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COMMUNITY-FOCUSED PERSPECTIVES TO INTERDISCIPLINARY UNIVERSITY CAMPUS MANAGEMENT – A BUSINESS MODEL CASE STUDY

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ABSTRACT

University campus managers are facing challenges with facilitating education, research and societal impact in the Internet era. Old university spaces are unable to fully support the myriad demands of the complex, networked, interdisciplinary university campus communities. Thus, tools are needed that help manage and develop university campuses and learning space concepts for a variety of user groups.

Business model approach has succeeded in solving similar issues in business: increasing complexity, lack of resources, technological change, uncertainty and increasing tempo. This study conducts an empirical test on six space development projects of one university campus by employing a business modelling tool, named the Business Model Canvas. The aim of this study is to identify the pros and cons of a business model approach for university campus management by answering three main research questions: 1) How is the Business Model Canvas perceived in spatial development context?; 2) How are spaces described through the Business Model Canvas; 3) How should the Business Model Canvas be developed further for the purpose of university campus management?

The main data were collected in seven workshops, where the Model was employed in seven space development projects. The data collection process was divided to three phases, each addressing one research questions. First, a room-size development case aimed to discover how the Model is perceived as a space planning tool. Second, five building-size developments strove to define how different spaces are described through the Model. Third, a campus level development set out to further develop the Model for university campus development purposes. Altogether 24 participants attended the workshops. In addition, the background case data was contributed to by diverse documents ranging from annual reports to seminar presentations.

The results suggest a community-focused approach to developing university spaces. All the cases addressed community and space use as the main value propositions, same stakeholders in multiple roles, and thematic focus. The model simultaneously enabled both top-down and bottom-up approaches, which was considered convenient for conceptualization purposes. However, the space projects were described on the abstraction levels of community, network and space, which made within- and cross-case comparability challenging. The participants considered the model incomplete but saw potential in the approach. The results propose that the Model be modified to better meet the needs of university campus management through modifications, such as a more specific, layered structure and inclusion of concrete value measures.

Keywords: University Campus Management, Business Model Canvas, Community facilitation, Space Operator, Community Operator, Network Operator

INTRODUCTION

University campus managers are facing challenges with facilitating education, research and societal impact in the Internet era. Multiple scenarios addressing concerns of time, scale and complexity are speculated for the future of schooling (OECD 2001), higher education (OECD 2008), learning spaces (Dugdale 2009) and university campuses (Den Heijer 2011; Bygst 2013). These speculations derive from the rapid technological development and globalization, converting the natures of education, learning and working less dependent on space, location and time (Joroff 2002; Shabha 2004; Marginson 2006: Dugdale 2009; Neary et. al. 2010). Space users are by large able to choose how, where, and when they want to work. The boundaries between physical and virtual dimensions of space are blurring, and activities executed in these dimensions vary for example based on the social context (ie. Fitzpatrick et. al. 1996; Zhang and Jacob 2013). Therefore, more flexibility and novel solutions are required for facilitating activities in physical and virtual environments.

Literature on university campus management bases on static models such as the integrated corporate real estate management (CREM) model (Den Heijer 2011) and added value of facilities management (FM) in the educational facilities model (Kok et al 2011). However, these models are unable to fully consider the increasing complexity of university campus environments (Rytkönen and Nenonen 2013).

Similar challenges emerged in business in the mid-1990s as complexity and uncertainty drastically increased in arranging functions of multiple stakeholders in a fast-pace, globalized world (Osterwalder 2004). At the same time, the concept of business model became prevalent. In a literature review on business models, Zott, Amit and Massa (2011) concluded that there is no consensus on the definition of business model. However, four emerging themes were

identified. Accordingly, a business model can be described as: 1) a new unit of analysis of a firm with wider boundaries than those of the firm; 2) a system-level, holistic approach to how firms do business; 3) an emphasizer of activities of the firm and its partner network; and 4) an explainer of the creation and capture of value.

The addressed themes cover the major issues of university campus managers. Yet, to the knowledge of the writer, university campus management has not been by large studied through the lenses of business model approach before a recent conceptual paper (Rytkönen and Nenonen 2013). Accordingly, one of the most employed practical applications from the field of business models, the Business Model Canvas (Osterwalder 2010), seems to provide at least four fresh views to university campus management. With certain critique and limitations acknowledged (Rosenberg et al. 2011; Kraaijenbrink 2013), the Business Model Canvas offers benefits in: facilitating novel space project conceptualizations; mapping complex stakeholder relationships; identifying complex added value structures; and approaching services from both customer and provider aspects. (Rytkönen and Nenonen 2013)

The Business Model Canvas derives from research of Osterwalder (2004) with a strong emphasis on practitioner applicability. Thus, the Business Model Canvas could potentially link the practitioner approach to academic research and function as a framework for data collection revealing novel vital elements and dimensions that can not be mapped with the existing CREM and FM models. However, the Business Model Canvas has not been empirically tested to understand space management professionals' perception of the model and how it could be further developed for this specific purpose. Thus, this study examines perceptions of the Business Model Canvas in university campus management context, information provision of the Business Model Canvas for the university campus management, as well as further development suggestions of the Business Model Canvas to better support the needs of university campus management.

The present study is structured under five main sections: first, University Campus Management section argues for the validity of the Business Model Canvas as an approach to university campus management; second, Methodology section describes the action research method employed, data collection and analyses; third, Findings section presents the main results from the cases; fourth, Discussions cover the trustworthiness and authenticity, limitations and practical implications of the study; and, finally, Conclusions briefly frame the core message of the paper.

UNIVERSITY CAMPUS MANAGEMENT

The evolving concept of university campuses

Evolutions of scale, time and complexity have resulted in a demand for new methods in space planning and development in university campuses. (Bygst 2013) Universities have in general three main missions: education, research and societal impact. Infrastructure in which university actions are executed, strive to support these activities. A campus is defined in the Oxford dictionary briefly as "the grounds and buildings of a university". However, future scenarios of schooling, higher education and university campuses propose a more holistic definition of a university campus including also the social and virtual infrastructure.

University buildings tend to have low utilization rates compared to other building types globally. Reviews of space utilisation across United Kingdom in higher education estate indicate that utilisation rates of teaching spaces varied often between 15% to 20% during core learning hours (Neary et al. 2010). As another example, according to a two-year study conducted by the University System of Georgia (University Herald 2013), the utilization rate of 440 classrooms in average was 31 % as they were employed for only 18,5 hours of a normal 40 hours week with two thirds of the designated spaces in use. The issues of time and logistics and increased interest towards on-line lectures were also pointed out in the study. This example demonstrates an increasing potential of sharing campus resources internally between different units of universities, and externally between educational institutions, the industry and rest of the society.

Deriving from evolutions of scale, time and complexity, OECD (2001) has published three types of future scenarios in schooling: maintaining the status quo, re-schooling and de-schooling. From the university campus aspect, the maintaining scenarios can be interpreted as means of conserving the role of university campuses as they are today without changing the infrastructure model profoundly. Re-schooling would mean generating a campus as an ecosystem of physical, social and virtual dimensions of space that supports the education system in symbiosis together with the society. Ultimately, de-schooling can mean replacing the physical university infrastructure with completely virtual education ecosystems with the aim of affording education to as many as possible. (OECD 2001)

Moreover, OECD (2008) has described hypothetical alternative futures for higher education based on the University Futures program conducted together by OECD and CERI. They describe the four alternatives focusing on institutional systems point of view: Open networking, Serving local communities, New public responsibility and Higher Education Inc.. In the light of university campuses, the open networking future focuses on strong internationalization and mobility of students. Serving local communities future bases on national, regional and local missions and impacts. New public

responsibility emphasizes public regulation and funding while employing new forms of public management tools resulting in shared responsibility among a variety of stakeholders in society. Higher education Inc. argues for an international competitive business format of higher education institutions. (OECD 2008)

Furthermore, Den Heijer (2011) is speculating the future of university campuses in four possible scenarios: Traditional University, University College, Network University, or Virtual University. Traditional and University College scenarios base on the existing institutional model which would probably lead to elitism by decreasing the amount of students and raising the quality in education due to lack of resources. Network University suggests an increasing amount of students and funding by alternative solutions in physical and virtual infrastructures while not investing in more space per person. Virtual University model proposes a totally virtual infrastructure which enables a large amount of students to be educated. (Den Heijer 2011) The possible impacts of the strengthening virtual infrastructure to i.e. value proposition of universities are discussed in multiple studies (i.e. Abeles 2011; Carr 2012). On the other hand, Turney et al (2009) conclude in their study on learning in higher education, that even though integration of virtuality improves learning outcomes, formal contact hours are needed as one learning approach does not suit all the students.

The introduced future scenarios outline probable educational, institutional and spatial demand trends for learning landscape in higher education. The natures of learning and working have developed but facilitation of these actions in higher education seems to follow behind demands. There is potential in sharing the existing campus resources inter-disciplinarily internally and externally as the utilization rates are rather low, and technological advances enable mobility in learning and working. Thus, there is a need for future-oriented tools that can inspire university campus managers in managing the overall picture of university campuses. As these future scenario examples describe, university campuses are an interesting empirical context for testing a business model approach in built infrastructure for several reasons. Reasons include the increasing complexity of the environment that universities function in, the alternative increasing potential that universities and education form businesswise, the myriad interdisciplinary cross-section stakeholders involved and their actions in the network, and finally, the complex value-network the context covers.

Real estate management models

According to Den Heijer (2011), CREM theory is the most applicable theory of all real estate theories for the purpose of university campus management. She defines campus management as "the range of activities undertaken to optimally attune the university's accommodation to the university's performance", in which university's accommodation consists of both land and buildings. She identifies four essential aspects and stakeholders that university campus management is based on: physical, functional, strategic and financial. Yet, referring to the development scenarios discussed earlier, "range of activities" and "optimally attuning university's accommodation" seem inadequate if only considered in physical context. The discussed scenarios propose inclusion of social and virtual management to the definition.

There are also multiple general models outlining the relationship between organizational strategy and corporate real estate (Heywood 2011; Haynes 2012), and the concept and added value elements of CREM and FM (e.g. Joroff et al. 1993; Lopes 1997; Krumm 1999; Lindholm 2008; Jensen 2010, Coenen et al 2013). Also general level process models (e.g. Lindholm 2008; Ebinger and Madtrisch 2012) and more specific, static quantitative models that aim at measuring the outlined entities have been developed (e.g. Lindholm and Nenonen 2006; De Vries, De Jonge, and Van Der Voordt 2008; Jensen, Van Der Voordt, and Coenen 2012).

What comes to the FM and CREM models in educational environment, not too many models have been published. A recently published model from the field of FM conceptualizes the added value of FM in educational environment (Kok et al. 2011). Moreover, the most recent model in the field of university campus management, the integrated CREM model (Den Heijer 2011), aims at integrating the most important qualitative and quantitative data in university campus context. The integrated CREM Model (Den Heijer 2011) is a static performance measurement model which is based on the Balanced Scorecard developed by Kaplan and Norton (1992). It integrates physical, functional, strategic and financial aspects to CREM into one consistent model. The measures and indicators it consists of have been developed based on the needs of industry practitioners in 48 Dutch universities (Den Heijer 2011). The main purpose of the model is to assess important measures to be considered when making real estate decisions with the highest priority in controlling economical risks related to the real estate. However, because of its static nature, it is not capable of reflecting 1) the overall picture of university campus processes and outcomes, 2) the networked nature of university environments, 3) causalities between the different stakeholders, 4) new spatial development concepts. That is why it requires a supporting dynamic model that could provide causal information.

To the knowledge of the writer there are only a few models that would focus on a holistic picture of the CREM processes and outcomes focusing on the value created for the customers as clients, customers and end-users. Jylhä and Junnila (2013) argue, that despite the increasing interest towards end-user demands (Dent and White 1998; Luoma et al. 2010; Rothe et al. 2011), this is due to a complete neglect of the actual customer value creation processes in field of Facilities Management – how would it be possible to improve a process that is unknown? At the same time, the need of

developing facilities management towards more user-centered and service-oriented concepts has been proposed by other scholars (Alexander and Price 2012; Coenen et al. 2013). Usually, the virtual dimension has been acknowledged as an enabler but not included in any of the management models.

Suggesting the Business Model Canvas approach

In an extensive literature review on business models, Zott, Amit and Massa (2011) point out that there is no common understanding of the concept of business models and therefore, they propose a classification of the existing business model literature under three following research streams: (1) e-business and the use of information technology in organizations; (2) strategic issues, such as value creation, competitive advantage, and firm performance; and (3) innovation and technology management. Under these literature streams, they have not been able to formulate a consensus on the concept of business models but they have been able to address its main purposes, what the concept is not, its antecedents, mechanisms and outcomes. They conclude that in all the literature streams, a common understanding is that a business model is a new relevant unit of analysis, it does not only describe what businesses do, but how they do it, it describes a firm-centric yet boundary-spanning activity system and both value creation and value capture. Also, a consensus of the position and role of business model has been agreed in prior literature (ie. Osterwalder and Pigneur 2002; Osterwalder 2004; Morris et al. 2005; Tikkanen et al. 2005, Shafer et al. 2005) – it is between the business strategies and business operations (Rajala 2009). Business model in general should thus be able to reflect how a business strategy can be converted into practice which would be useful for the university campus managers.

The Business Model Canvas is described as "A shared language for describing, visualizing, and changing business models" (Osterwalder, Pigneur and Smith 2010). As it has been claimed to be successfully employed for communication and development purposes by practitioners in business (Osterwalder 2012), it potentially creates a good basis for collecting data on specific cases and discuss the major topics around the case studies. The Business Model Canvas is designed for practitioners, and it bases on the dissertation of Osterwalder (2004). Zott, Amit and Massa (2011) classify Osterwalder (2004) under the e-commerce literature stream. It could, thus, function as a linkage between the physical and virtual dimensions. It could also link practitioner approach to academic research, and function as a framework for data collection revealing vital elements that are invisible through the lenses of the existing CREM and FM models. The Business Model Canvas has been criticized because of lacking some of the elements that other business model conceptualizations have (Rosenberg et al. 2011; Kraaijenbrink 2013). These limitations acknowledged (Rytkönen and Nenonen 2013), the business model canvas has been employed as a framework for conducting data collection in the workshops of this study.

METHODOLOGY

The method used in this study is participatory action research (PAR) as defined by Reason and Bradbury (2008). It aims at integrating three corner stones of PAR practitioners: participatory, action and research (Chevalier and Buckles 2013). In brief, PAR is an iterative, participatory, collaborative, and constructivist approach to studying social constructs with the respected community members. According to Kemmis and McTaggart (2007), it can be more broadly defined through seven characteristics: as 1) a social process followed i.e. in research settings of education and community individually and collectively, 2) participatory process in which people engage in examining their knowledge in social context, 3) practical and collaborative as people examine their social practices, 4) emancipatory as people examine how the social structures affect them, 5) critical as it aims to release people from their social constraints, 6) reflexive as it aims to help people to invest reality to change it and vice versa; and 7) as a process aiming to transform both theory and practice. Accordingly, the primary purpose of action research is to produce practical knowledge that is useful to people in their everyday life.

Data Collection

The Business Model Canvas is tested as the framework for collecting data on the subject because of its visual appearance and claimed ability (Osterwalder 2012) to function as an efficient business model development and communication tool. The data was gathered in seven thematic workshops that were divided into three phases: first phase strove to discover how the Business Model Canvas is perceived as a space planning tool; second phase aimed at defining how a space is perceived through the Business Model Canvas; and third phase set out to suggesting development directions for the Business Model Canvas in university campus management context. In between the workshops, the writer analyzed the findings and iterated the data collection method accordingly which is typical for the participatory action research methodology (Reason and Bradbury 2008). The main elements of the data collection phases are listed in Table 1.

Table 1 Description of data collection by phases

	Phase of the action research method	1 Discovering how the model is perceived in spatial development context	2 Defining how an existing space is described through the model	3 Developing the model through analysis
Space project descripitions	Space project type and sqm	Single area units, 30-1000 sqm	Building size units covering multiple rooms, 750-3200sqm	A Campus-wide area covering 42 buildings, 240000sqm
	Space project development budget €	3000 - 100000 (~100€/sqm)	1000 -1 000 000 (estimate running and development annually)	350 000000 (to be invested between 2013 - 2020)
	Nature of spaces	'Recycled', unutilized corridors or rooms	Building or part of a building that has been redeveloped after former tenant relocation	42 existing buildings, a new main building under planning (to be built in 2016)
	Main purpose of the space project	Facilitate interdisciplinary collaboration in learning, highlighting the image of a specific school	Facilitate interdisciplinary collaboration under certain theme in research, industry and learning	Facilitate world class interdisciplinary education, learning, research and societal impact
	Focus of the projects on activities of	Multidisciplinary students across the university	Thematic interdisciplinary research, learning and societal impact, cross-sector communication	Multi-disciplinarity, offering freedom of choice, transcending traditional boundaries in research and art, rich connections, open innovation, social interaction, efficient use of limited resources (University campus vision 2011)
	Focus themes of the projects	Learning and education	Product development, Digital manufacturing, Urban innovation, Entrepreneurship, Interdisciplinary learning	Arts, Business and Technology
Workshop descriptions	Participants in the workshop	11 :Students (4), teaching staff (2), administrative employees (2) service unit employees (3)	8 Space project initiators and employees of the space projects	8: Space project initiators (6), campus service staff (1), external space service entrepreneur (1)
	No. of Business Model Canvas models produced	4	5	3
	Data collection method and analysis	Describing the model, participants in groups of three, asking to model what there could be. Feedback. Comparison.	Face-to-face discussion, modeling a specific case. Comparison.	Teaching how to employ the model, participants in groups, modeling each group's perception on the same case. Feedback. Comparison.
	Writer involvement	Descriptive (describing the model, answering questions once asked)	Involving (co-designing and proactively offering ideas)	Tutorial (asking how groups were proceeding, helping)

The first phase data was collected in a space planning workshop, where 11 voluntary university staff members and space users aimed to co-design an existing 850 square meter hall into a collaboration hub. The aim of the workshop was to test how the Business Model Canvas worked from point of view of the volunteers. The volunteers represented students (4), teaching staff (2), administration (2) and service units (3) of the same university. They were divided into four groups, each of the groups having at least one student, one service unit representative and one member who was familiar with the model. The groups were given a short explanation of what the Business Model Canvas is and which blocks it consists of. They were asked to discuss and outline the ideas of the space under design by employing the Business Model Canvas. There were two facilitators who were ready to answer all the related questions. Finally, each group presented their ideas and they were asked: "Did you find the model useful for the purpose of planning the space? Why/why not?" Involvement of the writer was otherwise relatively low as he did not proactively help the groups. Altogether four business models were produced.

The second phase concentrated on defining how representatives of five space development projects perceived their space projects through the model. Based on the analysis of phase one, the second phase data collection method was developed to a more intimate setting. One project at a time was modeled with one or two respected representatives and the writer. All of the participants had heard about the Business Model Canvas before the workshops. However, all of them felt that the terminology of the Model was incomplete in university context. Customer segments was considered an inappropriate term to describe the users of the university facilities. The building blocks that needed to be explained the most were the Channels and the Customer relationships. The facilitator described their difference to be: "Channels describe how a customer is attracted to come to the space for the first time, whereas Customer relationships describe how a customer relationship is maintained resulting in customer visiting the space time after time." Researcher involvement was relatively high as he co-designed and proactively helped the attendees in getting forward with the Business Model Canvas structure. Eight participants attended the second phase workshops in which five business models of five cases were produced.

The final phase strove to develop the Business Model Canvas further to support the needs of university campus managers. There were six persons representing the modeled space development projects, one employee of the campus and spatial service unit and one interested external firm representative. The background of the research was presented, and the identified inconsistencies with the terminology in phase two were opened up: Customer segments were defined as clients, customers and end-users as defined by CEN (2006) in FM context. The participants were divided into three groups, and they were asked to outline the whole university campus as they perceive it with help of the Business Model Canvas. After the exercise, each group presented their models, and analyses made of the earlier workshops were introduced. The possible future directions were discussed and in addition, feedback was collected in form of an open questionnaire survey addressing five questions: 1 Did you find the model useful in describing your own space? ; 2 What kinds of new perspectives did it open up?; 3 What were the pros and cons of the model?; 4 How do you think the model should be developed further (or should it) for the specific need of describing / developing space concepts?; 5 Which building blocks require the biggest attention when developing a new model for university campus management and why? Researcher involvement was higher than in the first phase but lower than in the second phase. Eight participants attended the third phase workshop in which three business models of one case were produced.

Sampling

As the future scenario examples outlined, university campuses provide an interesting empirical context for testing a business model approach in built infrastructure for several reasons. Reasons include the increasing complexity of the environment that universities function in, the alternative increasing potential that universities and education form businesswise, the myriad interdisciplinary cross-section stakeholders involved and their actions in the network, and finally, the complex value-network the context covers.

The case university of the study at hand was chosen because it offers a unique setting for studying interdisciplinary space facilitation, which can be seen as a cost-efficient way of taking resources into a more efficient use. It is a merger of three distinct higher education institutions from fields of business, technology and arts. Its aim is to create synergies between the three fields to create novel innovations. The process of centralizing functions in an existing main campus of the former technological university is on-going as this study is being executed, and the chosen samples aim at facilitating interdisciplinary collaboration. The study at hand is based on seven university space development projects on different organizational levels that can be categorized in three different sizes: single learning areas, building or part of a building, and a whole campus consisting of 42 buildings. The cases were chosen based on the criteria of: locating in the same campus, converting existing spaces to facilitate new activities, facilitating interdisciplinary collaboration, and being initiated by a different actor than the other cases. A brief overview of each category is provided in the following.

[1] Phase one sample focuses on a single learning area in two floors covering 850 square meters. Altogether ten similar projects have been executed in the case university, aiming at increasing interdisciplinary internal communication and encounters between students from different departments of the university. The project areas vary in size between 30-

1000 square meters, and their development budget is relatively low, ranging from 3000 € to 100 000 € which equals to about a 100 € per square meter. The modified spaces are either rooms or corridors with low utilization rates situated in many locations around the campuses that are redesigned to facilitate both collaboration and individual working through spatial design solutions. Project funding is case-specific but is this case based on a collaborative model between a school unit, library services unit and the university. Each case involves voluntary students and staff from the local school community who help in co-designing and constructing the space, which is seen as a crucial element of the concept. Each development is considered a prototype and a learning process based on which the next development aims at better results. The focus is first on increasing internal communications and encounters of the university and second, trying to elaborate links for external collaboration.

[2] Phase two sample consists of five space development projects ranging between 750-3200 m2 in size. They are similar in aiming at both internal and external interdisciplinary collaboration by uniting education, research and industry activities in the same space. Each space has been utilized for different purposes by a former tenant and afterwards taken over by a space operator other than the campus service unit. The initiators are users who have become co-producers of spatial services. Each case is managed and run autonomously by a different operator and each project is active in on-line communications. Even though the units are autonomous, they work in collaboration with the other four projects. All the projects get strategic funding from the university but have also other funding sources in forms of industry collaboration projects and donations. One of the projects focus mainly on student-industry collaboration through arranging interdisciplinary courses, one on promoting entrepreneurship linking startups with venture capitals in a variety of events and programs, two on research-industry collaboration, and one on creating a network of learning spaces facilitating internal communication. Each project concentrates on a specific theme: product development, entrepreneurship, urban innovation, digital manufacturing, and interdisciplinary learning. The initial space development budgets of the cases vary from 1000 euros to 400 000 euros but are not precise as all projects work as living labs for testing and developing spaces, and thus, the annual running and development budget can reach up to a million euros.

[3] Phase three sample is based on the campus level referring to the 240 000 square meter campus that all the other cases are located in. Due to a decision made in 2011, the campus that has formerly facilitated only technology school activities, will be home for also arts and business school actions starting in 2015, which is due to a merger of three original schools into one university in 2010. However, the real estate portfolio in terms of area will remain as about the same because a new building under planning will be built on the campus in 2015-2016, and it will be about the same size as the premises that will be abandoned from another location. Yet, according to the annual report and real estate services source, an ambitious overall aim is to reduce space requirement needs by 25 % by sharing facilities as soon as lease contracts end. Thus, the existing infrastructure will be employed for the facilitation of new and old activities in the campus region. The investment budget of the whole campus area is estimated at around 350 000 000 € between years 2013 - 2020. Yearly premises related costs have totaled between 62-66 million € during last years according to the university board annual reports (2010-2012). The campus vision has been outlined in 2011 and developed year after year.

The samples of different phases describe well the scale variance on different levels in campus management. The organizational school and department levels were excluded from the samples as this study focuses on interdisciplinary space development projects.

Data analyses

The collected data were analysed after each phase and compared with each other resulting in iteration of data collection for next phase as advised by Lincoln and Guba (1985) and Glaser and Strauss (1967). In phase one, the analysis was conducted by comparing the designed business models and cross-analyzing them with feedback from each of the groups. The analysis of phase two was conducted by comparing the designed business models and by searching potential clusters that the elements could form. Third phase analysis was conducted by first analyzing the feedback and then examining how the designed models matched the clusters created in phase two.

FINDINGS

The findings were three-fold: the model was perceived in three ways, spaces were described on three different abstraction levels, and three development directions were suggested for the model. All the findings indicate that as the Business Model Canvas is an open qualitative model allowing a variety of approaches, each case reflects perceptions of the individuals who model it, and thus, result in subjective visions of space projects from multiple abstraction levels. However, the results imply an interconnection between the findings of the different workshops. The main findings are concluded in Table 2 Main findings.

Table 2 Main findings

Spatial dimension	Phase 1. How is the Model perceived?	Phase 2. How were the spaces described?	Phase 3. How could the Model be developed further?
Social Community	Too narrow for concept development	Action orientation	Employ for prescribing purposes, not for describing
Physical Space	Too vague for space development	Technical detail orientation	Include measures for costs, values and impacts
Virtual Network	A useful idea generator for conceptualization	Enabling structure orientation	Develop causality – how do different actions interrelate?
Main learning for facilitator	Teach the basis of the model, pinpoint purpose, and co-create with the attendants. Allow more time.	Do not get over-involved but teach and help people in getting started. Pinpoint time orientation: past, present or future?	Educate, discuss and collect feedback.

1) How is the Model perceived?

The Model was perceived in three different ways: either as an idea generator for conceptualization, as a model too narrow for concept development purposes, or as a model too vague for space design purposes. A probable explanation could be the variety of abstraction levels that attendees were used to: the ones who were used to abstract and strategic thinking found it too narrow and the ones who were used to practical thinking considered it too abstract.

The first group which considered the model too abstract, outlined their ideas by describing specific equipment such as 'TV/ear phones' or 'smart board' and by addressing them fixed places in the space under design. The second group which considered the model too specific, described their perception through emotional words such as 'peace', 'inspiration' and 'relaxation'. The third group which considered the model as a new idea generator mainly employed action-oriented words such as 'entertainment', 'interviews', 'collaboration' and 'studying'. Thus, after the first workshop, it was evident that more precise facilitation and guidance is demanded to get comparable results.

2) How are spaces perceived through the Model?

In phase two, 244 elements were altogether described on five modeled cases, including only 11 elements common to all the cases. Community and space use were the common value propositions, same stakeholders were described in multiple roles (as customers, partners and resources), strategic university funding was included in each, and thematic focus was highlighted throughout the sample. Analysis of data from phase two proposes that the cases are very heterogeneous by nature and indicates a need for clustering the data in layers.

The identified value propositions varied from very concrete specifications such as 'kitchen', 'free wi-fi', 'connections', 'tools' and 'workshop spaces' to very abstract elements such as 'atmosphere', 'buzz', 'co-working', 'fostering entrepreneurship' and 'society'. A common customer segment to all the cases was students. Researchers, schools of the university, the university, corporate partners and home country were considered customers in four cases out of five. Guilds, student unions and associations, University courses, startups and spin-offs and delegations and visitors were considered customers in two cases out of five. In addition, there were 20 other identified customer segments that were specific customer groups to one case. There were no common elements to all under Customer Relationships, Key Resources nor Revenue Streams. This implies that the different space operators aim at nurturing the Customer Relationships in different ways, by various resources and receive their money in a myriad ways.

3) How should the Business Model Canvas be developed further for the purpose of university campus management?

Findings from the third phase indicate three development directions: towards a prescribing tool for linking supply with stakeholder action demands; towards a measurement tool concentrating on specific outcomes such as costs, values and impacts; or towards a causal process model between the network stakeholders. In general, the information collected in the workshops was scattered and heterogeneous which challenged comparability between the cases. However, it seemed that each of the groups was specifically concentrated on one of the identified layers – community, space or network - of the second phase findings which strengthened their validity.

The analyzed data formed three information clusters: *community* which requires mainly *social* facilitation focusing on the actions taken by end-users of a space, *space* which requires mainly *physical* facilitation pinpointing the technical abilities of tangible space for a community, and *network* which requires mainly *virtual* facilitation concentrating on the external partners that are connected to the community through the space enabling collaboration. The development suggestions related to emphasizing: prescription of new concepts and actions rather than describing existing ones

(community); or measuring the costs, values and impacts of elements (space), or the causalities between different stakeholders (network).

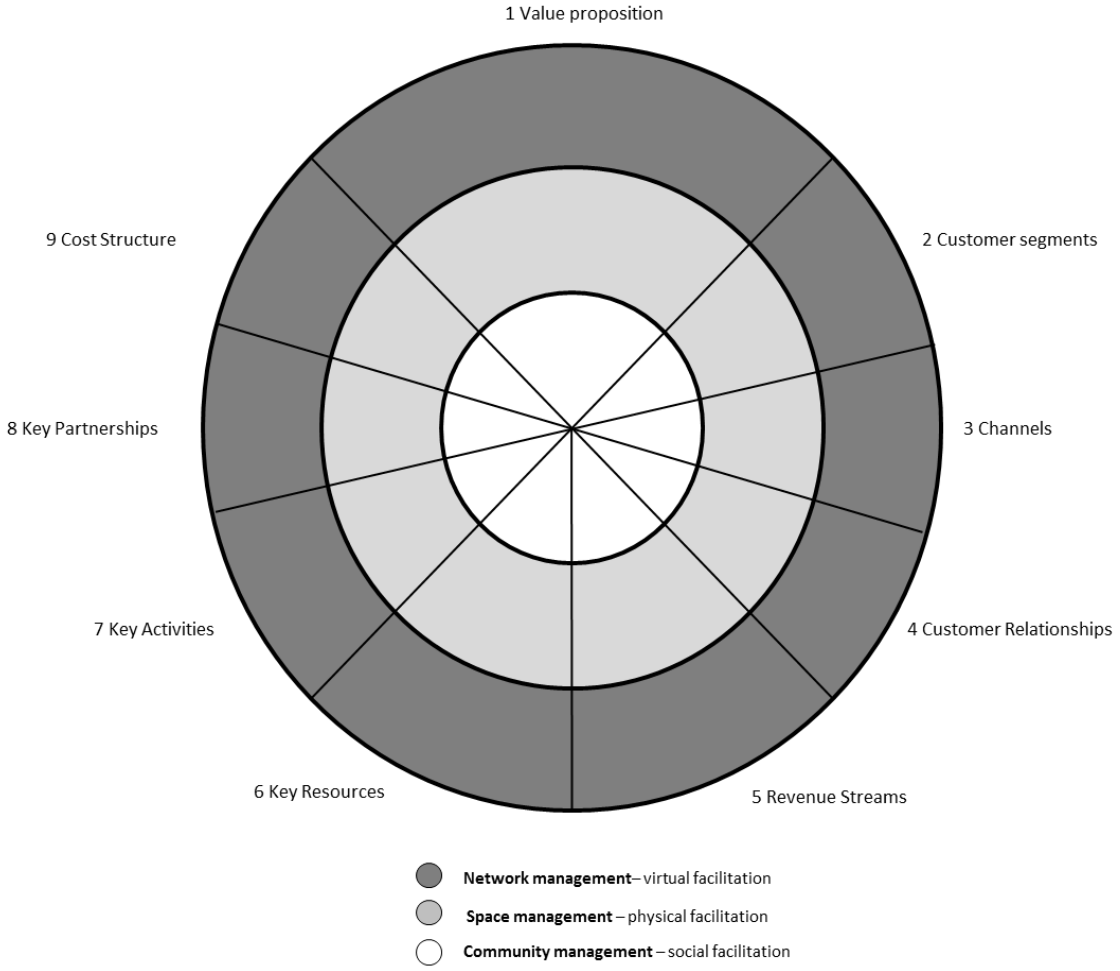

Figure 1 Proposed management layers for the nine sectors of the Business Model Canvas in University Campus context

To conclude the findings, the model is perceived in at least three different ways when applied to spatial developments; spaces seem to be described on three different abstraction levels when utilizing the model; and three types of development directions are suggested. Based on the findings, a conceptual three-layered management framework for analyzing business models of built environment operators is proposed as visualized in Figure 1. The proposed framework has connections to a three-dimension boundary object framework proposed by Zhang and Jacob (2013) in the field of information sciences. Their framework consists of physical, epistemological and virtual dimensions.

DISCUSSION

Trustworthiness and authenticity

Guba and Lincoln (1994) propose trustworthiness and authenticity as quality evaluation criteria of qualitative research (Bryman and Bell 2011). They argue that the evaluation measures in qualitative research should differ from those of quantitative research because they are critical of the view that in social world there would be absolute truths but believe rather in several possible assessments. Thus, they have constructed trustworthiness and authenticity as the evaluation criteria that would replace reliability and validity in qualitative research. Trustworthiness consists of four criteria: credibility, transferability, dependability and confirmability, whilst authenticity can be evaluated based on ontological, educative, catalytic and tactical authenticity.

As the models of this study were co-created with the studied persons and their milieu, the credibility is relatively high. However, what comes to the transferability, it was also pointed out by the participants that as the projects are ever-

evolving, the business models evolve over time, which is why they should be constantly updated. Thus, the gathered data only provides a subjective vision of how the operators see their business models at one specific time, and no absolute truths on whether the projects function alike can be proven based on this data. On the other hand, according to Lincoln and Guba (1985) it is an empirical issue, whether the findings hold on in another context or even in the same context in another time. The business models of the projects should, thus, be repeatedly followed over time in order to understand how the business models evolve. Also, the developed conceptual model should be tested in another context to confirm the transferability. The case descriptions allow judgements about the transformability. To ensure dependability, the gathered data should be peer-audited which has not been done in the context of this study.

From confirmability aspect, the findings can be criticized because in addition to the primary data, the writer has been following the campus development processes of different levels of the case university since September 2011. He has attended various workshops, followed a myriad of space development projects, interviewed a number of people, read through numerous annual reports and articles and consulted the competition committee of a new building. Before the establishment of the new university, he used to study in the case campus, and after the merger he joined an interdisciplinary program which had courses in three campuses of the university. Thus, some sort of subjective vision has certainly evolved on the phenomenon which might decrease the level of objectivity. On the other hand, the writer does have a deep and wide understanding of the cases and their relations on all levels, which can be beneficial for the purpose of researching the related phenomena.

Authenticity has proven useful particularly for action research purposes even though in other qualitative research evaluations in general its influence has not been valued to a great degree (Bryman and Bell 2011). From ontological and educative aspects, the authenticity of the study has been ensured by being in constant idea exchange with the people responsible of the campus development and management on all levels of the university and informing them about, discussing with, educating them and collecting feedback from them for the research. As the study aims at finally contributing to the development of the respected campus, also the backgrounds for its catalytic and tactical authenticities are in place.

Limitations and practical implications

The study at hand is limited to case examples in one interdisciplinary campus of a university which is under a thorough organizational development. Thus, the research setting is uncommon and probably not applicable to all possible campus settings. However, according to the findings, the Business Model Canvas seems to reveal important abilities that do not show when observing facilities through 'traditional' real estate management models. Potential further studies include at least three main further study subjects: Processes behind the interdisciplinary case projects and their relation to organizational change; Relations between the project investments and costs in comparison to the created added values and impacts for the university; Differences between business model typologies; and testing the model in another context.

The case study projects have arisen increasing interest around the world in forms of increasing number of visitors from all over the world, amounts of collaborative partners, and exporting one of the concepts to Australia, Chile and China. As John Goddard (2013) said: "There are a lot of great initiatives going on in Aalto University, true pioneers in Europe in societal innovation." According to informal discussions with the visitors from around the world, the bottom-up management and interdisciplinary approach of the space projects seems to be one of their most interest raising abilities. Thus, the processes and, their relation to organizational change should be studied in more detail.

The values and impacts of the case projects in the long run are difficult to evaluate. Even though promising, the increasing interest towards these types of spatial development projects alone does not prove their values or impacts in relation to costs and investments for the university. Albeit even more promising, the satisfaction of stakeholders in utilizing these facilities does not prove the added values and impacts either. They form just a part of the indicators that could possibly prove the efficiency and effectiveness of these alternative space projects. Further studies could thus aim at assessing purposeful measurements for each customer and partner segment based on the Business Model Canvas.

It must be highlighted that the business models for this study's purpose were directional as they were based on subjective views of the project operators which is why their realization in practice can be questioned. The ideas collected with help of the Business Model Canvas are based on the staff visions. Studies on how the customers (as end-users, customers and clients) and partners perceive some of the projects indicate results mainly for but also against the visionary models (i.e. Björklund et. al. 2011; Kojo et. al. 2011; Sahramaa 2013). Because of the simultaneous project-like nature of the developments studied on phase two, their business models are constantly evolving, which is why their realization and development processes should be repeatedly followed. Thus, the business models and their evolution over time should be studied in more detail. Also the traditional business models of one discipline setting should be compared with these interdisciplinary projects outlined here. In addition, the developed model should be tested in another empirical context.

CONCLUSIONS

The developments in the natures of knowledge work and education are changing the paradigms of managing their supporting structures. Evolutions of scale, time and complexity both enable and require novel space concepts to attract university communities to campus facilities. Thus, the infrastructure in which universities function, need to support that development as an entity. The results of this study suggest a holistic approach to managing university campuses where the focus is on social facilitation of the campus community. Virtual and physical facilitation are seen as supportive, interconnected structures enabling the core actions – education, research and societal impact - to happen. The case examples suggest interesting directions for the evolution of university campus management and development. Their management process seems to prioritize facilitating a community, which is connected to a value creation network through a physical space. The space becomes a place only once the community actions are taken inside. Before the actions inside, they can be considered underemployed structures creating rather costs than values for the university and its communities.

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