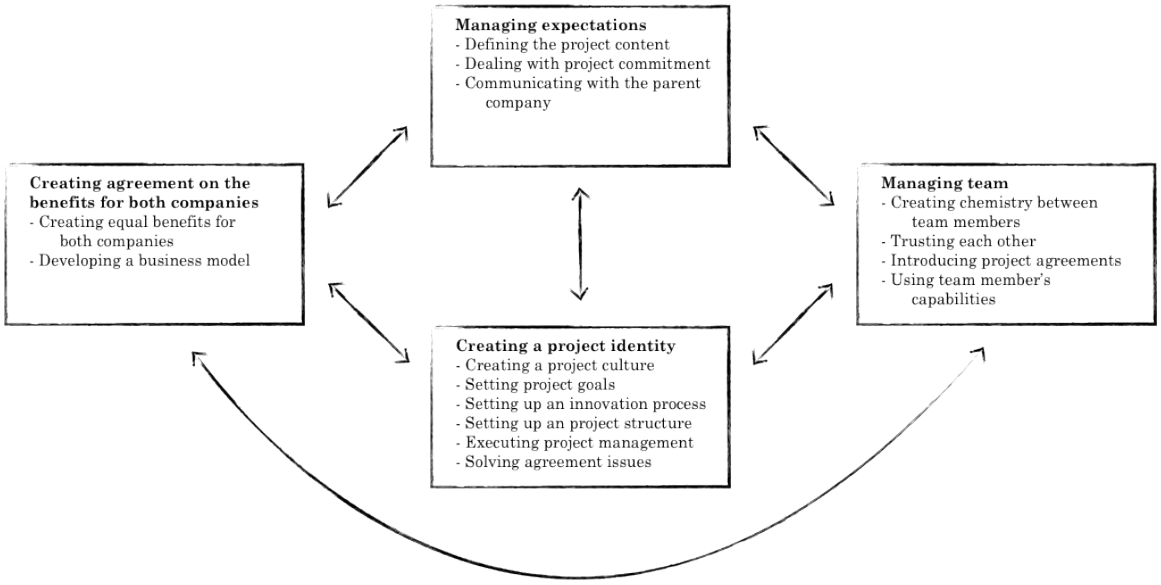

Figure 1 The conceptual model

The first three themes, 'creating a project identity', 'agreeing on the benefits for both companies', and 'managing expectations', cover three main aspects about managing the *content* of the networked innovation project. At the right side the theme 'managing team' says more about the quality of the teamwork. They are about the group dynamics of the networked innovation project. The themes have their own content and focus, but are interrelated and influence each other. How they are related and how they influence each other will be the focus of our next study.

The aim of this study was to create an understanding of the themes that influence collaboration in networked innovation teams from a product development perspective. In a retrospective case study on a successful networked innovation project we asked the interviewees about their experiences and the themes that influenced the collaboration. Based upon a thematic analysis, resulting in fifteen sub-themes influencing the collaboration, we developed a conceptual model that represents the four themes concerning collaboration in innovation networks from a a product development perspective. This conceptual model could function as a base for further research.

Reflecting on the literature review described in section 3 of this paper, we found differences between our case and literature on multidisciplinary teams. Especially defining the project content needs much more attention in an innovation network than in a multidisciplinary team. This is an important finding, because if we want to create tools and techniques to improve collaboration in innovation networks it seems more relavant to focus on these themes than to focus on the aspects found in literature on multidisciplinary teams.

Looking at our results, we could say that the themes influencing collaboration in networked innovation from the perspective of a product development company resulting from this study are typically related to the fuzzy front end of an innovation project. Creating a project identity, agreeing on the benefits for both companies and the expectations should be made explicit in this phase. Several

of the themes influencing collaboration arose because, for example, the companies implicitly followed their own process, had their implicit goals, or did not explicitly discuss their expectations. Furthermore, when it comes to previous literature on teams, Valkenburg (2000) describes two streams of literature. First, literature on teams mainly focuses on social processes and group dynamics in teams without explicit reference to the team's task [25]. The object of the study of the researchers in this field of knowledge is the team process. Second, literature on design methodology that includes studies on different design domains, e.g. engineering, architecture, industrial design, and software design [24]; it is about the content of the design project. In this research, those two fields also arose. Group dynamics is more related to the field of psychology.

Managing the content is the part we, as strategic designers, working in a product innovation management department of industrial design engineering faculty, can understand and could possibly influence. For this reasons this will be our focus for further research, in which we will study how the themes are related and influence each other and how networked innovation teams deal with this themes during the fuzze front end of an innovation project.

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