
Open Business Model Innovation in Healthcare Sector

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Abstract

The Open Innovation and Open Business Model Innovation (OBMI) approach (Chesbrough 2005, 2008) has been one of the most discussed innovation frameworks in the 2000s, and probably one of the most important contributions to business model innovations (BMIs) since 2005. Managers in the healthcare sector responsible for innovations have also tried to adapt the OBMI approach as a tool among the numerous other innovation tools.

The aim of the paper is to present an initial study of the implementation of the framework of OBMI in the European healthcare sector. The study is naturally inspired by Chesbrough's work on OBMI but also Michael Porters work on healthcare sector (Porter 2010) and shared values (Porter 2011).

The study includes four European Hospitals (University Hospital Oslo, HSDJ Barcelona, University Hospital Aarhus and University Hospital Aalborg). Data is supplemented with experience from the European and US healthcare sectors.

The paper focuses on the following research questions:

- How can OBMI be defined?
- How is OBMI used in the healthcare sector?

The paper concludes by proposing a definition of open and close business models, and open and close business model innovations.

Keywords: Open and Closed Business model innovation, Open BM Innovation models, Multi Business Model innovation, Healthcare sector

1. INTRODUCTION

Healthcare represents one of the largest proportions of public spending in any European country, where unlike the US, citizens are entitled to substantial free healthcare, a right enshrined in European law. Some European countries such as Italy, Ireland, Spain and UK operate a free-at-the-point of use state system with zero or very minor barriers to entry. (In Spain, it is necessary to hold a social security card, but these are available to all citizens (*Carta de Derechos y Deberes* - Charter of Rights and Obligations.)

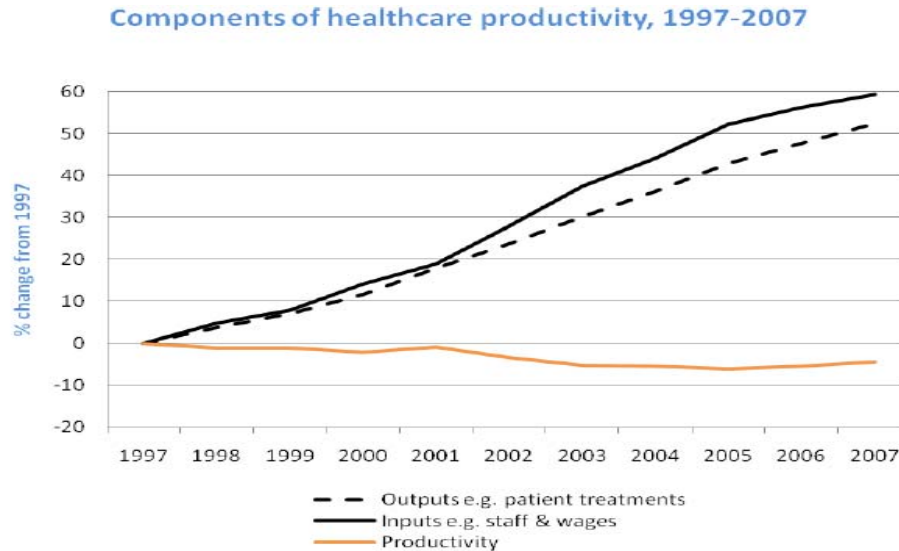
A number of European countries operate a system where independent profit or non-profit healthcare providers are financially reimbursed after treatment has been provided. Here, a conventional financial value market operates between commissioners of care (usually insurers) and providers. In the Netherlands and Belgium, for instance, citizens must join an insurance system, choosing from a number of private insurers. The State provides funding through payments to insurers. In Germany, a comparable model is now being fundamentally changed so that all such insurers would be nationalized. In 1996, France introduced a specific cap for its state payments in health insurance spending, however, a decade later the deficit resulting from the cap being broken had doubled to 49 billion euros.

Comparative details of all European healthcare systems can be found in Appendix 1 and at the WHO European Observatory on health systems and policies [WHO 2011]. The UK is an example where the State, in addition to commissioning and paying for all care, is also by far the most dominant provider. In order to drive the BMI and best value proposition, the UK Government relies substantially on measures of value other than of a standard financial kind. This paper draws attention to a number of such measures in order to try and make a more general contribution to researching business model values and BMI in a domain that to date seems to have escaped study by the general academic business community (apart from Michael Porter – see Chapter 4), despite its massive size (USA: 2.5 trillion euros p.a. in 2007, UK: 120 billion euros p.a. in 2010).

A dramatic graph showing the nature of “the healthcare business” challenge is exemplified by the UK statistics shown below, which indicate sharply rising levels of services (value proposition) to patients, as measured by staff numbers which have risen at the same rate. However, the measure of productivity shows no change or even a decrease. In other words, the figures have not been impacted by heavy investment in BMI and change.

The Economist’s report on the future of healthcare in Europe [EIU 2011] states that the rising cost of healthcare cannot be met with current levels of public funding, raised via taxation and insurance. The report states that the main drivers of rising healthcare costs in Europe are:

- ageing populations and the related rise in chronic diseases;
- costly technological advances;
- patient’s demands driven by increased knowledge of options and by less healthy lifestyles; and
- legacy priorities and financing structures that are ill-suited to today’s requirements.



Source: Office for National Statistics. Total Public Service Output and Productivity. June 2009

Figure 1 Components of healthcare productivity, 1997–2007.

The report goes on to state that a completely unrecognizable level of change in business—via BMI—must consequently be applied to European healthcare sector to match the challenge coming up in the period up to 2030 which the report covers. The figure 1 outlines that despite rising costs and flat or dropping productivity, BMI is extremely difficult to enact. When looking at detailed techniques used in other sectors such as business and value modeling and business values, conventional application in healthcare is very low. The result of this predicament, at least in one administration, the UK, is proposed to focus on output-based measures, creating a multi-layered business value structure allowing a combination of peer evaluation and market forces to drive BMI fundamentally based on outcomes and other quality measures.

This research looks in more detail at one approach to take up with this challenge—implementing OBMI—trying and establishing its effectiveness in order to throw light on whether this approach is applicable to healthcare systems at national, regional, or at a hospital provider level.

2. RESEARCH QUESTION

Not wanting to belittle the importance of OBMI as an approach related to solve the healthcare sector's challenge, we studied the following research questions:

- How is OBMI adapted in the healthcare sector?
- How can OBMI be defined?

In this context, the paper firstly tries to understand the fundamentals and clarify about the terminology of an OBM and OBMI framework. Second, the paper studies how the OBMI concept is implemented in the healthcare sector.

3. DESIGN/METHODOLOGY/APPROACH

The approach is a qualitative case research from 2010 to 2012 covering four European Hospitals (University Hospital Oslo, HSDJ Barcelona, University Hospital Aarhus, University Hospital Aalborg). Data is supplemented with analysis and statistics from European and US Healthcare sectors. The study was formed as a part of the Neffics EU project funded by the European Commission.

4. THEORETICAL BACKGROUND

Managers in many industries these days, also in the healthcare sector, responsible for BMI are trying to adapt the OBMI approach (Chesbrough 2005, 2008) as a model to take over or supplement the numerous other innovation framework concepts and models (Cooper 1993, Eppinger 2000, Sanches 2000) that exist.

Healthcare and other sectors are in a time of disruptive change of BMI, BMIM and even business values of BMI (Neffics 2012). Many businesses, in general, are now actively trying to implement a new BMI concept where an OBMI can take up the challenge and strong demand for more flexible and dynamic BMI. The focus among others is on the development of solutions that empower the individual, in a social context, to improve and manage personal life as a citizen, elderly, patient, consumer, civil servant or worker. Special emphasis has been given to productivity gains, customer satisfaction, and provision of new capabilities of public interest, in particular, harnessing the "network effect" of healthcare typically supported by heavy investments in ICT networks.

Healthcare business also takes up the OBMI approach because it is free, quick, realtime-based and contributes to a leaner BMI process and reduces or even hopefully takes away direct costs. However, there is not much research on how the healthcare sector has adapted the OBMI concept. And, where in the BMI process, is it strategic to place the OBMI?

Openness, visibility, transparency, sharing and speed of BMI provide a new dimension and era to the healthcare sector. However, as Professor Henry Chesbrough stated at the Oslo Innovation Week October 2011 (Chesbrough 2011):

"I never said that businesses should be religious on Open Innovation and Opening the Business Model". That would be too naïve".

Hereby, Professor Henry Chesbrough stated that businesses still have to think and act strategically about BMI and, in particular, not be strategically naïve about the concept and implementation of OBMI.

4.1. *Open business and open business model*

The concept of an open business (OB) and an open Business model (OBM) (Chesbrough 2007) is indeed an opportunity, but also a challenge to many businesses. The concept of an OBM and OBMI is nice, however, merely looking nice does not mean that it is easy to implement, and can be filled with many pitfalls. Most business leaders, when asked about implementing the OBM concept, would have a ready answer—'Yes, we would like to

adapt the concept.’ However, when they do so and come up with their experience, they will most likely argue that their businesses, business models, organizational structure and networks would not really at the moment allow an OB and OBMI concept.

But what is an OB and what is an OBM? Many managers and some academics do not really know how to define an OB and OBM. And even if they do, they will present very different versions of their knowledge about these two concepts. What is it about OB and OBM that make them so attractive? What do we really know about the rationale of OB and the OBM? What is the difference between a closed and an open BM? And, what is the difference between an OB and an OBM?

At present, some literature tries to address the OBM innovation concept (Chesbrough 2005;2008, Von Hippel 2005, Von Krogh 2007, Scozzi 2012) and argues how and why to innovate openly (e.g. Chesbrough 2008, Von Krogh 2007, Von Hippel 2005). Both academics and practitioners alike recognize and appreciate the vision and the obvious potential of the OBM and OBMI concepts. However, most share a common difficulty and a strategic risk perception of OBMI, in spite of the intensive research done in this field in the past five years. Therefore, the OBMI concept still remains very fuzzy in its definition, purpose and operational form (Scozzi 2012). Thus, before discussing what OBMs’ are and look like in the healthcare sector, a clear definition, as well as a theoretical background, is required.

4.2. *Towards a definition of: ‘Open Business’ and ‘Open Business Model’*

Firstly, we draw an extension on the difference between a business and a business model. We define ‘business’ as the overall “umbrella” for one or more business models in it (Lindgren 2011). We propose that all companies and all organizations can be defined as “a business”, inspired by Derek F Abell’s terminology (Abell 1983). The business also consists of some business models (BMs) that have already been introduced to the market “AS IS” BMs and others that are not “TO BE” BMs as illustrated in Figure 2.

Those responsible for BMI have to pay attention to both sides of BMI —“TO BE” BM and “AS IS” BM to cover all aspects of the strategic BMI in a business. In a creative phase of the BMI process, the output could be many different ideas, concepts, prototypes and implementation proposals of business models and later on some of these may turn out to become new models in the business portfolios of already operating business models.

We have earlier defined the business model as comprising seven generic building blocks (Lindgren 2011) and defined each of the individual seven building blocks, however, without taking into consideration the question: What is an ‘Open Business (OB) and an Open Business Model (OBM)’ really?

Different authors will define the OB concept in dissimilar ways. In order to simplify things though, it would probably be easier to separate the question into two discussions or definitions: firstly, what is an ‘OB? Secondly, what is an ‘OBM?. An “OB” could be considered as an overall concept of how the business is performing and hereunder the framework on how the business innovates its business and business models. Several terminologies have been used on OB (please see Appendix 2). From this study, it is clear that the openness related to business must be, in reality, related to openness on how we define the business. In this context, Abell (Abell 1983) provided us with three dimensions—customer function equal to value proposition, customer groups equal to user and customers served by the business, and finally customer technology equal to value

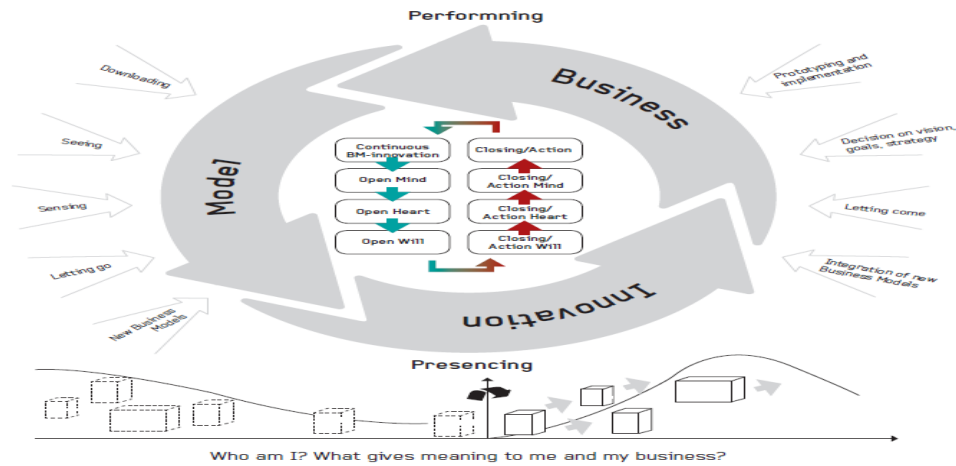


Figure 2 A Business Model Innovation Process with “TO BE” and “AS IS” business models. Lindgren and Saghaug 2011, inspired by Otto Scharmers.

chain [internal] and competence (technology, HR, organizational system and culture). We added three more—networks, relations and value formula. Every business has to consider these seven “business pillars” when it defines its business and in which the business models can operate.

Hereby, we are now left with another question: How open a business is and can be? One of the thoughts is for a business to be incremental and be radically open. To nail it down, the degree of openness is really a strategic choice of the business manager. With openness comes automatically the question of risk and value of an OB and OBM. Further, there are other questions to be deliberated: Which part of the business to open? When to open? When to open part or the whole core of one’s business or the “heart of the business? Finally, an answer is needed related to the question of openness to whom—internal or external openness to other businesses, business models or building blocks? We consider ‘openness’ as equally important to measure and define, related to the businesses internally as in with other internal BMs and and/or externally as in openness to BMs external to the business.

This discussion is very much related and equal to previous discussions on competence and core competencies back in 2003 (Prahalad and Hamel 2003). In this case, it is not just competencies in a core business that are of concern, but all the earlier seven business areas and subsequently also all the seven building blocks in the specific business models and related models.

Businesses these days are becoming more and more related, integrated and dependent i.e. the network-based business models (Lindgren *et al.* 2010). Linked businesses and link business models link businesses together and could lead someone to define these as OBs. Today, businesses that enter an open business environment have the ability to more or less download, see, sense, create, capture, deliver and consume all the data from all the business and all the different business models and building blocks of such. According to Tim Berners-Lee (Lee 2009), the more linked data, the more linked businesses and the

more linked business models our society gets. Wikipedia, some would say is the best practical example of a link business and some would say an example of an OB. Everybody can access Wikipedia and everybody can contribute to Wikipedia. But is Wikipedia really an OB? Can Wikipedia really be classified as an OB and can a closed business model be built upon an OB? We propose that **a closed business (CB) can be built upon an OB.**

An OB, therefore, does not seem to necessarily demand that “next business model” should be built as an OB and on OBM, but seems to be able to be built upon one or more CB models. So, the fuzziness is really complete when the above mentioned is taken to consideration, and OB and OBM are still not defined. Let us, therefore, begin with trying to answer the question:

When can one say an OB and an OBM are open?

KEY CHARACTERISTICS OF AN OPEN BUSINESS

When businesses link their business with another business, you open Your Business. There seems, therefore, to be a strong relation between linking different businesses together and the OB concept.

Our previous baseline analysis has shown that businesses with all kinds of “formats” links with other businesses, but the degree of integration and transaction between different businesses is another characteristic to the concept of openness and OB. Transparency may not really be an important issue for classifying an OB, but it is maybe a step to an OB. Data and business that are transparent—named open in some definitions—might be useful and potential for other businesses and for defining a business as open.

The above express some of the challenges and differences between a CB and an OB. A CB protects its business models with patents, licenses and restrictions and they fight whoever breaks their licenses, patents e.g. A CB does not allow others to use their licenses and patents in their business. An OB does and opens the business and business models to whoever wants to link, see, sense, download, create, capture, deliver and consume and thereby benefit from it. OBs seem from outside to give everything away for free (Anderson 2007). But do they really do this?

The power of unlocking what other business have embedded is important to our society (Amidon 2011). We have to release the IC, the business and its models so they can be used for creating more value to other businesses (Lee 2009). We have to release the “locked in” potential of other businesses—either they are tangible or intangible assets. The internet has contributed to make it easier “to release” the tangibles and intangibles of businesses (Lindgren 2012).

We now turn to the question: When can we, in economic terms, define an OB and consider an OB as **a recognized open entity designed to create, capture, deliver and consume value to and with other businesses?** The level of opening the business could be related to parts of the business, which was earlier defined as opening different Business models and/or different building blocks and how open are they really. OB could be related to opening all parts of the business or opening just some parts of the business, either one business model or one or more building blocks in a business model.

Taking this into account our earlier definition of the business model including the seven building blocks of the business model could now be transformed to an OBM as:

‘An OBM is defined as a pattern, plan, representation (especially in miniature form) of the openness, or description designed to show the openness of the

Table 1 Definitions for the ‘Open Business’ and ‘Open Business Model’

Inspired by Authors	Expected definition of an open business model
Timmers, 1998	“Open Business model stands for the architecture for the value proposition flow, including a description of the various business actors and their roles related to openness, the potential benefits for these actors and the sources of revenues when the business model is openthe open business model includes all stakeholders”.
Venkatraman and Henderson 1998	“An architecture along three dimensions of openness: business model interaction, asset configuration and knowledge leverage”.
Selz 1999	“A open business model is an architecture for the business value proposition flows. This includes a description of the various economic agents and their roles related to openness. An open business model also describes the potential benefits for the various agents and provides a description of the potential revenue flows” when a Business Model is open.
Stewart and Zhao, 2000	“Open Business model is a statement of how a business will make money and sustain its profit stream over time via opening its business model”.
Linder and Cantrell, 2000	“The open business model is the organization’s core logic for creating value open”.
Hamel, 2000	“An open business model is simply an open business model concept that has been put into practice. An open business model concept has some major components that are open: Open Core Strategy, Open Strategic Resources, Open Customer Interface and Open Value Network”... (Elements of the open core strategy include openness of the business mission, openness of value proposition and an open market scope, and basis for differentiation is related to openness. Strategic resources include openness of core competencies, openness of key assets, and openness of core processes. Openness of the business model related to Customer interface includes the degree of openness related to fulfillment and support, information and insight, relationships and pricing structure. The open value network consists of suppliers, partners and coalitions)”.
Petrovic et al, 2001	“Open Business model describes the logic of an open business system for creating value that lies behind the actual processes”.
Weill and Vitale, 2001	“A description of the roles and relationships which are open among a business consumers, customers, allies and suppliers that

	identifies major flows of value proposition and money and the major benefits to participants”.
Magretta, 2002	“Open Business models are stories that explain how the Business model work openly...An Open BM describe, as a system, how the pieces of an open business model fit together, but they don’t factor in one critical dimension of performance: competition”....” a good open business model has to satisfy two conditions. It must have a good open business model logic - who the customers are, what they value, and how the business model can make value and money by providing them that value. Second, the open business model must generate profits.”
Amit and Zott 2002	“An open business model is the architectural configuration of the building blocks of transactions designed to exploit open business model opportunities. The transaction building blocks refer to the specific value proposition – tangible and intangible - that is openly exchanged and/or the parties that engage in the open exchange. The architectural configuration explains the open linkages among the components of transactions – building blocks - and describes their open sequencing”.
Osterwalder et al. (2004)	<i>“A blueprint of how a business does open business. It is a conceptual tool that contains a set of building blocks and their relationships and allows expressing business’s logic of earning money openly. It is a description of the value an open business offers to one or several segments of customers and the architecture of the open business and its network of partners for creating, marketing and delivering this value and relationship capital openly, in order to generate profitable and sustainable revenue stream”</i>
Chesbrough 2007	“The open business model is a framework to link ideas and technologies to economic outcomes” openly... “It expresses the understanding of how business of all sizes can convert technological potential openly [e.g. value proposition, feasibility, and performance] into value [price, profits and other value]”..... “Every Business has a part or a whole an open business model, whether that model is articulated or not”.
Skarzynski and Gibson 2008	“The open business model is a conceptual framework for identifying how a business creates, delivers, and extracts value openly. It typically includes a whole set of open integrated building blocks, all of which can be looked on as opportunities for open business model innovation and open advantage”.

business model and its related building blocks or workings of an OBM and its related building blocks, business model system, or business model concept.

An OBM would be a representation of a type of business model, either as an object which is usually smaller than the business, **or as a simple description of the OBM** which might be used in “calculations” of how open the business model is.

An OBM could be defined when a smaller part of a business model (one or more building blocks) is/are open, **often used to show how an OBM works or what it looks like when it is more or less open.**

As shown in Appendix 1, some authors have attempted to define what they think are the characteristics of the OBM concept, but no one has really defined yet fully as to how openness can be defined in this concept. Some authors take a narrow technological, innovative or financial approach on the open business model (e.g. Chesbrough 2007, Von Hippel 2005, Von Krogh 2007) and relate it to the advantages of OBMI. Others do not (e.g. Amit and Zott 2002, Magretta 2002, Osterwalder et al. (2004), Zott 2011) but just refer to OBMs. No one has yet taken up the discussion on openness and degree of openness of the business model. Some have incorporated business strategy in their definition of the advantage of openness related to how open should the business model be defined (e.g. Chesbrough 2008, Von Krogh 2007). Most have, however, left the theme and definition of openness out.

However, it seems that most (if not all) authors could agree that an OBM is simply defined by the combination of the three terms ‘open’ ‘business’ and ‘model’. We, therefore, propose the following OBM definition:

“a description (a model) of how open a business model and its related seven building blocks are, and designed to provide and take value proposition to and from other business models—either internal or external to the business.”
(Lindgren 2011)

In relation to whoever has previously commented on what a business model is, we have tried to elaborate on their definition and what they might have said, if they had been given the opportunity of defining what the open business model really is. We went further in this work by integrating our previous definitions of business model into their expected definition of the open business model. This can be seen in Table 1.

From the above mentioned elaboration on the OB, we have adopted some of the main definitions, since we have found them to be the most comprehensive and direct in providing a concrete detailed proposal to a definition of the OBM. Consequently, according to this,

“an Open Business Model (OBM) serves as an open business model building platform with seven building blocks that can potentially individually be open or closed—incrementally or radically opened/closed. The result represents an OBM’s operational manifestation, its openness and its degree of openness”. (Lindgren 2011)

Thus, it becomes very clear that the real challenge for OBM ‘designers’ is to firstly identify which building blocks are to be opened or/and to be closed in the OBM and then describe how open and how closed each of the building blocks are—‘AS IS’ OBM—before innovating it. Secondly, which building blocks should be opened or closed, how should the “TO BE” OBM look. In this context, we have put examples in Appendix 3 of some companies that claim they are OB, but where we with our definition also claim that

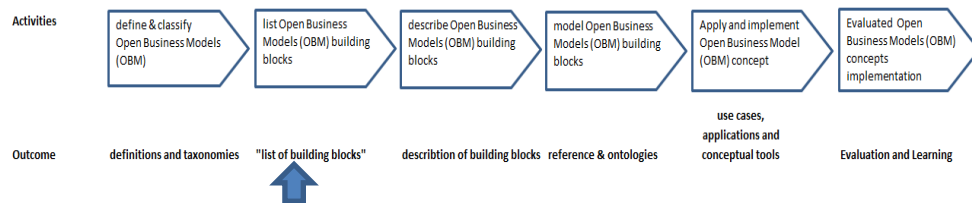


Figure 3 A Proposal for a Future Evolution on the Open Business Model Concept (Lindgren 2011).

they have both closed BMs and OBM in their business.

Nobody can, therefore, really get the full picture of how open or closed a BM really is seen from outside for the above-mentioned. These businesses either say they are open, or others from outside classify or perceive them as OBs. Therefore, we propose that a framework for OBM is established to go a little closer to what we define and believe is an OBM. To do this, we have to go a little back in the history of OB, OBM and OBM innovation.

4.3. The evolution of the open Business and open Business model concept

The term “the Open Business Model” became popular in the mid-2000s around the same time as ‘innovation com era’, open innovation and open business model concepts became popular and important. As some forms of so-called open business model ecosystems emerged (Innocentive, HP, Younoodle, Katalabs, Gohit, Second Life, Facebook), many businesses started to rethink and established their businesses, business models and business model structure by shifting or choosing from a so-called close form for business (a firm, an entity, a business with a certain number of Business model”) to an open form for business model (Open Business model).

Inspired by Chesbrough (2008), the “father” of the evolution of OBM and the “trigger” for the research on open innovation, open business and OBM framework, we could register within the category of five core phases related to the OB.

In **the first phase**, a number of suggested OBM approaches can be drawn up, which show that there is still some confusion about the definitions and taxonomy of OBM. In **the second phase**, which we believe we are in now, we would complete the OBM definitions by proposing what elements belong into an OBM and what do not. This we will do in the next section. **The third phase** will follow with a detailed description of these OBM building blocks and others to describe the OBM. In **the fourth phase**, researchers can start to model the OBM building blocks conceptually culminating in an OBM ontology and finally, in **the fifth phase**, those found OBM models can be applied into OBM innovation leadership and management and related information systems [practical] applications. In this context, the NEFFICS platform www.neffics.eu was helpful and could in the future be a platform or player in an environment of OBM..

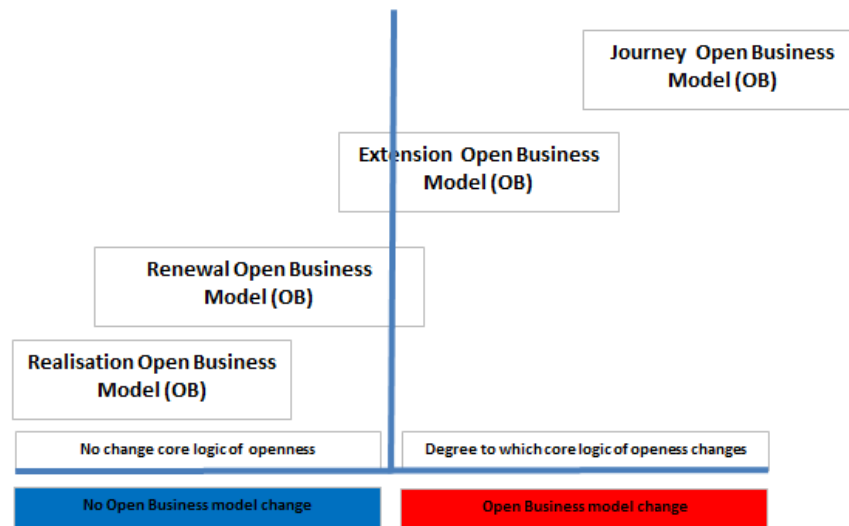
In this context, our baseline analysis have shown that academically we have reached the first part of the second phase in our Figure 3 with some examples of what we define as an OBM.

4.4. *Linking the ‘Open Business and Open Business Model’ concept to open business model innovation*

The diverse and lack of clear definitions and classification of the OB and OBM notion converge towards the approach that the OB and OBM are really related to some vision of a OB and OBM and maybe in some cases only to parts or some key parts of a vision of an OB. It seems that nobody has dealt with a number of additional start-up and operational issues that transcend the open [business] model framework. Furthermore, it seems that the OB and OBM are not just related to one strategy but includes a number of open business model strategy elements.

We have in our baseline analysis approached “the open business” and “open business model” concept as a unifying unit of analysis and concluded that the findings of our cross-theoretical perspective have led us to believe that no single theory can fully explain the OB and OBM. Consequently, it is difficult to identify a holistic framework for a generic OB and OBM depending merely on one OB and one author’s perspective—not even the father of OBM Chesbrough has done so. The contributions from our baseline research show that we could however propose and identify some common ideas and theories of the OB and OBM with the following details and aspects:

“An OB and its related OBMs are built upon ideas and concepts that are advocated by the main theoretical framework of Henry Chesbrough (Chesbrough 2008) and the ideas and concept of the business model framework (Lindgren *et al.* 2011) to an OB and OBM”. However, the OB and OBM have to be related to time and perspective of the OBMI processes—creation, capturing, delivering and consumption phase. This we try to illustrate in Figure 4.



Lindgren inspired by Linder and Cantell and Chesbrough

Figure 4 A Proposal for a Logic on the Open Business Model Concept (Lindgren 2011).

OPEN BUSINESS MODEL INNOVATION (OBMI)

For that reason, our concept of the OBMI is also formed on the above. Additionally, according to this view, since the existing OBMI perspective in general but not in detail takes into consideration the ways in which tangible and intangible values and components of “locked in business”, “locked in business models” and “locked in business model building blocks” can be valuable to other businesses and business models, we claim that the OB and OBM are still incremental in their thoughts and concepts related to openness and especially to what we think could be really a radical OB and a radical OBM.

However, the existing thoughts of “OB” and “OBM” concepts are a starting point but are still difficult to imitate, are less transferable, less substitutable and less productive with use. It is fundamentally built on a business and business model framework that mainly has a resource-based view, not an integrated and a network-based view of a business and business model.

Furthermore, from a strategic OB and OBM network theory perspective, we identified a strong link between the radical OB and OBM concepts related to the network configuration and value creation of BMI in networks (Please see Neffics D. 3.1. and D. 3.2. EU Neffics project) and also by Porter about shared value (Porter 2011). By building on the insight that open combinations of inter-firm cooperative arrangements such as strategic open alliances, open joint ventures, relationships of open knowledge zones (Amidon 2011), an OB and OBM are expected to create more value than a closed business and closed business model. We conclude that from an OB and OBM perspective, the fundamentals of inter-firm cooperative arrangements—OBMI—are essential to enable the business to release the real potential, share values and achieve real new value creation of OB and OBMs.

In many cases, we also see the integration of openness related to physical, digital and virtual network formation as a vision of OBMI, that have not yet really turned into business and business models brought to the market or even contributing value for the partners. The real OB and real OBM are, therefore, in our terminology based on networks rather than on an open single business and single business model exchange of assets but also on integration between different worlds (Neffics 2012).

Accordingly, it could be understood that the OB and OBM baseline studies encompass the entire open business and business model processes characteristics, associated both with internal operational open business processes, as well as external business and business model relations. However, as Zott (Zott 2010) offers in his very detailed description of linking theoretical substances to the OBM research study, the theory of OBM is still associated with the OB and OBM research where the firm, in our context the business, is the entity.

This is still somewhat peculiar and builds boundaries to develop more OBs and OBMs, especially when we know and see that everything is moving towards value networks and network-based businesses in general (Pasternack 1998, Hagedorn 1998, Child and Faulkner 2005, Goldmann & Price, Vervest 2005, Cresson 2010, Porter 2011). Pasternack wrote already in 1998 about “The centerless corporation”, an OB as a new concept, in which the OBM aimed at transforming organizations knowledge to growth and prosperity. The firm entity is therefore the real boundary to release the real OB and OBM potential.

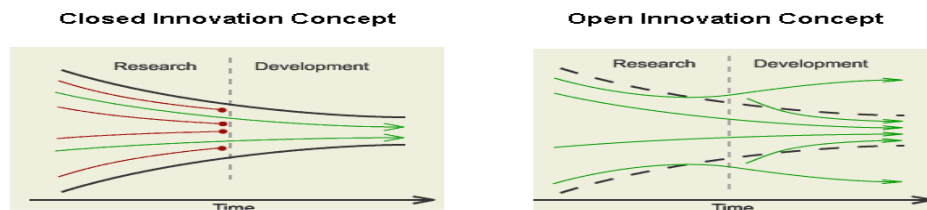


Figure 5 Chesbrough's Closed and Open Innovation Model Chesbrough 2005.

OPEN BUSINESS AND OPEN BUSINESS MODEL RELATED TO TIME

So far, the parts relating to OBMI from the idea, concept, prototype, to the market introduction could be classified as one phase. The objective for OBM, the real business and real business model phases where they are acting on the market could be considered as another phase and another objective for OB and OBM.

The issue here is that Henry Chesbrough and others opened the arena on open innovation and OBM framework in which the thoughts about OBM framework primarily focus on the innovation and, especially, upon the creative phase of OBMI handling. This phase is regarded relatively easy and often also relatively risk free to OB and OBM. However, the closer a business or a BMI project gets to the commercialization point of the business model, the more risky and restrictive the business and business modeling gets.

Our baseline research shows that most academic contributions to the concept of OB and OBM is in the innovation phase and that even this contribution is still very young, fuzzy and preliminary in its context with most focus on the creative and innovative part of OB and OB modeling. The OBMI concept is also very much related to opening up to the environment external to the business. Equally important is the opening up the internal parts of the business to other business areas and business models inside the business. OBMI concept has yet not focused much on the commercial and competitive parts of business and BMI as can be seen in Chesbrough's model beneath.

The consequence is that OB and OBM still have some answers to give to the question: How to create and operate OB and OBM in the commercialization part of a business? It could mean that OB and OBM do not fit to one type of BM environment that is still characterized by closeness, competition and single business forms but would fit very well to another. However, Chesbrough marked some advantage to moving from a closed BM to an OBM in his book in 2008, which can be seen in the model shown in Figure 6 and 7.

The OB and the OBM concepts touch hereby upon participation and integration from/with the external environment of the business—the network-based business models (Taran 2009). As can be seen in the model beneath from Chesbrough, the assets of other BMs enter into and exit the BM during the BMI process.

Chesbrough is especially focused on technology, internal/external venture handling, license, spin-out, divesting and how to gain new markets, and gain or obtain access to other businesses markets when doing OBMI. In our terminology, we believe the OBM

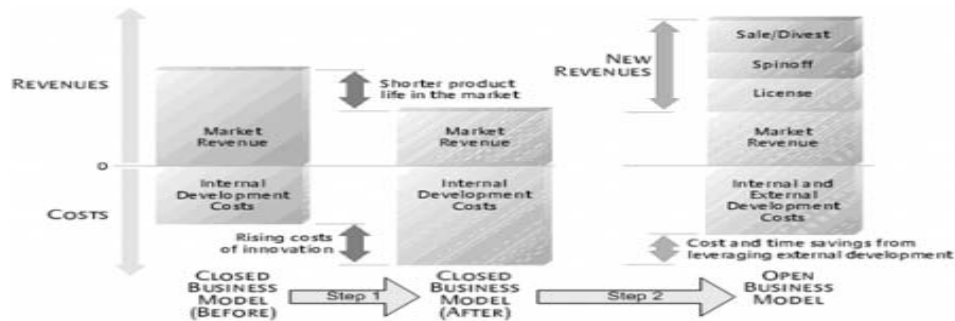


Figure 6 Chesbrough's Closed and Open Innovation Model Chesbrough 2005.

approach can be much wider than this, when other business and BMs with all types of building blocks are fully activated into an OB and OBM context.

Von Krogh *et al.* (Von Krogh 2007) proposed customers to be part of an integrated part of the business's BM i.e. "Customer-Integrated Business Models" concept focusing on the innovation part of the BM and the customer participation and the way the customer takes part in conception, production and/or delivery processes. The customer is here considered as one resource for OBM. This has important consequences according to Von Krogh on primarily four building blocks—value proposition, customer and the value chain. The fourth building block is the competence building block which refers to organizational systems. The inter-relations between these building blocks we found during our analysis is also touched upon. Still the approach to OB and OBM is the resource based view

OBMI represents an ontology as a convention between open network partners' businesses and BMs applied to the generation, along with sharing each other's BMs, their values and assets between stakeholders (Verstraete & Jouison 2007). The openness and the radicality in this openness can, however, be very different from one OBM to another. Fundamentally, we propose that an OBM may be built in an equal way to a CBM, comprising a variation of the fundamental seven building blocks (Lindgren, Taran and

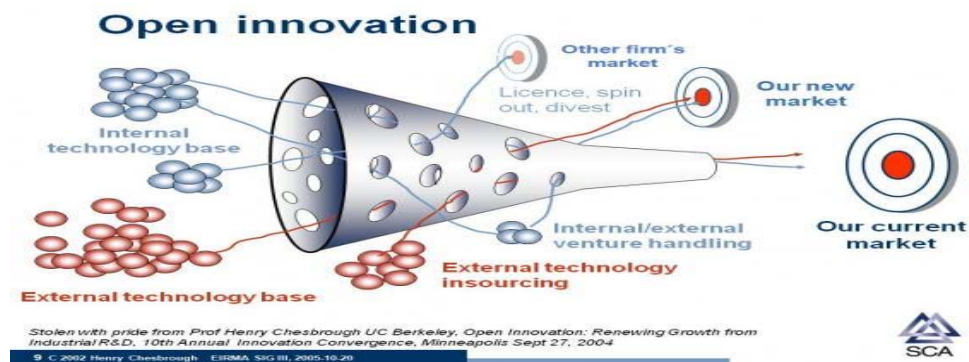


Figure 7 Chesbrough's Closed and Open Innovation Model Chesbrough 2005.

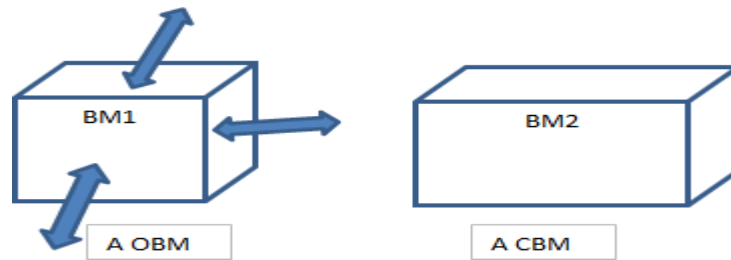


Figure 8 Flows In and Out of a Business Model.

Boer 2010). The OBM is, however, different to the CBM because it is specified as a given BM with a unique configuration of openness related to the closed BM. It means that in an OBM, one or more of the individual building blocks as shown in Figure 8 can be open for flows in and out of the building block. A closed BM (CBM) by contrast has no in and out flows on any building blocks.

Seen from a business perspective, in Figure 8, Business 1 has only CBMs and can, therefore, be related to our framework and classified as a Closed Business (CB). Business 2 has, however, both an open and closed business models and therefore could be classified as an OB.

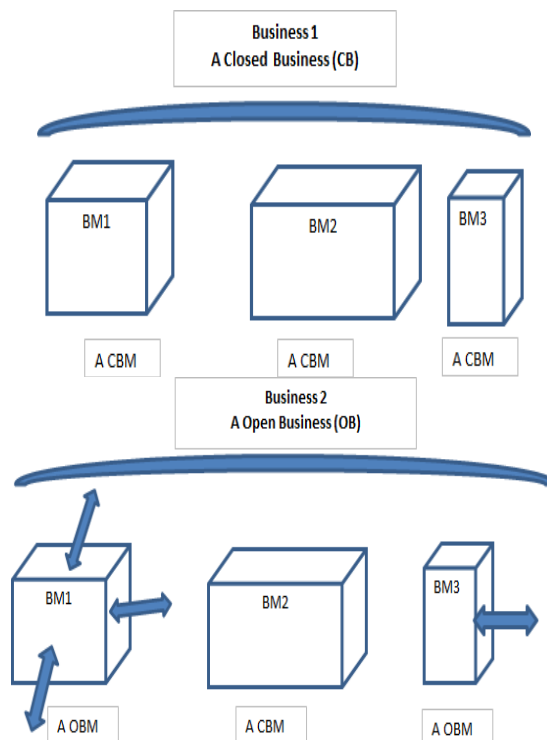


Figure 9 Example of a Closed Business and an Open Business.

None of these businesses, however, show the time dimension of openness. In most cases, we believe that the business model is seldom fully open or fully closed over time. Any business model has to open up to its business environment to either create, capture, deliver or consume values.

WHO IS THE TARGET FOR THE OUTPUT OF AN OPEN BUSINESS MODEL

In Osterwalder's business model, the customer is a part of the business model (Osterwalder 2004). In his model, the customer is the target of the value proposition and the origin of revenue streams. Customers in other models are not a part of the infrastructure, nor an actor involved in the definition of the offer according to (Von Krogh 2007). Therefore, one could argue that the customer, in some business model frameworks, is inside the model while in others models he is outside. In our business model framework, the customer is always inside it and all building blocks both inside and outside a business model can be targets and be affected by any tangible or intangible output of such a model.

In his model, Yip (Yip 2004) emphasized the transformation and the distribution processes of the business. According to Yip's model, the customer is at the end of the whole process of "production" and "distribution" i.e. value chain function. Here again, the customer receives the business' output through distribution channels or relations without any potential role of "content generator". In our model, the output from the OBM could also be output and value to other building blocks than the customer inside and outside the business model e.g. the value proposition, value chain, competence, network and relations inside the model and all seven building blocks of any business model in any business outside the model.

Having said this, the output of an OBM could therefore be defined as being different from products, services, processes and money. It could also be learning, improvement, efficiency, effectiveness, innovation etc. which we have earlier described in Neffics project (Neffics 2011 D 3.1. and D 3.2.) The consequence is that our previous definition of output of a business model is challenged or increased which in turn opens up for even more potential of the value of OBM. The OBM construction enables the absorption of other outputs than a closed business model does.

5. USE CASES OF OPEN BUSINESS AND OPEN BUSINESS MODEL INNOVATION IN HEALTHCARE SECTOR

5.1. Oslo University (OU)

Oslo University Hospital was formed by the merger of Rikshospitalet (The National Hospital), Ullevaal University Hospital and Aker University Hospital. With 24,000 employees, the new Oslo University Hospital is one of the largest hospitals in Europe, with a yearly operating budget of 17B NOK (\$2.6B). Oslo University Hospital has a rich history of innovation and is currently establishing a complete infrastructure for innovation. Its "Clinic of Innovation" has helped to build an internationally recognized culture of innovation that reaches from the hospital's boardroom to workers at every level, and even involves external constituents such as vendors and suppliers. Oslo University Hospital is also part of an EU-funded regional healthcare innovation zone that includes major hospitals in Sweden and Denmark.

The Oslo University Hospital introduced the OBMI methods as primarily a user and employee driven OBMI initiative. Based on the pioneering work of UC Berkeley Professor Henry Chesbrough, the Norwegian Induct Software, an integrated Enterprise 2.0 technology and social networking software with a flexible and customizable innovation process management framework, was implemented. The result is a ‘Software as a Service’ (SaaS) platform that allowed the Oslo University Hospital to easily practice OBMI through the creation of virtual innovation communities.

”We are dedicated to exploiting the potential for innovation of Norway’s public health sector, primarily through user-driven and employee-driven innovation,” announced Professor Kari Kvaerner, Innovation Director, Oslo University Hospital. The initiative had three primary goals; to improve the quality of care provided to the patients, increased operational efficiency, and improvements in the region’s public health sector. To help achieve these goals, and to facilitate a transition to a more open innovation environment, the hospital deployed a new platform for innovation cooperation with their employees. The creativity of 24,000 employees and combination with the open innovation software was aimed at facilitating a structured implementation of ideas and realizing significant cost savings from the increased levels of innovation, collaboration, and information sharing achieved through the induction of innovation community.”

5.2. Aarhus University Hospital (AAUHS)

Aarhus University and Aarhus University Hospital implemented the Stanford University Bio-X concept (<http://biox.stanford.edu/about/index.html>). The aim was to bring research, clinic and industry together in an open innovative partnership. The goal was to strengthen research, development of human competencies, products and services within healthcare innovation of the hospital. The Bio-X initiative was mainly focused at improving healthcare technology. Students from Aarhus University would develop products and services with the clinic, which would be able to support and facilitate innovative and interdisciplinary research and education. The Bio-X medical design education brings together master students and masters from different disciplines, such as medicine, engineering and social science together in small teams, to identify different needs and demands in specific hospital departments. The team would hereafter develop a product which would solve the need and demand, with the aim of transforming it commercially later.

5.3. Aalborg University Hospital (AAUH)

In 2008, Aalborg University Hospital (AAUH) established a department called “the idéaclinic”. The ideaclinic was a result of AAUH’s innovations strategy and was financed partly by the hospital, partly by EU-funds and the Growth forum in North Jutland. The AAUH introduced the OBMI method in all the hospitals in North Jutland region as a primarily employer-based OBMI approach. The aim of the OBMI initiative was to establish one place for all hospitals in the North Jutland region, where employees but also patients, relatives and others with interest in healthcare innovation could hand in ideas and concepts of healthcare innovation. The “idea clinic” was aimed at supporting the ideation process, so those who had initially fostered the idea could get further on with the idea.

5.4. HSJD

Hospital Sant Joan de Déu (HSJD), located in Barcelona is the largest children's hospital in Spain and among the top five in Europe. In 2010, the hospital started the project H2O – Liquid Hospital, an initiative which seeks to radically transform healthcare through an intensive use of technologies oriented towards the patient. HSJD aims to be a Liquid Hospital, going beyond the physical building blocks of the hospital (<http://www.health2con.com/tv/success-story/>). HSJD is one of the most relevant examples of open innovation in Europe, where a hospital is using online care, telemedicine, mobile apps and health 2.0 tools to put the patient in the centre of care.

The HSJD introduced the OBMI method as a special global invitation to any apps provider in the world to offer/develop APPS within a specific BMI scope related to what HSJD would like to have. The “AppCircus ON Health” (<http://appcircus.com/event/appcircus-on-health>) was the world's biggest competitor ub mobile applications, in this instance focused on apps in the domain of healthcare sector. The contest brought together the most useful and innovative applications for health and well-being worldwide. 50 apps were shortlisted and presented to an international jury, who chose 10 for final presentation. One winner apps was elected and this was presented at the well-known doctor2.0 conference in Paris. All apps were very different in form and comprised good ideas to the healthcare sector, which in turn enabled HSJD to gain ideas and knowledge of new potential “TO BE BM”.

6. FINDINGS AND DISCUSSION

Our findings show that there is much unused potential in the OBMI framework concept related to what the healthcare sector really use today. Our research cases show that the OBMI concept is primarily used in the ideation and conceptualization phase in the healthcare sector, whereas it could with preference be used more in other stages of the BMI process. This might be related to the fact that there are still several strategic risks and security issues to take care of and be aware of for the sector related to OBMI in these phases of the OBMI process.

Our research shows four very different approaches to OBMI and OB. Three internal OB approaches relate to Aarhus, Aalborg and Oslo University Hospital, where the sector opens its business and BMs to employees and special groups comprising students and some suppliers. the HSJD case exhibits an external OB approach, where unknown network partners from outside are invited to contribute to HSJD's Business. There are most OBMI approaches internally in the businesses and few externally to the businesses.

When healthcare sector implements OBMI thoroughly and aligns it to their BMI process, it faces a risk of wasting BMI resources and being too open in BMI. We found that many of the OBMI projects studied were not really implemented and commercialized because the hospitals simply did not know how to implement them into either their own businesses or into/together with external businesses. In order to attract other businesses, an opening up approach has to be developed so these can create, capture, deliver and consume the BMs developed. AAUH and AUHS, however, have established a relationship with the industry and even entities—MTIC and IDEACLINIC—to take care of this challenge. However, it is still very early days of this approach.

It seems that the healthcare sector have some more steps to climb before understanding and realizing the real potential of the OBMI framework. The hospitals

studied do not strategically fully understand the challenges, barriers, possibilities and pitfalls of opening their business models and BMI. This may prevent them from enjoying the full impact and success of OBMI as they primarily use the OBMI framework to get ideas and concepts, and very few ideas and concepts are transformed into real business models and business models with important growth and improvement of the sector business economically. Further, the innovation leader and the management group involved in the OBMI process do not always know when to strategically open and when to close related to the time of the BM innovation process. This has to be learned with practice.

The ability to understand, implement and even commercialize OBMI in the healthcare sector is important for the success of future OBMI in this sector. Using the OBMI framework concept can indeed contribute to the innovation of “AS IS” and “TO BE” BMs and improve the results of BMI in the healthcare sector. However, a misunderstanding of the OBMI framework concept and when to use it can lead to strategic BMI faults and serious risk. It seems quite easy to understand the OBMI framework concept, however, it seems also to be quite complicated to implement and use the framework, especially in the healthcare Sector. In particular, to identify and define when and how to strategically use the framework is complicated. OBMI is a very new and a different approach in the healthcare sector whose previous mindset and practice of BMI would need to be changed. The research shows that there is a need for a better understanding of OBMI among managers in healthcare sector to apply the real values of OBMI.

7. CONCLUSION

The future of healthcare in Europe and US states that the rising cost of healthcare cannot be met with current levels of public funding, raised via taxation and insurance. Therefore, there is a strong need to find new ways and change previous BM innovation activities in the sector. OBMI is one relative new approach to deal with this challenge. Our findings indicate that there are very different practices and approaches concerning adaptation of the OBMI concept in the European healthcare sector. The research shows challenges and opportunities of OBMI but also risky implications of OBMI. When practicing OBMI, focusing on developing new business models (BM) and the use of OBMI in discovering opportunities and new possibilities of “AS IS” and “TO BE” BMs are important. The OBMI concept can indeed according to our findings contribute to new BMs with big market and customer opportunities, high technological and manufacturing improvements that can be used directly in the suffering healthcare sector. The paper presents some important findings on how the OBMI concept was applied to primarily “TO BE” business models in healthcare sector and where they found the challenges, barriers, opportunities of the framework related to time and scope of innovation process.

8. FUTURE EXPECTED RESULTS/CONTRIBUTION

We expect, in future research, to find more methods, opportunities, challenges and barriers to OBMI related to healthcare businesses. We further expect to find that these influence the real and commercial opportunities of implementing OBMI.

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APPENDIX 1. COMPARABLE DATA ON THE HEALTHCARE SECTOR

HEALTHCARE SPENDING

Background information on the cost of healthcare worldwide

Healthcare Spending as % GDP

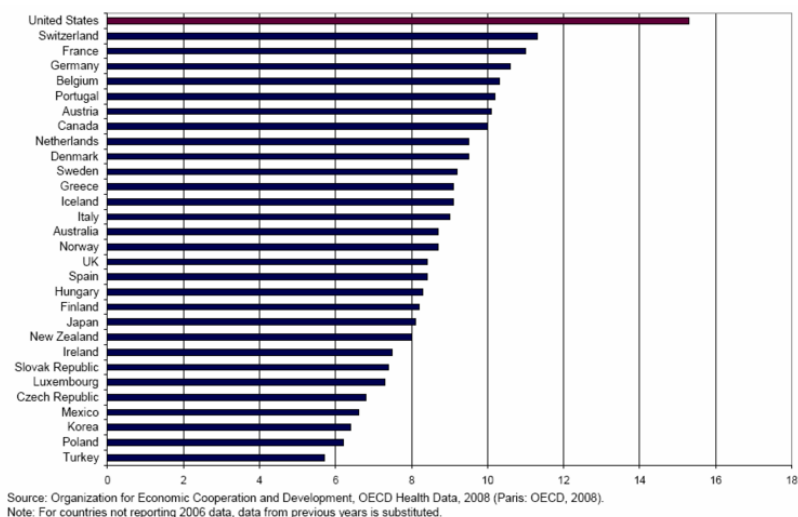


Figure A.1. Healthcare spending as % GDP OECD 2006.

Figure A.1 shows spending on healthcare as a proportion of GDP. Spain and the UK can be seen as having a very similar spending in GDP terms.

A particular problem experienced by all European states is the fact that the cost of provision of healthcare is rising faster than other components of GDP and state spending. This is a relentless rise which has defied attempts to control it. It is fuelled by many factors including a huge general increase in life expectancy and a much greater range of drugs and treatments which help to prolong life.

Figure A.2 shows the growth of the population who are over 65 in the EU, US and Japan. In the EU, the percentage of over 65 will rise from 10% to 25% over the period indicated.

Figure A.3 shows the rise in spending on the UK healthcare systems, the National Health Service (NHS) in recent years (taken from an NHS report in 2010)

This relentless increase is a severe problem for all advanced economies. In recent months, we have seen grave examples of this, from the situation in Greece where provision of free healthcare has substantially collapsed, to the UK where the new government seeks controversially to create something very close to an open financial marketplace between the State as the Commissioner and a combination of State and private healthcare providers operating in the full force of market competition.

Figure A.4 compares spending between UK healthcare European healthcare.

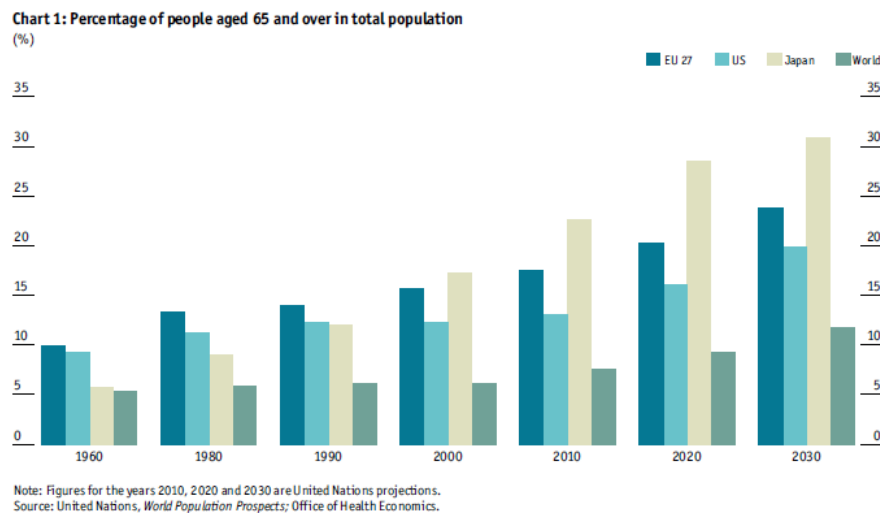


Figure A.2. Percentage of People Aged 65 and over in Total Population 2010, 2020, 2030

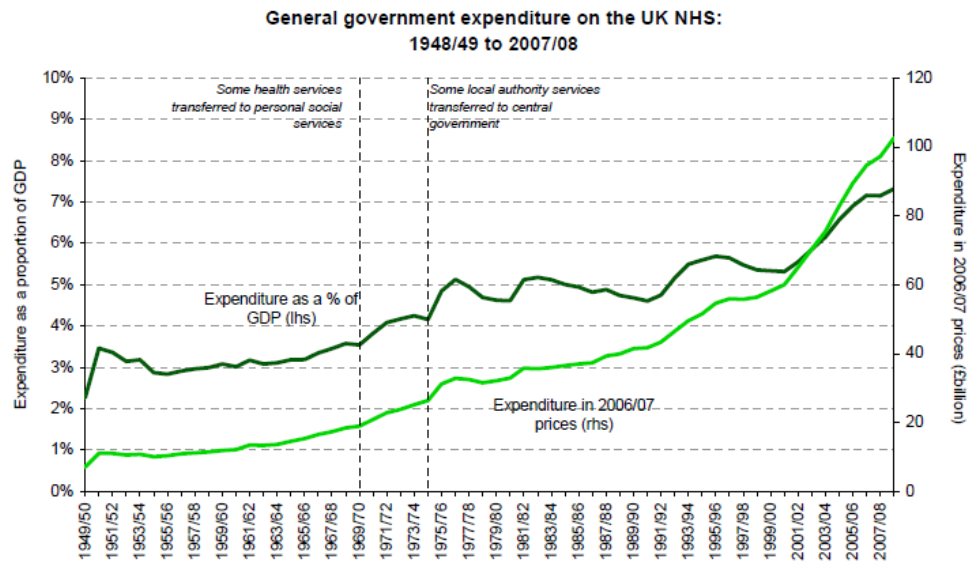


Chart 1: General government expenditure on the UK NHS: 1948/49 to 2005/06

Figure A.3 General Government Expenditure on the UK NHS: 1948-49 to 2007-08.

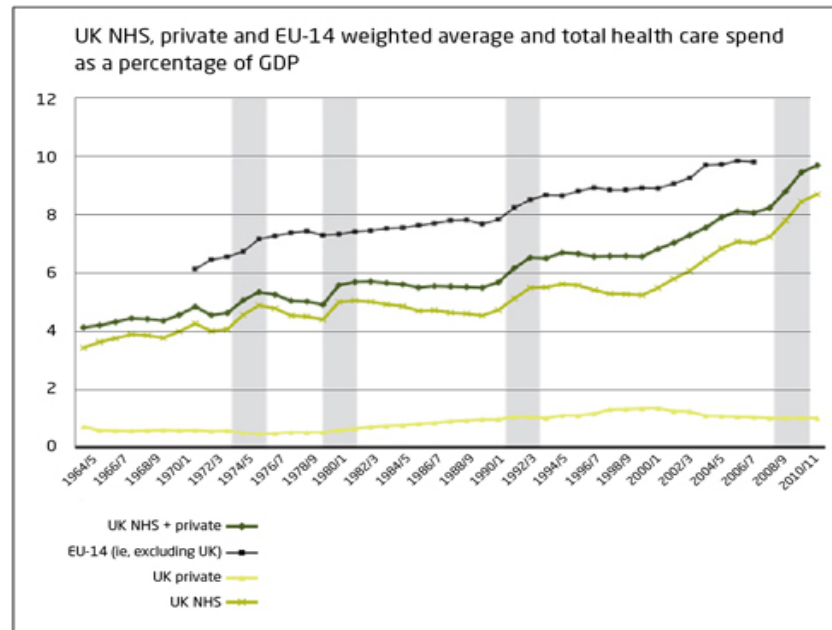


Figure A.4 UK NHS, Private and EU-14 Weighted Average and Total Healthcare Spending as a % of GDP 1964/65 to 2010/2011.

APPENDIX 2. DIFFERENT TERMINOLOGIES OF OPEN BUSINESS

Terminology used of Open Business	Key issues
Open for business – we are open for business	Mindset
Business in a transparent way by intimately integrating an ecosystem of participants, collaborating in public space.	Way of acting
An open business could be defined as with the idea of transparency with the more traditional business goal of making money.	Goal of Business
Open business structures and platforms make contributors and non-contributors visible such that the business benefits are distributed accordingly.	Structure
Open business is with open calculation of profit formula – price, cost and revenue.	Calculation
An open business could be defined with transparency, as used in the humanities and in a social context more generally, implied as openness, communication, and accountability.	Human and social context
As a metaphorical extension of the meaning a "transparent" object is one that can be seen through.	Object is transparent
Transparent procedures include open meetings, financial disclosure statements, freedom of information legislation, budgetary review, audits, etc.	Procedures
They activate personal engagement and productivity by benefiting the contributors and producers that they can live from it and helping the clients to reduce their costs.	Engagement and productivity
An open business with the rights to use the core assets of the business but not commercially. Often with a restriction of use with the demand of mentioning the source	Usability of the business assets
An open business where everybody, all network partners can join and take, give and contribute to whatever is of interest in the business or part of business e.g. single business models or part of business models – building blocks (value, customers, value chains, competences (technology, organizational systems, HR, brand, patents, knowledge, culture, networks, profit formula, money).	Access and join ability – access and ownership to assets

APPENDIX 3. CLASSICAL EXAMPLES OF OPEN BUSINESS AND OPEN BUSINESS MODEL

INTERMEDIARY OPEN BUSINESS MODEL

- **InnoCentive** – InnoCentive is an open innovation marketplace whose principle is the following: scientific or technical challenges are published on the Innocentive web platform by seekers (corporations, agencies, not-for-profit organizations) who are looking for solutions to help with product development or other science problems. Each challenge has a significant associated cash award. People whose solution is chosen by the seeker win the bonus (www.innocentive.com)

- **www.Github.com**

GitHub is a web-based hosting service for software development projects that use the Git revision control system. GitHub offers both paid plans for private repositories, and free accounts for open source projects. As of May 2011, GitHub was the most popular open source code repository site.

GitHub Inc. was founded in 2008 and is based in San Francisco, California. In July 2012, the company received US\$100 Million in Series A funding, primarily from Andreessen Horowitz.

- **www.YouNoodle.com**

YouNoodle is a San Francisco-based company, founded in 2007, that is building an ecosystem of entrepreneurs all over the world to help organizations innovate faster. YouNoodle is the company behind Podium, a software as a service (SaaS) platform that supports university, non-profit, government and enterprise clients in organizing innovation challenges and competitions. Podium manages the application and judging processes for seven out of the world's top 10 universities as well as for organizations like Intel, Amazon, NASA, and Start-Up Chile.

The company is also working to cultivate the global entrepreneurial grid with their network of entrepreneurs and startups. They are developing a site, currently in private beta, that will allow entrepreneurs to identify their Next Step. Once identified, it will provide targeted resources to help them achieve their goals, connect with others and find useful tools curated by experts.

- **www.Linux.com**

Linux is a Unix-like computer operating system assembled under the model of free and open source software development and distribution. The defining component of Linux is the Linux kernel, an operating system kernel first released on 5 October 1991 by Linus Torvalds.

Linux was originally developed as a free operating system for Intel x86-based personal computers. It has since been ported to more computer hardware

platforms than any other operating system. It is a leading operating system on servers and other big iron systems such as mainframe computers and supercomputers: more than 90% of today's 500 fastest supercomputers run some variants of Linux, including the 10 fastest. Linux also runs on embedded systems (devices where the operating system is typically built into the firmware and highly tailored to the system) such as mobile phones, tablet computers, network routers, televisions and video game consoles; the Android system in wide use on mobile devices is built on the Linux kernel.

The development of Linux is one of the most prominent examples of free and open source software collaboration: the underlying source code may be used, modified, and distributed—commercially or non-commercially—by anyone under licenses such as the GNU General Public License. Typically, Linux is packaged in a format known as a Linux distribution for desktop and server use. Some popular mainstream Linux distributions include Debian (and its derivatives such as Ubuntu), Fedora and openSUSE. Linux distributions include the Linux kernel, supporting utilities and libraries and usually a large amount of application software to fulfill the distribution's intended use.

A distribution oriented toward desktop use will typically include the X Window System and an accompanying desktop environment such as GNOME or KDE Plasma. Some such distributions may include a less resource intensive desktop such as LXDE or Xfce for use on older or less powerful computers. A distribution intended to run as a server may omit all graphical environments from the standard install and instead include other software such as the Apache HTTP Server and an SSH server such as OpenSSH. Because Linux is freely redistributable, anyone may create a distribution for any intended use. Applications commonly used with desktop Linux systems include the Mozilla Firefox web browser, the LibreOffice office application suite, and the GIMP image editor.

Since the C compiler Linux is written with and the main supporting user space system tools and libraries originated in the GNU Project, initiated in 1983 by Richard Stallman, the Free Software Foundation prefers the name GNU/Linux.

- **www.Facebook.com**

Facebook is a social networking service launched in February 2004, owned and operated by Facebook, Inc. As of September 2012, Facebook has over one billion active users, more than half of them using Facebook on a mobile device. Users must register before using the site, after which they may create a personal profile, add other users as friends, and exchange messages, including automatic notifications when they update their profile. Additionally, users may join common-interest user groups, organized by workplace, school or college, or other characteristics, and categorize their friends into lists such as "People From Work" or "Close Friends".

Facebook was founded by Mark Zuckerberg with his college roommates and fellow students Eduardo Saverin, Andrew McCollum, Dustin Moskovitz and Chris Hughes. The website's membership was initially limited by the founders to Harvard students, but was

expanded to other colleges in the Boston area, the Ivy League, and Stanford University. It gradually added support for students at various other universities before opening to high school students, and eventually to anyone aged 13 and over. However, according to a May 2011 Consumer Reports survey, there are 7.5 million children under 13 with accounts and 5 million under 10, violating the site's terms of service. A January 2009 Compete.com study ranked Facebook as the most used social networking service by worldwide monthly active users

BIOGRAPHIES

Peter Lindgren is Associate Professor of Innovation and New Business Development at the Center for Industrial Production, Aalborg University, Denmark. He holds B.Sc. in Business Administration, M.Sc. in Foreign Trade and Ph.D. in Network-based High Speed Innovation. He has (co-)authored numerous articles and several books on subjects such as product development in network, electronic product development, new global business development, innovation management and leadership, and high speed innovation. His current research interest is in new global business models, i.e. the typology and generic types of business models and how to innovate them.

Ole Horn Rasmussen is Post-Doctoral Fellow at the Department of Mechanical and Manufacturing Engineering, Aalborg University, Denmark. He is also a consultant, project leader and researcher at Aalborg University, and a networker at DJØF. He was earlier a supervisor, Ph.D./Researcher/Fundraiser at Aalborg University and a Ph.D./Researcher/Fundraiser/Research fellow at POENOR. Ole Horn Rasmussen has immense experience in the area of structural changes and transformations related to the evolution of organic agriculture.

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Alf Martin, Founder and CEO of Induct, Norway has over ten years of experience working in executive and consulting roles for both large and small companies. During the starting up of Induct, as part of the research, he conducted approximately 250 interviews with organizations about their innovation practices. Mr. Johansen is a true “value chaser,” and is constantly scanning the environment for potential problems and challenges for which he can develop creative solutions. Mr. Johansen holds Master’s degree in Business and Economics Degree from the Norwegian School of Management, from where he has also completed a course on “Entrepreneurship and Innovation in Silicon Valley”.

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Trine Wintør, CEO at MTIC - Trine has an M.Sc. in food science and technology and a PhD in molecular genetics from the Royal Veterinary and Agricultural University Denmark (now part of the University of Copenhagen). For the past ten years, she has worked in assessing, financing, and developing companies and products based on research—first as innovation manager at Symbion Science Park, then as managing director of Symbion Management and of the venture capital firm Symbion Capital I; she has also been a partner in the venture capital firm SEED Capital Management I/S. Before Trine was

appointed CEO of MTIC, she was the head of Tectra, the technology transfer unit of the Capital Region of Denmark, which is responsible for the commercialization of research conducted at all the hospitals in the region. Trine is a board member at Caretech and at the Business Innovation Fund.

Kjeld Lisby, is the Chief Innovation Officer of the Ideaclicnic at Aalborg University Hospital. He has experience within innovation through many years in the Danish Defence sector and as manager of one department in the softwarecomapny CSC. He is also in the management of improving the Aalborg University Hospitals collaboration with all other innovation stakeholders in the region, hereunder to establish innovation collaboration national and international.