

The role of human resources in business model performance: the case of network-based companies

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Structured abstract

Purpose—This paper is concerned with identifying the role(s) of the individual employee(s) in the value creation process of three network-based business models that are analyzed through case studies. The paper focuses on how the relationships between the network-partners internally and also outside the network affect value creation.

Design/methodology/approach--The study conducted is a case study of three network-based business models applying a semi-structured interview approach as the primary source of data.

Findings--We show that together with the terms “integrating” and “enabling” which the traditional literature tends to use, we can add expressions like “building” and “aligning” in order to describe the role of human resources in the value creation process of the network-based business models. Human resources are found to be important for aligning the value proposition of the network as a whole to the customers’ needs and expectations.

Practical Implications—This paper demonstrates the advantages of network-based value configurations and indicates how performance measures may be directly derived from value creation maps.

Originality/Value—This paper contributes to understanding advantages and drawbacks of network-based companies and how such types of organisation challenges the people within and outside of them.

Limitations—The generalizability of the results are restricted by the fact that the network-based businesses studied have a different set of stakeholder tensions than more traditionally organized

Key words--Human resources, human capital, business models, network-companies, multiple case study

1. Introduction

Opening the financial newspapers may give the impression that the drivers of value creation in today's economy are equivalent to financial capital and, well, more financial capital. Sporadically, the personal aura and role of a specific highly redeemed and qualified top-CEO is perceived as a value driver of a certain organisation, for example in instances where he/she is employed by a company or alternately – fired by one. However, very seldom is the role of human resources in the value creation of companies celebrated in the same fashion as financial capital and other types of scarce resources, despite the fact that flexibility and the ability to acquire and utilize new knowledge seems important in today's globally-oriented competitive environment.

In the last couple of decades, the speed of change in the business landscape has continuously accelerated, and during the early years of the new millennium the knowledge-based society along with rising globalization and the developments in the BRIC economies ensured that this momentum continued to surge. As new types of value configurations gradually emerged, so did new types of business models. As such, existing nodes of analysis for identifying sources of corporate value, such as knowledge and core management processes became obsolete for illustrating value creation. Accordingly, managers as well as external analysts of companies must recognize that business models are made up of portfolios of different resources and assets and, not merely traditional physical and financial assets, and every company needs to identify their own specific business model that links its unique combination of assets and activities to value creation. Hence, also the question of which role human resources play in the performance of the business model becomes important to address.

The rising interest in understanding and evaluating business models can to some extent be traced to the fact that new value configurations seem to outcompete existing ways of doing business and there are many examples where some businesses are more profitable than others in the same industry, even though they apply much of the same strategy. This illustrates that a business model is different from a competitive strategy and a value chain.

The three aspects networking, innovating and globalizing are key success factors for sustaining business growth and they are inevitably cornerstones of the successful business models of the future. Networking and the ability to collaborate with key strategic partners in win-win based relationships will become even more vital for companies in the next years and decades. Building and encompassing e.g. win-win based relationships with strategic partners will require dedicated business model innovation and these aspects will be under severe pressure from the rising degree of globalization.

New value configurations, such as those born out of the three success factors for future growth highlighted above, reflect changes in the competitive landscape towards more variety in value creation models within industries. Among such new ways of doing business is a rising application of network-based business models. Previously, the name of the industry may have served as a recipe for addressing customers. It doesn't any more. Already in 2000, the leading management thinker, Gary Hamel, quoted that competition now increasingly stands between competing business concepts. If firms within the same industry operate on the basis of different business models, different competences and knowledge resources are key parts of the value creation, and thus comparison of the specific firms even within peer groups now requires interpretation based on an understanding of differences in business models.

The purpose of this paper is to study the role of human resources in an empirical sample of three network-based business models seeking to innovate existing industries and create business models that can be globalized in an easy fashion. The expected outcome of this paper is thus to explore the particularities,

roles and relationship types sticking to the most important human resources in our network-based case-companies. In the first part of the paper a number of frameworks that address value creation and business models are discussed. This leads to a contemplation of the role of human resources in the value creation perspective from a theoretical perspective, i.e. what is the role of human resources and how are they related to value creation? Accordingly case studies of three network-based business models focusing particularly on how human resources become a part of ensuring the performance of business models are conducted and from this analysis the paper concludes upon the role of human resources in business model performance.

Towards network-based business models

A business model is not (necessarily) a value chain, and a business model is not the same as a strategy. To address the former, there may well be a value chain like structure in a business model, but describing the value chain of a company does not necessarily indicate what the main sources of value creation are for that particular company. The same can be said for strategy. Strategy is typically a means of outmaneuvering competitors and therefore a dynamic factor. Hence the business model can be understood as the platform from which to execute strategy and in this sense a mediator between organizational structure (value chains) and strategy. Already in 1998, Stabell & Fjeldstad (1998, 414) suggest that the value chain is but one of three generic value configuration models. Based on Thompson's (1967) typology of long-linked, intensive and mediating technologies, they define the value chain as a value configuration that models the activities of long-linked technology. They argue that distinguishing between such generic modes helps in facilitating the analysis of firm-level value creation.

The first of the two alternative generic value configuration models proposed by Stabell & Fjeldstad (1998) is the value shop logic. It concerns firms where value is created by mobilizing resources and activities to resolve a particular customer problem. The second alternative to the value chain is the value network logic. It models firms that create value by facilitating a network relationship between their customers using a mediating technology, e.g. like an infomediary or innomediary, as Sawhney *et al.* (2003) explicates.

Giertz (2000) argues that every archetype of business is based on some sort of value creation logic and that understanding and managing companies thus requires a simulation, or representation, that can help test the business model and its strategy. Referring to Stabell & Fjeldstad, this would incorporate identifying the applied value configuration or business logic, and development of appropriate performance measures, as accentuated by Eccles (1991) and Kaplan & Norton (2008). Allee (2000) contends that in order to facilitate the analysis of the value of network-based models of business, knowledge and intangible value exchanges must become an integrated part of the representation models applied in visualizing them. In this connection, Hamel (2000) talks of competing value networks – a synonym for the inter-corporate value chain and Porter's value system (2000, 88).

From a similar perspective, Sweet (2001) identifies four strategic value configuration logics: value-adding, -extracting, -capturing, and -creating. These logics exist no matter the prevailing macroeconomic paradigm and are, in a sense, archetypes of business models that we can combine with Stabell & Fjeldstad's (1998) value configuration logics. Sweet argues that it is the ability to manage these logics well that creates success. By stating this, he confirms the necessity of understanding how the business model and its value creating elements work, as a prerequisite for managing the company. Sweet's logics can be perceived as archetypes of value propositions, which are a central aspect of for example Osterwalder & Pigneur's Business Model Canvas (Osterwalder *et al.* 2010).

The value proposition or offering of the company depicts which value it intends to deliver to its customers. "A 'business model' is [...] a precise definition of who customers are, and how the company intends to satisfy their needs both today and tomorrow" (Morris 2003, 19). Morris' takes his point of departure in the value of the offering to the end users by the company, is very close to the definition of the knowledge narrative from the Danish guideline for intellectual capital statements. The knowledge narrative "expresses the company's ambition to increase the value a user receives from a company's goods or services" (Mouritsen *et al.* 2003, 12). Hence when working with network-based business models, it is important for us to understand the value proposition of the network as a whole.

The resource base of value creation

The management of fundamentally important strategic value configuration logics such as relationships to suppliers, access to core technologies, insight into the users' needs etc., can be just as important and relevant as inventing new revolutionary ways of doing business. Hence the resource-base in the company is important, as there has been a lot of focus on which resources actually drive company value creation. For example, in the knowledge society it is stated that primarily knowledge drives value creation. Along these lines, Miller, Eisenstat & Foote (2002) argue that capabilities are the backbone of the competitive advantage of a company, because such resources constitute a more stable element on which to base sustainable development than competitive strategy in a highly volatile business environment. Confirming this, De Carolis (2003) finds that imitability of firm knowledge resources has a significant negative effect on firm performance. In a business environment characterized by rapid and discontinuous nature of change a framework that can facilitate business model innovation becomes necessary for sustainable competitive advantage (Malhotra 1999).

As resources are central aspects of several examples of generic business model frameworks (cf. Betz 2002) the resource-based view is an important aspect of the field of business models (Hedman & Kalling 2003). Klaila (2000) explains how the business model helps to identify the critical behaviors, competencies, and market conditions and account for the resources of intellectual capital in the company. From the resource-based perspective we must perceive resources in the sense of being assets (Boulton *et al.* 1997) and inputs to the value creation process of the company. As it is difficult for organizations to understand the role of knowledge resources in their value creation (Covin & Stivers, 1997) the business model approach may play an important role in visualizing the capability configurations of the company, which are the cohesive combination of resources and capabilities embedded within its infrastructure that generate value (Miller, Eisenstat & Foote, 2002). Reasons for assembling networks are often to gain access to resources and competences, knowledge of technologies, markets and customers, access to value chains; just mention a few.

2. The human resource factor of business models

Employees and competences may comprise important factors of corporate performance and perhaps it is even the case that the role of human resources and competences constitute greater and greater proportions of corporate values in a society that is moving away from industrialization and capital and towards innovation and knowledge as the backbone of industrial competitiveness.

In some streams of literature within accounting and management, especially the last couple of decades have given rise to discussions concerning the value of human resources; in some instances also analyzed in

the form of human and intellectual capital. It is not the purpose of this paper to track the notions of this debate back to the likes of Itami 1987, Edvinsson & Malone 1997 and Sveiby 1997, not least to say even further back to the beginnings of the human resource costing and accounting debate (cf. Hermansson 1964, Brummet, Flamholz & Pyle 1968, Flamholtz 1985). Rather, we are here concerned with identifying the perceived role of human resources in value creation and performance of business models.

There are several recent reviews of business model definitions and business model frameworks (cf. Fiel 2011, Nielsen & Lund 2012). In general, three perspectives inform such frameworks, namely either from innovation, strategy or management accounting. However, one of the first frameworks that attempted to corner the ideas of business models for the sake of describing and evaluating companies came from the roots of auditing. Among the nodes of Bell et al.'s (1997) Strategic-Systems Auditing Framework came the Client Business Model, which situated the core value creation processes of the company as a mediator between markets, products/services, alliances and customers. In this framework, human resources and competences were not made explicit. Rather, they were to be found as implicit aspects of the management structure, in effectuating core processes and in resource-management.

Almost 10 years later, Chesbrough (2006) cornered the term "Open Business Model" which has many similarities to the notion of network-based business models applied in this paper. An open business model uses both internal and external sources to create value and also uses both internal and external sources to capture a piece of that value. Despite its basis in an innovation perspective, Chesbrough's model does not explicitly identify the role of human resources, management or competences for that matter. However, in opposition to Bell et al.'s (1997) model, Chesbrough introduces the notion of the value proposition and in this sense comes closer to cornering the value of products to the customer group. In the Business Model Canvas (Osterwalder & Pigneur 2010), the value proposition is even model central to understanding the business model, and competences are an explicit part of the framework as a separate building block.

Another stream of literature on business model representation is derived from the fields of strategy, marketing management and management accounting. Here we may find inspiration in models such as Heskett et al.'s (1994) Service-profit chain and the Strategy Map framework suggested by Kaplan & Norton (2001). Both models are interesting because the notion of the human factor, understood as either employee satisfaction or competences are viewed as a basis for value creation. In the latter they form the basis of performance measurement. Such notions are also found in a related stream of literature concerning the measurement and management of intellectual capital. For example, Sveiby's (1997) Intangible Assets Monitor illustrates how human capital is a pillar of value creation, while the Intellectual Capital Statement (Mouritsen et al. 2003) sees human resources as one of four types of knowledge resources that enable the company to deliver value to the users of its products.

Thus with the exception of Chesbrough's (2006) and Bell et al.'s (1997) frameworks, most business model frameworks have some sort of conception of the human resource factor built into them. However, as is also evident, the human resource factors are mobilized in different ways. Therefore, a side-effect of this study is expected to be a contemplation of the type of modelling of the human resource factor found most appropriate for network-based business models.

3. Measuring the performance of business models

The problem with trying to visualize the business model of the company is that it can very quickly become a generic and static organization-like diagram illustrating the process of transforming inputs to outputs in a value chain like fashion. However, such visualization often leaves the reader wondering how the

organization actually functions and creates value. Hence, the core of the business model description should be to stress the connections between the different elements and silos that make up a company, i.e. the actual activities being performed in the company. Companies often report a lot of information about activities such as customer relations, distribution channels, employee competencies, knowledge sharing, innovation and risks; but this information may be irrelevant if the company fails to show how the various elements of the value creation collaborate with one another, and also which changes one should keep an eye on. One such idea on how to visualize the business model is the popular Business Model Canvas proposed by Osterwalder & Pigneur (2010).

Descriptions of internal linkages in the company related to performance and value creation and relationships between elements like e.g. activities, resources, and processes could be one way of addressing these issues. Internal value drivers may vary significantly by industry and by company, or should we say by business model. Regardless of industry, it is of vital importance for a company to understand the drivers behind its value creation (Fenigstein 2003), i.e. which aspects deliver value-added? Value drivers are typically related to the core processes of the company.

Understanding the value drivers of a company may potentially lead to the identification of key performance indicators. Bray (2002) perceives value drivers as the link between key performance indicators and business objectives, at the same time underlining that value drivers are not outcome-oriented key performance indicators, rather they are forward oriented performance measures. Hedman & Kalling (2003) propose value drivers as measurements of actual activity, which they state is an intermediary level separating the resources and the offering of the company. As value drivers imply causal relationships, they are more clearly visualized in a business model.

In Bell *et al.*'s framework (1997), value drivers are not explicitly mentioned, but they can be viewed as the interlinking of specific activities performed in the core business processes of the company. Key performance indicators are, according to Bray (2002), linked to business objectives via identification of the key drivers of value, which in turn can be interpreted as key success factors. Value drivers are not static performance measures, they will vary over time, both within a business cycle and from business cycle to business cycle (Wahlström 2003), and eventually the present value-drivers of the company will be replaced. This may be the result of the company changing its strategy or business model, which must have an effect on the drivers involved in the value chain and value creation process. Alternatively, it could be due to the changing external environment.

A company may be seen as a value creation system within which tangible as well as intangible assets are utilized and created. In this process, it is important to develop a strategy for bundling all the sources of value creation potential in a company into a single "recipe for adding value" (Daum 2002), i.e. a business model. The ability of establishing precise connections and causal links and relationships between knowledge resources, competences, intellectual capital etc. and the value creation of an organization has been in the interest of the business and academic communities for a long time. Furthermore, it is an important element of the business model approach (Hedman & Kalling 2003). However, this relationship may be an unsettled one. Hermans' (2002) research within the context of Finnish biotechnology firms provides an exception. He tests and analyzes empirically how intellectual capital is connected to the market potential of Finnish biotechnology firms, finding among other things that management experience, research and patent application intensities, and the public financing of R&D activities have significant influence on growth prospects of the enterprises.

The ability to establish causal links between resources, activities, processes and their outcomes, i.e. value, is a prime deliverable of applying a business model perspective. This is accentuated by Haslam et al. (2012) who discuss business models from a value realization perspective. A business model perspective ought to ensure that what is being measured is relevant, an argument that has been aired previously by the likes of Kaplan & Norton (2001) and Ittner & Larcker (1998). According to Dikolli & Kulp (2003), a business model approach to mobilizing performance measurement helps identify and focus on the causal links between managerial actions, intermediate performance measures, and overall firm performance. Via a business model approach it is possible to identify causal loops that depict linkages between key performance measures and financial results (Bell *et al.* 1997) and which link combinations of assets to value creation (Boulton *et al.* 1997). In the next section we take a closer look at a methodology with precisely this agenda.

Cognitive maps as the platform for measuring business model performance

When we talk of measuring the business performance of human resources we can address this from varying perspectives. For example, from a risk perspective it can be argued that if the right competences are not present in the firm, then performance will be expected to be weak. Also, if human resources leave the company or the network, and are employed by competing organisations and networks, this may also be problematic. However, also the incorrect utilization of the human resources that are present in the network could be problematic as it could likewise be problematic if the human resources are not nursed and developed properly.

Of special concern in relation to network-based business models, is the potential problem of establishing value-adding relationships between the human resources for both intra-, and interorganisational cooperation. Bad configuration may be a potential cause of fragility and is affected by aspects such as different personalities, different demographic cultures, differing cultures across work groups, differing ambitions, and also the level of focus on the joint assignment and cooperation within the company or network.

Moreover, these intra- and interorganisational relationships are rarely formalized and made visible in network-based businesses. The knowledge on their nature, intensity, strengths and weaknesses typically belongs solely to the people who work within the companies that are involved in the network. They manage these relationships in order to increase the value created for their company and, as a consequence, for the whole network. However, discovering and managing these network-specific relationships is a very hard task. It is thus necessary to use a tool, which can facilitate this operation, by making explicit how human resources create, activate and change these relationships on which the value creation of the network depends.

Here, cognitive mapping enables the highlighting of the causal structure the actors' thought, visualizing the specific and contingent representations of a particular domain (Huff & Jenkins, 2002). This tool focuses on the relevant role of cognitive aspects (feelings, values, experience, perceptions, learning, skills, motivations) that support and influence the decision making in management and organization. Cognitive maps provide a framework of reference in order to understand the company's current strategic position as well as to identify the relationships among key actors and events. This may provide useful information to decide how to improve the company's position (Fiol & Huff, 1992).

For the aims of this paper, two types of cognitive maps seem to be particularly suitable: the identity map and the causal map (Fiol & Huff, 1992). The former offers a static perspective because it detects the main elements from which the company's success depends on (key actors, key events, key success factors). The latter provides a dynamic point of view because it identifies the relationships among the elements previously detected by the identity map. In other words, the causal map allows us to visualize the way in which key actors connect themselves and their actions to the other relevant elements of the company's "field". This allows understand how they perceive the link between their efforts and the effects on value creation. In this paper we study three different network-based business models through cognitive mapping in the form of causal maps.

4. Methodology

This paper is based on eight semi-structured interviews within three network-based businesses located (primarily¹) in the northern Jutland region of Denmark. The three networks have been a part of the International Centre for Innovation project; a 5 year research project aiming at developing 10 new network-based business models and working on improving the globalization potential of them. Our interviews were conducted within the networks 'Mobile Tracking', 'Low Energy and Sustainable Construction' and 'ViewWorld'.

The Mobile Tracking project is concerned with developing and refining business models for the use of location data. Location data is information about the whereabouts of people i.e. geographic location at a given point in time. The project aims at utilizing new technologies to track cell phones and other mobile devices in order to develop new products and services to businesses and end users who make use of location data. Additionally, it is envisaged that the project can help to create new relationships between businesses, customers and users and at the same time provide a basis for developing new business models across firms and actors.

The Low Energy and Sustainable Construction project focuses on challenging existing building components and construction methods. The network aims at developing a building system that can be produced industrially and used for low-energy refurbishment of existing buildings. The network wants to develop a value chain of associated business models that makes it possible to market and sell such a building system to building renovation firms and construction companies alike.

The ViewWorld project aims at developing simple and effective mobile reporting and communication solutions for companies working with aid and relief operations in third world countries. The network aims at creating a new platform for business models for the NGO market and furthermore to develop a global business model for the NGO segment.

Data collection

The interview form was semi-structured, probing into five themes, which reflect the purpose of the paper, and these in turn therefore constituted the main sections of the interview guide:

¹ These networks are a part of the International Centre for Innovation (ICI) project conducted by Aalborg University. The funding of 8.4 mill. Euros for the 5 year research project on creating network-based business models was provided by the regional fund and the EU. The focus was thus on business networks primarily in this region, but not confined to it. As such the networks are spread across most of Denmark, although there is an overweight of companies in the northern region.

1. General information about the respondent and his/her background
2. Information concerning the respondent's tasks in relation to the company's overall business and the purpose of the network (the role)
3. Causes of job-related success
4. Relationships (internal and external)
5. Management information applied for decision-making

The first section contained questions concerning the background of the interviewee (personal profile, previous positions, experience), and the background of the company (history, activities, business sectors and segments, goals). In the second section, we asked about the present job function of the respondent (job description, major assignments, share of time spent for each assignment). Asking these types of questions allowed us to gain relevant information on the overall activities of the respondent as well as being able to relate them to the overall objectives of the company. This gave us a frame of reference on which the following sections of the interview could be based.

The third section of the interview guide enclosed questions on the specific way in which the company creates value, on what creating value means in that operational context, and on what this process is founded. This allows the interviewer on the one hand to identify the main elements of the company's "terrain" (i.e. the "building blocks" with which the interviewee daily works) and, on the other hand, to understand the causes of the company's success or failure and how the respondents react to them.

The fourth section included questions on relationships between the company and its main business partners. So the interviewees have been asked for information on their main business partners, on the aims of the relationships, on their strengths, on their features, on the competences demanded to the partners in order to establish a satisfying relationship, on what makes a relationship easy or problematic to handle. This allows us to gain a deeper insight on the material and immaterial (knowledge) flows that link the interviewees' company to its business partners as well as to understand what is perceived to be critical in a relationship.

The last section focused on questions on the kind of measures (financial, non financial, etc.) the company uses for management purposes. This allows us to understand how much the company is "measurement-oriented" and if there is the need to identify new indicators in order to support the decision making process.

During the interview process we made use of asking for extensive amounts of examples and stories as reflexive-type questions much in the manner described by Kreiner & Mouritsen (2005). In this way we aimed at forcing the respondents to explain what really goes on during their workday and also to stimulate them to provide details and thoughts that were more detailed than we otherwise would expect to get.

Analyzing the data

Immediately after finishing each interview the interviewer wrote a brief résumé of the main points according to the 5 themes of the interview guide. Here we aimed at noting down exceptional examples or particularly interesting points being made. The interviews were transcribed in their full length and we applied a structural coding approach in the analysis of them along the lines of Krippendorff's (1980) recommendations. This coding tree was based on the full interview guide. After coding the interviews, a list containing the value drivers considered critical by the managers interviewed was prepared. The data-

analysis was initiated by first identifying the relationships among value drivers and secondly by identifying the causality types between value drivers and the particularities of the relationships.

5. Analysis and discussion

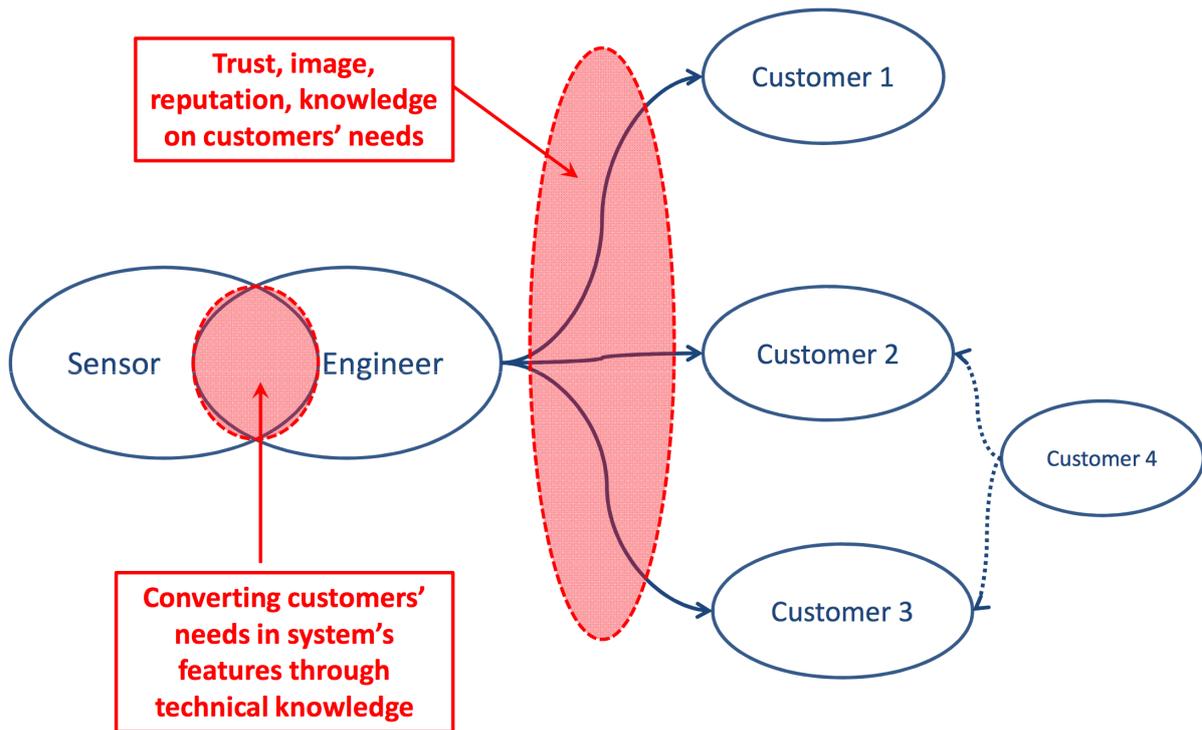
Due to the setting of this study being in relation to a series of network-based companies, the results generated may not be generalizable to all corporate or industrial settings. However, this particular setting may provide some interesting and exploratory prospects for the analysis being conducted due to the fact that the network-based setting inevitably will emphasize and exaggerate certain aspects of doing business. Hence, companies that do not at the present utilize their business networks to the same degree as the three case companies studied here, will be able to attain important insight from the study and use this for their own inspiration. The remainder of this analysis and discussion is structured so that the cognitive maps that were created on the basis of the empirical data are disclosed below. Thereafter a series of themes that go across the three case studies are discussed, leading to the conclusions of the paper.

5.1 Visualizations of the case companies

On the basis of the interviews, a visualization of each of the case-companies' value creation was generated. As it will be evident to the reader these maps take the form of distinctly different visualizations of the business model across the three cases studied. This emphasizes the inherent difficulties of creating so-called generic value creation maps because each network has its own particularities and characteristics. The implication of this is that suggesting generic performance measurement methodologies might become problematic. As such this study applies two different techniques in order to allow for the peculiarities of each network: cognitive maps and generic representations. Below each visualization is discussed briefly, with focus on the way in which the business models work, on the interactions among the actors involved and on the role played by the human resources in each of the three business models. Moreover, in the last paragraph of this section, the strengths of using cognitive mapping for analysing the network-based business models are discussed.

5.1.1. Visualization of the Red network

Figure 1 below depicts the associations between the actors that make up the Red network. In this network two main actors can be identified: Sensor, which provides the technology in order to identify people's movements, and Engineer, a consultancy firm which handles the relationships with customers. The primary activities relating to creating the product are carried out between "Sensor" and "Engineer" on the one hand and on the other hand the customer related activities are carried out between Engineer and the potential partners. The back-end part of the business model takes the form of a tightly knit Red network. This network is characterized by very strong interdependencies between the partners. Our data indicate that it would take between 9 and 15 months for either party to build up the activities of the other part.



<Please insert figure 1 about here: Red network>

Human resources in the network activate two main knowledge flows:

1. Engineer-customers: Engineer aims at explaining to the customers why they need Sensor's solutions, getting information about their needs and expectations. Engineer's reputation and image are essential in order to establish good relationships with customers.
2. Sensor-Engineer: The aim of this knowledge flow is to convert customers' needs into the features of the system through technical knowledge held by Sensor and Engineer.

Sensor's solutions can be used to get location data about cars and pedestrians. Even if the technology is exactly the same, these two segments are very different in terms of ripeness, growth scenarios and the willingness of potential customers. Cars traffic is a big success both for Engineer and Sensor. Getting location data about car movements supports the decision making process of the local government in relation to traffic planning. Sensor's solutions provide an exact picture of how the traffic flows, allowing planners to identify changes in traffic patterns. This information can be used to plan the local government's investments in roads and intersections in order to maintain and develop the road systems as well as to make traffic plans. So all the actors involved in this segment can clearly see the value of the reciprocal relationships. Both the knowledge flows (Sensor-Engineer; Engineer-customers) work very well. The value proposition of the network is very clear and Engineer's human resources play a central role in order to explain what is the value added both for Sensor and the local government.

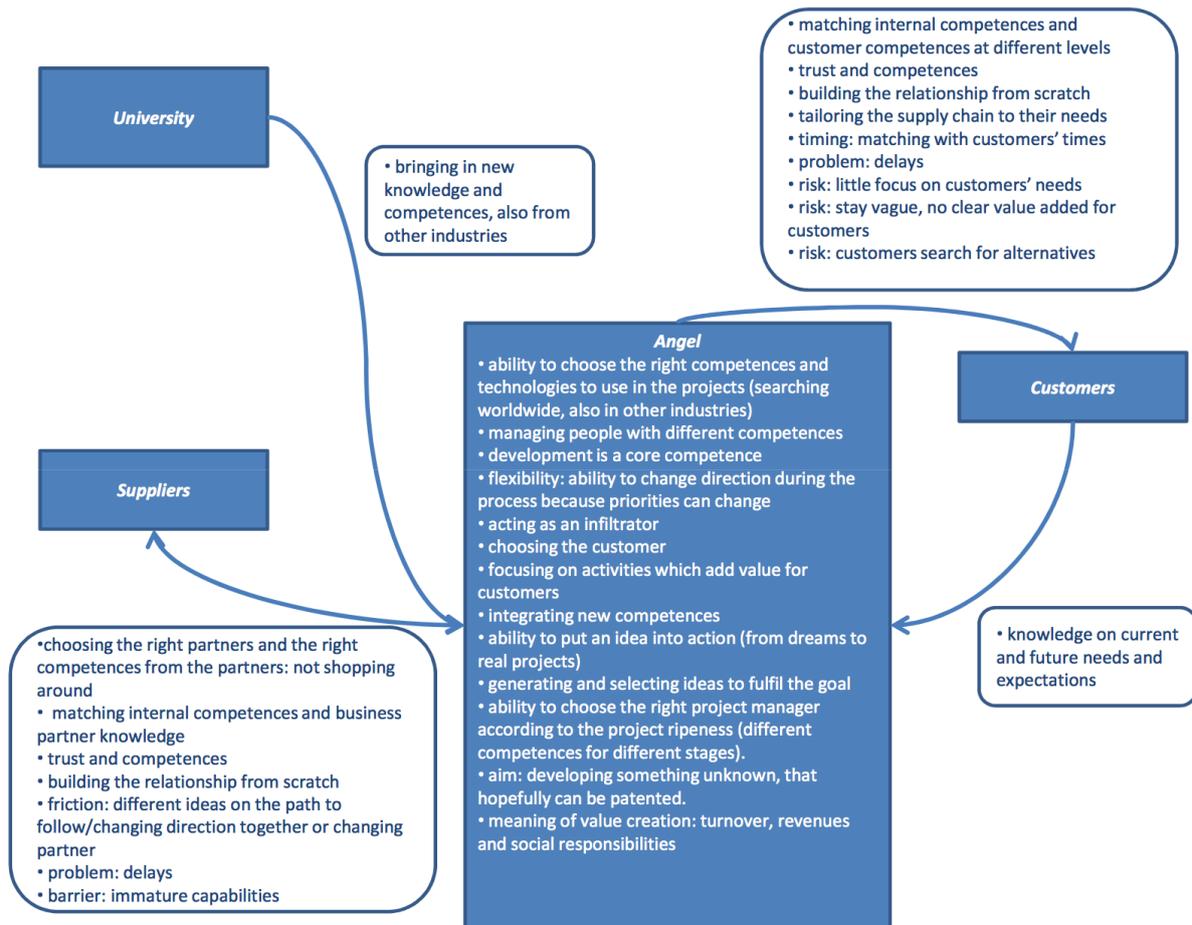
The pedestrian segment is still in its infancy. Here location data on people's movements have a high potential usefulness for retailers associations, shopping centers etc. Tracking how many people visit certain areas or how people move around the shops or the shopping centers (where they go, where they stop, for how long they stop) is very relevant in order to support their decision making process about events planning and shopping policies (advertising, shop-mix just to name a couple). Human resource types

involved in the network are concerned with building the business model from scratch. The knowledge flow between Engineer and Sensor works quite well. The relationship between these two companies is already proven. Moreover, the technology is the same as that of the car segment. However, the knowledge flow between Engineer and the customers does not seem to work properly. There is a distinct misalignment between the actors involved. On the one hand, Engineer's human resources think that customers are lacking financial resources to invest in the solution. At the same time, customers think that the solution is too expensive compared to the value they may get and clients notice that the relationship with Engineer is not profitable. In particular, customers could potentially get a closer relationship, while contacts with Engineer are still sporadic. Finally, another drawback which involves this relationship is that clients notice that they can't identify a stable team of employees in Engineer, which they can talk to. The team changes members from time to time and this "turnover" in Engineer's team makes it difficult for them to properly understand the customers' expectations (at least in the words of the customers), hindering the creation of a stable and close relationship.

It seems to be the case that Engineer's human resources are failing in explaining the customers the potential benefits of the solution and they have not succeeded in replicating the success received in the car segment. So currently there is no basis for establishing a win-win based relationship. This mismatch is locking the network-based business model: the value proposition is not clear and there is no consistency between the information needs of customers and the behaviors of Engineer's human resources.

5.1.2 Visualization of the Green network

Figure 2 below depicts an attempt at visualizing the value creation of the Green network. In this network one company, Angel, forms the central node of the network in a sense forming a network-based business model around itself.



<Please insert figure 2 about here: Green network>

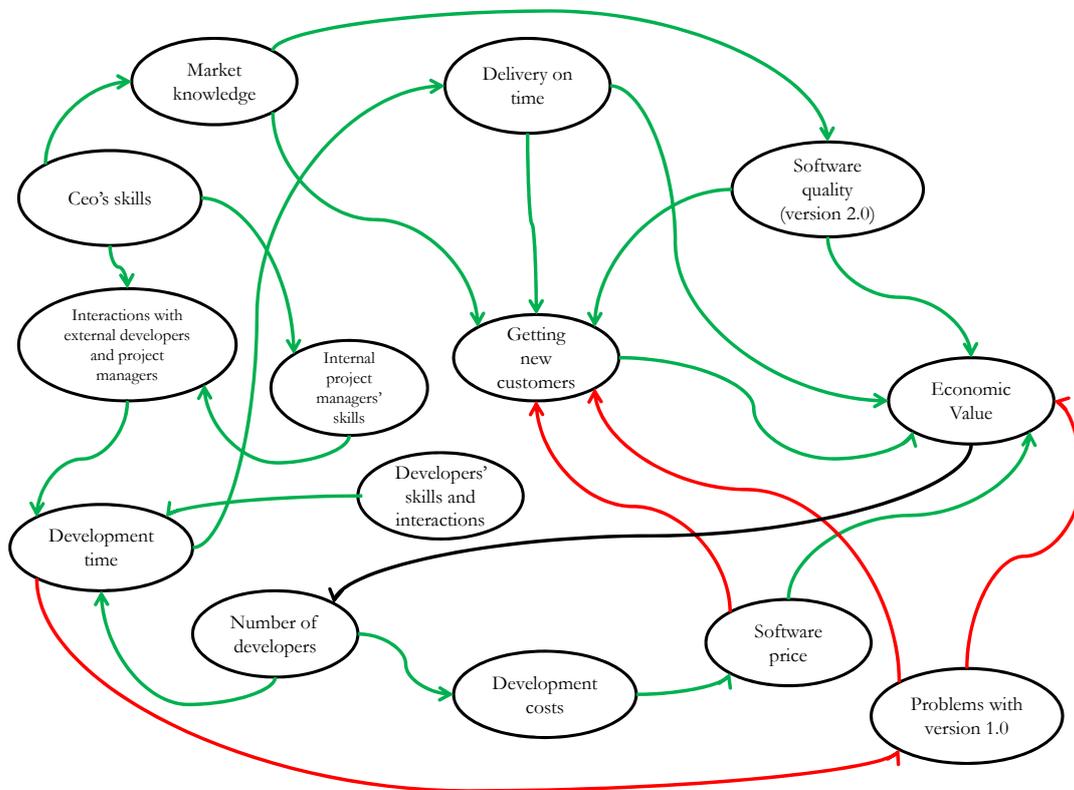
This company acts as a broker between suppliers and customers. It “chooses” its customers and tailors the supply chain to their needs. In particular, the project managers have to identify the future needs and expectations of customers, whether expressed or non-expressed. In this instance, the task is to search for competences and technologies, which are able to meet the customers’ needs. The search process is worldwide and also covers related industrial segments in order to gain access to extra competences. In fact, projects almost always diverge from one to another, leaving no room for standardization and enhancing the relevance of creativity and flexibility. This entails a central role for human resources in the business model building and operations.

In such a context, it is essential for project managers to know the right time to change paths and e.g. when to integrate extra competences from the outside (e.g. from a university). Priorities can change over time and the project managers have to be ready to take opportunities as they emerge. Moreover, building relationships from scratch is all about trust between the companies involved. As it is typical in radical innovations, the starting point of each project is so intangible and unclear that a high degree of trust is essential. In a sense, trust means that all the companies involved have to be ready and available for changing direction as the projects move forward and change features. In the beginning of each project, there are many possibilities and paths that can be taken to reach the goal. Angel and its business partners have to accept the risk of changing paths (as well as the delays entailed) as the projects proceed in order to

keep the projects consistent with customers' needs. Otherwise it is likely that customers will search for alternatives. Hence, Angel's human resources are actually building the business model from scratch in each case and they explore new opportunities by analyzing customers' needs and choosing the right competences from the right business partners. In other words, this business model is constantly in progress.

5.1.3. Cognitive map of the Blue network

Figure 3 below depicts a causal map of the Blue network. In this visualization, it has been possible to identify the specific value creation activities of the network and their relationships. This enables a much more precise performance measurement, albeit also has the drawback of becoming very detailed. Perhaps too detailed for managerial purposes.



<Please insert figure 3 about here: Blue network>

Going deeper into the analysis of the network, four main human resources can be identified:

- the CEO
- the project managers
- the external developers and external project managers
- the customers (10 NGOs)

The interactions and relationships among these four categories of human resources can be considered as the core knowledge of the network, i.e. the knowledge on which the value creation of the whole network is based. The CEO acts as a “bridge” between the customers’ expectations and the development department’s tasks, in the perspective of a win-win based relationship. His understanding of customers’ needs is essential in order to create software that can be considered useful for clients. So the knowledge flow between the CEO and the customers is very relevant, probably the most relevant because it becomes a lifeblood for the network itself. Discussing special issues within the system, how to test it and how to bring it to the field allows the CEO to “translate” the real requirements of customers into technical features of the software. This step takes place during the meeting with the external developers and project managers. Here there is a combination among skills, competences and experiences of these individuals in order to bridge the gap between the clients’ expectations and the technical features. The knowledge that flows among these subjects is very technical and concerns details about the systems employed (developments, functionalities and deadlines).

Of course there are also other value drivers in the business model of the Blue network. These are not related to human resources, but financially related (economic value, development costs), process related (development time, delivery on time) and customer related (market knowledge, getting new customers). These value drivers can act as hindering or enabling factors for human related value drivers.

5.1.4 Cognitive mapping versus other visualization techniques

Comparing cognitive mapping as applied in the Blue network with the more general representations of the Red and Green network allows us to identify strengths that characterize of the former over the latter. In fact, cognitive maps can provide very useful information in order to analyze the network-based business models under three perspectives: dynamism, alternative courses of action and performance measurement.

Cognitive mapping enables us as researchers to visualize and to explain the managers’ mental models, thus reproducing the specific ways in which a company creates or destroys value. The nodes of the map are the value drivers, which the management considers important to create or destroy value, while the arrows identify the relationships among the value drivers. Such relationships among the value drivers can be of different natures. They can be:

- positive (green lines), when one value driver positively affects another one;
- negative (red lines), when one value driver negatively affects another one;
- doubtful (black lines), when the influence of one value driver on another one is uncertain.

This tool makes it possible to identify the most important value drivers and to visualize the relationship network among them, representing the peculiar way in which value is generated or destroyed in a given operational context. Moreover, the map enables us to understand the ways in which managers perceive the succession of events, give meaning to the relationships between the events themselves and evaluate alternative courses of action. In other words, managers can assume that a certain "path", made up by decisions and actions, is going to lead to a particular outcome, that is, the creation or the destruction of value. So the map can be considered a framework, which gives the managers the opportunity to search for alternatives and to change “path” in order to increase the value generation.

Finally, the causal map can be considered the basis for setting up a new measurement system or for improving and updating an already existing measurement system. In particular, the map can be considered

the foundation upon which to build a specific set of indicators, improving the selectiveness of the system and avoiding the risk to squander the management's attention. So, compared to other visualization techniques, cognitive mapping can be considered a very powerful tool in order to understand and to measure how a network-based business model works as well as the role played by the human resources inside the business model.

5.2. The effect of the human resource factor

Our working hypothesis has been that if human resources are an important asset to the value creation – and ultimately to success – of the business model, then they are also important to manage correctly. Through our interviews in the three networks we studied, we tried to ascertain which factors that precisely added value to the company, among them human resources and other asset classes. We disguised these questions through the metaphor of “value drivers” and asked our respondents to describe the value drivers of the company and their potential interrelatedness. As described in our methodology section, we put much weight on respondents being able to exemplify their “value driver hypotheses”. From the data a series of generic themes concerning human resources as value drivers in the network-based company reveal themselves.

Human resources are often assumed to create value by integrating other types of knowledge resources and assets and by enabling the interaction of other knowledge containers such as customer relationships (Osterwalder & Pigneur 2010), processes and technology (Mouritsen et al. 2003). Whilst the applied verbs of the traditional literature tend to be integrating and enabling, we find evidence of building as an important notion in our data. Here the building of relationships is highlighted as a key effect for the success of the network-based business model.

In the case of the Green network we studied, the business model may at first glance seem to be rather complex because it involves a portfolio of companies with differing competences and needs according to the various projects being undertaken (see figure 2). Furthermore, being a relatively new business area in an established company introduces a tension of fragility into the business model because Angle is forced to build the relationships with new types of customers and suppliers from scratch in almost every instance. In a setting of stable relationship types one may be left pondering why precisely this is problematic. However, in the case of the Green network every company involved has to find its role in each project, preferably in the perspective of a win-win based relationship, and this is a complex task.

Together with building relationships, networking skills is found to be an important factor for success. For these network-based businesses, attaining sufficient and suitable competences is to a large degree an international search process across geographical and industrial borders. One respondent stated: “The final aim of the projects is to develop new knowledge or technology that hopefully can be patented or trademarked. From this perspective, the networking skills of the people inside the company are essential as well as their sensitivity to understand what kind of competences are needed in every project and in each stage of every project”. The importance of human resources is emphasized in situations where standardization of processes, deals and business setups are impossible, and therefore human resources are constantly correlated to qualities such as creativity and flexibility. This entails a central role for human resources in the building and effectuation of network-based business models.

In several instances the interactions and relationships among these human resource based assets are considered as the core knowledge of the network, i.e. the knowledge on which the value creation of the whole network is based. We also found evidence of human resources playing important roles in relation to

the brokerage of knowledge and competences and how to effectively combine such assets to create value. In one of our cases, the CEO specifically stated his role to being a broker between the expectations of customers and the network's own R&D competences with the aim of creating win-win based relationships. This particular respondents' understanding of customers' needs was an expression of the necessity of creating a software package that would be useful for clients. So the knowledge flow between the CEO and the customers was the cornerstone of the network's business model. A useful metaphor for this enactment is that human resources are the engine of the network-based business model, while the relationships among these particular human resources, which are all about enabling knowledge flows, can be considered the fuel which allows us to switch the business model on.

Like every engine – or organization for that matter – wear and tear will inevitably lead to some sort of maintenance and service. In our investigation of these three network-based business models we encountered several instances of fragility and risk. The high relevance of human resources in the value creation seemed to entail certain drawbacks. In the case of Green, the fragility of the business model became evident in cases of minor changes regarding required competences or minor mistakes concerning procurement of new knowledge from external partners that potentially could destabilize the whole network. For the Green network, it was a major concern that the relationships with business partners were relatively weak, as the perceived risk of losing these partners was higher than with well-established business partners.

This risk of “partner turnover” was also very explicit in the Red network. Human resources were perceived essential for the development of the business model because they acted as a bridge between the customers' needs and technological solution provided. This entailed a very strong synergy between the two key partners (see figure 1), making them highly integrated at both marketing and technology levels. The stakeholders in this network highlighted issues of instability in the human resources of both of the key partners. Hence the stability and continuance of the team members was equivocated to stability in human resources, primarily due to the costs of contacting and communicating with new team members (as seen from the perspective of the external stakeholder). Such challenges are not unusual and can to some degree be handled by use of structured customer relationship management and clear communication channels. However, the “customers” of the network perceived personal contacts and face-to-face communication as key facets in establishing meaningful business, and this “production constraint” challenged the two key partners' ability to change their project teams according to their own management challenges. As such the fragility of human resources became a risk on several levels of performance simultaneously.

On a final note, some of the anecdotes presented by the respondents indicated risks of lacking internal knowledge sharing. In one case this impeded a network from replicating the success in one business segment to another business segment. In another case lacking internal knowledge flows disabled the network from being able to properly explain to potential customers the value added of the technical solution. Thereby the lack of communication among the human resources in the network created a barrier for the success of the business model.

In the Red network, human resources activated two main knowledge flows, namely cross-selling and knowledge of technology. The customer partner lives on having an established network for cross-selling, and its reputation and image of being objective and reliable are essential in order to establish good relationships with customers. This establishes a huge amount of trust between this company and its customers. The aim of the knowledge flow relating to knowledge of technology is to convert customers' needs into system features. This knowledge conversion is expected to increase the intelligence of the solutions.

This study also illustrates that human resources cannot stand alone, and that the correlation with the other generic types of value drivers that make up the business model are key aspects to be managed. By other generic value drivers we mean e.g. financially related (economic value, development costs), process related (development time, delivery on time) and customer related (market knowledge, getting new customers). These value drivers can of course act as hindering or enabling factors for human related value drivers, but the study here illustrates that human resources often become the enabling factors of other value drivers. For example, market knowledge can stimulate the skills of software developers. A deeper understanding of customers' needs could potentially boost the creativity of these individuals. In other words, the availability of customer insight knowledge in close proximity to software developers, e.g. inside the development team itself, could potentially enable the alignment of the value proposition of the network to the customers' expectations, in turn activating the business model in the desired direction.

However, the other generic value driver types can also hinder the activity of human resources. For example, the Blue network experienced some problems with an older software version due to a lack of financial resources. In particular, this hindered the proper investment in software development and created two negative effects. On the one hand, the development process was very slow, as the internal department consisted of only two software developers. This meant delays in deliveries. On the other hand, the software quality was low since there was a gap between its real functionalities and the customers' expectations. Finally, the outcome of this negative combination was the loss of customers. From this perspective, the lack of financial resources became a "cage" for the business model. It hindered the full deployment and mobilization of human resources with negative effects on customer satisfaction and on the value creation of the network.

5.3. Particularities of the relationships that generate success

In section 5.2 above the importance of relationships, and also the risks connected with the potential fragility of relationships, for business model success, were emphasized in several instances. Human resources were perceived as brokers of competences and customer needs, in a sense being mobilized as mediators of value creation. Our empirical data suggest that human resources act as brokers between the other value drivers in a company. It might be counter-argued that human resources are in fact the true value drivers of business models while other "drivers" merely are the key resources? Relationships too were the focal point of problems stemming from the lacking stability of contact teams. In other industries, e.g. the software industry, stability is sometimes perceived as problematic because it may indicate that too little new knowledge is being acquired. Therefore, this section digs into the particularities of the relationships that are the cornerstones of generating success.

Strong customer relationships were important drivers of success because they gave access to understanding customer needs. Respondents talked of choosing specific customer segments and even specific customers and tailoring the supply chain to their needs. In particular, in the Green network, the project managers speculated in identifying the future needs and expectations of customers, both explicitly expressed and non-expressed expectations. Hence the ability of the project manager focus specifically on the activities that really adds value for customers is important. After identifying customer needs comes the search for competences and technologies, which are able to meet those needs.

In the Red network there were two key partners and the relationships in the whole network context were characterized as being either technologically oriented or customer oriented. In both instances the reputation of the partner was a key success factor. At the same time the contextual differences among

customer and technology relationships created an uneasy relationship in the network. We identified significant differences according to dimensions such as:

1. The overall business model of the partner companies
2. The culture of the employees
3. Differences in focus on the project from top management in relation to the overall activities of the partner companies
4. Personality differences among key contact points

The above factors seemed to be enhanced by the fact that one of the key partners was very dependent upon the financial success the common product, while the other was not. This created a lot of tension in the relationship, stressing the importance of equality and of pre-determined conditions. Nevertheless, the relationships that define the Red network enable one partner company to access new customer groups with its product and the other partner company to cross-sell to existing customers, in turn creating a greater lock-in of these customers. Together these two companies are able to build a business model that they cannot develop by themselves without the risk of simultaneously creating another competitor. As such, actors involved in this network are aware of the value of these reciprocal relationships.

5.4. Special thoughts relating to the fact that these were network-based business models

As this paper reflects on a study of network-based business models, caution must be taken in generalizing the results to a standard corporation context. However, as more and more companies are realizing that networks have the ability to create e.g. rapid scalability and access to global sourcing through network-based ventures, our data here may give important insight into aspects that are important to focus on. The potential fragility of relationships is one such aspect that may be more problematic for network-based companies, even though the scalability prospects mentioned above could outweigh such problems from a cost-benefit perspective.

To exemplify this, one of our cases illustrated a series of drawbacks relating to difficulties in keeping the best software developers employed over a longer period entailed a reconsideration of the business model as a whole. The CEO of the Blue network came to a turning point and decided to expand R&D activities by outsourcing the development process of the software. On the one hand, this allowed the company to save a considerable amount of financial resources because the development costs were lower with the external department. On the other hand, this shift permitted to get a flow of new human resources in the business model, overcoming, as a consequence, the bottleneck experienced in the past. Moreover, the flow of new developers has the potential to “unlock” the business model, which was previously stuck because of the lack of skills and competences. Acquiring new human resources is an essential precondition to make the business model effective by improving the development time and the software quality. This choice brought to the current shape of the business model. This shape should allow Blue to achieve its key targets of getting a new software version ready, selling it to new customers and thus raising financial resources. The external development department, in fact, can be considered as a scalable model for the Blue network. In this network outsourcing minimized operational risks (but probably induced a new set of risks that were not discussed in the interviews).

Even though it may increase “relationship-risk” the example above illustrated how outsourcing could increase success through flexibility and scalability. Our data indicates that network-based ventures

encounter problems of explaining the whole value proposition of the network and this can be a hindrance to acquiring customers. This may not be problem solely for network-based companies as normal corporate structures may encounter problems of complex value chains e.g. becoming hindrances for clear marketing and communication. Another problem of the “whole” relates to equality of focus and of need to perform between network partners. However, we find multiple examples of sub-optimization in the management control literature, which match well with this problem thereby indicating that it is not specific to a network context.

In a network-based company alignment becomes difficult. Above we saw how the alignment of goals focus and operational risks created problems. Alignment also became important in relation to cultural and personal aspects. While both aspects may also be present in traditional companies, solving these problems may be more difficult in network-based ventures. The ability to intervene from management is not present and as such some weight should be placed on how the choice of partners is conducted. This may not always be possible and some companies may be in the situation that they do not have any other networking possibilities than the partner they cannot cooperate with. This is an interesting perspective for further study, for example from a network facilitating perspective.

6. Conclusion

This paper set out to study the role of human resources in business model performance. It did so in the context of network-based ventures. The presences of human resources were, by themselves, significant value drivers in the three network-based business models we studied. We found human resources to be most valuable when mobilized in relation to delivering value to customers and also when they acted as mediators for other resource types such as financial capital, processes and other types of structural capital. In a sense, human resources acted as mediators of knowledge combinations in the network setting forming the basis of this study. As such, human resources were responsible for activating the business models and making them dynamic.

In fact, analyzing the role of human resources avoids the risk of focusing too much on the static and generic aspects of the business models, and therefore to a greater extent on illustrating the process of transforming inputs to outputs. On the contrary, examining the activities and the interactions of human resources allows us to understand how the business models really work, as well as their strengths and their weaknesses.

Human resources are of great importance for aligning the value proposition of the network as a whole to the customers’ needs and expectations. This requires a high degree of communication among the human resources inside the network. Otherwise, a lack of interaction can create barriers among the companies involved in the network, generating, as a consequence, the risk of misalignments.

Human resources also played an important role in forming relationships among the network partners constituting the businesses being studied. While the respondents spent much airtime praising the flexibility of human resources, their importance in network-based businesses and their role in value creation, our analysis revealed contradictory notions of the same set of resources. While human resource dependence was important, they too became problematic for network-based businesses because they entailed risks. Much of the risks were related to losing relationships and losing access to competencies and markets and our analysis indicates that structured customer relationship management and even also knowledge management has a potential to support risk management in these instances. So together with the terms

“integrating” and “enabling” which the traditional literature tends to use (Mouritsen et al., 2003; Osterwalder & Pigneur, 2010), we can add expressions like “building” and “aligning” in order to describe the role of human resources in the value creation process of the network-based business models.

This paper offers some interesting points for further research. Firstly, the notion of management is left rather unaddressed in this paper, apart from the fact that a lack of consequence-structure could be problematic in instances of conflict and disagreement. It would be interesting to pursue notions of creating management-ability in network-based business models without ruining the advantages of these by condemning them to a life of ordinary business. Questions such as; In which way do we go about solving problems of misalignment and how this challenges management, and how does management cope with fragile resource situation and relationship situations? Furthermore, is it possible to create a performance measurement system that can tackle a loosely coupled dynamic environment; and which at the same time leads to sensible management decisions? In this study, not very much information on performance measurement was uncovered. However, the data seems to suggest that there are certain – company specific – drivers of success. These can be analysed in relation to their role in the business model leading to the identification of relevant performance measures. One concrete suggestion for further research is therefore to create and validate cognitive maps for one or more network-based business models and apply this map as a platform of performance measurement in order to test the consequences of such a practice.

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