

Performance Estimation of Networked Business Models: Case Study on a Finnish eHealth Service Project

Marikka Heikkilä¹, Sam Solaimani², Aki Soudunsaari³, Mila Hakanen³, Leni Kuivaniemi³ & Mari Suoranta³

Abstract

Purpose: The objective of this paper is to propose and demonstrate a framework for estimating performance of a networked business model.

Design/methodology/approach: Our approach is design science, utilising action research in studying a case of four independent firms in Health & Wellbeing sector aiming to jointly provide a new service for business and private customers. The duration of the research study is 3 years.

Findings: We propose that a balanced set of performance indicators can be defined by paying attention to all main components of the business model, enriched with measures of network collaboration. The results highlight the importance of measuring all main components of the business model and also the business network partners' view on trust, contracts and fairness.

Research implications: This article contributes to the business model literature by combining business modelling with performance evaluation. The article points out that it is essential to create metrics that can be applied to evaluate and improve the business model blueprints, but it is also important to measure business collaboration aspects.

Practical implications: Companies have already adopted Business model canvas or similar business model frameworks and tools to innovate new business models. We suggest that companies continue their business model innovation work by agreeing on a set of performance metrics, building on the business model frameworks enriched with social measures of network collaboration.

Originality/value: This article contributes to the business model literature and praxis by combining business modelling with performance evaluation.

Keywords: Business Model, Business model innovation, Performance Metrics, Performance indicators, Business network, collaborative network

1: University of Turku & University of Jyväskylä, marikka.heikkila@ju.fi

2: Nyenrode Business Universiteit, the Netherlands

3: University of Jyväskylä

Acknowledgement: This study was funded by Tekes, the Finnish Funding Agency for Technology and Innovation

Please cite this paper as: Heikkilä, M., Solaimani, S., Soudunsaari, A., Hakanen, M., Kuivaniemi, L., Suoranta, M. 2014. "Performance Estimation of Networked Business Models: Case Study on a Finnish eHealth Service Project", Journal of Business Models, Vol. 2, No. 1, pp. 71-88.

Introduction

Business modelling is a widely adopted method in companies to generate new innovative business ideas. The purpose of a business model (BM) is to describe the general logic of business, including business value; the customer segment, service, organisation, technology and financing (Bouwman et al., 2008). In other words, a BM can be seen as a representation of the corporate or network strategy, and as the starting point for planning operative business processes (eFactors, 2002). A core virtue of a BM is its high-level and comprehensive view on business, which makes it an attractive tool for designing and representing new ideas. However, the literature on BM implementation and the measure of its performance is limited. Traditionally rooted in accounting literature, performance metrics (PM) can be defined as variables or indicators that express the effectiveness and/or efficiency of (a part of) a system or activity (Lohman et al., 2004). PM have been advocated as a promising instrument to evaluate and measure factors that are crucial to companies' performance. Most studies focus on a single company (Iqbal et al, 2012), use financial metrics (Lambert and Davidson, 2013), and are based on a certain system or tool, such as Balanced Score Card (Kaplan *et al*, 1992) or the Value Prism (Neely *et al*, 2002). As highlighted by Busi and Bititci (2006), Voelpel et al. (2006), and Ferreira et al. (2012), there is a gap in the literature relating to performance measurement of collaborative business models.

This paper aims to contribute to both BM and performance measurement literature by proposing a framework that integrates both streams. The framework enables performance estimation in the context of business models, particularly within networked settings. The case selected for this study illustrates how performance metrics are incorporated into the innovation process of the networked BM.

This paper is structured as follows: in the subsequent chapters we discuss business networks, BMs and performance metrics literature and conceptualize a framework. Next, we will describe our research method and demonstrate the practical usability of a performance indicator framework thru one empirical case of a networked business model and its metrics. Finally, we will draw conclusions and will outline opportunities for future research.

Business Networks and Business Models

There are several streams of literature on networked business, such as value creating nets (Parolini, 1999), Smart Business Networks (Vervest et. al., 2005, 2008), Industrial management & processing (Håkansson and Snehota, 1995), and economic sociology (e.g. Powell, 1990). Möller et al. (2009) have divided business networks to a basic, innovative, and a business creation network, where the partnership varies from operative to strategic. Even though in literature there are some differences in emphasis, the characterizations of business networks share many commonalities: the business networks are described as being formed by interdependent organizations (Vervest et. al., 2005, 2008) that are co-operating with each other, and consisting of specific roles and value interactions (Håkansson and Snehota, 1995) oriented toward the achievement of a particular task or outcome (Allee, 2008) in order to produce value add (Parolini, 1999). This paper focuses on collaborative networks having joint processes, where the partners share information, resources, and responsibilities to plan, implement, and evaluate activities to achieve a common goal (Camarinha-Matos et al., 2009, Pekkola 2013b). Overall, a collaborative network aims at mutual benefits for the stakeholders involved (Christopher et al. 2008). Also, trust is a required factor and enabler for co-creation, because the cooperation cannot be built purely on contracts (Lee and Choi, 2011). Without trust, the partners are not willing to share their knowledge and ideas, which is a crucial part in business creation. Trust can be reached through open communication and knowledge sharing (Gillespie and Mann, 2004; Allee, 1999), but also honesty, consistency and respect are needed elements (Larson and LaFasto, 1989).

Current studies on BM and BM innovation have mainly focused on definitions, taxonomies, and change methodologies for business models of individual organisations (e.g. Timmers, 1998; Amit and Zott, 2001; eFactors, 2002; Magretta, 2002; Hedman and Kalling, 2003; Faber et al., 2003; Lambert, 2008; El Sawy and Pereira, 2013). However, the networked nature of business is to some extent taken into account in BM and BM innovation literature (Zott et. al., 2011). For instance, BM Can-

vas (Osterwalder and Pigneur; 2010) and STOF (Bouwman et al, 2008) consider partners as a key component of a BM. Also the BM innovation literature underlines the importance of a networked approach in the concepts of open BM innovation (Doz and Kosonen, 2010; Chesbrough, 2006), co-creation (Schrage, 1995; Prahalad and Ramaswamy, 2000), value networks (Allee, 2008), and resources and capabilities within and across organizational boundaries (Bouwman et. al., 2008).

Author (2013) depicted networked BM innovation as a two-stream process, where 1) the BM is created and analysed by using the available BM ontologies and tools and 2) the change management concerns the selection and facilitation of learning between networked partners, alignment of strategies and processes, and feasibility assessments. Solaimani and Bouwman (2012) proposed a framework that identifies knowledge exchange, process alignment, and value exchange as core areas when analysing the inter-organizational interaction in the context of business model innovation. Figure 1 summarises our understanding over the triple role of a network's business modelling process in business networks: The BM for a collaborative network should also pay explicit attention to advancing (Heikkilä, 2010)

1. learning, knowledge sharing and trust between the parties, i.e. using BM as a boundary object (Star

and Griesemer, 1989; Brown and Duguid,1991; Bolland and Tenkasi, 1995).

2. agreement over processes and rules, which can be operationalised into formal coordination mechanisms, such as norms and contracts.
3. assessment of the risks, rewards, and fairness of the deal.

Performance metrics for networked business models

According to the literature, From a governance perspective, a network level performance measurement system helps to coordinate the network business and to steer the network actors to pursue the common targets (Cohen and Lee, 1988; Kulmala and Lönnqvist, 2006; Kaplan et al., 2010; Yin et al., 2011; Bititci et al., 2012), and increases the alignment of operations, communication, trust, and commitment in the whole network (Pekkola, 2013). Kulmala and Lönnqvist (2006) suggest that the network's performance measures should reflect the end users' perspective with both financial and non-financial factors. More generally, equity between networked actors has been emphasized by Leseure et al. (2001). Yet, so far there are limited stud-

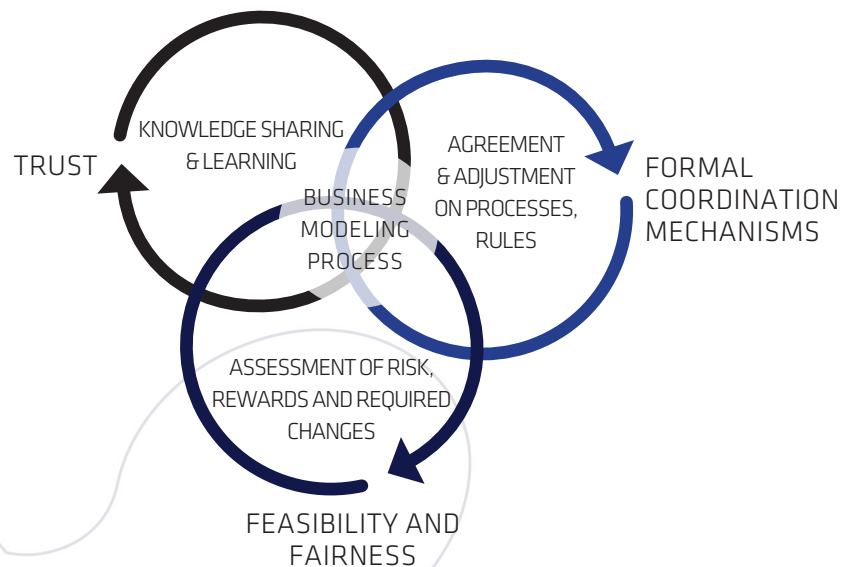


Figure 1 Three focuses of business modelling in business networks.

ies that focus on measurability of BM and BM innovation (Solaimani, 2014). Ferreira et al. (2012) suggest that collaborative performance measures should be defined to evaluate the BM. Voelpel et al. (2006) criticise the Balanced Score Card (Kaplan and Norton, 2001) and call for performance measurement frameworks that are suitable for networked business and are more dynamic. Furthermore, it is more common that the metrics are introduced only after the business is operating, even though we see that it would be beneficial to have a set of metrics already earlier, in the conceptual testing, piloting and/or prototyping phase of the innovation process. The metrics can then be utilized more dynamically to steer the development of the business idea, since the required changes and obstacles can be identified more easily.

Heikkilä et al. (2010) propose that performance indicators should be assigned for all main components of the BM. In the same vein we suggest that performance measurement starts with drafting a BM – using frameworks such as CANVAS (Osterwalder and Pigneur; 2010), STOF (Bouwman et al, 2008), VISOR (El Sawy and Pereira, 2013) or CSOFT (Heikkilä et. al., 2010) – to represent the business idea. As already mentioned, a BM acts as a dynamic boundary object (Star and Griesemer, 1989) helping the parties to communicate and share the business logic, understand each other's motives and goals, and to agree on joint goals and metrics for the cooperation.

Consistent with the commonly accepted BM building blocks, we propose the next five PM perspectives:

1. *Customers*: The aim is to understand the need of the customer, what kind of a customer relationship is established (Osterwalder and Pigneur 2010), and recognising differing customer segments.
2. *Service*: describes the intended and perceived value of the service, as well as how it is provided to the customer (Amit and Zott, 2001; Bouwman et al. 2008; Osterwalder and Pigneur 2002).
3. *Organisation*: describes the core tangible and intangible resources, roles and responsibilities within one or a network of organizations (Osterwalder and Pigneur, 2010; Bouwman et al 2008)
4. *Finance*: traditionally, financial performance has been the focus of PM studies. This perspective focuses on costs and revenues caused or shared between partners (Daas et al, 2013).
5. *Technology*: refers to information and communication technology (ICT), which enables the service, or supports the operations and collaboration. Some BM frameworks consider technology as a key element of a BM (Bouwman et al 2008), while others consider technology as a part of the firm's organizational arrangement (Osterwalder and Pigneur, 2010).

In addition, there are three network-oriented perspectives that have a specific focus on inter-organizational relationships and interdependencies (Heikkilä, 2010; Solaimani and Bouwman, 2012; Solaimani et. al., 2014). The network perspectives describe the constituent parts of a collaborative network, including shared processes, fairness, knowledge sharing and trust:

1. *Fairness and Value*: Ring and van de Ven (1994) and Leseure et al. (2001) point out the importance of equity in addition to traditional efficiency as criteria for assessing cooperative networks. Equity means 'fair deal', where inputs or outcomes are not always divided equally between the parties. We find this principle of fairness to be a distinctive character of collaborative networks. The partners are allowed to question the fairness of the deal from their point of view and either continue in the network or, if not satisfied, step out or renegotiate the terms of the co-operation.
2. *Information, learning and Trust*: The business model creation, negotiation and sense making give opportunities for mutual learning and knowledge sharing between the parties. During this interaction trust between the parties builds up (Ring and van de Ven, 1994). Trust is claimed to be the generic coordination mechanism in networks (Adler, 2001; Powell, 1990; Lorenzoni and Baden-Fuller, 1995).
3. *Processes and Formal Mechanisms*: Successful co-operation requires that the parties are willing to align their internal strategies and processes to better fit with the networked business model. This

includes alignment of processes both within each company and between the partners (Solaimani and Bouwman, 2012). The rules and practices have to be agreed on between the parties either thru social norms or written contracts.

To be able to improve the BM and to help turning the business profitable and sustainable, measures of the business from different perspectives are needed. We propose that multiple perspectives can be achieved by assigning metrics to each of the BM components described above.

Design Science Research

Following a design science approach, this article aims at developing a framework to be used in evaluating the performance of networked business models. Design science research focuses on systems or constructs that do not yet exist. Although any type of research method can be applied in design science research, typically studies are case-based, collaborative and interventionist (Van Aken and Romme, 2009). Our study is an action research case study (Baskerville and Wood-Harper, 1996) with a focus *“on research and learning through intervening and observing the process of change”* (Cunningham, 1997, p. 406). The interventionist approach means that researchers are collaborating with the organisation in developing actual solutions to problems, and contributing both to theory and practice (Dumay, 2010; Lukka and Suomala, 2014).

The case for this study was selected based on pragmatic considerations, such as availability and commitment of the actors, but we also find the industry it represents, the Health and wellbeing industry, a very interesting context; the industry is highly fragmented with several actors, such as hospitals, nursing care and wellness providers, and pharmacies as well as an increasing number of information and communication technology companies. E-healthcare solutions are likely to increase in the near future, thanks to emerging sensor and mobile technologies and big data analytics that allow new ways of collecting healthcare-relevant data. This, however, calls for novel collaborative business models and performance indicators. In our case study, the focus of the collaborating practitioners and scholars was to develop a common business model and related

performance indicators in parallel. The authors actively participated in the process of identification of metrics (Baskerville and Myers, 2004; Heikkilä and Kuivaniemi, 2012; Heikkilä et al., 2013). Both the researchers and the practitioners aimed at increasing the understanding of performance measurement in the context of networked business models.

Data collection and analysis

The data for this article was gathered in a research project, which started in June 2011 and is running until May 2014. The project is funded by one of the largest Finnish governmental innovation and research funds (Tekes) and the participating companies (Occupational health care provider, Pharmacy chain, Pharmaceutical producer, and an entrepreneur specialised in sports and pharmacy consultancy). The researchers are from a Business and Economics School, and have complementing backgrounds in sports, information systems, entrepreneurship and growth companies both from academy and business side.

In literature (Bourne et al., 2003), the PM work is described either as a facilitator-led process or as an expert-led process. In the former, the PM work is the responsibility of the management team, and consultants or other external persons are utilized as facilitators in workshops. In the latter, the indicators are defined by a group of individuals, typically experts, that more or less undertakes its work isolated from the management team. The approach is typified by a small number of workshops, where the work is reviewed with the management team. In our case example, the work method resembled more of the latter, since the management team consisted of persons from all participating companies and did not have meetings frequently enough to take the lead in defining the indicators in detail.

Table 1 shows the process, tasks and data produced/collected in the project. The process consists of five steps adapted from Verschuren and Hartogh (2005) presented in Table 2.

The empirical data are mainly collected based on 15 semi-structured interviews (Table 2). However, we utilised all our knowledge and insight gathered during the project (Table 1).

Table 1 The sources of data throughout different phases of the project

Phasing	Task	Data
Idea	<ul style="list-style-type: none"> • Discussing the initial idea and earlier solution proposal: discussing the ethical and financial value of the service on societal, network, company and customer levels. • Contacting and agreeing with the partners to take part in the BM innovation process. • Launching a multidisciplinary research project. 	<ul style="list-style-type: none"> • Videos, photos of the session and documentation of the concluding CANVAS. • Project plan
Requirements and assumptions	<ul style="list-style-type: none"> • Research on markets, • Open seminars on health and wellbeing • Selecting several Business Model tools. Workshops with the BM tool experts. Testing alternative BM tools (CANVAS, STOF, CSOFT). • Discussion of alternative IT solutions. 	<ul style="list-style-type: none"> • Marketing studies (3), • Memos from workshops (3) • IT requirements specification draft
Identifying the solution	<ul style="list-style-type: none"> • Creating business model descriptions for the network and for each individual partner. • Connecting the business idea with changes required in current processes. • Recognising challenges and performance indicators for a network business model • Analysing relations and trust between partners 	<ul style="list-style-type: none"> • Memos from brainstorming the networked business model with the partners (8), • Memos and BM canvas from the business modelling session with the partners (4), • Interviews of partners about the viability of the intended networked business model (4) • Interviews of network relationships (8)
Service process prototype	<ul style="list-style-type: none"> • Minimum viable product pilot of the service without IS support. • The analysis of the viability of service processes 	<ul style="list-style-type: none"> • Observations. • Questionnaire on customers' attitudes toward the intended service (2 rounds) • Interviews on service process (3)
Implementation	<ul style="list-style-type: none"> • Not yet defined 	

Table 2 The interviewees

	Company	Number of interviews
Interview		
The CEO	SME	3
Service development directors	Occupational Healthcare provider	4
ICT Developer Mng.	Occupational Healthcare provider	1
Pharmacist	Pharmacy	1
Sales and Marketing Pharmacy	Pharmacy	2
Marketing manager	Pharmaceutical producer	2
Doctors	Occupational Healthcare provider	2
Total		15

The interviews varied from one to one and half hours and were recorded. During the interviews, the interviewer made memos regarding meta-information, including the emphasis, reactions and expressions of the interviewees, and key concepts being discussed. After each interview, a short report was written about the essential topics that were discussed during the interview. Prior to the interviews, a case study protocol was developed to guarantee research reliability (Yin, 2004). As suggested by Yin (2004), the protocol consisted of five sections: the purpose of the study, data collection, report outline, question outline and evaluation.

The interview data is triangulated with other data sources (Yin, 2004), such as brainstorming and modelling sessions, company websites and project management meetings notes. Based on the data, the authors in a systematic way indicated an actual or potential issue that perhaps should be measured and evaluated. The issues were discussed in management meetings of the project

with the partners. Then, the metrics (Table 3) were derived jointly by the researchers and the entrepreneur. In the last phase, the performance data was collected, analysed and presented to the network partners.

Case Study: Physical Activity Prescriptions

This study analyses an innovative pharmaceutical case, in which a number of companies aim to collaboratively develop services that increase and improve the physical activity of their customers.

The service focuses on preventing health issues (e.g. obesity, type 2 diabetes) that are typical of Western industrialized countries. The core process in the intended business model goes as follows: A medical doctor (in the Health Care Company) prescribes the patient physical exercise instead of / in addition to normal drugs. The

changes in the physical wellbeing of the patient (e.g. body age index, body mass index, body fat percentage) are measured regularly at a pharmacy, and the patient is also encouraged to increase his or her physical activity level. The data from each measurement session is stored to a central database, and aggregated reports on the changes in the physical wellbeing of the patient or a group of patients (for instance employees of a certain company or industry) can be produced from this database. This data is available when the patient is seeing her/his doctor again.

The BM for the service is presented in Figure 2 using Canvas by Osterwalder and Pigneur (2010), which was already familiar to all, and adopted as a BM innovation tool in the internal processes of one of the partner organisations. The networked BM Canvas was jointly created in workshops facilitated by the researchers. It recognises two customer segments, the first being the patients and the other segment consisting of employers, i.e. companies that have a contract with a Health Care Provider for occupational healthcare¹. The value proposition to the

1 In Finland it is obligatory for the companies to arrange occupational healthcare for their employees and most companies buy it from Health Care Companies.

patients is that they will be more motivated to exercise as they get more holistic health services and also verified changes in their physical wellbeing. From the employers' perspective, the intended service helps to keep the employees more fit, leading to less absence from work.

The next step was to define the metrics related to the eight perspectives of the framework proposed earlier. Based on the research data, the researchers proposed to the practitioners the objectives or critical factors that should be measured from each perspective. For instance, customer retention was one of the main concerns of the companies, which has led them to include 'drop out rate' as one of the service-driven metrics. In addition, the companies involved suggested other issues, such as user experience, process quality and willingness to share knowledge, to be subjected to measurement. Collaboratively, the authors and the entrepreneur constructed a set of performance metrics for all these issues. For instance a modified servqual metrics (Parasuraman et al., 1988) was selected to measure user experience, and the number of errors/reclamations and time spent in handling reclamations provides a measure of process quality. The indicators are presented in Table 3.



Figure 2: Business Model of the empirical case

Table 3 Performance metrics for the empirical case (the metrics that we analysed in the pilot are in italics).

Perspectives	Objective	Performance metrics
Customer	Potential customer base, market visibility	<i>Number of potential customers in different segments</i> Number of national mainstream media articles
Service	User experience, Value	<i>The dropout rate from each of the service steps/ The second purchase rate</i> <i>Servqual (Parasuraman et al., 1988)</i> <i>Willingness of customers to recommend the service to their friends</i>
Technology	Applications, Architecture, Hardware, Data	Service providers' data base visits -% Availability (24-7) & response time Extensibility of new functions Quality, integrity
Organisation	Organization network, complexity, density and structure	<i>The reach of service providers related to the geographical dispersion of the customers ("we reach 82% of Finns")</i>
Finance	Profitability, cost/risk	Net profit % ROI Revenue growth %
Fairness & Value	Fairness, sharing of risks and costs	Fairness of value distribution: <i>How does value creation occur to every network partner?</i> Intention of partners to continue in the network
Information, Learning & Trust	Knowledge availability; Level of trust	<i>Frequency of interaction</i> <i>Quality of interaction: openness (feelings, emotions, out-of-the-box ideas,), genuine listening</i> <i>Quality of and: critical and, shared targets, knowledge sharing</i> Losada line (Losada and Heaphy, 2004) Interparty Trust: "The partner firms in the alliance can be trusted to make sensible alliance decisions", "The counterparts in each company provide required information" (Luo, 2008)
Processes & Formal Mechanisms	Process intensity Process quality Process flow Diversity of processes	Number of active participants in each network organization Evaluation of processes: Number of errors/reclamations & Handling of reclamations (time, number of contacts)

Performance measurement results

Before further investments, the partners decided to develop a proof-of-concept. Accordingly, they aimed for testing a minimum viable product (Ries, 2011). In the management meeting all agreed that the first initial performance estimates could be done during the pilot study. In the pilot, four medical doctors in the occupational health care company prescribed physical exercises to their patients. The physical wellbeing of these patients was tested in a local pharmacy two times: immediately after getting the prescription, and again 3 months later.

The researchers collected measures about customers, service, organisation, fairness and value, knowledge exchange and trust. The pilot study focused on testing one part of the process, as well as customer satisfaction and value add. Therefore, the metrics regarding the IT and database solutions and the financial arrangements were not included. The performance metrics data was collected via a questionnaire filled by the patients during their visits to the Pharmacy for check up of their physical fitness, by interviewing the company representatives and also the doctors taking part in the pilot, and by market analysis (Table 1). The results of the measurement are:

Customers: As basic service can be operationalised without extra investments on health and wellbeing technology by the employees or employers, at its best, this mass-market service concept can reach the whole population. However, the service is designed to take into account the everyday practices of people with medical conditions requiring regular appointments with the doctor and visits to pharmacies to collect the medicine. These are considered to be the group that would benefit most from improved physical wellbeing, because it helps them to cope with the underlying medical condition. Therefore, based on statistics², we estimated that the potential size of the customer segment is 40% of Finnish citizens.

Service: In the pilot 66% of the patients returned to the second physical fitness test after 3 months of the

first measurement (drop out rate 33%). This percentage was found by the partners (i.e., occupational health care provider, MD's and pharmacies) to be on a satisfactory or even good level. Therefore one of the greatest uncertainties related to the success of the service, the commitment of the patients in the service, was found not so worrisome after all. The servqual questionnaire results showed high measures on all aspects of service quality. Furthermore, a clear majority of the patients were willing to recommend the service also to their friends (97% in the first round, 83% in the second round).

Organisation: The health care provider company currently has 16 000 corporate customers and 500 000 occupational healthcare customers, covering 20% of the Finnish workforce. The pharmacy chain, in turn, has 73 pharmacies located all over Finland. However, as such the current network of pharmacies cannot reach the whole potential customer segment or the volumes of the health care company. Some of the interviewees raised this as an issue restricting the number and locations of customers that can be offered this service. Whereas the performance measures on customer segment and service value show that there is potential in the planned BM, the results from the business network aspects pointed out some weak spots in the plan.

Fairness & Value: All the partners saw the financial potential of the BM, but the values and aspirations of different actors aroused questions, such as *"We have several stakeholders in this complicated network, we have the pharmacy side, medical doctors, service providers who evaluate whether prescriptions are used, and us... it is not clear which value propositions all these actors, individually and collectively, are focussing on now, and if these values will be different in future"*. Also the sharing of costs and benefits was still unclear: *"...we have all the lego bricks, we can actually build the process, but are we all going to have our shares?"*

Communication, Learning & Trust: To support open knowledge sharing a more open and personal communication should be reached (Barnett et al. 2010). One partner commented: *"Still I see that the meetings are still more formal than they should be, thinking about trust building and conduct, communication could be more open"*. Also another partner required openness:

² http://www.terveyskirjasto.fi/terveyskirjasto/tk.koti?p_artikkeli=suo00060#s1

"I long for straight talk; that all could say straight what they want and expect". A more frequent interaction was hoped for and the trust among the partners had not developed at the expected pace, which is put into words trust building and conduct, communication could be more open. Also another partner required openness: "I long for straight talk; that all could say straight what they want and expect". A more frequent interaction was hoped for and the trust among the partners had not developed at the expected pace, which is put into words by one interviewee: "It (trust) would be developed more if we had more discussions and moments for communication." Another interviewee highlighted that the level of trust and community will regress when the shared experiences and doing decrease.

Discussion

Models and frameworks are helpful for clarifying abstract concepts and constructs. But to be useful in practise, a framework must be applicable to the conditions in which it is to be utilised. The proposal presented in this paper is designed to take into account the prevailing practices and processes of practitioners and just enhance them with performance measurement. The process of developing the performance metrics in our case study followed steps that are commonly identified in literature (Krause and Mertins, 1999; Bourne et al., 2003):

1. **Develop a model of the object of study.** When organisations are innovating collaborative business models together, they typically use some BM ontology (such as CANVAS or STOF) to design their business model. This ontology then serves as a boundary object between the partners, facilitating learning and exchange of knowledge between different parties. We suggested the companies to use business model ontology as a starting point also for performance measurement work and supplementing it with specific perspectives concerning networked environment.
2. **Identify the critical factors.** We used the eight differing perspectives on the collaborative business model to identify the important factors.

3. **Define the performance indicators.** The indicators were selected first based on discussions with the management board and complemented with the suggestions from relevant literature. Each of the 8 perspectives was associated with at least two indicators. In our case, 22 indicators in total were defined.
4. **Gather and verify the data.** The first data was collected in a pilot study covering 5 out of 8 perspectives. We utilised questionnaires, interviews and market surveys.
5. **Evaluate the performance indicators.** The data was analysed and performance measures presented. The performance measures resulted in some changes in the networked BM discussed below.
6. **Implement a continuous process.** To be done

Implications to the networked BM: The findings from Performance estimation caused some changes and improvements to the BM. For instance, to hinder the drop out of customers from the service, the variety of channels for contacting the customers was increased with email, SMS notifications and phone calls. A more profound change was done to improve the business network's coverage of a potential customer segment by introducing alternative means to take the physical wellbeing measures; in addition to pharmacy, the Health Care Provider Company may take the measures or the patient may buy measurement devices and take the measures independently at home. These alternatives would allow the service to reach a considerably higher number of customers. As concerns the fairness and value doubts between the partners, the next major effort was to evaluate how the service would be linked and combined to the other service processes of the partners, and how much synergy effects could be achieved there.

Finally, the results show that the partners in our case network consider it important to focus on trust and communication already from the beginning of the co-operation. They see that knowing the others personally, open communication, and the "we spirit" are valuable when knowledge is to be shared over company

boundaries. This openness would facilitate out-of-the-box thinking and provide room for innovation.

Conclusions

In this paper, we study the concept of performance measurement within the context of networked business models. We propose an integrative framework and a set of corresponding performance indicators, all of which help to estimate the performance of the business model. The proposed framework underlines the importance of eight perspectives, i.e., 1. customer, 2. service, 3. technology, 4. organization, 5. finance, 6. fairness & value, 7. information, learning & trust, and 8. processes & formal mechanisms. When metrics are defined for each of these perspectives, it is possible to evaluate the performance of the BM including the inter-organizational relationships and interdependencies within the business network. A set of metrics taking differing perspectives on the business model may also spot potential challenges and changes needed in the business model and business network arrangement.

In line with action research principles, the framework was used throughout the process of the creation of a BM in the network of several companies within the Health and Wellbeing sector. In this regard, multiple performance metrics were defined to evaluate the business model from the eight perspectives. Next, measurement data was collected in a pilot study to show the potential of the intended business model, while metrics pointing out the areas in need of improvements. Our analysis indicates that in case of col-

laborative BM innovation, it is important to formulate metrics to evaluate the BM, which, in turn, help identifying problematic issues at an early stage.

This article contributes to the business model literature by combining business modelling with performance evaluation. The article points out that in collaborative business model innovation it is important to create metrics that can be applied to evaluate and improve the business model blueprints. As evidenced in our case example, by collecting metrics the problematic issues can be found early, and the BM can perhaps be adjusted to overcome the problems.

Last, we can draw some suggestions on the procedure of BM performance evaluation. The companies first utilize the BM as a boundary object (Star and Griesemer, 1989), helping the partners to reach an understanding, and then continue the business modelling process by agreeing on a set of performance. Compared e.g. to switching to use the balanced score card, this is an easier way for evaluating the BM, because the partners can continue using the already-in-use BM tool as the framework for defining the metrics.

There are still many ways in which we can further our understanding on this topic. Here we defined the performance metrics for a potential networked business model. It would be fascinating to study the performance metrics as the networked business evolves from the early phases to maturity, and to closing stages. This would provide a dynamic view on how the set of metrics and their relative importance changes in time.

References

- Adler, P. (2001), Market, Hierarchy, and Trust: The Knowledge: Economy and the Future of Capitalism, *Organization Science*, Vol. 12, No. 2, pp. 215–234.
- Allee, V. (1999), The art and practice of being a revolutionary, *Journal of Knowledge Management*, Vol. 3, No. 2, pp. 121-131.
- Allee, V. (2008), Value network analysis for accelerating conversion of intangibles, *Journal of Intellectual Capital*, Vol. 9 No. 1, pp. 5-24.
- Amit, R. & Zott, C. (2001), Value creation in E-business, *Strategic Management Journal*, Vol. 22, No. 6-7, pp. 493–520.

- Barnett, M., Anderson, J., Houle, M., Higginbotham, T. & Gatling, A. (2010), The Process of Trust Building Between University Researchers and Urban School Personnel, *Urban Education*, Vol. 45, pp. 630-660.
- Baskerville, R. & Myers, M. (2004), Special issue on action research in information systems: making is research relevant to practice –foreword, *Mis Quarterly*, Vol. 28, No. 3, pp. 329–335.
- Baskerville, R. & Wood-Harper, A-T. (1996), A critical perspective on action research as a method for information systems research, *Journal of And Technology*, Vol. 11, pp. 235–246.
- Bititci, U., Garengo, P., Dörfler, V. & Nudurupati, S. (2012), Performance measurement: Challenges for tomorrow, *International Journal of Management Reviews*, Vol. 14, No. 3, pp. 305-327.
- Bititci, U., Mendibil, K., Martinez, V. & Albores, P. (2005), Measuring and managing performance in extended enterprises, *International Journal of Operations & Production Management*, Vol. 25, No. 4, pp. 333-353.
- Boland, R. J. & Tenkasi, R. V. (1995), Perspective Making and Perspective Taking in Communities of Knowing, *Organization Science*, Vol. 6, No. 4, pp. 350-372.
- Bourne, M., Neely, A., Mills, J. & Platts, K. (2003), Implementing performance measurement systems: a literature review, *International Journal of Business Performance Management*, Vol. 5, No. 1, pp. 1-24.
- Bouwman, H., De Vos, H. & Haaker, T. (2008), *Mobile service innovation and business models*. Springer.
- Brown, J. & Duguid, P. (1991), Organizational Learning and Communities of Practice: Towards a Unified View of Working, Learning, and Innovation, *Organization Science*, Vol. 2, No. 1, pp. 40-57.
- Busi, M. & Bititci, U.S. (2006), Collaborative performance management: present gaps and future research, *International Journal of Productivity and Performance Management*. Vol. 55, No. 1, pp. 7-25.
- Camarinha-Matos, L. M., Afsarmanesh, H., Galeano, N. & Molina, A. (2009), Collaborative networked organizations– Concepts and practice in manufacturing enterprises, *Computers & Industrial Engineering*, Vol. 57, No. 1, pp. 46-60.
- Chesbrough, H. (2010). Business model innovation: opportunities and barriers, *Long Range Planning*, Vol. 43, pp. 354-363. Chesbrough, H. (2006), *Open business models: How to thrive in the new innovation landscape*, Harvard Business School Press.
- Chesbrough, H., & Rosenbloom, R. (2002), The role of the business model in capturing value from innovation: evidence from Xerox Corporation’s technology spinoff companies, *Industrial and Corporate Change*, Vol. 11, No. 3, pp. 529–555. Available at <http://icc.oxfordjournals.org/content/11/3/529.short>
- Christopher, S., Watts, W., McCormick, A. & Young, S. (2008), Building and Maintaining Trust in a Community-Based Participatory Research Partnership, *American Journal of Public Health*, Vol. 98, No. 8, pp. 1398-1406.
- Cohen, M. A. & Lee, H. L. (1988), Strategic analysis of integrated production-distribution systems: models and methods, *Operations research*, Vol. 36, No. 2, pp. 216-228.
- Cunningham, B. (1997), Case Study Principles for Different Types of Cases, *Quality & Quantity*, Vol. 31, pp. 401-423.
- Daas, D., Hurkmans, T., Overbeek, S. & Bouwman, H. (2013), Developing a Decision Support System for Business Model Design, *Electronic Markets*, Vol. 23, No. 3, pp. 251-265.
- Doz, Y.L. & Kosonen, M. (2010), Embedding Strategic Agility: A Leadership Agenda for Accelerating Business Model Renewal, *Long Range Planning*, Vol. 43, pp. 370-382.
- Dumay, J. C. (2010), A critical reflective discourse of an interventionist research project. *Qualitative Research in Accounting & Management*, Vol. 7, No. 1, pp. 46-70.
- EFactors. (2003), E-business Model Roadmap, Deliverable 3.1. IST-2001-34868, EUROPEAN COMMISSION IST PROGRAMME. Available at http://www.wi.uni-muenster.de/wi/studies/archive/izi/ss05/E-FACTORS_D3_1.pdf
- El Sawy, O. A. & Pereira, F. (2013), *Business Modelling in the Dynamic Digital Space: An Ecosystem Approach*. Springer.

Faber, E., Ballon, P., Bouwman, H., Haaker, T., Rietkerk, O. & Steen, M. (2003), Designing business models for mobile ICT services, *Proceedings of the 16th Bled Electronic Commerce Conference eTransformation*, Bled, Slovenia.

Ferreira, P. S., Shamsuzzoha, A. H. M., Toscano, C. & Cunha, P. (2012), Framework for performance measurement and management in a collaborative business environment, *International Journal of Productivity and Performance Management*, Vol. 61, No. 6., pp. 672-690.

Gillespie, N.A. & Mann, L. (2004), Transformational leadership and shared values: the building blocks of trust, *Journal of Managerial Psychology*, Vol.19, No.6, pp. 588-607.

Hedman, J. & Kalling, T. (2003), The business model concept: theoretical underpinnings and empirical illustrations, *European Journal of And Systems*, Vol. 12, No. 1, pp. 49-59.

Heikkilä, J., Heikkilä, M. & Tinnilä, M. (2008), The Role of Business Models in Developing Business Networks, In A. Becker (Ed.), *Electronic Commerce: Concepts, Methodologies, Tools, and Applications*, And Science Reference, pp. 221-231.

Heikkilä, M. (2010), *Coordination of complex operations over organisational boundaries: From managing in-house resources to business modelling for smart business networks*. Lap Lambert Academic Publishing.

Heikkilä, M. & Heikkilä, J. (2013), Collaborative Business Model Innovation Process for Networked Services, In J. Järveläinen, H. Li, A.-M. Tuikka, & T. Kuusela (Eds.), *Co-created Effective, Agile, and Trusted eServices*, *Lecture Notes in Business And Processing*, Vol. 155, Springer Berlin Heidelberg, pp. 133-147.

Heikkilä, M., Kuivaniemi, L., Soudunsaari, A. & Suoranta, M. (2013b), Assessing the potential performance of network business model: Performance Indicators in the case of "physical activity prescription", *In the 22nd Nordic Academy of Management Conference*, 21-23 August, Reykjavik, Iceland.

Heikkilä, M. & Kuivaniemi, L. (2012), Ecosystem Under Construction: An Action Research Study on Entrepreneurship in a Business Ecosystem, *Technology Innovation Management Review*, (June 2012, pp.18-24.

Heikkilä, J., Tyrväinen, P., & Heikkilä, M. (2010), Designing for performance - a technique for business model estimation, In M. Seppä, N. Helander, & I. Ilvonen (Eds.), *Proceedings of EBRF*.

Håkansson, H. & Snehota, I. (1995), *Developing Relationships in Business Networks*. London: Routledge.

Iqbal, J., Naz, S., Aslam, M. & Arshad, S. (2012), Performance management: a review of 30 articles from a single source, *Interdisciplinary Journal of Contemporary research in business*, Vol. 4, No. 3.

Kaplan, R. S. & Norton, D. P. (1992), The balanced scorecard-measures that drive performance, *Harvard Business Review*, Vol. 70, No. 1, pp. 71-9.

Kaplan, R.S., Norton, D.P. & Rugelsjoen, B. (2010), Managing alliances with the Balanced Scorecard, *Harvard Business Review*, Vol. 88, No.1, pp. 68-75.

Kulmala, H. I., & Lonnqvist, A. (2006), Performance measurement of networks: towards a non-financial approach, *International journal of networking and virtual organisations*, Vol. 3, No. 3, pp. 299-316.

Krause, O. & Mertins, K. (1999), Performance management, in Mertins, K., Krause, O. and Schallock (Eds), *Global Production Management*, *Proceedings of the IFIP WG5.7 International Conference on Advances in Production Management Systems*, September.

Lambert, S. (2008), A Conceptual Framework for Business Model Research, *Proceedings of the 21st Bled eConference eCollaboration: Overcoming Boundaries through Multi-Channel Interaction*, Bled, Slovenia.

Lambert, S. C. and Davidson, R.A. (2013), Applications of the business model in studies of enterprise success, innovation and classification; An analysis of empirical research from 1996 to 2010, *European Management Journal*, Vol. 31, No. 6, pp. 668-681.

- Larson, C. E. & LaFasto F. M. J. (1989), *Team Work. What must go right / What can go wrong*. Sage: London.
- Lee, J-N. & Choi, B. (2011), Effects of initial and ongoing trust in IT outsourcing: A bilateral perspective, *And & Management*, Vol. 48, pp. 96-105.
- Leseure, M., Shaw, N. & Chapman, G. (2001), Performance measurement in organisational networks: an exploratory case study, *Int. J. Business Performance Management*, Vol. 3, No. 1, pp. 30-46.
- Lohman, C., Fortuin, L., & Wouters, M. (2004), Designing a performance measurement system: a case study, *European Journal of Operational Research*, Vol. 156, No. 2, pp. 267-286.
- Lorenzoni, G., & Baden-Fuller, C. (1995), Creating a Strategic Center to Manage a Web of Partners, *California Management Review*, Vol. 37, No. 3, pp. 146-163.
- Losada, M. & Heaphy, E. (2004), The Role of Positivity and Connectivity in the Performance of Business Teams: A Nonlinear Dynamics Model, *The American Behavioral Scientist*, Vol. 47, No. 6, pp. 740-765.
- Lukka, K. & Suomala, P. (2014), Relevant interventionist research: balancing three intellectual virtues, *Accounting and Business Research*, Vol. 44, No. 2, pp. 204-220.
- Luo, Y. (2008), Structuring Interorganizational Cooperation: The Role of Economic Integration in Strategic Alliances, *Strategic Management Journal*, Vol. 29, No. 6, pp. 617-637.
- Magretta, J. (2002), Why business models matter, *Harvard business review*, available at <http://info.psu.edu.sa/psu/fnm/asalleh/MargarettaWhyBusModelMatter.pdf>
- Möller, K., Rajala, A. & Svahn, S. (2009), *Tulevaisuutena liiketoimintaverkot - Johtaminen ja arvonluonti. Teknologiateollisuus*: Tampere.
- Neely, A., Adams, C. & Kennerley, M. (2002), *The Performance Prism. The Scorecard for Measuring and Managing Business Success*, Prentice Hall.
- Osterwalder, A. & Pigneur, Y. (2010), *Business model generation: a handbook for visionaries, game changers, and challengers*, John Wiley & Sons.
- Osterwalder A. & Pigneur, Y. (2002), An e-Business model ontology for modelling e-Business, In Loebbecke et al. (Eds.), *The proceedings of the 15th Bled Conference on E-Commerce*, Bled, Slovenia.
- Parasuraman, A., Zeithaml, V.A. & Berry, L.L. (1988), SERVQUAL: a multi-item scale for measuring consumer perceptions of the service quality, *Journal of Retailing*, Vol. 64, No. 1, pp. 12-40.
- Parolini, C. (1999), *The Value Net: A Tool for Competitive Strategy*. Chichester: John Wiley & Sons Ltd.
- Pekkola, S. (2013), Managing a network by utilizing performance measurement information, *Measuring Business Excellence*, Vol. 17, No. 1, pp. 72-79.
- Pekkola, S. (2013b). Performance measurement and management in a collaborative network, PhD thesis, Lappeenranta University of Technology, available from <http://urn.fi/URN:ISBN:978-952-265-476-2>
- Powell, W.W. (1990), Neither Markets nor Hierarchy: Network Forms of Organization, *Research in Organizational Behavior*, Vol. 12, pp. 295-336.
- Prahalad, C.K., & Ramaswamy, V. (2000), Co-opting customer competence, *Harvard Business Review*, Vol. 78, pp. 1-8.
- Ries, E. (2011), *The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses*, Crown Publishing: New York.
- Ring, P. & van de Ven, A. (1994), Developmental Processes of Cooperative Interorganizational Relationships, *Academy of Management Review*, Vol. 19, No. 1, pp. 90-118.

- Schrage, M. (1995), Customer relations, *Harvard Business Review*, July–August, pp. 154-156.
- Solaimani, S. (2014), *The alignment between business model and business operations within networked enterprise environments*, PhD dissertation, Delft University of Technology, The Netherlands.
- Solaimani, S. & Bouwman, H. (2012), A framework for the alignment of business model and business processes: A generic model for trans-sector innovation, *Business Process Management Journal*, Vol. 18, No. 4, pp. 655-679.
- Solaimani, S., Itälä, T. & Bouwman, H. (2014), Networked Enterprise Business Model Alignment: A case study on Smart Living, *Journal of And Systems Frontiers*.
- Star, S. L & Griesemer, J. R. (1989), Institutional ecology, 'Translations' and Boundary Objects: Amateurs and Professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39, *Social Studies of Science*, Vol. 19, pp. 387-420.
- Timmers, P. (1998), Business models for electronic markets, *Electronic markets*, Vol. 8, pp. 3-8.
- Van Aken, J. & Romme, G. (2009), Reinventing the future: adding design science to the repertoire of organization and management studies, *Organization Management Journal*, Vol. 6, No. 1, pp. 5-12.
- Vervest, P., van Heck, E., Preiss, K., & Pau, L.-F. (2005), *Smart Business Networks*. Springer.
- Vervest, P., van Liere, D. & Zheng, L. (2008), *The Network experience, New value from Smart Business Networks*, Springer.
- Verschuren, P., & Hartog, R. (2005), Evaluation in Design-Oriented Research, *Quality & Quantity*, Vol. 39, No. 6, pp. 733-762.
- Voelpel, S. C., Leibold, M. & Eckhoff, R. A. (2006), The tyranny of the balanced scorecard in the innovation economy, *Journal of Intellectual Capital*, Vol. 7, No. 1, pp. 43-60.
- Yin, R. (2004), *Case Study Research: Design and Methods*, Sage Publications.
- Yin, Y., Qin, S. & Holland, R. (2011), Development of a design performance measurement matrix for improving collaborative design during a design process, *International Journal of Productivity and Performance Management*, Vol. 60, No. 2, pp. 152-184.
- Zott, C., Amit, R. & Massa, L. (2011), The business model: recent developments and future research. *Journal of management*, Vol. 37, No. 4, pp. 1019-1042.

About the authors

Dr. Marikka Heikkilä is a Senior Research Fellow at the University of Turku, Finland. She is an economist with interest on information systems, business models and business model innovation, collaboration and coordination in business networks, especially with regard to services.

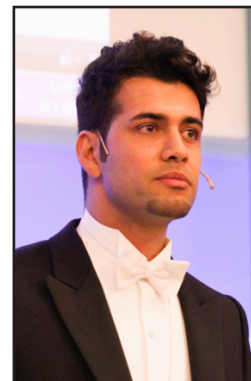
Marikka has obtained MSc. and Licentiate of Science on Economics and information Systems at the Helsinki School of Economics. She received her PhD from the faculty of Information Technology at the University of Jyväskylä.

She has participated in numerous interdisciplinary and international research projects as a coordinator, project leader and researcher. Current projects focus on health & wellbeing services and business modeling. She has authored numerous scientific articles, of which 33 are published in refereed journals or books. The most recent ones are appearing in *Technology Innovation Management Review (TIM Review)*, the *Journal of Theoretical and Applied Electronic Commerce Research (JTAER)* and *Technological Forecasting and Social Change*.

Public profile available at: fi.linkedin.com/in/marikkaheikkila/



Dr. Sam Solaimani is Assistant Professor at Nyenrode Business School, The Netherlands. He is also affiliated with the center for open innovation at Haas School of Business, Berkeley, USA. Sam holds a PhD from Delft University of Technology, with focus on Business Model innovation, analysis and implementation within complex networked enterprise environments. He has obtained a MSc. (With Honors) on Business Information Systems from University of Amsterdam and a BSc. on Information Science from Utrecht University, the Netherlands. Currently, within a consortium of ABN AMRO, Achmea and McKinsey & Company (Lean Education and Research Network) he investigates the concepts of Innovation Management, Lean philosophy and SMEs competitiveness and performance. He has authored several peer-reviewed publications, some of which have recently appeared in the *Business Process Management Journal (BMPJ)*, *Electronic Markets (EM)*, and *Information Systems Frontiers (ISF)*. Public profile available at: nl.linkedin.com/in/samsolaimani



Mr. Aki Soudunsaari has Master's Degrees in Sport and Health Sciences as well as in Economics at the University of Jyväskylä. He is doing his PhD in the School of Business and Economics from the area of growth venturing. He is studying how to build winning venture teams, and how to create a winning corporate culture.



He is also a partner in two health related companies operating in Finland, Russia and Scandinavia that are growing at a fast pace. He has been a Visiting Scholar at the San Jose State University, in Silicon Valley Center for Entrepreneurship, California, USA. He has been nominated as a Young Academic Entrepreneur of the Year in Finland.

Ms. Mila Hakanen (MSc Econ) is a researcher and PhD candidate at the Jyväskylä University School of Business and Economics, Finland. She has worked as a project researcher in several Finnish interdisciplinary projects. Her longest work is in the project called "Globally scalable business models in health, exercise and wellbeing markets". Her research is focused on the areas of interpersonal trust, communication and trust building, trust management, and business networking.



Dr. Leni Kuivaniemi studied business sciences at Jyväskylä School of Business and Economics, where she received her PhD in 2010. Her research interests cover e.g. growth venturing and entrepreneurship. Before attending business studies she graduated as a lawyer from the University of Helsinki.



She has worked at JSBE as an assistant professor in service business as well as project manager and teacher/lecturer of contract and family law. In addition to research, she currently works as a CEO in her own company, which operates in education. She is also a partner in Global Enabler, the new global player in business creation.

Dr. Mari Suoranta is an assistant professor in marketing at the University of Jyväskylä, Finland. Her current research interests include entrepreneurial start-up marketing, firm growth, and management and entrepreneurship education. 2008 and 2010-2011 Mari was a Senior Fulbright Scholar at the Center for Entrepreneurship and Technology, and the Fung Institute for Engineering Leadership at the University of California, Berkeley, USA.

