Leading Technology-Driven Business Model Innovation from a Bottom-Up approach: Learnings from the Engineering Industry

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Abstract

The need to stay ahead of the rapidly developing competition is more essential than ever. Focus in academia on innovation management throughout the 20th century centred on managing innovation in products and services. However, development of innovative technologies and services is of little value if not exploited by a differentiated business model that describes the dimensions in which the business operates (Chesbrough & Rosenbloom, 2002); (Chesbrough, 2010)). As business models are harder to duplicate than technologies and services, an increasingly important competitive advantage is the capability of business model innovation (BMI) (Teece, 2010).

Despite the various research in BMI within the past 20 years, the organizational and leadership parts of BMI remain poorly understood (Bj?rkdahl & Holm?n, 2013); (Spieth, et al., 2014) (Foss & Saebi, 2015). Furthermore, academic research on BMI still lags behind business practice and popular discussion (Zott, et al., 2011). Academia and the business sector emphasize the need for continuous BMI in incumbent businesses to sustain economic success (Amit & Zott, 2012); (Arend, 2013); (Demil, et al., 2015). However, focus from academia has mainly been centred on disruptive innovation, new market entrants and how incumbents fail to innovate on their existing business models. There exist only few insights in how continuous BMI could be lead in incumbent companies (Bj?rkdahl & Holm?n, 2013); (Winterhalter, et al., 2014); (Berends, et al., 2016). With the urgency of adopting business model innovation in established businesses, there is a need for further guidance, methods and severe empirical evidence. This study addresses the research question of:

How do Incumbent Project-Based Service Businesses Lead Technology-Driven Business Model Innovation from a Bottom-Up approach with regard to value creation, capturing and delivering?

Until now, the business model research has argued for various models, frameworks and even the definitions of business model innovation has varied. The need for grounding the business model literature has blurred the field. An establishment of schools, key components etc. are now securing the ground for more focussed research. As an example, the one thing scholars agree upon as a key part a business model is ‘value’ in terms of value creation, capturing and delivery. To contribute broadly to the BMI research, this value-based framework is used for
understanding how incumbents lead the process of BMI. To investigate the organizational dimension of BMI and the value-based framework, interviews have been carried out with four organization groups: Top management, project-management, end-users and loose partners. The need for conducting longitudinal studies is addressed through closely following the case of using technology for BMI an incumbent engineering consultancy in the period 2017-2020.

Some of the great innovations like Sony’s Play Station and HP’s printer business were born through bottom-up initiatives in incumbent businesses. However, research shows that successful innovations need both bottom-up and top-down efforts and very often, the link is not very well made (Birkinshaw, et al., 2011). In recent years, the performance and prices of Virtual Reality (VR) and Augmented Reality (AR) has led to an increasing focus on these technologies in the industry of Architecture, Engineering and Construction (AEC). On behalf on bottom-up initiatives, a European top 25 engineering company has initiated a three-year project on creating new business opportunities of VR and AR. By 'going native', this longitudinal study will provide deep insights in how an incumbent and project-based business can organize continuous BMI.

Together with researchers from Aalborg University and Aarhus University, a SME and a large engineering consultancy, it is investigated how the value of Virtual Reality (VR) and Augmented Reality (AR) is created, captured through business models and delivered to customers and partners.

The initial findings reveal at least two bodies of findings. The first part of findings relates to the organizational dimension of the value-based framework of BMI. First, the three dimensions of value creation, capturing and delivering are viewed very different upon from the various organisational entities. Second, organizing knowledge-sharing is focal for technology-driven BMI. Third, measurements of success should be linked closely to other KPIs of success in the organization. The second part of findings relates to the role of middle management as a crucial factor for the success or failure of the value aspects of BMI. The role of middle management is especially important for developing and leading the BMI capabilities, especially with regard to allocating resources, setting the right teams, measuring success and leading a continuous process of BMI.

This paper further presents the findings of the longitudinal case study research.
Leading the Process of Technology-Driven Business Model Innovation from a Bottom-Up approach: Learnings from the AEC Industry

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Abstract

Purpose - This paper presents the initial findings of an ongoing longitudinal study on how the need for leadership and management varies in the different phases of a bottom-up initiated BMI process in a incumbent engineering business that introduces new business models with new technology (Virtual Reality).

Design/methodology/approach - The study is a case study investigating four different business units in the company. The interviews engages with different layers of attachment to the project. Top management/steering group, Project managers, internal/external customers and end users, and partners. The interviews are semi-structured, recorded and transcribed. The files are coded using Nvivo 11. The coding is compared and discussed in relation to the presented theory.

Findings - A major contribution of this paper is the visualisation of two paradoxes generated by the engineering business and the bottom-up approach in relation to the BMI process. It also discovers the different work processes and presents these in relation to the value concepts in the business.

Originality/value - This paper develops an understanding of the practical implication in a buttom-up approach for incumbent project-based businesses. The deciphering of the value concept can help companies to position their activities in the early stages of the BMI process and project start-up.

Keywords - Business model, Business Model Innovation, Value Creation; Value Capturing, Virtual Reality

Paper type - Case Study Research paper

I. INTRODUCTION

The primary pursuit of businesses is to create and maintain value (Conner, 1991) and the need to stay ahead in the rapidly developing competition is more essential than ever. Developing the innovation capabilities in business is regarded as the primary engine for wealth generation (Lawson & Samson, 2001). Academia’s focus on innovation management throughout the 20th century has mainly centered on managing innovation in new products and services. However, development of innovative technologies and services is of little value if not exploited by a differentiated business model that describes the dimensions in which the business operates (Chesbrough & Rosenbloom, 2002) (Chesbrough, 2010). As business models are harder to duplicate than technologies and services, an increasingly important competitive advantage is the capability of business model innovation (BMI) (Teece, 2010).

‘In the face of discontinuities and disruptions, convergence and intense global competition, companies now need to transform their business models more rapidly, more frequently and more far-reaching than in the past.’ (Doz & Kosenen, 2010).

Until now, the business model research has argued for various models, frameworks and even the definitions of business model innovation have varied (Zott, et al., 2011). The combat for defining theories in a somehow emerging body of literature has blurred the view on definitions, frameworks and actual theories. An establishment of schools, key components, etc. are now securing the ground for more focused research.

In a comprehensive overview of the current literature within BMI research, Gassmann et al. (2016) notes that scholars now agree on at least two aspects of BMI. First, the central advantage of the BM is to draw a holistic picture of the business and to explain how the business creates and captures value for itself and its stakeholders (Amit & Zott, 2012) (Gassmann et al., 2016). Second, scholars now widely acknowledge on three central themes; namely value proposition, value creation and value capture. This study builds upon the definition on BMI by (Casadesus-Masanell & Zhu, 2013) that a business model innovation can be defined as ‘the search for new business logics of the firm and new ways to create and capture value for its stakeholders’.

Despite the various and increasing research in BMI within the past 20 years, the organizational and leadership parts of BMI remain poorly understood (Björkdahl & Holmén, 2013) (Spieth, et al., 2014) (Foss & Saebi, 2015). Little or no research has so far dealt with the leadership aspects of BMI systematically. Furthermore, academic research on BMI still lags behind business practices and popular discussions (Zott, et al., 2011) as the most research has been centered on positioning in the new body of literature while focusing on defining the concepts, creating schools and proposing different frameworks. Many industries have been working actively with BMI for years – however, they need some academic foundations for improving the work and to close the ‘business model innovation leadership gap’ as proposed by Chesbrough (2007). Academia and the business sector both emphasize the need for continuous

So far, the main academic interests focus on exciting disruptive innovations, new market entrants or bashing incumbents when failing to innovate on their existing business models. In spite of the economic and societal importance of incumbents, research on incremental innovation in incumbent businesses is remarkably sparse. There exist only a few insights on how BMI is lead and managed in incumbent companies (Björkdahl & Holmén, 2013) (Winterhalter, et al., 2014) (Berends, et al., 2016). With the urgency of adopting BMI in established businesses, there is a need for further guidance, methods, and severe empirical evidence of how incumbent businesses lead and manage the process of incremental BMI.

To contribute to the BMI research, this paper unfolds how leadership and management affects value proposition, value creation and value capturing in incremental processes of BMI in established businesses. We are proposing a process framework were the need for leadership and management differs depending on the stage of BMI. Future research within this field need to shed light on the transformation process of the actual business models, the role of middle management and further steps in the value process; i.e. value delivery, value utility and value re-development.

The paper is structured around four parts. The first part contains this introduction, where the second part explains the theoretical foundations. Thirdly, a brief presentation of the case is presented which is followed by methodological considerations. The final part contains the findings, conclusions and suggestions for further research.

II. THEORETICAL BACKGROUND

The theoretical lens of this study is related to the bottom-up approach to BMI and the process of organizing it through leadership and management. The aim is to connect the ways leadership and management is conducted throughout the BMI process to cope with some of the challenges of determining the value propositions, creating value and capture value for the business.

A. Business Model Innovation

As noted by Foss & Saebi (2015, p. 4), the academic research of the business model construct has served multiple purposes, amongst others as 1) a basis for classification of firms; 2) as an antecedent of heterogeneity in firm performance and 3) as a new form of innovation. This study takes a point of departure in the field between the Technological School and the Duality Schools as two of Schools of BMI proposed by Gassmann et al. (2016). According to the technological school, the maxim of the business model is to define ways for commercializing novel technology, while the duality school view business models as coexisting with competing business models, requiring ambidextrous thinking (Gassmann, et al., 2016).

By applying to these schools we refer to a realist perspective on ontology, and the degree of abstraction is based around frameworks and components rather than either narratives or activity systems.

While the classifications of firms and the performance implications of business models arguably belong to other studies, the role of leadership, and how it affects value creation, capturing and delivering calls for a view on the business model as both a vehicle and a source of innovation. For example, Chesbrough & Rosenbloom, 2002, p. 532) described the business model as ‘a focusing device that mediates between technology development and economic value creation.’

Building on the idea that the business model shows the logic of the firm, the way it operates and how it creates value for its stakeholders, there is a growing consensus across the literature that the business model resides within the question of ‘how’ (Santos, et al., 2015). In this study, we define business model innovation as how the business creates, capture and deliver value that is new to the industry, to its partners or its stakeholders.

B. Organizing the BMI process

Where breakthrough changes need a top-down approach (Kostoff, et al., 2004), most of the incumbent businesses strive for staying in the game with incremental innovation processes (Christensen, et al., 2015). As this study is about incumbents, we focus on the bottom-up perspectives and the incremental BMs as extensions or modifications of existing business models. However, a successful innovation processes need to be structured both as top-down and bottom-up (Govindarajan & Sebell, 2012).

Some of the great innovations like Sony's Play Station and HP's printer business were born through bottom-up initiatives in incumbent businesses. However, research shows that successful innovations need both bottom-up and top-down efforts and very often, the link is not very well made (Birkinshaw, et al., 2011). Many studies have focused on the top-down perspective of BMI, and many have even stated that BMI cannot occur without strong support from top management. This might be true in hierarchical businesses with a singular or few BM in play. However, in project-based businesses (non-hierarchical) with multiple ongoing BM, top management has little chance of affecting every single BM – as long as it corresponds to the overall strategies. In this study, the bottom-up approach of BMI is defined as ‘a non-hierarchical innovation process emerging from the bottom‘ of the business to multiple business units.’
Leadership vs. Management in BMI processes

Leadership is crucial to the success of BMI. However, some clarifications are needed as 'leadership' and 'management' is often used interchangeably although some crucial differences exist. Further, many people refer to 'leaders' as the people in the very top of the hierarchy of an organization, while 'managers' may be referred to as the layer below the leaders. And then, the specialists and other workers exist in the layer below the managers. This very misleading mistake divides 'leadership,' 'management' and 'actual work' in a strict hierarchy while in most businesses some individuals far from the directors' offices might be excellent leaders, and where some intended 'leaders' in fact work as managers. Finally, people tend to think of 'leadership' as related to personal characteristics and charisma. Personally, we only know of few people with great charisma – which logically leads to the conclusion that only a few people can provide true leadership. However, both great leaders and managers surround us.

According to Kotter (2013), 'leadership' is associated with taking an organization into the future, finding opportunities that are coming at it faster and faster and successfully exploiting those opportunities. Further, as Kotter state, 'leadership is about vision, about people buying in, about empowerment and, most of all, about producing useful change.' Leadership is closely related to actions rather than certain attributes, meaning that many people can learn to become a leader. As the world is moving with increasing pace, leadership is becoming increasingly needed for more and more people, no matter where they are in a hierarchy. If the business is relying on a few extraordinary people at the top to provide all the leadership needed, the business employs a recipe for failure. Especially about BMI, which by nature is a holistic process, leadership is constantly needed at all business levels.

On the other hand, Kotter (2013) argues, 'management' is 'a set of well-known processes, like planning, budgeting, structuring jobs, staffing jobs, measuring performance and problem-solving, which helps an organization to predictably do what it knows how to do well.' Managers steer the production of products and services as promised, make sure to deliver consistent quality, remain within budget – and keeps delivering until the project is done (and then a new one begins). In every organization, especially the project-based businesses with multiple ongoing projects, management is an enormously difficult task, which is tended to be underestimated. For BMI, management is crucial, but it should not be confused with leadership.

(Foss & Stieglitz, 2015) notes that because the types of BMI differ depending on the challenges, the role of top management in leading BMI processes differs correspondingly. As we have stated in this paper, not only top management must take leadership of the BMI process – leadership may occur at various levels of the business. When the depth of change is limited to incremental BMI, which is the of bottom-up initiated processes, they argue that the role of top managers are related to monitoring and moderating. If the change has a more radical change to the business, the role of top management should rather focus on sponsoring and designing. Here, we build on this framework by applying it to both 'leadership' and 'management' since we argue that both are needed for successful BMI. The

<table>
<thead>
<tr>
<th>Process</th>
<th>Management</th>
<th>Leadership</th>
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<tr>
<td>Vision Establishment</td>
<td>Plans and budgets</td>
<td>Sets the direction and develops the vision</td>
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<td></td>
<td>Develops process steps and sets timelines</td>
<td>Develops strategic plans to achieve the vision</td>
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<td></td>
<td>Displays impersonal attitude about the vision and goals</td>
<td>Displays very passionate attitude about the vision and goals</td>
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<td>Human Development and Networking</td>
<td>Organizes and staffs</td>
<td>Aligns organization</td>
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<td></td>
<td>Maintains structure</td>
<td>Communicates the vision, mission, and direction</td>
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<td></td>
<td>Delegates responsibility</td>
<td>Influences creation of coalitions, teams, and partnerships that understand and accept the vision</td>
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<td>Delegates authority</td>
<td>Displays driven, high emotion</td>
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<td>Implements the vision</td>
<td>Increases choices</td>
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<td>Establishes policy and procedures to implement vision</td>
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<td>Displays low emotion</td>
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<td></td>
<td>Limits employee choices</td>
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<td>Vision Execution</td>
<td>Controls processes</td>
<td>Motivates and inspires</td>
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<td>Identifies problems</td>
<td>Energizes employees to overcome barriers to change</td>
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<td>Solves problems</td>
<td>Satisfies basic human needs</td>
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<td></td>
<td>Monitors results</td>
<td>Takes high-risk approach to problem solving</td>
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<td>Takes low-risk approach to problem solving</td>
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<tr>
<td>Vision Outcome</td>
<td>Manages vision order and predictability</td>
<td>Promotes useful and dramatic changes, such as new products or approaches to improving labor relations</td>
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<td></td>
<td>Provides expected results consistently to leadership and other stakeholders</td>
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In modular and incremental BMI processes, which only encompass further development of existing projects in isolated parts of the business, the leadership role is limited and decentralized. The vision, parameters for success and alignment with teams and employees are known from the everyday work. Hence, the need for leadership is reduced. On the other hand, there is a stronger need for empowering management in terms of resource planning, knowledge sharing and progress. A clear alignment between leaders and managers is needed but the leaders are less necessary as it must be expected that such modular BMI processes are familiar work in a project-based business, which preferably should be in a constant process of continuous incremental BMI. If the project of Mixed Realities were to be implemented in one department or division of the business, then a modular approach to leadership and management would comply.

In more architectural but still incremental BMI processes, which comprises most of the business, a moderating role for leaders is needed. The moderator should ensure strategic content, provide a roadmap for the change process and take part of active participation and mutual adjustments in order to continuously lead the way. This more iterative approach needs a more tight alignment with management as changes in 'business as usual' might be necessary. For example, managing after the usual KPIs, organizational structures and revenue streams might hinder the BMI process. Some changes are needed and they must be dealt with in close coordination between leaders and managers. Implementing the project of Mixed Realities as a new way of thinking for most of the business implies a number of organizational changes and is an example of if more architectural approach to BMI.

When pursuing a more radical approach to BMI, but only in modular parts of the business, a decentralization of leadership is needed. However, to link the radical BMI process to the strategic content of the business, a close link to a sponsor or coach in the top management team is necessary. It is the leaders' responsibilities to keep a close eye to changes in the outside environment and to share knowledge with both leaders and managers in order to act accordingly in BMI process. For the managers' point of view a more iterative management style is needed. When radical changes in the BM is wanted, fail-fast, lean-startup, prototyping, contextual design and other iterative managerial processes might prove beneficial. This calls for other types of managers than the business is used to.

Architectural and radical BMI processes intend to transform the entire business. In such cases, the top management must act as 'agent of change' with active involvement in everyday decision making and with attention to detail. In order to encompass changes at all organizational levels, decisions must be centralized and the top management team must be highly aligned. Such an approach leaves little room for managers to navigate within, and the role of managers is limited to execution of top managements decisions. If Mixed Realities were to transform the entire business, top managers must take a strong leadership while leaving the execution to the managers.

D. Challenges for Leading BMI Processes

As Chesbrough (2007) put it, many organizations have a 'business model innovation leadership gap,' meaning that no one person in the organization has the authority and the capability to innovate the business model. Many people across the organizational hierarchy need to be part of the BMI process – but at the end, businesses usually are stuck in the paradox of internal inertia, where business is done as usual. It takes a lot of power to convince the top management to pursue a new business model – and the more radically different a potential new model is, the more data needs to be provided to justify its consideration. All too often, the result is that the established business model becomes unchallengeable (Chesbrough, 2007).

BMI is arguably part of a complex organizational change, which is often hard. The potential pitfalls lie in the complex nature of BMI, which consists of organizational elements such as:

- Value Proposition
- Customer Segments
- Differentiator from Competitors
- Value Streams
- Hardware, Software & Data
- People with the needed Know-How
- Value Delivery System
- Reward Systems

The elements of BMI are intertwined in a complex system, and therefore we borrow the theoretical framework from...
another organizational stream; complementarity in complex systems (Brynjolfsson & Milgrom, 2013). The tighter the fit between the elements, the harder it is for others to imitate the BM. However, a tight fit is hard to develop. Because of all the synergies and complementarities between the various elements, changing only one of few practices is likely to reduce overall performance. Then, the natural conclusion is, it is necessary to change all the practices in the new BM simultaneously. Developing such a new BM at once might be difficult or unfeasible for several reasons (Brynjolfsson & Milgrom, 2013) (Foss & Stieglitz, 2015).

**Complexity of complementary elements**

The complexity with many interacting elements makes it difficult to forecast the actual performance changes due to BMI. Changes in a single or even a few elements might be prone for more or less correct performance forecasts, while architectural or radical changes with simultaneous changes across many complementary elements take the BM innovators into unknown territory (Levinthal & March, 1993). The uncertainty often challenges BMI.

**Lack of accurate communication and alignment of incentives**

Actors who control different business practices need to coordinate the scope, time and content of the change. Because of the partially unpredictable outcomes, the actors constantly need to coordinate any additional adjustments. This requires a well-orchestrated communication and continuously alignment of incentives for all parties. Especially in project-based business with multiple ongoing projects and business models, the element of accurate communication and alignment of incentives is in danger of being neglected while favoring other projects. On the other hand, the project-based businesses are used to this type of precise communication leaving them with a potential competitive advantage.

**Business culture impede changes away from the known**

The business consists of both explicit and well-defined practices as well as many implicit or poorly defined ways of acting (culture and rule of thumb). Employees and business partners are likely to continue to act with the usual implicit mental models and assumptions of the old BM despite any changes in the explicit practices towards a new BM.

**System inertia caused by elements of an existing BM**

Like the culture, the existing logic has emerged gradually over an extended period, the existing model often present a tight fit of elements and entails a compelling logic – especially if it made the business successful. Changing a few elements might change status quo but will most likely not change the BM in radical ways (Milgrom & Roberts, 1990). If changes to the existing BM is happening in isolated and uncoordinated manners, it will often fail to improve performance as the new initiatives does not fit to the existing business model and therefore will be discarded (Rivkin & Siggelkow, 2003). Naturally, the system is set up for incremental changes of the existing business model rather than radical changes.

**The Timing of Change may differ from the initial plans**

Even if a sufficient set of relevant changes towards a new BM is defined and agreed upon, a clear action is well-communicated, an agreement on new incentive models has been agreed upon, and the leaders, managers and other employees are beginning to act accordingly, the timing of change can present difficulties. Some variables take time to develop and might be costly (e.g., hardware like new buildings or technology, knowledge like training new people, soft values like brand or reputation, etc.). Hence, the business must phase in the changes at another schedule than first planned.

**Requirement of establishing and maintaining coherence among BM elements**

About the complementarity perspective, the individual elements need to fit each other to realize their full potential (Milgrom & Roberts, 1990). In a BMI perspective, it is needed to search and learn how to establish coherence between the elements and how they complement (or substitute) each other. This trial-and-error approach calls for a strict balancing of conflicting demands of search and coordination. Otherwise, the business runs the risk of performance-damaging over-exploration (Siggelkow & Rivkin, 2006).

Viewed from the complementarity perspective BMI is very much a process of search, learning and experimentation, usually with uncertain performance prospects (Foss & Stieglitz, 2015). In order to guide and handle the iterative process of BMI both leadership and management is demanded.

**E. The Value-Based Framework for BMI**

Following Bowman & Ambrosini (2000), value has two main components:

- **Perceived use value** is subjective and defined by customers, based on their perceptions of the usefulness of the product on offer. Total monetary value is the amount the customer is prepared to pay.
- **Exchange value** is realized when the product is sold. It is the amount paid by the buyer to the producer for the perceived use value.

When applied to BMI, that value must be created and then captured (Prahalad & Bettis, 1986). In this study of BMI, we propose to view the effects of leadership in BMI processes through the lens of value. More detailed, we propose the notions of ‘value creation’, ‘value capturing’ and ‘value delivering’. To understand the concepts, we start by defining them.

**Value Creation**
Value creation can be defined as 'the invention or the reconfiguration of assets and skills making it possible to create a usage value (new product, new service, etc.) subjectively seen as new and relevant for the potential user' (Lepak, et al., 2007, 182).

Further, Lepak et al. (2007) argue that value creation can occur at individual, organizational and societal levels. Here, at the organizational level, value creation derives from the actions of people in the organization working on and with procured use values.

In processes of BMI, value is created by the actions of employees, who in combined effort – and often in collaborations with external partners or customers – transform the values that the business has acquired to further value for either internal optimization or value for externals. The process of value creation does not necessarily mean that the employees can realize added exchange value (if for example the development costs are superior to the exchange value). One of the important roles for leaders is to change or even terminate the process of BMI if it does not realize in added exchange value to the business. How much exchange value has been added can only be determined when the newly created use value is sold.

Amabile (1996) highlights three important conditions relevant to evaluate the value creation, which here is related to BMI. Firstly, it is important to recognize that, in order to evaluate the novelty of the BM, users must possess specialized knowledge of both the focal entity and what alternatives exist at a given time so that a comparison of novelty, costs, usability and, hence, value can be made. Second, a user cannot evaluate usefulness without an understanding of the meaning of the new BM in a specific context. Third, the evaluation of novelty, costs and usability of the BM cannot be done independently of the social or cultural context in which it is introduced.

Within the realm of 'dynamic capabilities', a body of literature within the field of strategic management, studies have examined how businesses create value by focusing on how the creation of new advantages as existing ones are worn away by environmental changes. For example, Teece et al. (1997, 516) contend that firms build advantages by distinctive organizational processes, asset positions, and evolutionary paths that allow them to 'integrate, build, and reconfigure internal and external competencies'. Later, Teece (2010) stated that 'a business model articulates the logic and provides data and other evidence that demonstrates how a business creates and delivers value to customers' and that BMI itself can be a pathway to competitive advantage.

Value Capturing

Value capture can be defined as 'the capacity of the company to capture a material (monetary) or immaterial (knowledge, reputation, etc.) sum received in exchange for a usage value created for a potential user' (Lepak, et al., 2007, 182).

March (1991) has suggested that there is a need for scholars to understand the relationship between the exploration of new ideas, which connects well with value creation, to the exploitation of ideas, which connects with value capture. If value is spilled through loss of knowledge, replication or a poor BM then the process of value creation is of little use. Sirmon, Hitt & Irland (2007) identify the process of resource management as a critical mechanism through which value may be captured once created. Specifically, they propose that businesses must take actions that:

1. Structure the resource portfolio,
2. Bundle resources to build capabilities, and
3. Leverage capabilities to exploit market opportunities.

By doing so, they can simultaneously create and exploit value for customers as well as owners. Thus, at the organizational level of analysis, value may be captured by the use of resources with attributes that make them difficult to imitate, through the source's own use of creative destruction before competitors can use the innovation, and through methods of resource management

Value Delivery, Usage and Re-Development

In addition to value proposition, value creation and value capturing, Teece (2010) argues, that value must also be delivered to the end-users. Figuring out how to deliver value to the customer – and to capture value while doing so – are the key issues in designing a business model.

It can also be argued, that also value usage and re-development of value should be included. When value is delivered to the end-users (both internal and external), it can be argued that the leaders have no effect on how that value is then applied and further developed. However, we find that leaders also must understand the further processing of value – even outside the business or the time frame of a given BMI proces. It can be stated that the change of further sales, developing valuable customer relations and strengthening of other immaterial values like the brand increases when engaging in continuous BMI processes – also outside the core of the business. This calls for studies on BMI processes with strong customer relations. In this paper we present the findings on an empirical study of the effects of leadership and management in bottom-up processes of BMI. By understanding the drivers and barriers for value propositions, value creation and value capturing we propose a theoretically and practically founded set of suggestions to business leaders who seek successful outcomes of bottom-up initiated BMI processes.
III. CASE STUDY: LEADING AND MANAGING THE PROCES OF BOTTOM-UP INITIATED BUSINESS MODEL INNOVATION — COWI

COWI A/S is a Danish consulting engineering business with a particular focus on infrastructure, buildings and the physical development of society. Since 1930, the business has grown steadily and is now one of Europe’s largest engineering companies. During its 85 years, COWI has had more than 50,000 projects for approx. 175 countries and the projects include consultancy on bridges, ports, railways, highways, airports, wind farms and urban areas worldwide. By 2017, COWI had approx. 6,500 employees worldwide, a turnover of approx. € 750m and earnings before taxes (EBIT) of approx. € 40m corresponding to approx. 5 %. With approx. 15,000 ongoing projects, COWI has a large portfolio of small and large projects ranging from road safety near schools to the world’s largest bridges. The development in COWI has always been characterized by actively meeting the major global and national changes that constantly affect the way in which best advice is provided that creates value for the customer and COWI. The coming years, the global megatrends such as urbanization, digitalization, sustainability and Big Data are great drivers for both competition, for better consultancy services and BMI.

From the perspective of COWI and the industry of Architecture, Engineering and Construction (AEC) as such, technologies for representing reality in new ways are opportunities for BMI. Some of the most explicit value propositions are related to internal internal projects (streamlining and optimizing numerous processes related to all project development and execution phases) and to external phases (introduction of end-users, time-savings, increased customer experiences, etc.). Both internal and external value propositions are improved decision-making, walk-throughs for assessment of design changes and potential conflicts, constructability reviews, better collaboration, virtual exploration and viability testing of the design, user involvement, and field coordination.

Being integrated into the day-to-day activities, technologies like Virtual Reality (VR) and Augmented Reality (AR) is intended for analysis and assurance related to the particular project disciplines. Further, AR and VR can be applied for simulations of operation phases, investigating how design can be optimized to support actual requirements by introducing co-creation, letting users experience daily operation in VR, and enabling changes the physical boundaries on requests. Operational use cases also include simulating maintenance operations like repairs or replacement of large pieces of equipment. By going into detail with the case of mixed realities in a single case business, this study seeks to understand how technology-driven BMI unfolds and how the process can be lead and managed.

A. Development of Mixed Realities

Representing the real world in models has been an integrated part of the AEC industry for centuries. In the 1950s, Morton Hellig’s Sensorama started the development of Virtual Reality (VR). After having its breakthrough in the late 1980s and the beginning of 1990s, it has matured significantly and started offering possibilities for finding solutions to complex problems (Thabet, et al., 2002). However, the price of computers and VR-related technologies allowed only research institutions and a few professional businesses to look into the possibilities.

The last decade's advancement in computer and display performance have made VR-technologies accessible to everyone. Inspired by the movie Avatar (2009), Oculus Rift (2013), Nintendo’s Pokémon Go (2015), and Apple launch of VR-platforms for development (2016) VR has become mainstream. Smartphones, low-cost head mounted displays, Google Cardboard, Xbox, etc. offer low costs (starting from $15) and a wide range of possibilities for anyone interested in VR. Isdale defined in 1993 that VR might hold different meanings to different people. In the current context, the term VR will be referred to as:

‘computer-generated simulation of three-dimensional (3D) images of an environment or sequence of events displayed on a screen which enables user interaction’ or otherwise stated as ‘an experience in which a person is surrounded by a computer-generated 3D representation and can move around in the generated virtual world and see it from different angles, reach into it, grab it, and reshape it.’

(Mifflin, 2001)

B. Applying Mixed Realities in COWI

COWI has a long experience in reality capture, and the business has experienced a huge rise in the number of projects using Building Information Modelling and 3D Design. The development is partly due to public legislation and client requirements, but also due to an increased awareness in the AEC industry that 3D models with embedded information are utilized for improving quality in the projects.

The natural curiosity of engineers, the hype of VR/AR and the possibility of value creation for the clients have triggered employees in COWI to test and try out the technology. The interests showed from various disciplines such as architecture and visualization, landscape design, BIM management, etc. Especially the Danish and Norwegian business lines has a long tradition of applying 3D modelling as an approach to reality capture, while other countries like the US, are still dealing with 2D drawings, which are incompatible with 3D and virtual design. An internal community site tried to capture all the organization's activities within VR, but no or little time
was allocated to maintaining the internal site for knowledge sharing. As described earlier, the reward system in such a project-based business does not comply with bottom-up initiatives, as the reward system is built around "billable hours." As no resources were allocated, all tests, prototypes, equipment, etc., must be coordinated within billable projects and with no customer-expressed need for Mixed Reality, much of the work was carried out voluntarily or with very limited resources in many individual departments. The various bottom-up initiatives needed a cross-organizational backing and coordination to thrive.

C. Initiating A 3-Year Programme: Implementing Mixed Realities in COWI's Projects

As part of the strategy, One Step Ahead 2020, 'Innovation' elevates as one of the four main pillars of the future development (together with Leadership, Business Mindset, and Operational Excellence). Accordingly, a pool of monetary resources were allocated to cross-organizational strategic innovation projects. Through bottom-up initiatives across COWI, a technical SME and a university, a strategic application for COWIfonden were made in 2016. COWIfonden accepted the application for seed money for a 3-year program (2017-2020). Throughout the period 2017-2020, this program will seek to deploy Mixed Realities to existing and new COWI projects — while proposing and testing various reconconfigurations of BMIs. The project is divided into three phases:

1. Developing Minimum Viable Products of Mixed Realities and testing of value.
2. Development of a few deep cases for understanding the drivers and barriers for value proposition, value creation, and value capturing.
3. Broader application of Mixed Realities and based on phases 1 and 2.

The measure of success of the developed solutions is related to internal value for COWI employees (saving time, improving quality, enhancing communications, etc.) as well as external value (new projects, new customers, development of customer relations, etc.) It is the hope, which both employees and customers will integrate Mixed Reality into their daily work while creating a competitive advantage for COWI as a primary engineering consultancy for delivering excellent solutions within Mixed Realities. A formal setup for measuring cost-benefit will be created, including measuring benefits for partners and society.

IV. METHODOLOGY

This chapter explains the overall research design, presents the considerations of choosing a case study approach and describes the collection and analysis of data. Further, a discussion of the selected methodology and methods will enlighten the quality of the study.

A. Research Design

Here, the research design is divided into three components:

1. Epistemology and Ontology
2. Research Questions
3. Conceptual Framework
4. Research Protocol

The foundations of the research design consists of the epistemodology and ontology. Epistemology deals with the nature and sources of our knowledge of leading BMI. At the one extreme of the epistemological continuum is the objectivist view of BMI. Here, concrete structures are mapped, the nature of relationships are studied and causal effects calculated. The positivistic approach to understanding BMI emphasizes an empirical analysis of the given relations between leadership, drivers and barriers for value and outcomes. The 'objective' form of knowledge that specifies the precise nature of laws, regularities, and relationships among phenomena measured in terms of social 'facts' (Skinner, 1957). Although we work towards a positivistic understanding of the knowledge of leading BMI processes from a bottom-up perspective, we also acknowledge the need for a phenomenological understanding of the process in which leaders, managers, co-workers, partners, customers etc. concretize their relationships. As we are both concerned with mapping objective facts and understanding the underlying structures, we propose a critical realist approach. The aim with Critical Realism is to identify, analyse and assess the mechanism and underlying structures for the empirical events and transformed to the this study, it is sought assessed how mechanisms and structures of leading BMI from a bottom-up perspective can be changed in order to reach the the most valuable outcomes.

The ontology of BM research is framed around conceptualization and formalization of the elements, relationships, vocabulary, and semantics of a BM (Osterwalder, 2004) and which is structured into several levels of decomposition with increasing depth and complexity (Chesbrough, 2010). Throughout the last 15 years, scholars have sought to identify constructs of business models (Osterwalder, 2004), (Massa & Tucci, 2014) (Lindgren & Rasmussen, 2013). Here, we build on the framework proposed by Massa & Tucci (2014), where business models are understood differently depending on the abstraction from 'reality'.

...
The Research Questions

The point of departure is the research question, which is:

How does leadership and management in bottom-up-structured and technology-driven business model innovation processes affect the value proposition, value creation and value capturing in incumbent project-based service businesses?

To analyze the research questions in a structured way, a conceptual framework has been set up.

The conceptual framework gives an overview of how the case study research arrives at answers to the research questions. First, the aspects of 'leadership' must be understood. Then it is investigated how leadership affects the drivers and barriers to value creation, value capturing and value delivered. The identification of how leadership affects the drivers and barriers leads to analyses and discussions of the actual outcomes and impacts of the BMI process. Finally, some suggestions for addressing the leadership aspects to end with a successful BMI process are provided. The conceptual framework is further elaborated upon in chapter V. Findings.

The research Protocol breaks down the conceptual framework into a more detailed and action-oriented approach. This protocol contains procedures and general rules for data collection and analysis and enhances the reliability and validity of the study. To strengthen the research protocol, it will be developed further along the process. The overall approach is as follows:

0. Research Design
As in depth knowledge is needed, underlying structures are being revealed and as the outcomes is recommendations for future leaders of bottom-up initiatives of BMI, the case study research is suggested.

1. Data Sample
A representative business of the AEC Industry is identified (in terms of number of employees, revenue, collaborations and multiple ongoing business models).
In the case business, a specific case is chosen (technology-driven, bottom-up initiated and value-oriented).

2. Data Gathering
As surveys, economical analysis, technical analysis and other quantitative data collection methods are insufficient to reveal the underlying structures and mechanisms at play, the quantitative data is supplied with qualitative sources. 15 interviews with respondents throughout the hierarchy have been conducted and transcribed. More than 25 meetings have been attended to. A number of documents (meeting minutes, applications, strategies, decision papers etc. have been scrutinized.

3. Variables
As we are in the process of analyzing the data, the final variables are not yet settled.

4. Analysis
The data analysis further exits of creating casual networks, which can be described as a display of the most important independent and dependent variables in the research and the relationships between them. Casual networks are also associated with analytic texts describing the meaning of connections amongst factors. According to Miles & Huberman (1994) generating meaning is related to:

- noting patterns, seeing plausibility, clustering, counting, making contrasts/comparisons,
- subsuming particulars into the general,
- noting relations between variables, finding intervening variables, building a logical chain of evidence and making conceptual coherence.

All documents are analyzed with Nvivo – a software for qualitative text analysis. At the moment, the three overall categories in the conceptual framework are being broken down to sub-categories. At the moment, we have identified approx. 15 sub-categories and a total of approx.. 52 codes. More than 1,000 references to the codes have been made. The analyses have not yet been conducted.

5. Validity
After a pilot test consisting of few interviews with known stakeholders, the interviewguide and the research protocol were adjusted slightly – mainly with some more specific questions to the different groups and some additional interviewees.

At least two researchers have conducted the interviews and the data analysis. The findings represent the researchers’ interpretation of the data. To strengthen the validity, the research is closely followed, discussed and adjusted in collaboration with fellow researchers and employees at the company.

However, at this stage, it has not been possible to gather information from the customers, which is an obvious pitfall. The reason is mainly related to some missing appointments between project managers, researchers, and customers. It would strengthen the research significantly
when understanding the customer perspective more deeply. It is expected to conduct, transcribe and analyze interviews with the customers before publishing this paper.

B. Case Study Research
In particular, the method of case study research can help to elaborate on questions of 'how and why things are working as they do' as well as 'how and why things can/can-not be improved. In the study of leading the process of BMI, there are many variables that can affect the outcomes. The topic is regarded to be too complex to be understood in depth through survey results, analyses of economic matters and other quantitative means for conducting empirical data. Some of the reasons for applying case study research here are:

- **Creative insights from juxtaposition of contradictory evidence tends to unfreeze preconceptions**
  Especially the notable assumptions that BMI cannot occur successfully from a bottom-up approach

- **Likelihood of generating novel theory**
  The context of incumbent project-based businesses is not very well understood although the number of people working in such organization is on the rise.

- **Likelihood of being empirically valid**
  By going in depth with the cases and by interviewing a number of people across and in relation to the business, and by using a range of other methods such as field notes, observations, analysis of documents etc., it is possible to uncover as much truth about BMI processes in an incumbent project-based business as possible.

- **Easiness of establishing causality**
  By creating a conceptual framework, a detailed research protocol and strings of causality it is likely to establish valid links of causality although the number of variables.

As a final comment on the reasons for conducting a case study research on this topic is the application of a 'mixed methods approach' and to enhance methodological triangulation. This case study consists of an empirical gathering of data from a variety of sources.

**Triangulation**
Various methods contribute to the data collection, and methodological triangulation provides stronger substantiation of constructs, hypotheses, and reliability. The following describes the data-gathering data methods in this study.

**Interviews**: The primary source of data in this longitudinal case study interviews. 15 interviews will be conducted with participants in the whole hierarchy in and around the project-based business. In this way, the topic of organizing BMI processes from a bottom-up perspective is evaluated from various sources. Interviews with a length of 30-120 minutes are regarded as preferable as such meetings provide the researcher with enough data without being too long-stretched and hard to plan and carry out. For analytical and validation purposes the interviews were transcribed. To further strengthen the validity, a summary has been send to the respondent for approval. To overcome the bias above for the researcher, a co-researcher participates as secondary interviewer and controller at most interviews.

**Document analysis**: A source of secondary data for the case study is reviews of strategies, annual reviews, business plans, ATRs (internal document of Activities, Time and Resources between the company and the client), meeting minutes, presentations, etc. The document review is another vital source of data as the researcher cannot be present at all places at all times. However, a critical view must be applied to the document analysis as other rationales may lie behind, and other contexts are revealed. Hence, a co-researcher has reviewed the documents as well.

**Field studies**: In longitudinal studies 'going native' is a great asset for data collection. In this study, one of the researchers was invited to participate in the daily life of the business which has proven of great value for observing the actual processes along the way and engaging in everyday activities such as formal and informal meetings, that is. Field studies provide new perspectives on interviews and document analyses.

**Surveys**: The case business has carried out two Employee Satisfaction surveys (2015 and 2017) and are continuously measuring customer satisfaction. These quantitative datasets provide further insights and compliments the qualitative parts.

**Action Research**: In general, action research is applicable if a specific process is implemented and it is wanted to understand the effects of it. From the author's perspective, action research would not be as beneficial to this study as action research is not neutral, non-biased and objective. However, by 'going native' for a longer period, some biases will occur. Therefore, a co-researcher has validated the data.
V. FINDINGS

The initial findings relates to process of bottom-up initiated BMI. In this process, there is explicit tasks for leadership and management to ensure a proper value proposition, value creation and value capturing. A closer examination of the findings will take place in January 2017 when the final interviews are conducted. Analyses will be made in the software, Nvivo, to further establish the findings. The findings will also be backed by additional statements from previous research.

In general, we find that it is important to state the nature of the BMI process before determining the nature of leadership and management. In this case, the technologies of VR and AR were sought implemented across appropriate business units and departments. Acknowledging that not all departments need new, exciting and valuable ways of representing reality, we state that this case primarily is linked to modular changes in the organization. Further, as implementing new technologies to existing projects do not alter radical changes for the entire business, the case is arguably based on incremental perspectives. We argue, than in this project that leadership needs to be somehow decentralized and that management should be rather loose.

To understand the process of bottom-up initiated BMI, the case of implementing VR and AR in COWI has been followed closely for 15 months. Based on interviews, document analysis and meetings, the process can be defined in a 10-stage model. Leadership and management is often dealt with by different people – but in some processes it is hard to distinguish the difference. Even a single person can shift several between 'leading' and 'managing' the process during a single day.

1. Initiating the bottom-up approach

While top management is the initiator and driver for radical and architectural BMI processes, the basis for initiating incremental and modular BMI processes seem to be dedicated employees with a personal and professional drive. Most respondents in the project group who initiated the BMI process are motivated by 'technological fascination and a profound desire for value creation to others'. It should be taken into consideration, that this result might apply for employees in the AEC industry but not necessarily to other industries. The authors' experience with similar BMI processes reflects, that 'the drive of champions' are crucial for bottom-up initiated BMI processes.

'Often, when something is happening, a champion is behind. Champions in COWI are allowed – or self-allowed – to do a lot of stuff. It is impressive how such driving forces motivate others and set up the projects. When we have the champions in COWI, we are well-positioned. If you miss a person who walk the extra mile, and where more permissions and restrictions are in place, that's where we meet the challenges.'

(Technical Director)

Leadership is needed at several levels. First and foremost, leadership needed for allocating resources for BMI processes. Second, 'champions' are key to any business, and development of this personal traits is a noble leadership role. Third, leadership is needed at the individual level of the 'champion' as inspiration, dedication and support is crucial for transcending ideas into business models.

'One of our specialists has made a special contract with his boss. Within a certain time frame, the contract legislates lower billability than normal. He got in on paper. And his boss cleared it further up the system. I think it is rather unique, but clever of him, I think.'

Chief Project Manager

Management at this stage of the process is related to removal of some of the barriers that keep the champions motivated. We identify such barriers as 'allocating time', 'setting up meetings with network partners' initialize platforms of knowledge sharing' etc.

2. Developing the project and setting the team

As the driving force, the team seem to somehow settle around the champion – while in more radical and top management initiated processes, the managers set the team. By closely following the meetings in this initial phase it is clear, that cooperation with great managers (both from middle and top positions) is needed when setting up the team, the value proposition, economic frames and deliverables.

'Focus changed from our hardware to our software – and how we can facilitate value creation. [...] presented the idea about the strategic application to COWIfonden and briefly sketched it out. I thought it looked very interesting – especially because we are interested in [...] and in widening our business portfolio.'

(Head of Development, external partner, SME)

Leadership of setting up the right strategic alliances with both internal and external partners is needed as this stage.

Management is here related to setting the team, ensuring quality and delivering the proposition are specific tasks for managing at the initial phase.
3. Alignment with top management

If a BMI process is to transpire across the organization – even when bottom-up initiated – it needs some kind of initial approval from top management. As earlier stated, the type of BM needs to be evaluated before determining the level of centralization of leadership and managerial control. In this case, the BMI process can be defined as incremental and modular – which naturally lead to a decentralized leadership (a steering group outside top management) and slightly loose management leaving many decisions to the project group itself.

'We are not receivers of the value. We are just facilitating value creation and that it transpire into business. It is the progress and that you reach your defined targets.'

Senior Market Director

Leadership at this stage is associated with authority and decision of centralization/decentralization of leadership. Further, the initial value propositions are agreed upon. As leadership is decentralized, the project group is left with rather wide options for developing the BMI process. Management is here connected with formalizing the collaboration between the decentralized leadership and the project group and its partners. We identified 'goal setting', 'agreement of KPIs' and 'defining the process' as the most important roles for management at this stage.

4. Setting up the BMI process

With the formal issues in place the BMI process gains momentum. Hardware is bought, software is set up, platforms for knowledge sharing are launched and the project is linked to the enterprise resource planning system (ERP-system). Meetings are being arranged, communication planned and travels arranged. This is primarily a role for management. However, leadership is needed to ensure that the process maintain its innovative characteristics. In this BMI project of inducing new technology to several business units

5. Value creation

The value creation of adopting a new business is not always as well-defined the value creation of existing and well-known business models. Projects need to be carried out and tested for value creation. As earlier stated it is important to have control projects with the old business model in play in order to conduct a fair evaluation – and to communicate the value creation.

'We have tried to ensure it [progress] – but that might be one of the weaknesses here. We need to be careful about the tendency of "shoot-and-forget" ... and not to lose it when the first excitement is over and it goes into normal business. There might be some more work than we anticipated in being pro-active.'

(Technical Director)

Leadership of value creation is connected with the ability of pushing the limits, applying creative thinking and gently push the employees outside their comfort zones. At the other hand, leaders must remember to celebrate the victories of value creation to keep motivation high – a notion that somehow seems forgotten among the many other ongoing projects.

Managers seem to have a more important and profound role for value creation than first anticipated. The skills of setting up the right processes with iterative designs are needed. Some employees (at least in the AEC industry) find it necessary to deliver the highest possible value creation to end-users – with large resource usage and often with low involvement from end-users. Here, the managers and leaders must cooperate closely and keep insisting on shorter processes and steeper learning curves in order to facilitate progress. Otherwise the BMI process risk too long periods of stand-by – and other projects win the attention of the employees and customers. Further, managers need to show progress to the business in terms of visibility and communication.
6. Value capturing

In general, the previous five stages build on each other to create either internal or external (or both). The ideas of BMI processes were initiated at the heart and soul of the business – and transcended to value creation for end-users. At this stage the stream of returns back to the core-business. The focal point is where the new BM is at play at the end-user – and value is exchanged back to the business. It might be monetary, time saved, better customer relations, a won proposal etc.

'This Monday [at the study trip to Finland] we talked to [...]. They said: "Well, some major construction companies realized that by applying 3D projecting throughout the entire process, they could save 8-10 % of the costs. And in these kind of projects, that [money] is huge.'
(3D Specialist)

Leadership is to facilitate processes of knowledge sharing across the business of how value was captured. Through internal and external relationships, leaders should facilitate further value capturing of the BM.

Managers must document the value capture and ensure that the value captured is aligned with the KPIs and success factors of the BMI process. Further, the manager has an important job of ensuring knowledge creation – and to ensure valuable feedback from end-users.

As this this longitudinal study is now entering it final phases we propose further stages for investigation. However, the results does not yet exist and the following is based on preliminary ideas and suggestions.

(7. Value delivering)
We propose value delivering as an important stage of the BMI process as determining the channels for value also might impact the actual value for the business. For example, some initial findings indicate that the skills of the end-user (and his employees) is crucial for understanding the BM – and hence for the future value capture.

'It is important to get along well with the customer's "ambassadors" – then introducing [a new BM] is less challenging... It is very important. It is much easier to present a solution which is understandable to the customer.'
(3D Manager)

(8. Value usage)
The BMI is of little value if not applied. With new technology like VR and AR, there exist a wow-effect which is used for initial interest and perhaps for initial value creation. Within a few years, it is expected that most people are somehow familiar with the technology – and that actual usage in everyday work in for example the AEC industry leads to better build environments.

'We need to get pass the "imponator-effect". We need to see, what is feasible and how it brings value ... The driving force is to reach at better decisions. To get better products and to avoid the damn mistakes we keep doing. To avoid having a concrete column in the middle of this meeting room!'
(Associate professor, external partner, university)
Leaders and managers need to follow up with customers and partners. By customer/partner in order to facilitate processes of adjusting the BM. For example, 2D drawings has for years been part of the project delivery, in some countries (especially in Scandinavia) 3D models are now expected as normal deliverables. Mixed Realities might be an integrated part of engineering within a few years. Hence, to contiously re-develop the value proposition seem important for the BMI process.

It is about taking the customer by heart – because every large or medium-sized engineering consultancy can design and produce a tunnel. The hardcore engineering work is “bulk”.

Senior Market Director

Perhaps leaders should re-engage in new networks for value re-development. For example the BMI process if Mixed realities stems from years of working with 3D modelling – and before that 2D drawings. Simultaneously, managers could work for strengthening the knowledge sharing with outside partners and strive for some sort of ‘open BMI’.

VI. CONCLUSION AND FURTHER RESEARCH

In the era of digitalization, the great innovations seem to occur especially in terms of innovation in the business model and not only in the products or services. The speed with which technology and society change arguably divide businesses into those who refuse to innovate on the business model (and disappears from the map) and those who constantly innovate and renew (those who transpire into new business adventures). BMI has thus become a focal parameter for developing a business’ competitive advantage. Business leaders and managers call for ideas and champions for BMI and thousands of initiating ideas are being born every single day at vending machines, in meetings, at study trips, during the daily commute or at other venues for creativity. However, only few innovations transpire from the initial ideas at the bottom to main transformations of the entire business.

To investigate the leadership and management dimensions of BMI and the value-based framework, a case study has been conducted in COWI, a major Danish engineering consultancy. This study addresses the academic and practical gab of leading business model innovation through bottom-up initiatives. Especially the role of leadership and management was investigated throughout the process. The findings points towards nine stages of bottom-up initiated BMI, where leaders and managers must take different roles to secure a great value proposition, value creation and value capturing.

A literature study with the theoretical lense of complementarity theory revealed the following challenges for value creation and capturing in BMI processes.

- Complexity of complementary elements
- Lack of accurate communication and alignment
- Business culture impede changes away from the well-known
- System inertia caused by existing BM
- Timing of Change differ from the initial plans
- Requirement of establishing and maintaining coherence among BM elements

The empirical findings is summed up in the table.

<table>
<thead>
<tr>
<th>Stage // Role</th>
<th>Leadership</th>
<th>Management</th>
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<tbody>
<tr>
<td>1. Initiating the bottom-up approach</td>
<td>Allocating resources. Development and support of 'champions'.</td>
<td>Removing barriers like 'allocating time', 'setting up meetings with network partners' ‘initialize platforms of knowledge sharing'.</td>
</tr>
<tr>
<td>2. Developing the project and setting the team</td>
<td>Setting up the right strategic alliances with both internal and external partners.</td>
<td>Setting the team, ensuring quality and delivering the proposition.</td>
</tr>
<tr>
<td>3. Alignment with top management</td>
<td>Decision of centralization/decentralization of leadership.</td>
<td>Formalizing the collaboration between the decentralized leadership and the project group and its partners.</td>
</tr>
<tr>
<td>4. Setting up the BMI process</td>
<td>Ensure that the process maintain its innovative characteristics.</td>
<td>Purchasing of material, setting up platforms, linking to ERP-system, meetings, communication, travel booking etc.</td>
</tr>
<tr>
<td>5. Value creation</td>
<td>Pushing the limits, applying creative thinking and gently push the employees outside their comfort zones.</td>
<td>Setting up the right processes with iterative designs and ensuring end-user involvement.</td>
</tr>
<tr>
<td>6. Value capturing</td>
<td>Facilitate processes of knowledge sharing across the business of how value was captured.</td>
<td>Document the value capture and ensure that the value captured is aligned with the KPIs and success factors of the BMI process.</td>
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<td>7. Value delivering</td>
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<td>8. Value usage</td>
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<td>9. Value re-development</td>
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In order to better understand the roles of leadership and management of bottom-initiated BMI, it is recommened that future research should address the role of middle management as potential champion in BMI processes. Further, we suggest to dig deeper into the configurations of the existing and new business models in order to understandthe drivers and barriers for a more ambidexterous approach. Finally, we call for further development of the value-based framework og BMI, where both value proposition, value creation, value capturing, value delivery, value usage and value re-development is further elaborated theoretically and empirically.
VII. REFERENCES


