MASTER

Business model innovation at high tech established organisations
design principles for innovation of existing software business models

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Business Model Innovation at High Tech Established Organisations: Design Principles for Innovation of Existing Software Business Models

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The best description for how I experienced my graduation project last year is like travelling the world. Taking a plane, unsure about its ‘true’ destination and challenges, experiences, and moments of learning that lie ahead. Another description would be one of a Brownian motion, where there is a heading which is redefined through entrepreneurial efforts. These valuable experiences would not have been possible without a number of people who believed in me and inspired me to look beyond initial findings, and discover their ‘true’ nature, much like experiencing different cultures while travelling.

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During this project I was allowed to meet and speak to a wide variety of interesting and inspiring people. I would like to take the opportunity to thank them for their support and interest in my graduation project. In particular I thank for my colleagues in the department for making me feel welcome and engaged in daily operations of the business.

Last but not least I would like to thank all that were involved in this project, whom I have interviewed, and my colleagues at AlphaCo for their stories and distraction when I needed it the most. Finally, I would not have come this far without the support of my family, girlfriend, friends and fellow students. Thanks!

Stefan van Leuven

Eindhoven, August 2013.
Abstract

As a means for corporate innovation, growth and downstream value creation, high tech established organisations have adopted business model innovation to capitalize on new business opportunities. In order to reap the benefits from this complex innovation process, organisations need careful business model innovation processes between the existing and new business model. This research project investigates these business model innovation processes, and focuses on software business models in high tech established organisations in particular. For this purpose, design science methodology is applied by combining a literature review with a multiple case study comprising three empirical cases from three high tech established organisations that successfully mastered the art of business model innovation. Eight research-based design principles derived in the systematic literature review increase the understanding of theoretical mechanisms underlying the structure and success factors of business model innovation processes. In addition, fifteen practice-based design principles derived from empirical research provide an understanding how actors involved in these transition processes cope with complex interventions and mechanisms between the existing and new business model and how these enhance the chance of successful business model innovation. For corporate entrepreneurship scholars and practitioners facing challenges related to business model innovation, the final set of thirteen design principles will provide a better understanding how to rejuvenate existing business models and design and implement specific design principles in particular phase of the innovation trajectory. The design principles are tested in one practical case (AlphaCo); however the principles have not been implemented in a high tech established organisation yet. The combination of both theoretical underpinnings and the empirically observed activities and interventions furthermore created insight in how to deal with business model innovation in high tech established organisations, specifically focused on software business models.
Management summary
This thesis focuses on exploring the structure and success factors associated with the BMI process in high tech established organisations. The purpose of this study is to develop a set of design principles that aid high tech established organisations inexperienced with the complex structure of business model innovation, and increase the chance of successful rejuvenation of existing business models. The design principles were derived by combining insights from existing literature and empirical results. Existing literatures does not provide an overview how high tech established organisations should structure the business model innovation process to enhance its success. Therefore the goal of this thesis is to: “generate insights in the structure and success factors of business model innovation processes within high tech established firms, specifically through development of design principles, by combining insights from both practitioners and academics.”

Within this goal two research questions are formulated; the science-based research question, as following: “How should high tech established organisations innovate their existing software business model?” and the practice-based research question is defined as: “How should AlphaCo innovate its existing software business model to generate new business opportunities?”

Due to the little empirical knowledge available on how business model innovation processes are structured and what interventions and mechanisms influence the chance on successful business model innovation; this research study adopted an exploratory approach. The next sections describe the research methodology, main results and conclusions, contributions, limitations, and future research.

Research methodology
In order to address the research goal and questions, a science-based design approach is taken after Van Burg, Romme, Gilsing, & Reymen (2008). The design principles are formulated following CIMO logic proposed by Denyer, Tranfield, & van Aken (2008). To develop the design principles three steps were conducted. First, systematic literature review created the theoretical groundwork for the derivation of research-based design principles. Second, a multiple case study approach based on three business model innovation trajectories within three different companies resulted in practical insights in the business model innovation process. The companies are headquartered in the US, France, and the Netherlands; all of them executed successful business model innovation projects in the past, which were available for analysis. In total eleven interviews were conducted and coded and analysed using NVivo – a qualitative research software tool. The final step concerns the synthesis of both practice- and research-based design principles in a final set of design principles for successful business model innovation in high-tech established organisations.

Results
The main results of the systematic literature review include eight research-based design principles, an overview of relevant academic literature including new business development and corporate entrepreneurship lenses on the business model innovation processes, and insight in the interventions and mechanisms for successful business model innovation in high tech established organisations, specifically focused at software business models. The business model innovation process is perceived successful when the rejuvenated business model becomes an integral part of the organisation, complementing the existing business model in a hybrid form or completely replacing the old business model.

While contributions in the field of business models and business model innovation have increased significantly of the last years (Zott, Amit, & Massa, 2011), the majority of research has taken a rather static view of business models (Frankenberger et al., 2012). Thereby the question how business model innovation is achieved received limited attention (Chesbrough, 2010; Amit & Zott, 2010; Osterwalder
Based on these findings, eight research-based design principles were derived in order to aid in the complex innovation process, as depicted in Appendix VIII.

Several scholars and academics state that new business development functions as an “organisational carrier” through which new competences are acquired or developed to create new, profitable business (Chesbrough, 2003; Vanhaverbeke & Peeters, 2005). Business models are capable of (re)designing markets and creating new industries, providing companies with a competitive advantage. However, high tech established organisations have to overcome existing business logic in order to rejuvenate obsolete business models or explore business models for the future. Ways to innovate existing business models were identified, leading towards enhancement of business model innovation success through carefully managed business model objectives and metrics. The analysis of the relevant bodies of academic literature made clear that learning and experimentation mechanisms (Teece, 2010; Chesbrough, 2010; Morris, Schindehutte, & Allen, 2005; Sosna, Trevinyo-Rodriguez, & Ramakrishna Velamuri, 2010), as well as effectual mechanisms (Sarasvathy, 2001, 2008; Chesbrough, 2010) and network effects might prove successful mechanisms underlying the complex structure of business model innovation.

Furthermore it was found that business model innovation has become a key trigger for differentiation and competitive advantage, value creation, initiating new markets and even entire industries. However, many high tech established organisations have difficulties to innovate their business model. In general, managers do not sufficiently understand their existing business model in order to refocus and change where necessary.

The multiple case study approach included three business model innovation trajectories in three different organisations. In total eleven interviews were conducted with CEOs, senior group directors, marketing managers, product managers, software engineering directors, and application engineers. The interview transcripts were combined with official corporate documentation including presentations and company documents (e.g. business plans, strategy summaries, and consultancy reports). The analysis of this data revealed six patterns: (1) new business development as organisational carrier (Chesbrough, 2003; Vanhaverbeke & Peeters, 2005), (2) ways to innovate business models, (3) effectuation during business model innovation (Sarasvathy, 2001; 2008), (4) learning during business model innovation, (5) network effects in business model innovation, and (6) business model innovation objectives and metrics. Besides the overview of six patterns, fifteen practice-based design principles were derived from empirical results (Appendix VIII).

The result from this research project is fourfold. Synthesizing both research- and practice-based design principles the first result is a set of thirteen final design principles. Second, from 47 episodes in the empirical results a conceptual business model innovation process was structured in three phases: pre-transition, transition, and post-transition. These two results partially contributed to the third result in an effort to answer the science-based research question; a comprehensive business model innovation framework comprising design principles and phases of the innovation trajectory aimed to structure and identify success factors for high tech organisations that seek to rejuvenate their software business models. Lastly, two business model innovation trajectories are designed for the specific business problem within AlphaCo.

**Conclusions**

By synthesizing both practice- and research-based design principles, a final set of thirteen design principles was developed for successful business model innovation in high tech established organisations (Appendix VIII). I was able to specify for each of the design principles the phase in which they should be implemented. This results in specific process-oriented design recommendations for rejuvenating of existing business models. Certain principles are in particular relevant in specific phases of the business model innovation trajectory. Figure 8 displays the process view on
implementing the design principles. Multiple data sources suggested that by applying these in practice, and at least attempting to intervene and control the design and evolution of design principles, the high tech established firm increase chances of successful business model innovation. The six patterns comprise of one or multiple design principles in all phases of the process partially contribute to successful management of business model innovation processes. These aspects include:

**Interventions in the business model innovation process:**
- Trigger business model innovation by employing new business development as ‘organisational carrier’ through which new competences are acquired (P1.1).
- Ways to innovate business models; focus on revenue model innovation in the initial phase (P2.1), while the trajectory gradually evolves towards enterprise model innovation in the transition and post-transition phases (P2.2).

**Mechanisms in the business model innovation process:**
- Create entrepreneurship to stimulate effectual mechanisms during the entire innovation process. However, these mechanisms tend to fade into more causal logic during the late post-transition phase (P3.1).
- Focus on learning-before-doing and trial-and-error learning during pre-transition phase and improvisational learning and learning-by-hiring during transition and post-transition phases (P4.1). Furthermore, create long term knowledge acquisition via an application engineer and build the sales team for customer relationship (P4.2).
- Managers should clearly formulate reasons for collaborations in the pre-transition phase (P5.1), because this provides guidance and sense making of strategic collaborations to enhance network effects early in the transition phase (P5.2). Engage in the Open Source Community to gain fast distribution and adoption and leverage this constituent to build an eco-system of co-developers (P5.3).

**Outcome in the business model innovation process:**
- Relax explicit goals and objectives during pre-transition (P6.1). While the innovation process leapfrogs further via multiple iterations, managers should provide clear objectives and install financial metrics in the post-transition phase (P6.2), and install rules and business processes during the late transition and post-transition phases to create business model replication and transferability (P6.3). Enhance business model innovation success by installing corporate champions throughout the entire business model innovation process (P6.4).

**Contributions, limitations, and future research**

The main contribution of this research project concerns its main goal: shed light upon and create insights in the structure and success factors of business model innovation in high tech established organisations, because academic research so far has shown limited attention for this innovation process. Additionally, the preliminary study within AlphaCo revealed the practical business problem where high tech established organisations inexperienced with rejuvenation of existing software business models have limited tools to enhance the success of business model innovation. By developing insights in the structure and success factors for business model innovation processes, this study contributes to provide systematic ways to innovate existing business models.

The primary contribution concerns the thirteen design principles addressed in Chapter 5 and Chapter 6, in which knowledge that this thesis is built upon is applied in practical situations and by which practical experiences contribute to the academic understanding of business model innovation in high tech established organisations.

To address the complicated issues of managing the business model innovation process, the business model innovation phases of Frankenberger et al. (2012) and Osterwalder & Pigneur (2010) were reconfigured based upon 47 episodes in the three business model innovation trajectories to
develop the conceptual business model innovation phases – pre-transition, transition, and post-transition. These phases were integrated and extended by actionable design principles for specific phases of the innovation process to build the framework as it is depicted in Figure 9. Furthermore, this thesis contributes to a better understanding of business model innovation triggers, found before the pre-transition phase.

I was able to add to Giesen, Berman, & Bell (2007) their research findings and concluded that ways to innovate business models in this research setting differentiates emphasis during specific phases of the innovation process. Additionally, with this research project I contribute to an initial understanding how business model innovation objectives and metrics are structured during different phases of the business model innovation process.

Limitations of this study concern the small sample (three business model innovation trajectories including 47 episodes), the fact that business model innovation success is hard to measure, and the minor validation study. The design principles were tested in one practical case (AlphaCo); however the principles are not implemented in this case. Future research should focus on specific mechanisms underlying the principles to deepen knowledge of this particular phenomenon. Furthermore, the design principles would benefit from testing in other industries and prioritization.
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1. Introduction

Organisations like Apple, IBM, and Southwest Airlines are well-known examples of established organisations who have successfully mastered the art of business model innovation (BMI). Their success cannot merely be explained by introduction of novel products or services alone, but rather by their innovative ways of doing business as a whole. These companies have managed to develop innovative business models distinctive from industry rivals, which create additional value for their customers and partners in their eco-system. The examples, as well as academic literature (Chesbrough, 2007; Giesen, Berman, & Bell, 2007; Teece, 2010; Lambert & Davidson, 2012), demonstrate the power of BMI for an organisation to achieve superior performance and therefore is a desirable goal.

While contributions in the field of business models and BMI have increased significantly of the last years, the majority of research has taken a rather static view of business models (Frankenberger et al., 2012). Thereby the question how BMI is achieved is widely neglected (Chesbrough, 2010; Amit & Zott, 2010; Osterwalder & Pigneur, 2010). Academic literature on BMI tend to focus on diverse aspects of the complex process, such as external drivers on business model change, network based business models, risks underlying the design of novel business models, and the different learning mechanisms that are at play during the innovation process.

As became apparent from extensive literature review, innovating existing business models within high tech established organisations is much under researched. This is confirmed by O’Conner & DeMartino (2006) and Deodhar et al. (2012), who urge the necessity to conduct thorough case analysis in high tech established organisations. Subsequently, scientific BMI literature might profit from a detailed best practices analysis in a practical setting or cross-case comparison. Additionally, a preliminary study within AlphaCo revealed the practical business problem where high tech established organisations inexperienced with rejuvenation of existing software business models have limited tools to enhance the success of business model innovation. Summarizing, current academic literature provides no consensus or best practice on how high tech established organisations should innovate their existing business models.

With this thesis I aim to contribute in closing the identified research gap by exploring the structure and success factors associate with the BMI process by derivation of design principles, combining existing literature and empirical results. The purpose of this study is to develop a framework which describes the structure and success factors how to innovate existing business model in high tech established organisations. This BMI framework will comprise of conceptual phases of the BMI process and design principles derived from empirical results. I employ a multiple case study approach based on three BMI trajectories within three different companies. The companies are headquartered in the US, France, and The Netherlands; all of them successfully executed BMI projects in the past, which were available for analysis. The research goal is as following:

Research goal:

“To generate insights in the structure and success factors of business model innovation processes within high tech established firms, specifically through development of design principles, by combining insights from both practitioners and academics.”

Subsequent to the research goal, this research project aims to answer a specific business problem. Thorough problem analysis and validation indicated the necessity to investigate AlphaCo’s software business model, and explore trajectories to innovate its existing business model. The way these enterprises or business units (BU) create, deliver and capture value from their software operations are
referred to as ‘software business model’. Two case studies (Alpha and Beta) are separate entities owned by AlphaCo, while the third case study (Gamma) is a software supplier of AlphaCo.

AlphaCo is a high tech established company where innovation is mainly driven by incremental technology innovations. Much of the added value in the value chain is in the hardware tool. However, AlphaCo aims to focus on downstream value creation to enhance customer experiences and capture more value from its entire value chain. To build this value chain, software business models of the downstream software products need rejuvenation. This thesis project provides AlphaCo with a framework useful to structure their BMI process, and sets forth two scenarios how to innovate their software business model in order to generate business opportunities. This results in the following science- and practice-based research question:

**Scientific-based research question:**

“How should high tech established organisations innovate their existing software business model?”

**Practise-based research question:**

“How should AlphaCo innovate its existing software business model to generate new business opportunities?”

To achieve the scientific goal, the research project followed the design oriented approach of Denyer et al. (2008) (Chapter 2), in which research-based design principles were derived from a systematic literature review (Chapter 3), and practice-based design principles were constructed based upon empirical results from multiple case studies (Chapter 4), which have been synthesized into a final set of design principles and BMI framework (Chapter 5), tailored to a specific design solution for AlphaCo (Chapter 6). Conclusions, contributions, and limitations and future research are drawn in Chapter 7. An overview of this research project can be found in Figure 1. Due to fact that scientific knowledge about BMI processes is limited, this research project will take on an explorative character. This is important for the methodological choices explicated in the next chapter.
# Structure

- Chapter 1: Introduction
- Chapter 2: Research methodology
- Chapter 3: Theoretical background
- Chapter 4: Multiple case study
- Chapter 5: Synthesis of design principles
- Chapter 6: Directions for business model innovation at AlphaCo
- Chapter 7: Conclusions, contributions, limitations and future research

# Topics

- Introduction to the subject; reason for the research; purpose of the research; main research question; relevance of the research; overview of the thesis
- Research design; systematic literature review; derivation of design principles, design
- Introduction into innovation, strategy and entrepreneurship; new business development; business models in the software industry; business model innovation; research-based design principles
- Case descriptions; cross-case analysis; practice-based design principles
- Business model innovation design principles; business model innovation framework; validation and reliability
- Directions for business model innovation trajectories at AlphaCo
- Conclusions; contributions; limitations and future research

Figure 1 Structure and topics of the report
2. Research methodology

In this chapter the design is created to conduct the research project. Since the research questions are broadly formulated, first the scope of the researched is narrowed down to create a work size that can be handled within the time limit of a master thesis. Next the research plan and methods that were used for case selection, data collection, and data analyses are presented. The chapter concludes with design requirements and methods to cope with validity and reliability of this research project.

Although the definition of business models is variously defined among academics and practitioners, there is a widespread acknowledgement that the business model is a new unit of analysis (e.g. Amit & Zott, 2001, 2010, 2012). In this research project I adopt Osterwalder & Pigneur (2010) their definition of an organisation its business model: “the rationale of how an organization creates, delivers, and captures” (p.14). Throughout this study the business model is a source of innovation in itself, as opposed to literature in which business models help the technological innovation process. Subsequently, the business model is centred on the focal firm, but its boundaries are spanning wider than those of the organisation. In order to structure business models as a unit of analysis the nine building blocks framework from Osterwalder and Pigneur (2010) is used (see Figure 2 and for a detailed description see Appendix I), this provides the basis for the description and analysis of the cases.

To answer the research questions, this research adopts the research-design-development cycle from a science-based design perspective by Van Burg, Romme, Gilsing, & Reymen (2008). Van Aken (2005) argues that management research should be both rigorous and relevant. The author sets forth that academic research is often descriptive and not practically relevant since these general theories are often not applicable to specific domain problems. Therefore van Aken (2005) proposes to focus on solution-oriented knowledge deducted from a design science approach – bridging the gap between theory and practice. This method allows development of practice-based design principles from practices. Additionally, a systematic literature review generated a set of science-based design principles. Synthesizing practice- and research-based design principles provide evidence for a final set of grounded design principles from both practitioners as well as academics. In Figure 3 a graphical representation of the research method is visible, including chapters of the thesis report.
This process follows the CIMO-logic presented by Denyer et al.’s (2008), and states that in defined Contexts, certain Interventions should be implemented to trigger generative Mechanisms leading to Outcomes. Related to this research project, AlphaCo defined the context in which a high tech established organisation inexperienced with structures and success factors of BMI seeks to innovate their existing software business model. The BMI process invokes organisational change mechanisms, which are sought to identify and understand in this initial research attempt. Finally, successful BMI is defined as the overarching outcome of this process.

2.1 Research plan
The research questions presented in Chapter 1 are broadly formulated and aim to generate a better understanding of the theoretical constructs under study. Bearing this in mind, the research plan provides a systematic methodology that is tailored to the research questions. The goal of this thesis is explorative by nature and seeks to contribute to a better understanding of BMI, specifically focused at the software BU in a high tech established organisation.

The data collection is generated via multiple case studies. Yin (1994) defines a case study as “an empirical enquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (p.13). Case study is mainly suitable in situations where the researcher has no control over behavioural events, the focus is on contemporary events, and the research focuses on why and how questions, rather than what questions. It is therefore well suited for an explorative business and management research, and characterized by: (1) focus on in-depth understanding of a phenomenon and its contexts, and (2) unclear boundaries between the phenomenon and the context. This research project used multiple case studies as a means to create theoretical replication.

2.2 Case selection and preliminary study
The cases that were used to identify the events and answer the research questions consist of three phases. First, a company was selected to provide valuable case studies as data source for the research project. The main selection criteria of this company was the fact that it was an established organisation in the high tech industry, and sought to innovate their software business model to capture more value from their operations, and are inexperienced with innovating established business models. This company is labelled as AlphaCo.

Second, the innovation trajectories from three case studies were particularly suitable to gain a better understanding of the phenomena present during BMI. Each of the three innovation trajectories occurred in a different organisation; two of which are small and medium-sized enterprises (Beta and
Gamma) and one BU, Alpha, within AlphaCo. The diversity in the sample is moderate, since the BMI process of two high tech established software firms are evaluated to form input for BMI at the software BU within high tech established organisations. The homogeneous sample is well suited for exploring a theoretical model while simultaneously gaining insights from practices, and testing the interventions in a different context – a high tech established organisation (O’Conner & DeMartino, 2006; Deodhar, Saxena, Gupta, & Ruohonen, 2012).

Third, in order to analyse and validate the problem within AlphaCo, further refine the case selection criteria, and get an overview of the potential case material a preliminary study was conducted in AlphaCo. For this preliminary study, approximately fifteen interviews (see Appendix II) were conducted to gather case characteristics in order to assess the context and feasibility of the cases, and whether these cases might fit the research plan. The initial interviews provided a clear general overview of the cases and how these organisations successfully mastered the art of BMI.

### 2.3 Data collection procedures

Data from the case studies was retrieved via interviews and documents and archives. Baxter & Jack (2008) and Blumberg (2008) argue that semi-structured or unstructured interviews are most suitable for exploratory and explanatory research studies. As stated before, the multiple case study set-up calls for comparability between similar events; and therefore benefits from semi-structured in-depth interviews. The interview protocol and questions are visible in Appendix III. Subsequently, interviews were conducted with project leaders to gain an overview of the events during the BMI process and to get references to other team members – Table 1 below lists the empirical data sources including interviewees and secondary data sources. Lastly, the transcript is sent to the interviewee and finalized after feedback and comments by the interviewee (see Figure 4).

<table>
<thead>
<tr>
<th>Case</th>
<th>Informants</th>
<th>Additional data sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>Managing Director</td>
<td>Company documents (business plan, strategy summary, presentations)</td>
</tr>
<tr>
<td></td>
<td>Sr. Business Development Manager</td>
<td>Initial and follow-up conversations</td>
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<td></td>
<td>Marketing Director</td>
<td>Annual reports (2009 - 2012)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Press releases (2009 – 2013)</td>
</tr>
<tr>
<td>Beta</td>
<td>CEO</td>
<td>Company documents (business plans, presentations)</td>
</tr>
<tr>
<td></td>
<td>Sales Director</td>
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<tr>
<td></td>
<td>Product Director</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marketing Director</td>
<td></td>
</tr>
<tr>
<td>Gamma</td>
<td>CEO</td>
<td>Company documents (business plans, presentations)</td>
</tr>
<tr>
<td></td>
<td>COO/ CFO</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marketing Manager</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Managing Director Europe</td>
<td></td>
</tr>
<tr>
<td>Industry Expert</td>
<td>Director Software Engineering</td>
<td>IBM software strategy presentations</td>
</tr>
</tbody>
</table>

**Table 1 List of data sources**

![Figure 4 Case study – and interview protocol](image_url)

### 2.4 Data analysis

Data analysis consists of four activities: (1) coding the transcribed interviews, (2) conducting a (cross-) case analysis based on these codes, and (3) deriving practice-based design principles from the
transcribed interviews and secondary data sources, and (4) synthesizing the research- and practice-based design principles into a final set of design principles. Appendix IV visualizes a comprehensive schematic overview of the activities these four activities. The synthesis of final design principle is depicted in Appendix VIII.

2.4.1 Coding
The interview transcripts were analysed using template coding; a method in which the transcripts of the interviews and documents are coded according a combination of predefined set of codes and open coding. This set of codes consist of codes that were derived from (1) the business model canvas by Osterwalder & Pigneur (2010), (2) theoretical constructs presented in chapter 3, (3) the BMI process, (4) a set of events after Poole et al. (2000), and (5) open codes. These events codes were used to subtract and group data according episodes per case over time. NVivo, a qualitative research software tool for coding and analysing data was used to code data sources.

Codes that represent Osterwalder & Pigneur (2010) their business model canvas are used to (1) identify and map the business model before and after the innovation process, and (2) understand relationships between building blocks in the business model canvas. Additionally, the umbrella code “BMI” compiles data that is the core of the innovation process and is used to find relations between episodes and theoretical constructs. The theoretical constructs and episode codes assisted in the explanation of underlying interventions and mechanisms that are present in the BMI process.

The definition and coding list in Appendix V provides an overview of predefined constructs, definitions, and main – or umbrella – codes. These main codes were hierarchically derived from sub-codes. Besides this classification reasoning, tacit and intuitive senses were used to compare incidents within the data.

2.4.2 Case analysis
The case analysis is done in two ways; within and across cases. First, within-case analysis aims to provide an overview of each case, gain familiarity with the data and to reveal unique patterns for preliminary theory generation. Second, cross-case comparison was used to look at the data through different lenses and in divergent ways to go beyond initial impressions. This is achieved through two strategies; (1) via selection of categories or dimensions and then look for within-group similarities and intergroup differences, and (2) via selection of pairs of cases at look for subtle similarities and differences between cases.

The analysis of empirical data in this study started with a detailed business model description of each case and revealed interesting patterns of the actors in the business model canvas. Afterwards, these within-case description and analysis were accessed by an industry expert who worked with, or in close contact with, Alpha, Beta and Gamma. The feedback resulted in minor changes and additions to the business model canvas of Beta and Gamma. Simultaneously NVivo – a qualitative research software tool – was used to code events, episodes, BMI, and theoretical constructs in the transcripts of the interviews and secondary data presented in Table 1. Afterwards event codes were rearranged and recoded to form case specific episodes over time to capture the entire BMI process. The BMI codes entail: ‘revenue model innovation’, ‘enterprise model innovation’ and ‘industry model innovation’ after Giesen, Berman, & Bell (2007). Theoretical constructs derived from systematic literature review include the high level codes: (1) new business development (NBD), (2) BMI, (3) entrepreneurship, (4) learning, (5) network effects, and (6) business model innovation objectives and metrics. Specific theoretical construct codes within these high level codes can be found in Appendix V. Open codes were used to capture the entire BMI process and, among others, include: ‘software’, ‘R&D’ and ‘Sales’ codes.
The theoretical constructs and episodes per case were compared using matrix comparison tables to get familiar with the data and find interesting intersections between episodes during the BMI process and theoretical constructs. These intersections were further investigated by detailed transcript analysis and resulted in excerpts that support the relationships and indicated within-group similarities and intergroup differences. Subsequently, excerpts were grouped per theoretical construct to gain cross-case comparison and find patterns across cases. These patterns form cross-case organisational practices which are rewritten in practice-based design principles using CIMO logic.

2.4.3 Derivation of practice-based design principles

The derivation of practice-based design principles was done after (Plsek et al., 2007). The methods used and studied by the authors are regarded as most fundamental and grounded ways to derive design rules from practice situations. In their 2007 article, Plsek et al. test four different methods to derive design rules, and argue how this might contribute to the further development of change and learning theory. This thesis uses two of these methods to derive practice-based design principles; (1) reviewing written documentation of change programs in order to extract design rules, and (2) listing to stories of change efforts told by change leaders, operational managers, and front-line staff and then extracting design rules off-line (e.g. via review of transcripts or notes).

De Jager (2009) builds upon Plsek et al. (2007) their research and argues that experts in a certain field store their knowledge in design rule-like heuristic statements. More specifically, individuals that play an active role in organisational change processes define clear goals, identify key factors in the situation, and rely on past experiences to guide their decision making. The BMI process is deeply rooted in organisational change, and therefore qualifies as a valid context for derivation of practice-based design rules. All the interviewees from the three case studies were involved in the BMI trajectory, or decision making process to engage in BMI. Therefore the interviewees can regarded as valid sources to derive practice-based design principles.

2.4.4 Synthesis of design principles

From systematic literature review and analysis of empirical results, research- and practice-based design principles were derived. Afterwards the practice- and science-based design principles were synthesized to create a final set of design principles. Both the practice- and research-based design principles were formulated using the CIMO logic of Denyer et al. (2008). This process started with grouping the design principles on similarity of context. Afterwards, the interventions of these design principles were evaluated for overlap. This resulted in clearer statements about the intervention or ultimately proved to be the same intervention. Next, mechanisms that are triggered by the intervention were compared. In overlapping interventions the mechanisms are aligned by giving a more concrete and explicit description of the mechanism underlying the intervention. Lastly, the outcomes of the design principles were evaluated and compared. There might be situations where the outcome of one design principles leads to a different context. In this case design principles were coupled. However, in the most cases the outcomes were either added or rewritten to the same outcome.

Detailed case analysis revealed the importance of network effects as success factor for BMI in this practical setting, where this effect was not found in existing academic literature. Furthermore, Giesen et al. (2007) identified three ways to innovate existing business models, however in this research setting only sights of two ways to structure BMI were found.

2.5 Design

The final set of design principles were used to design two BMI trajectory scenarios, in order to rejuvenate and guide AlphaCo’s existing software business model. The BMI process under research is part of a corporate business model and therefore needs careful consideration. To cope with this, three
design requirements for the development of BMI trajectories are generated from initial meetings and discussions with the software director of AlphaCo;

1. The design should provide AlphaCo with an overview how to innovate towards suitable new software business models;
2. The innovation trajectory should fit the corporate culture of AlphaCo;
3. The design principles must be generic by nature and applicable to software products of the different BUs within AlphaCo.

For the sake of simplicity and due to timing constrains the BMI trajectories are presented for the software products of the Life Sciences BU workflow.

2.6 Validity and reliability

The last step of the research methodology is the validity and reliability of the research. Special attention has been paid to the objectivity of the empirical data interpretation, by striving for a certain degree of distance from the research material and by representing them fairly and transparently. For the qualitative nature of this case study approach, Yin (1994) argues that it should not be evaluated on generalizability, but in terms of whether the study contributes to increased contextual insight. However, Rajala (2009) notes that if the study is able to offer considerable understanding of the specific context, the results could be “generalizable” from one context to another context. That is, if it is based on thorough understanding of four elements (Rajala, 2009, p. 41): “(1) theoretical knowledge of a substance area, (2) prior empirical results and their interpretations, (3) the researcher’s own empirical results and their interpretations, and (4) the environment of the phenomenon”.

In order to increase the quality of this research four different tests were conducted after Yin (1989): internal and external validity, reliability, and construct validity. Internal and external validity are measures that refer to the explorative nature of this research study, and therefore require a modest validity. Subsequently, using multiple types of data sources within three different organisations, and presentation and discussion with industry experts to validate the design principles, this study gains more means in terms of external validity and “generalizability”. Internal validity is mainly a prerequisite for causal and explanatory studies, and is therefore not related to this study. Naturally, errors and bias cannot be eliminated completely. However, using a structured interview protocol (see Appendix III) and intermediate documentation of results provides better control over data collection, which enhances the overall reliability of the study. However, inter-rater reliability might affect the control of data collection and coding. Clearly documenting the research methodology, data acquisition, and data analysis also results in increased controllability of the research study; increasing the reliability. Lastly, construct validity is accounted for via triangulation, which is widely used as a way for improving the reliability and validity in social research. The type of triangulation used in this study is data triangulation, since there is only one investigator, the BMI characteristics require a qualitative methodology and a limited theoretical framework is pre-defined in the theoretical background.

By addressing the research methodology used for this research project, this chapter provided insight how the objective and research questions in chapter 1 were addressed. The development of design principles as means to express answers to the above-mentioned questions plays a central role in this study. Therefore the next chapter depicts the theoretical background including research-based design principles for successful BMI in high tech established organisations.
3. Theoretical background

This chapter of the research project addresses the theoretical background and has two goals: first, it aims to structure existing literature on business models and its innovation process, specifically aimed at software organisations or BUs. Therefore this research project is situated between business model and new business development bodies of literate. The second goal is to partially provide insight in structure and success factors of the BMI process and how this process is related to business development activities within software organisations, in order to provide guidance to high tech established organisations inexperienced with BMI.

This is done by a brief introduction to new business development (NBD) in high tech established organisations via two distinctive pathways; corporate venturing and corporate entrepreneurship. Afterwards business models in the software industry are discussed and the chapter is concluded with description of the BMI process including challenges and possible solutions to break through barriers and challenges. The detailed systematic literature review argues for interventions and mechanisms in the form of research-based design principles that might provide guidance for BMI in high tech established organisations. These principles are derived using CIMO logic Denyer et al. (2008) and are mentioned throughout this chapter.

3.1 New business development in high tech established organisations

NBD is of significant importance for high tech established organisations in order to deal with rapidly changing environments and to fuel the innovation pipeline. Over the past decades NBD strategies have gained increasing attention among academics and practitioners. According to Roberts & Berry (1985) business development may involve new markets, new technology and new products or services. This is supported by Karol, Loeser, & Tait (2002) by their comprehensive customer/market-product/technology framework. These aspects may be incremental innovations on the product or market axis, but may also combine new technologies and new markets to cause, if successful, radical new businesses.

Numerous academics and researchers have identified and researched the topic of new business development, whether they call it “new business creation”, “corporate venturing”, “corporate innovation”, “corporate entrepreneurship” or “intrapreneurship”, their results on addressing challenges of NBD within high tech established organisations have been remarkably similar. New business creation, corporate venturing and corporate innovation in essence all start from the assumption that the corporate firm manages the new businesses (partly) separated from mainstream businesses. Additionally, these schools of thought are all rooted in organisational theory. Corporate entrepreneurship and intrapreneurship on the other hand, start from the assumption that the corporate firm stimulates an entrepreneurial behaviour within the organisation, and are both rooted in cultural theory school of thought.

For the reasons of clarity and scope, the schools of thought in the former and later themes will be used interchangeably, and from now on are labelled as corporate venturing (CV) and corporate entrepreneurship (CE).

3.1.1 Corporate venturing

Kiel (2002) reviews the corporate venture literature and identifies three types of corporate venturing: (1) independent, (2) internal, and (3) external. First, independent venturing is the formation of a new venture outside the corporate boundaries, and receives no support from the incumbent firm. The established firm may re-gain control via merger and acquisition and capital investments. Second, internal venturing addresses the creation of new ventures within the boundaries of the incumbent firm. The new venture may be connected to the high tech established organisation as a separate BU or to an existing business division. Recently, academics’ attention towards new business divisions has
increased emphasis on the importance to separate new ventures from mainstream business. New ventures typically have lower gross margin than mainstream business, and therefore high tech established organisations – in and effort to maximize operating margins and growth – will naturally favour mainstream business over long term prospects. Separating these activities into dedicated BUs allows the new venture to reap the full benefits of the incumbent’s resources, while creating a ‘landing zone’ for ventures to mature and compete with mainstream business. Third, external venturing is related to corporate venture activities that exist outside the boundaries of the high tech established organisation. Thus, the new venture gains maximum benefits from de-central and autonomous control, while still tapping into valuable resources of the high tech established organisation. Furthermore, Vanhaverbeke & Peeters (2005), among others, urge the importance for external technology venturing for NBD activities of organisations that have to cope with increasing complexity and technological growth in the industry; while simultaneously reinforcing internal venture processes. Kiel (2004) argues that external venturing is deeply rooted in organisations’ learning and experimentation processes; where learning from experiences and acquisitive learning (corporate venture capital is a good example) moderate the effect on external venturing capabilities.

The corporate venturing processes in Table 2, proposed by three different authors, are stage-gate processes where ventures move from one stage to the other. This overview provides a better understanding of the relation between corporate ventures and the corporate parent. The first and last corporate venturing processes take the corporate parent’s perspective, while the second study is considered from the corporate venture point of view.

Table 2 Overview of different corporate venturing process models. Adopted from De Jager (2009).

<table>
<thead>
<tr>
<th>Authors</th>
<th>Perspective</th>
<th>Stages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burgelman and Sayles (1986)</td>
<td>Organisational</td>
<td>1. Conceptualization</td>
</tr>
<tr>
<td></td>
<td>theory</td>
<td>2. Pre-Venture</td>
</tr>
<tr>
<td></td>
<td>Corporate parent</td>
<td>3. Entrepreneurial</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4. Organisational</td>
</tr>
<tr>
<td>Govindarajan and Trimble (2005)</td>
<td>Institutional</td>
<td>1. Forgetting</td>
</tr>
<tr>
<td></td>
<td>theory</td>
<td>2. Borrowing</td>
</tr>
<tr>
<td></td>
<td>Venture</td>
<td>3. Learning</td>
</tr>
<tr>
<td>O’Connor and DeMartino (2006)</td>
<td>Organisational</td>
<td>1. Discovery</td>
</tr>
<tr>
<td></td>
<td>theory</td>
<td>2. Incubation</td>
</tr>
<tr>
<td></td>
<td>Corporate parent</td>
<td>3. Acceleration</td>
</tr>
</tbody>
</table>

The corporate innovation strategy is an important trigger for NBD. Covin & Miles (2007) support this positive relationship in their study. The authors argue that CV is the way for high tech established organisations to progress, rethink, and rejuvenate core business with better growth opportunities. Covin & Miles (2007) have identified five different models that link corporate strategy to CV: (1) there is no link; (2) corporate strategy drives CV; (3) CV drives corporate strategy, indicating an opportunity-driven strategy that is continuously exploring new businesses; (4) CV and corporate strategy operate in a relationship of mutual causality, where the corporate strategy provides a context that is redefined through entrepreneurial efforts via CV; (5) CV is the corporate strategy, where entrepreneurship is deeply rooted in organisational structures, processes, culture, resources, and members (Covin & Miles, 2007).

Vanhaverbeke & Peeters (2005) argue that NBD, corporate strategy and competence building have to be linked in order to reap the potential benefits in a high tech established organisation. The authors’ case study at a high tech established organisation revealed a type four NBD-corporate innovation strategy model. Vanhaverbeke & Peeters (2005) find that corporate strategy building does not only provide guidance and sense to competence building, but is simultaneously facilitated by the corporate venturing process and the explorative characteristics it entails. Each new venture provides learning to
the organisation about new markets and technologies, which in turn sharpen the strategic vision on business opportunities. Thus, high tech established organisations are provided with guidance on which CV-corporate strategy model and activities to employ.

Moreover, the emphasis and impact force of NBD activities strongly influence the organisation’s corporate culture and perception towards CE and CV. Therefore NBD may act as a vehicle to individual and organisational learning and unlearning.

3.1.2 Corporate entrepreneurship

In the academic literature, CE is variously defined among academics and practitioners. Wolcott & Lippitz (2007) provide the widespread definition of CE “as a process by which teams within an established company conceive, foster, launch and manage a new business that is distinct from the parent company but leverages the parent’s assets, market position, capabilities or other resources” (p. 75). Covin & Miles (1999) identify three situations that are an example of common phenomena of CE; (1) a high tech established organisation enters a new business, (2) champion(s) that promote(s) new product, technologies or markets within the corporate context, and an (3) entrepreneurial “mind-set” drives an entire organisation’s. Different CE structures may coexist in one organisation as separate dimensions of entrepreneurial activities (Covin & Miles, 2007; Tushman & O’Reilly, 1996).

The first construct proposed by Covin & Miles (1999) is the process of corporate venturing, which is elaborated in the previous paragraph. The latter two constructs are respectively referred to as intrapreneurship and firm level entrepreneurship. These CE constructs are similar in the fact that they entail a “higher level” of CE enactment, and are rooted in cultural theory. Therefore the remainder of this section focuses on these concepts interchangeably, and are labelled as CE.

Covin & Miles (1999) and Wolcott & Lippitz (2007) both propose a four-model framework of CE. Table 3 depicts these models and categorizes each step according Covin & Miles’ (2007) their distinction between two patterns: (1) surface CE and (2) deep CE. Surface entrepreneurship is related to entrepreneurship in organisations that consider CE an important business goal, whereas deep CE is considered an important shared value throughout the entire organisation. Both CE models are elaborated in the literature review, previous to this research proposal.

Table 3 Overview corporate entrepreneurial models

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>CE models</th>
<th>Surface/ deep CE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustained regeneration</td>
<td>Deep CE</td>
<td></td>
</tr>
<tr>
<td>Organisational rejuvenation</td>
<td>Surface CE</td>
<td></td>
</tr>
<tr>
<td>Strategic renewal</td>
<td>Surface – Deep CE</td>
<td></td>
</tr>
<tr>
<td>Domain redefinition</td>
<td>Deep CE</td>
<td></td>
</tr>
<tr>
<td>Enable</td>
<td>Deep CE</td>
<td></td>
</tr>
<tr>
<td>Advocate</td>
<td>Surface CE</td>
<td></td>
</tr>
<tr>
<td>Producer</td>
<td>Surface – Deep CE</td>
<td></td>
</tr>
<tr>
<td>Opportunist</td>
<td>Surface CE</td>
<td></td>
</tr>
</tbody>
</table>

Selecting the right model to embed CE in an organisation is inseparable from a broadly and clearly communicated vision. Generating a broad vision will stimulate ‘out of the box thinking’, initiating an entrepreneurial mind-set throughout the organisation. Once the vision is set, an organisation needs to determine specific objectives. If the organisation is seeking corporate wide cultural transformation deep CE models are most appropriate, typically these processes have longer implementation time frames before the desired results are achieved. When an organisation seeks (quick) rejuvenation of particular BUs, surface models are more appropriate to enhance CE.

Covin & Miles (1999) and Wolcott & Lippitz (2007) both argue that organisations that put greater emphasis on business models grow faster than the competition, and indicate the importance of CE on BMI processes. Chesbrough & Rosenbloom (2002) confirm the positive relationship between novel
business models and NBD success; and conceive business models as “an important device that mediates between technology development and economic value creation” (p. 532).

### 3.1.3 New business development as ‘organisational carrier’

The process of NBD faces companies with the considerable challenge to pursue the most attractive growth phase. This challenge largely emerges from the decision to develop new businesses, which creates competence gaps between the existing competences and those required (Vanhaverbeke & Peeters, 2005; Bröring & Herzog, 2008). Chesbrough H. (2003) and Vanhaverbeke & Peeters (2005) state that NBD functions as an “organisational carrier” through which new competences are acquired or developed to create new, profitable business. Companies try to outperform competition by investing in research and development and external technology sourcing. However, for creating a sustainable competitive advantage these investments should valorise entrepreneurial insights into value-creating opportunities (Vanhaverbeke & Peeters, 2005). Each NBD activity attracts people, resources and technology or market knowledge with the incentive to valorise these assets and develop new, successful businesses. This entrepreneurial process enhances knowledge diffusion through the organisation, and therefore is an important “organisational carrier” to bolster an organisation’s capabilities.

Bridging these competence gaps may also entail cannibalization of existing competences in an effort to embrace organisational change (Govindarajan & Trimble, 2005). The authors researched the corporate venturing process and indicate the importance for organisations to unlearn as part of this process. Hence, the first research-based design principle;

**Principle 1:** High tech established organisations (C) should employ new business development as an “organisational carrier” (I) because this creates and identifies competence gaps (M) in order to provide guidance and sense to competence building (O).

### 3.2 Business models in the software industry

The rise of e-commerce with its new firms breaking through conventional ways of doing business has increased emphasis on the topic by both practitioners and academics. However, the definition of business models is still variously defined in scientific literature and business management journals. Osterwalder & Pigneur (2010) define business models as “the rationale of how an organization creates, delivers, and captures” (p.14), and throughout this research study the business model is a source of innovation in itself, as opposed to literature in which business models help the technological innovation process. Sniukas (2012) defines this BMI process as “transforming key elements of your business or inventing completely new ways of doing business” (p. 6).

This chapter aims to sheds light upon and structure existing literature regarding business models of organisations in the software industry, referred to as ‘software business models’. Business models are capable of (re)designing markets and creating new industries, providing companies with a competitive advantage. Academics and scholars provide various frameworks to visualise an organisation’s existing business model. Most frameworks include the four basic elements: customer value proposition, profit formula, key resources and key processes. Osterwalder & Pigneur (2010) build upon these basic elements and provide a comprehensive nine step business model canvas (see Appendix III). The authors differentiate between clear customer segments and accompanied value proposition on the one hand, and key processes to deliver the value proposition to the customer on the other. Revenue streams and cost structure provide supportive building blocks to these processes. Subsequently, high tech established organisations who seek to rejuvenation exiting business model should redefine parts of the business model building blocks and thereby engage in BMI.
The prevailing products offered in the software industry are intangible; however most of the organisations in the software industry also provide consulting and support services, which indicate human services. Software companies typically act as creators of intangible good, but do not sell the ownership of software to customers. Rather, organisations in the software industry act as lessors of intangible goods by allowing customers to use their software product under certain licensing conditions. Additionally, software companies provide service and consulting and training which corresponds to lessors of human services (contractor), indicating a high degree of hybrid business models.

### 3.2.1 Open innovation

Open innovation is an emerging more open business model, where companies literally open up to external collaborations to enhance their innovation and market potential. These collaborations are increasingly important in high tech established organizations to leverage inbound open innovation to create a sustainable competitive advantage. In addition, rather than organizations to rely solely on their internal paths to market, outbound open innovation can leverage a technologies potential by commercialization through the business model of external parties (Chesbrough & Crowther, 2006; Enkel, Gassmann, & Chesbrough, 2009). Within the software industry open source software (OSS) is the example of the open innovation paradigm.

### 3.2.2 Open source software

OSS is a software development and licensing paradigm, originated from the Free Software Foundation (FSF). The FSF was founded by Richard Stallman with the objective to balance the increasing influence of proprietary software. The OSS paradigm ever since has gained increasing ground and has led to the creation of widely used software products, such as Linux platform, Apache web server and Android mobile operating system.

OSS has several distinguishing features; in comparison with proprietary software the sources code of OSS is publicly available and modifiable by the entire community and thereby a highly collaborative software development community is created, whereas in proprietary software the source code remains inaccessible. Popp (2013) describes three ways to commercialize OSS business models; (1) leverage the open source community (OSC) as a supplier, (2) create proprietary software on top of open source codes, and (3) provide services around OSS to customers. Organisations that seek to use the open source community as supplier are typically triggered by the quality and cost advantages. The open source community is of significant size and has the ability to develop and test high quality software. Deodhar et al. (2012) propose three strategic firms’ dimensions to hybridization of the software business model in Figure 5: interface, involvement, and institutionalization, prioritized on the level of open source engagement of software business models.

![Figure 5 Hybridization of the software business model (Deodhar et al., 2012).](image-url)
3.2.3 Software business models

Creating business models requires combining business model archetypes, goods and services, revenue models and the cost structure, partner network and activities to operate the business model. The software industry offers mainly intangible goods, although a large proportion of companies are also providing consulting, support and training (Deodhar, 2012). Looking at Table 4, software companies are often creators of intangible goods (inventors) and distribute their invention via OEM suppliers as IP distributors or directly to end-users as IP lessor.

Common business models in the software industry, which are market in dark grey in Table 4, are software-as-a-product (SaaS), where the software vendor licenses the product to be used (not owned) by the customer, and thereby carries the cost for the usage rights, support, maintenance, and operation. Software companies that operate the SaaS business model typically act as IP lessors and contractors (Popp, 2013). Subsequently, software-as-a-service (SaaS) is a cost-efficient business model which can be defined as providing online access to the software product that is managed and maintained by the provider. In the SaaS business model the software company carries the cost of software support, maintenance, and operation. Typically organisations that execute the SaaS business model are financial, physical and IP lessors or IP distributors.

Emerging business models, especially offered by large software companies (e.g. IBM, SAP, Microsoft), offer additional goods and services and are marked light grey in Table 4. Popp (2013) investigated three valuable cases and found four emerging business models in the software industry. First, large software companies lent money to their customer to purchases and use their software, and thereby act as financial lessors. Second, software companies continuously revise their IP strategy and trade or sell IP rights as IP brokers. The author proposes another emerging form of IP distributor; the use of a software companies IP in the OEM business, which allows the vendor to distribute the software with its products. Third, large software companies have marketplaces or communities their partners can use to advertise their solutions, bringing additional revenue stream. Lastly, software vendors have retail stores where they sell their products (e.g. Microsoft flagship store).

<table>
<thead>
<tr>
<th>Type of Business Models</th>
<th>Financial</th>
<th>Physical</th>
<th>Intangible</th>
<th>Human</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creator</td>
<td>Entrepreneur</td>
<td>Manufacturer</td>
<td>Inventor</td>
<td>n/a</td>
</tr>
<tr>
<td>Distributor</td>
<td>Financial trader</td>
<td>Wholesaler, retailer</td>
<td>IP distributor</td>
<td>n/a</td>
</tr>
<tr>
<td>Lessor</td>
<td>Financial lessor</td>
<td>Physical lessor</td>
<td>IP lessor</td>
<td>Contractor</td>
</tr>
<tr>
<td>Broker</td>
<td>Financial broker</td>
<td>Physical broker</td>
<td>IP broker</td>
<td>HR broker</td>
</tr>
</tbody>
</table>

Hybrid business models consist of multiple business patterns. For instance, a software company could create a product and license this product to its customer (IP lessor), while simultaneously providing training and consulting (contractor). Hybrid business models can be a source of business model synergies in order to create a sustainable competitive advantage.

3.3 Business model innovation

BMI refers to the process of transforming, or completely reinventing, key elements of an organisation to new ways of doing business. In order to successfully commercialize these new ideas and technologies, it might be necessary to develop new, innovative business models. Chesbrough (2010) states that “a mediocre technology pursued within a great business model may be more valuable than a great technology exploited via a mediocre business model” (p.354), indicating the importance of BMI for organisations to be successful. This notion is widely supported by both academics and practitioners, demonstrating the increasing importance and emphasis of BMI on organisation success (Chesbrough H., 2007; Giesen, Berman, & Bell, 2007; Teece, 2010; Lambert &
Moreover, BMI has become a key trigger for differentiation and competitive advantage, value creation, initiating new markets and even entire industries. However, many high tech established organisations have difficulties to innovate their business model. In general, managers do not sufficiently understand their existing business model in order to refocus and change where necessary. Teece (2010) states that “selecting, adjusting and/or improving business models is a complex art” (p. 176), and much of the literature widely agrees on the importance of experimentation to enhance BMI. The authors sets forth that innovating an established business model requires significant amount of creativity, insight, and information and intelligence of customers, competitors and suppliers. Furthermore, business models entail a great deal of tacit components, and therefore require an entrepreneurial mind-set to innovate and benefit from them entirely. Thus, experimentation and learning are prerequisites to innovate an established business model (Teece, 2010; Chesbrough, 2010; Morris, Schindehutte, & Allen, 2005; Sosna, Trevinyo-Rodriguez, & Ramakrishna Velamuri, 2010). Hence, the second research-based design principle;

Principle 2: High tech established organisations that have to cope a changing environment (a), seek to exploit new technologies, products, or services (b), or explore new business models for the future (c) (C), should use business model innovation (I), because this process provides reinvention of the corporate strategy (M) to create or pursue new business opportunities (O).

3.3.1 Ways to innovate business models
Giesen, Berman, & Bell (2007) developed a framework with three main approaches to innovate an organisation’s business model. These approaches are denoted separately, but may be used simultaneously and interchangeable since this has an equal effect on firm performance. First, industry model innovation; this BMI approach involves innovation of the industry value chain, where adjacent markets and industries are addressed through horizontal integration. Second, revenue model innovation; this BMI approach involves innovation of organisations’ revenue streams, by reconfiguring offerings or introducing new pricing strategies. This dimension has a direct effect on customer experience. Third, enterprise model innovation; this BMI approach involves innovating the structure of the organisation and position in the new or existing value chain.

Principle 3a: In order to address adjacent markets (O), high tech established organisations that seek rejuvenation of existing business models (C) should employ industry model innovation (I), because allows (re)definition of their position in the value chain (M).

Principle 3b: High tech established organisations (C) that seek to enhance customer experience (O) should employ revenue model innovation (I) because this results in reconfiguration of offerings (M).

Principle 3c: High tech established organisations (C) that seek to capitalize on technological innovations via new business development (O) should employ enterprise model innovation (I) because this triggers external collaboration, network plays and (re)definition of organisational boundaries (M).

3.3.2 Business model innovation process
In general there are three contrasting BMI processes. The first is a structured BMI process via a controlled and stepwise process. Sniukas (2012) developed a BMI process (Appendix VI, figure 1), which high tech established organisations may follow in the innovation process. The author extends
the iterative process with five key elements derived from stage-gate® processes; description, input, tasks, output and gates. Second, Frankenberg et al. (2012) analysed fourteen cases which resulted in their “4I-framework” of phases of the BMI process and their key challenges (Appendix VI, figure 2). Third, Osterwalder & Pigneur (2010) theoretically analysed their business model framework and developed a five dimension BMI process (Appendix VI, figure 3). This process is a highly dynamic, semi-structured innovation processes where the process leapfrogs forward via multiple iterations. The first two and latter innovation processes differ in the continuity of their activities and phases. Whereas the process by Sniukas (2012) has a clear start and end stage, the process by has a similar approach, but evolves according several iterations. Contrary, Osterwalder & Pigneur (2010) their BMI phases are a continuous process. The latter process relies more on entrepreneurial behaviour and deep level corporate entrepreneurship, while the two former rely solely on surface level CE.

3.3.3 Business model innovation objectives and metrics
Organisations that seek ways to enhance their success increasingly focus on BMI (Lambert & Davidson, 2012; Zott & Amit, 2010). A preponderance of recent research studies provide case studies as a rich data pool for the chosen organisation’ business model, and form valuable exemplars to be imitated. Different studies constitute different notions of ‘success’, from financial performance (e.g. revenue growth, profitability, market capitalization and equity growth) to non-financial performance (e.g. resilience in challenging markets and social value to stakeholders).

Several academics provide different notions to enhance business model success. Giesen et al. (2007) find in their study an equal positive effect of each of the three ways to innovative business models on organisation success. Additionally, business model replication and transferability of an organisation’s business model are important strategies for high tech established organisation to reap the full success potential BMI. Subsequently, Chesbrough (2006; 2007) emphasizes the importance of top management support to successfully innovate business models, and states that “business model innovation clearly requires involvement of top leadership” (p.16), and designates this as one of the main challenges in high tech established organisations. Hence, the fourth research-based design principle;

Principle 4: High tech established organisations (C) that seek to enhance their business model performance (O) should emphasize the importance of top management support (a) and business model replication and transferability (b) (I), because this triggers commitment and transferability (M).

3.3.4 Challenges
Organisational changes and transformation are particularly difficult, especially if key capabilities and routines have not been developed yet. According Sniukas (2012) these organisational changes expose the organisation to three particular challenges for BMI in high tech established organisations: (1) BMI in itself is a special kind of innovation, where different organisational practices, processes and tools interplay; far to complicate for stage-gate-methods to apply, (2) organisational challenges relate to internal change processes in order to innovate the established business model, such as company culture and top management support, (3) on an individual level challenges emerge related to mental models, or cognitive maps, of managers and employees (Sniukas, 2012; Chesbrough, 2010). These cognitive maps state deeply rooted definitions on how the organisation creates value, competes, which customers to serve and how to merge these key aspects.
3.4 Breaking through barriers and challenges

As described throughout this chapter, BMI appears to be much tougher for high tech established organisations than for entrepreneurs, start-ups and industry newcomers. Therefore, Sniukas (2012) proposes the necessity to have clear processes, with clear tasks and a dedicated team to lead the way. Teece (2010) and Chesbrough (2010) stress the importance of the role of learning and adaptation, experimentation, and effectuation and when organisations seek rejuvenation of their business models. This chapter sets forth a review of these factors, to deal with the abovementioned challenges and create an environment that fosters BMI.

3.4.1 Learning during business model innovation

When crafting business models, the future business model may not be apparent beforehand, but rather evolve according an iterative process of trial-and-error learning. Teece (2010) supports this notion by stating that "entrepreneurs or managers who are well positioned, who have a good but not perfect business model template but who can learn and adjust, are those more likely to succeed" (p.187), and proposes that organisations need to create individual and organisational learning incentives to foster BMI. Thus, learning and adaptation to change are prerequisites to innovate established business models (Teece, 2010; Chesbrough, 2010; Morris, Schindehutte, & Allen, 2005; Sosna, Trevinyo-Rodriguez, & Ramakrishna Velamuri, 2010).

There is a rich body of literature focussing on learning mechanisms in the organisational setting. Table 5 sets forth five types of learning mechanisms that might occur during the BMI process of established organisations in the high tech industry.

<table>
<thead>
<tr>
<th>Learning mechanisms</th>
<th>Definition</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning-before-doing</td>
<td>Problem-solving can also occur long before a new product or process design is introduced into the factory through computer simulations, laboratory experiments, prototype testing, pilot production runs, and other experiments.</td>
<td></td>
</tr>
<tr>
<td>Trial-and-error learning</td>
<td>&quot;'On-line' actions and outcomes drive learning, but 'off-line' reflection and/or changes to action occur only after consequences of prior action are known.&quot;</td>
<td></td>
</tr>
<tr>
<td>Experimental learning</td>
<td>&quot;'Off-line', long term learning to acquire new, generalizable, and systematic knowledge of relationship or causal laws.&quot;</td>
<td></td>
</tr>
<tr>
<td>Learning-by-hiring</td>
<td>&quot;The acquisition of knowledge through the hiring of experts.&quot;</td>
<td></td>
</tr>
<tr>
<td>Improvisational learning</td>
<td>&quot;Real-time&quot;, short-term learning that is aimed at rapid problem solving or taking advantages from specific business opportunities instead of generating knowledge.</td>
<td></td>
</tr>
</tbody>
</table>

Different learning mechanisms are operational in different phases of the BMI process. Where learning-before-doing, experimental learning and learning are primarily aimed at knowledge development prior to the action, trial-and-error learning, learning-by-hiring and improvisational learning are “online” learning mechanisms which are focused around business opportunities and aid in the resolve uncertainty during the BMI process. This results in the fifth research-based design principle:

**Principle 5:** Established organisations in the high tech industry (C) should install learning-before-doing and experimental learning during in the beginning of the BMI process, and trial-and-error learning, improvisational learning and learning-by-hiring during the end phases of the BMI process (I) because this triggers knowledge acquisition mechanisms (M) in order to cope with different types of uncertainty along the innovation process (O).
As proposed by several authors, experimentation is an important antecedent on its own, and is therefore elaborated on in the next paragraph.

### 3.4.2 Experimentation during business model innovation

Academic literature widely agrees that organisations or BUs that have to deal with inertia, lock-in, and competence traps it is key to experiment and learn from these valuable experiences in order to rejuvenate their business models (Sosna, Trevinyo-Rodriguez, & Ramakrishna Velamuri, 2010; Chesbrough, 2010; Morris, Schindehutte, & Allen, 2005). Often the right business model is not discernible in the beginning, but merely evolves through experimentation. This experimentation is an advantage to cope with the high risk and uncertainty BMI entails. McGrath (2010) sets forth that business model experimentation (1) takes place across and within firms – where organisations can learn from preceding firm’s experimentation results and may be realigned to match the incumbent firm’s ecosystem, and (2) is highly path-dependent – where new business models emerge from a trajectory that is shaped by previous experiments. Thomke, von Hippel, & Franke (1998) summarize that BMI experiments should yield high fidelity results while using the least amount of resources as possible, performed quickly, and be discovery driven and informative by nature.

Organisations engaging in BMI should be comfortable with experimentation, which requires resource investments, and with financial tools that are suitable for experimentation. These financial tools rely less on traditional methods like net present value, but rather on decision methods for investments like real option reasoning. Therefore the goal of discovery driven strategic thinking is aimed to learn as much as possible at the lowest possible cost. This underlying concept forms the groundwork for what Sarasvathy (2001) describes as the “affordable loss” (p. 252) in effectuation theory, which is outlined in the next paragraph. The sixth research-based design principle;

**Principle 6:** High tech established organisations that have to deal with inertia, lock-in and competence traps (C) when seeking business model innovation (O) should perform high fidelity (a), low cost (b), discovery driven (c) and informative experiments (d) (I) because this results in quick trial-and-error learning (M).

### 3.4.3 Effectuation during business model innovation

As explained throughout the chapter, BMI is discovery-driven and explorative by nature. These characteristics provide no solid basis, as well as the lack of existing central artefacts, to make decisions following causal reasoning (Sarasvathy, 2001). These process characteristics are rather aimed at creating new artefacts; like firms, markets, and even entire industries. In effectuation the actor (entrepreneur or organisation) does not analyse the environment as much as possible, but rather takes action and enact upon the environment (Sarasvathy, 2001, 2008; Chesbrough, 2010). Here the difference between causal and effectual approach is that, where the former is looking for what should be done to achieve a goal, the latter starts at what can be done without having a predefined goal in mind.

When using effectual reasoning, entrepreneurs start analysing the resources that are to their disposal and build upon the concept of affordable loss, rather than expected return. Sarasvathy, (2001, 2008) proposes that effectuation is a valuable tool for institutionalization of entrepreneurship and decision making when faced with high levels of uncertainty, ambiguity and enactment. Moreover, effectual mechanisms might aid firm practices to overcome suffering from inertial, lock-in, and competence traps caused by ‘existing business model thinking’ to pursue novel business opportunities. Thus, this results in the seventh and eighth research-based design principle;
**Principle 7:** High tech established organisations that have to deal with inertia, lock-in and competence traps (C) when seeking business model innovation (O) should employ corporate effectuation processes (I) to trigger corporate-wide entrepreneurship (M).

**Principle 8:** High tech established organisations (C) that seek to enhance their performance (O) should map and actively innovate their business model (I) because this triggers trial-and-error learning (a), experimentation (b), and effectual (c) processes (M).

Summarizing, detailed systematic literature review has revealed six patterns to structure successful BMI in high tech established organisations: (1) NBD, (2) ways to innovate business models, (3) business model innovation objectives and metrics, (4) learning during BMI, (5) experimentation during BMI, (6) effectuation during BMI.

The analysis in this chapter has explicated an overview of existing literature regarding BMI, and concluded with a derivation of eight research-based design principles. Some interesting insights emerged which may contribute to successful BMI in high tech established organisations. However, the abovementioned principles were derived solely from academic literature, and would greatly benefit from detailed case analysis in a practical setting. The next chapter will outline results from the multiple case studies.
4. Multiple case study

As depicted before in Chapter 2 on research methodology, a multiple case study was conducted at three companies in order to increase the understanding the structure and success factors of BMI in practical settings, and to derive practice-based design principles from these experiences. This chapter sets forth the cases that were selected, and shares the main results of the extensive analysis that was conducted and concludes with the derivation of practice-based design principles.

4.1 Within case description

In total, three companies that successfully innovated their software business models were selected based upon criteria mentioned in Chapter 2.2. In order to support the understanding of the analysis, a brief description of the three cases is set forth in this section. Additionally, Table 6 depicts an overview of the selected cases and their characteristics.

4.1.1 Alpha

Being the youngest BU within AlphaCo, Alpha emerged after actively seeking new business opportunities with the objective to rapidly grow a new BU within AlphaCo. After relationships as hardware supplier and technology vendor for more than 3 years, AlphaCo acquired their former software partner and this initiated a new BU within AlphaCo, Alpha. Alpha was perceived as a promising new business opportunity where product innovation and new markets for AlphaCo were addressed. Initially Alpha was integrated in one of the other BU’s of AlphaCo, providing a landing spot in order to seek business synergies and use valuable resources of the parent BU.

From the beginning Alpha has focused on providing a total solution and focussing on value capturing from their downstream workflow; this contrary to the core business, capabilities and competences of AlphaCo. Alpha is the only BU that enables itself to capture value via recurring revenue streams for their software products. This helped to aid in the standardization of maintenance costs for the software platform, while enhancing the customer value proposition and boosting operating margins.

4.1.2 Beta

The corporate innovation strategy of AlphaCo resulted in the acquisition of company Beta, a former supplier and partner of AlphaCo, about one year ago. Additionally, the acquisition of Beta complements to AlphaCo’s technology and product roadmap, and vertical integration strategy. Company Beta is a highly profitable software development organisation, and considered to be a leader in their respective markets. The main customers of Beta are operational in the field of oil and gas, medical, and engineering. Company Beta is the result of a merger between two software firms that were founded in the 1980s, and ever since focused on graphics development tools. Their technology evolved from open source based software packages to proprietary highly specialized software packages for specific industry verticals. Beta started their software product portfolio with middleware software that enabled software developers to cope with very large datasets. However, contextual events pushed Beta to seek alternative revenue streams in order to continue aggressive growth and increase the valuation of the organisation. This led to a hybrid business model where a middleware platform for software developers is complemented with highly specialized end-user applications.

4.1.3 Gamma

The origin of Gamma lies in the OSC, where members are actively engaged in coding and testing OSS. Gamma started as a consulting and training company across various industry segments. The organisation was founded about ten years ago by two entrepreneurial software developers. Since their start-up Gamma’s realized a steady growth rate around sixty per cent a year. However, due to scaling constraints and promising business opportunities Gamma was triggered to innovate their business
model about three years ago. The accumulated knowledge from consulting projects resulted in a software platform for scientific computing; which is recently launched. The BMI process in Gamma just past the implementation of their rejuvenated software business model and is closely monitored during this phase in order to achieve financial and non-financial objectives and metrics.

4.1.4 Case characteristics
To complement the brief case descriptions in the previous sections, Table 6 lists case characteristics per BMI trajectory. All three cases are small and medium sized organisations operational in the high tech sector, where scientific computing software is used by end-users or is integrated as middleware development tool. Both Alpha and Beta operate as IP lessor of their software products, while Gamma recently transitioned from contractor to a hybrid business model acting as both contractor and IP lessor; while currently maintaining consulting and training as their main revenue source. These case characteristics reveal large case similarity of the BMI processes in the cases.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Alpha</th>
<th>Beta</th>
<th>Gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>Natural Resources</td>
<td>Scientific Visualization Software</td>
<td>Scientific Software</td>
</tr>
<tr>
<td>Turnover (M$)</td>
<td>50</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>FTE</td>
<td>100</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Software product</td>
<td>Applications</td>
<td>Middleware; Applications</td>
<td>Consulting and training; Application platform</td>
</tr>
<tr>
<td>Main software business model</td>
<td>IP lessor (Software as a product)</td>
<td>IP lessor (Software as a product)</td>
<td>Contractor</td>
</tr>
<tr>
<td>Main revenue source</td>
<td>Hardware sales</td>
<td>Royalties</td>
<td>Consulting and training</td>
</tr>
</tbody>
</table>

4.2 Cross-case analysis
This section explicates the outcomes of the cross-case analysis, as is described in the methodology chapter. The section will start discussing the comparison of BMI trajectories across cases. Afterwards, the conceptual BMI phases are set forth and four types of patterns are delineated that resulted from cross-case analysis. The last section of this chapter through fully discussed these patterns in which practice-based design principles are derived from detailed excerpt analysis.

4.2.1 Comparison of business model innovation trajectories in the cases
A key factor that might explain differences between trajectories is BMI take-off – the relationship of BMI with existing business activities. BMI in Alpha benefitted from valuable knowledge and activities in other BUs within AlphaCo, while Beta and Gamma pursued novel business models outside their existing activities.

Subsequently, innovation trajectories differ on their innovation strategy. Where an online innovation strategy is characterized by parallel design and implementation phases, in an offline innovation strategy these phases are clearly separated. Offline BMI trajectories are characterized by an extensive design phase because typically the launch or implementation of the rejuvenated business model must be flawless, as was the case at Gamma. Alpha and Beta experienced an online innovation strategy where initial business models were designed and implemented quickly, while significant effort was essential to evolve the business model after launch.

Business model synergies between the existing and new business model were strongest in cases Beta and Gamma. Beta complemented their middleware software business model with highly specific end-
user application in a hybrid business model, where there is a mutual causality and reinforcing relationship between the two business models. Gamma combined consulting expertise with their recently launched software platform, which creates synergetic benefits from faster consulting trajectories through ‘standardized’ platforms, while creating an additional revenue stream via platforms sales. Contrary to previously mentioned BMI processes, Alpha transitioned from hardware to solution provider where synergies between both business models appeared to be medium.

The trajectories at the different cases are characterized by various entrepreneurship processes. Alpha’s position in the corporate environment resulted in dedicated NBD teams and corporate champions, while in Beta and Gamma entrepreneurship was deeply rooted through the entire organisation and created an ‘entrepreneurial mind-set’. Table 7 summarizes abovementioned comparison of trajectories.

Table 7 Comparison of trajectories

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Alpha</th>
<th>Beta</th>
<th>Gamma</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI take-off</td>
<td>Existing</td>
<td>New</td>
<td>New</td>
</tr>
<tr>
<td>Innovation strategy</td>
<td>Online</td>
<td>Online</td>
<td>Offline</td>
</tr>
<tr>
<td>BMI phase</td>
<td>Post-transition</td>
<td>Post-transition</td>
<td>Post-transition</td>
</tr>
<tr>
<td>Business model synergy</td>
<td>Medium</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Entrepreneurship process</td>
<td>NBD, Champions</td>
<td>Entrepreneurial &quot;mind-set&quot;</td>
<td>Entrepreneurial &quot;mind-set&quot;</td>
</tr>
</tbody>
</table>

4.2.2 Business model innovation phases

Empirical results show only sights of a highly dynamic, unstructured, and uncertain innovation process much related to the BMI process proposed by Osterwalder & Pigneur (2010) and Frankenberger et al. (2012), where the trajectories merely evolve over time via entrepreneurial efforts. Although research by Osterwalder & Pigneur (2010) and Frankenberger et al. (2012) reveal respectively five and four step BMI processes, empirical results in this study show large coalescence between initial, intermediate, and final process phases. Specifically, I was able to categorize each of the 47 episodes in the BMI trajectories across cases where they occurred in the BMI process (see Appendix VI). From this analysis I was able to derive the conceptual BMI process as it is presented in Figure 6, where I distinguish three phases in the transition from existing business models to a new, novel business model: pre-transition, transition, and post-transition phases.

The pre-transition phase is characterized by high levels of uncertainty, and connecting and learning activities to familiarize and create awareness in the entire organisation with ‘new ways of doing business’, as illustrated by the Marketing Director of Gamma: "Gamma had never developed a proprietary software product before. Not enough people in company who have developed product before or been in product development team/process/organization".

In the transition phase the actual design of the new business model takes place. Depending on the type of innovation, parallel or sequential implementation of the new business model design is most suitable. The coalescence of the design and implementation phases are clearly articulated by Alpha its Marketing Director: ‘we created a lot of learning opportunities via trails, field trials and joint development projects’.

The post-transition phase describes the period after the new business model is implemented and operational in the organisation. During this phase the rejuvenated business model is actively managed and carefully nurtured to enhance its success and continuous evolution. This phase was strongly present in the BMI trajectory of Gamma; “Things go pretty fast and we know we are suboptimal, but somebody needs to stop and take some distance from the process and then get back with new approach. This is something that happens now and then. I think that we made the business model
innovation evolve to something that is much more efficient right now than it was in the past” Gamma - Managing Director BU.

![Figure 6 Business model innovation process](image)

### 4.2.3 Cross-case patterns

The BMI trajectories in the three cases consisted of multiple episodes, which were characterized by a multitude of dynamics. Table 8 summarizes the tables in Appendix VI and depicts the amount of coding references between theoretical constructs and all episodes in the specific cases. Detailed coding references of theoretical constructs in specific episodes per case are visible in Appendix VI, which provided the basis for detailed excerpt analysis.

The analysis of the separated episodes across cases identified four types of patterns: (1) context of the BMI process, (2) interventions in the BMI process, (3) mechanisms in the BMI process, and (4) outcome in the BMI process. Within these types of patterns, I was able to derive six patterns that form the basis for derivation of practice-based design principles.

The structure and success factors could partially be captured by combining insights from different academics and scholars in the field of entrepreneurship, NBD and corporate strategy. However, different patterns emerged from results generated in this research project, which was until now undiscovered in academic BMI literature. The remainder of this section shortly describes each pattern before thoughtfully discussing these patterns in the derivation of practice-based design principles in section 4.3.

<table>
<thead>
<tr>
<th>Patterns</th>
<th>Theoretical constructs</th>
<th>Alpha</th>
<th>Beta</th>
<th>Gamma</th>
<th>Total</th>
</tr>
</thead>
</table>

Table 8 Coding matrix of theories per case
**Context of the BMI process**

<table>
<thead>
<tr>
<th></th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>7</td>
<td>7</td>
<td>7</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Interventions in the BMI process</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern 1</td>
</tr>
<tr>
<td>4. New business development</td>
</tr>
<tr>
<td>Pattern 2</td>
</tr>
<tr>
<td>5. Business Model Innovation</td>
</tr>
<tr>
<td>6. Enterprise model innovation</td>
</tr>
<tr>
<td>7. Industry model innovation</td>
</tr>
<tr>
<td>8. Revenue model innovation</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Mechanisms in the BMI process</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern 3</td>
</tr>
<tr>
<td>10. Effectuation</td>
</tr>
<tr>
<td>Pattern 4</td>
</tr>
<tr>
<td>11. Learning</td>
</tr>
<tr>
<td>Pattern 5</td>
</tr>
<tr>
<td>12. Network effects</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Outcomes in the BMI process</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Pattern 6</td>
</tr>
<tr>
<td>13. Business Model Objectives</td>
</tr>
<tr>
<td>14. Metrics</td>
</tr>
<tr>
<td>15. Business Model Performance</td>
</tr>
<tr>
<td>16. Replication</td>
</tr>
<tr>
<td>17. Top management support</td>
</tr>
</tbody>
</table>

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**Context of the business model innovation process**

The context of the BMI process is derived from detailed excerpt analysis of the “context” umbrella code, including related challenges and triggers for BMI in the cases under research. The contextual pattern lists overarching triggers for BMI process at high tech established organizations. These triggers are: (1) company growth targets, (2) company valuation, (3) scalability, and (4) contextual events.

A detailed elaboration including excerpt analysis is provided in section 4.3. Where the other three patterns contain one or multiple sub pattern that consist of practice-based design principles, the contextual pattern does not comprise design principles because this pattern is explanatory by nature and provides a context for the innovation process.

**Interventions in the business model innovation process**

Detailed case analysis resulted in two patterns of interventions in the BMI process across all three innovation trajectories; NBD and ways to innovate business models.

Pattern 1. New business development as ‘organisational carrier’; all trajectories were strongly triggered by new business development activities and objectives. More specifically, 72 references were coded among the three trajectories.

Pattern 2. Ways to innovate business models; the innovation trajectories indicate the presence of revenue model innovation in the initial phase, while the trajectory gradually evolves towards enterprise model innovation.

**Mechanisms in the business model innovation process**

There is a unified view among scholars and academics of the importance of entrepreneurship and effectual process (Chesbrough, 2010; Sarasvathy S. D., 2008) and learning (Sosna et al., 2010) mechanisms during BMI. Additionally, empirical results show the importance of network effects as a mechanism during the innovation trajectories. This results in three patterns of mechanisms in the BMI process:
Pattern 3. Effectuation during business model innovation; cross-case comparison shows the presence of effectual mechanisms during the entire innovation process. However, these mechanisms tend to fade into more causal logic during the late post-transition phase.

Pattern 4. Learning during business model innovation; detailed episode analysis showed that all innovation trajectories build upon different learning mechanisms during the specific phases of innovation process.

Pattern 5. Network effects in business model innovation; all three trajectories show the importance of creating partnerships early in the innovation process to enhance benefits from network effects.

Outcome in the business model innovation process

The last cross-case pattern found in the empirical results regards moderators in the success of the BMI process. More specifically, BMI objectives and metrics and top management support (Wolcott & Lippitz, 2007; Chesbrough, 2007) was found in all cases. Subsequently, replication (Aspara et al., 2010) and transferability (Kallio et al., 2006) are often referred to as moderators in the success of BMI. Although replication and transferability were found in only one of the three cases, their presence was strongly indicated by the interviewees.

Pattern 6. Business model innovation objectives and metrics; several academics urge the importance of business models and organisational performance (Chesbrough, 2010; Lambert & Davidson, 2012; Zott, Amit, & Massa, 2010). However, little empirical research has focused on this particular relationship. More specifically, existing literature does not provide answers how BMI objectives and metrics should be aligned during BMI phases.

The remainder of this chapter sets forth key activities in these patterns and presents main lessons from the cases as practice-based design principles, derived from detailed excerpt analysis, projected on the BMI process, as it is depicted in Figure 6.

4.3 Practice-based design principles

This chapter concludes with the derivation of practice-based design principles. These principles are presented in the six patterns as described in section 4.2.3. The practice-based design principles are meant to provide general design rules for established organisations in the high tech industry to mitigate risks and uncertainty and thereby increase the understanding how to structure the BMI process and enhance the chance of successful BMI. The principles were derived from analysis of multiple cases through different theoretical lenses in the BMI process. Specifically, the practice-based design principles in this chapter were derived from empirical evidence following the CIMO logic proposed by Denyer et al. (2008), the same logic that is used to describe the research-based design principles.

Certain practice-based design principles are in particular relevant in specific phases of the innovation trajectory. I was able to specify for each of the practice-based design principles the phase in which they occurred and should be implemented. This results in specific process-oriented design rules from empirical results for innovation of existing business models in high tech established organisations. Figure 7 below presents a comprehensive graphical process view of the occurrence of practice-based design principles in specific phases of the innovation process; and aims to provide a better understanding and simple representation of the complex interventions and mechanisms that are present during BMI, and shapes a context before each principle is through fully explicated.
The context of the BMI process comprises triggers of the innovation process identified within the multiple cases. As was discovered in all of the three cases, BMI is often triggered by growth and revenue objectives, without having any strategy or program. The BMI process in the three cases was initiated by contextual events that triggered the need to rejuvenate the way the organisation captures value. As previously described, Alpha emerged after AlphaCo acquired its partner in order to adhere to their aggressive growth targets; "When Alpha’s customer went into receivership we jumped on it and built a business around it." Alpha - Managing Director, this resulted in opportunistic pursuit of this business opportunity and value capturing. Additionally, Beta was inclined to seek alternative revenue streams when their initial software license was published as OSS by their former partner, as the Marketing Director explains; “In that time this company was doing 95% of its revenue with that tool and suddenly that software component was free for everyone. You can imagine, we were about to shut down the company. This was one of the reasons why they wanted to diversify and go to the applications business to create another revenue stream”. BMI in Gamma was primarily triggered by company valuation, scalability, and growth targets, as the CEO of Gamma sets forth; "... in consulting you cannot get the entire value out of the team. We have known for a long time that we needed the transition to more product focus, because these fantastic people with great ideas can be combined in a product and this will scale much better”.

Summarizing, the abovementioned triggers for companies to engage in BMI, found before the pre-transition phase of the BMI process, are: (1) company growth targets, (2) company valuation, (3) scalability, and (4) contextual events. These triggers are mentioned separately here, but often occur simultaneously as the excerpts depict.

Following the six patterns derived from cross-case analysis, the next sections set forth detailed excerpt analysis from which practice-based design principles were derived.

### 4.3.1 New business development as ‘organisational carrier’

The process of NBD faces companies with the considerable challenge to pursue the most attractive growth phase. This challenge largely emerges from the decision to develop new businesses, which creates competence gaps between the existing competences and those required (Vanhaverbeke & Peeters, 2005; Bröring & Herzog, 2008). Chesbrough (2003) and Vanhaverbeke & Peeters (2005) state that NBD functions as an “organisational carrier” through which new competences are acquired or developed to create new, profitable business. This is confirmed by the Managing Director of Alpha, who indicates; "... in 2008 it changed because we were looking for a new business for AlphaCo and

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Figure 7 Practice-based design principles during the Business Model Innovation process
this business opportunity just fell in our lap and thus it was opportunity driven and it was driven by the pursuit of a new growth business”.

Each NBD activity attracts people, resources and technology or market knowledge with the incentive to valorise these assets and develop new and successful businesses. This entrepreneurial process enhances knowledge diffusion through the organisation, and therefore is an important “organisational carrier” to bolster an organisation’s capabilities. Thus, this results in the first practice-based design principle;

**Principle 1.1:** Established organisations in the high tech industry (C) should use NBD as an organisational carrier for BMI (I) because this creates a competence gap between the desired and existing business model and the desired and existing objectives and metrics (M) to successfully evolve and manage the entire BMI process (O).

The successful BMI process in Beta and Gamma was triggered by a relationship were the corporate innovation strategy and the NBD strategy coalesce, and are so intimately linked they become one. This is reflected in BMI objectives and metrics discussed in chapter 4.3.6. Additionally, CFO/COO of Gamma sets forth: “In many ways I would see them [NBD and the corporate innovation strategy] as one. (…) They [NBD and the corporate innovation strategy] are so intimately linked right now as we are doing this innovation process for the company, because not only are we coming out with products, but we are really innovating what our business model is in many respects”, indicating coalescence between NBD and BMI.

Subsequently, at Alpha the initial trigger was the objective to create another BU for AlphCo. These broadly formulated objectives were redefined through entrepreneurial efforts; “When [Alpha’s customer] went into receivership we jumped on it and built a business around it (…) the first year after the acquisitions we built the strategic plan around the opportunity. It was a year of orientation” Alpha - Managing Director. Thus, this results in the second practice-based design principle;

**Principle 1.2:** Established organisations in the high tech industry (C) should use NBD as an organisational carrier for BMI (I) to trigger coalescence between the corporate innovation strategy and NBD strategy, where the innovation strategy is intimately linked with the NBD strategy via entrepreneurial efforts (M) in order to support the entire BMI process (O).

4.3.2 Ways to innovate business models
In order to cope with previously mentioned BMI triggers the organisations in all three cases focused on value capturing by reconfiguration of their revenue flows during the pre-transition phase of BMI. The Managing Director of Alpha indicated “The first action we took was to charge license fees and annual support subscriptions for the software. If someone had a subscription they were entitled to things like: training, customer visits, software updates etc.; we wanted to standardize the cost of that”. While Alpha initiated their business model change via revenue model innovation primarily to continue rapid growth rates and capture more value created by their software products. Beta and Gamma applied revenue model innovation triggered by growth, company valuation and scalability. As the Marketing Director of Beta sets forth, “I would say that first at that time there was a need for rapid growth and the business of selling [middleware software] has a pretty low pace”, additionally, “The former CEO of this company was seeing a big decline and he wanted to search an alternative source of revenue and then we started to focus on the application” Beta - Marketing Director. Gamma initiated their BMI process by the need to transition out of their purely consulting role and pursued business opportunities that had a lot more leverage and scalability; “... purely driven by the need to
transition out of purely consulting, so that we can scale the business financially much easier and Gamma creating a larger impact on the scientific computing industry in general” Gamma – CEO.

The cases therefore indicate that deploying BMI via revenue model innovation in the pre-transition process as being one of the most important and fundamental aspects in successful value capturing. Hence, the third practice-based design principle;

**Principle 2.1:** Established organisations in the high tech industry (C) that seek new growth /business opportunities via business model innovation (O) should start the innovation process via revenue model innovation (I) because this triggers search for alternative revenue streams, which (a) provide recurring revenue and (b) better value capturing (M).

Moreover, during the transition and post-transition phase of the BMI process all three cases showed an evolution towards enterprise model innovation, where the focus is on fast value enhancement. The CFO/COO of Gamma sets forth; “... focusing on value proposition of what we are building from a customer standpoint for the first 2 years; highly focused on what it is we are creating”, indicating the importance of building customer relationships. AlphaCo complements their hardware with software solutions to offer a total solution and continuously add value to their solution offering; “It [the added value] is the whole solution. We don’t just sell [hardware], we sell solutions. (...) That is where the business is going and we are doing with [solution], and going more and more towards appliances” Alpha - Managing Director. This results in the fourth practice-based design principle;

**Principle 2.2:** Established organisations that operate in the high-tech industry (C) and seek to deliver higher value faster (O) should shift towards enterprise model innovation in the transition and post-transition phase of the BMI process by (a) enhancing customer relationships and (b) providing a total solution (I) because this triggers fast value creation and delivery (M).

4.3.3 Effectuation during business model innovation

The BMI trajectories emerged and evolved through entrepreneurial efforts primarily based on effectual reasoning, without having a clearly defined strategy beforehand. Sarasvathy (2001, 2008) and Chesbrough (2010) argue that in effectuation the actor (entrepreneur or organisation) does not analyse the environment as much as possible, but rather takes action and enact upon the environment. This is reflected in all cases, and as the CFO/COO of Gamma explains; "Part of what we’ve done is that we did not have a neatly defined process upfront. We kind of discovered the process along the way”. This is confirmed by the Managing Director EU, who explains; "... one of the interesting things of the process that we followed is that it has been based on some sort of intuition more than real process based approach to innovation". This clearly indicates the entrepreneurial efforts during Gamma’s entire BMI process. Furthermore, there is a clear interplay between organisational learning and effectuation processes, as Gamma’s CFO/COO explicates; "The software product we are going to come out with is that much superior than we even had envisioned upfront, because we’ve taken in account market changes, learning along the way, and it’s resulting in a superior software product". Beta experienced similar effectual mechanisms during the BMI process; “We were not really analysing what to do and make decisions to change that. As long as we are profitable and growing there are things that stay on the side” Beta - Product Director.

Although the importance of effectuation during the entire BMI process is clear, there is a tendency among all cases that effectual reasoning will gradually dissolve towards a more causal or strategic driven approach, as indicated by Gamma’s Managing Director EU; “Right now I would qualify it as a Brownian motion, so there is a clear heading and we are just bubbling around in a clear direction and so this effectuation process is basically still there, and I think that it is important for us that it
stays the way it is, because it allows us to have a situation to make very quick shifts”. This clearly indicates the learning mechanisms that are at interplay during the BMI process, where improvisational learning (Miner et al., 2001) is largely related to effectual processes. This learning practice is characterized by a short-term focus and aims to solve or take advantage of specific opportunities and enact upon environmental changes. Hence, the fifth practice-based design principle;

**Principle 3.1:** Established organisations operational in the high tech industry (C) should use effectual reasoning during the entire BMI process (I) because this triggers improvisational learning (M) in order to successfully enact on the environment and deal with uncertainties during the BMI process (O).

### 4.3.4 Learning during business model innovation

The cases under research articulate the importance of different types of learning during the entire BMI process, emphasizing the importance of learning mechanisms during the BMI process as proposed by Sosna et al. (2010). Empirical results the importance of trial-and-error learning and learning-before-doing in the pre-transition phase of the innovation process. As explained by the CEO of Beta; "(...) gather information from the customer to see what they are expecting", while consulting strategic advice from external parties; "We try to have some discussion and some meetings with our experts to see if we are going in a good direction" Beta - Product Director. Additionally, Beta experienced a similar learning trajectory during the beginning of the BMI process, which "Initially was definitely bubbling all the time and I think we could say that initially it was totally unstructured" Gamma - Managing Director BU.

Subsequently, learning-by-hiring and improvisational learning is primarily found during the transition and post-transition BMI phases. Gamma faced significant R&D investments during their change from merely consultancy towards proprietary products and managed this process via learning-by-hiring, as the Marketing Director explicates; "(...) one of the things we did is hiring a person who has led a product development team before. We started to bring that expertise in-house". Furthermore, Beta’s learning mechanisms are clearly visible long after the transition phase, where a formal product structure is set up; "... later we added a product director who was responsible for defining the roadmap of the product and how it fits the overall strategy" Beta - Product Director. As stated before, improvisational learning mechanisms are deeply rooted in effectual processes that are essential during the entire BMI process. Hence, the sixth practice-based design principle;

**Principle 4.1:** Established organisations in the high tech industry (C) should focus on trial-and-error learning and learning-before-doing in the pre-transition phase of the BMI process, while in the transition and post-transition phases the emphasis should be on learning-by-hiring and improvisational (I) because this triggers the conforming learning mechanisms during the BMI process (M) in order to adopt the right knowledge acquisition strategy (O).

In all the cases organisational learning is created via learning-by-hiring. This form of knowledge acquisition proved to be of significant importance during the transition and post-transition phase of the BMI process. Specifically, reconfiguration of the sales force has enhanced customer relationships and increased market knowledge. Gamma’s CFO/COO explains; "we are expanding our sales force and making fundamental change to be much more industry vertical focused on the sales front. (...)There is a new role within the company, an application engineer, who is a very technical person and is going to help us sell directly into those market verticals". This is confirmed by empirical results from Song et al. (2003) their research, which suggests that learning-by-hiring can be useful when hired persons are used for exploration and acquiring distant knowledge, indicating the usefulness
when seeking new growth opportunities in industry verticals. Subsequently, the Product Director of Beta explains; “They [application engineers] are working in the market in which they are specialized. To bring knowledge inside the company and when we have some specific questions about the market we can talk to them and they can go to the customer and understand what the customer is talking about”. Thus, this results in the seventh practice-based design principle;

Principle 4.2: Established organisations in the high tech industry (C) that seek to target specific industry verticals (O) should install an application engineer during the transition and post-transition phase (I) because this gains industry vertical specific knowledge (M).

Additionally, in all cases the sales team is reconfigured during the transition and post-transition phase to enhance customer relationships and sales in specific industry verticals, “... have account managers who can deal with the customers’ business managers and the customer’s buyers, the customers’ people that are going to sign the check. What these buyers care about are business results for their organizations” Gamma - Marketing Director. Resulting in the eighth practice-based design principle;

Principle 4.3: High tech established organisations in the software industry (C) should install an application engineer and account manager in the sales process (I) to have a highly specialized and knowledgeable sales team (M) that is capable of solution sales in industry verticals (O).

4.3.5 Network effects in business model innovation

In general, all cases show the importance of having partnership early in de BMI process. However, the use of partnership in the business models among the three cases varies significantly. Alpha primarily aims for learning incentives, where the Marketing Director explains: "we create a lot of learning opportunities via trials, field trials and joint development projects". Partnerships that prove to have added value in providing a total solution often leads to merger and acquisition by AlphaCo.

Subsequently, Beta installed corporate development partnerships in order to accelerate growth; "We have partners for the most of the significant of the OEM suppliers (...) they bring some hardware and we bring some software and putting it together makes a really valuable solution" Beta - Product Director and Sales Director. This is validated by Management Presentations early in the transition phase which state; "Growth will accelerate due to alliance" and "Accelerate pace of cross-market penetration through [partner] alliance and improved visibility", indicating the importance of partnership that create network effects early in the BMI process.

Principle 5.1: Established organisations in the high tech industry (C) should clearly formulate reasons for collaboration in the pre-transition process (I) to trigger learning-before-doing (M) in order to provide direction and guidance to partner networks (O).

Principle 5.2: Established organisations in the high tech industry (C) that seek growth opportunities of their software products (O) should build strategic collaboration alliances early in the transition process (I), because this enhances the value proposition by providing a total solution and triggers improvement of visibility across markets (M).

Additionally, as explained in the case description, Gamma originated from the OSC which is their main partner during the BMI process. The Managing Director EU of Gamma explains the importance of having the OSC to create network effects; "The Open Source Community members are testers for
developers are going to report plenty of little issues, report questions, report vision of how they want to see the tools evolving. We also plan to open the platform and people can deploy their own open source libraries within the framework”. Furthermore, the importance of the OSC is to create a fast diffusion and adoption of software product to create network effects fast, instead of making money on top off them, as the Managing Director BU of Gamma explains. Hence, the ninth, tenth, and eleventh practice-based design principles;

**Principle 5.3**: Established organisations in the high tech industry (C) should leverage OSC as partner in the pre-transition and early transition phase of the BMI process (I) to trigger knowledge sharing and improvisational learning (M) where members are co-developers, co-creators and stewards in the software (O)

### 4.3.6 Business model innovation objectives and metrics

As set forth in the literature review, organisations increasingly focus on BMI as a means to enhance organisational performance and success (Lambert & Davidson, 2012; Zott, Amit, & Massa, 2010). The case studies indicate the importance of having general objectives in the pre-transition process. These objectives are broadly formulated to enhance entrepreneurship and creativity. Moreover, in all cases the organisations relaxed financial targets (e.g. revenue and gross margin) in order to fund the innovation process or focus on search and growth, as the Managing Director of Alpha explains: “As a start-up hosted inside of AlphaCo, which is a profitable stable company, our target was just to grow the business as quickly as possible”. Beta and Gamma faced significant R&D investment during the transition phase and respectively had the objectives: “At that time we had the business plan where the goal was effectively to balance the two businesses. We are not yet there, but we are making progress.” Beta – CEO and “We did not set out a lot of explicit goals, objectives, and deadlines at the start. However, we did send out the overarching goal of saying: this is the platform that we want to create; this is how we see it growing out in phases. (…)We are definitely transitioning and have been over the last 2 years to a somewhat less financial metric based approach to much more a leading indicator operationally focused approach” Gamma - CFO/COO.

Performance indicators (e.g. revenue and gross margin) are typically far lower for emerging technologies and markets. High tech established organisations tend to allocate resources to the most profitable businesses, thus the established business model will naturally be favoured over the new business model (Chesbrough, 2010; Teece, 2010). This challenge is successfully overcome by all organisations under research and results in the twelfth design principle;

**Principle 6.1** Established organisations in the high tech industry (C) that seek new growth/business opportunities (O) should provide overarching objectives and relax explicit goals, deadlines and financial targets in the pre-transition phase of the BMI process (I) because this enhances the benefits from the effectual process to deal with uncertainties in this stage of the BMI process.

In the post-transition phase the BMI process has to be managed in order to ensure continuous evolution. During this process the business model is supported by more explicit objectives and financial targets, as explicated by the CFO/COO of Gamma: “Next year we are going much more to a typical metric based way in terms of the financial targets we have. So in 2014 we want to start going back to historical metrics as well as having much more formal way about expectations”. Beta similarly shifted towards ‘standard’ financial metrics and objectives during the end of the BMI process via two strategies; “These two strategies (1) increase the sales, but also (2) increase the price
per seat by providing a better value proposition” Beta – CEO. This results in the thirteenth practice-based design principle:

**Principle 6.2:** Established organisations in the high tech industry (C) should provide clear objectives and financial targets in the post-transition phase of the BMI process (I) because this results in higher (1) sales targets, and (2) price per seat of the software product (M), which ultimately drives growth of revenue and gross margins (O).

As indicated before, replication (Aspara et al., 2010) and transferability (Kallio et al., 2006) of business models are important factors in their success. However in the empirical results this phenomenon is only found in company Beta, where the Marketing Director sets forth; “Once you have a good business model it is easier to replicate it than to reinvent a new one.”. This is supported by the Product Director of Beta who indicates: “we will use this [the new business model] in other markets and need to find ways to adapt our royalty revenue model to other markets where the price of the software is less important”. Subsequently, in order to ensure continuous evolution of their business model, Beta installed some rules and business processes which are applied to carefully install their successful business models in new business activities, as indicated by Beta’s Sales Director; “we tried to set up some rules and business processes and apply this now for all new business models we are creating”. These rules and business processes consist of organisational changes and communication flows to guide the innovate process through the entire organisation. Hence, some standardized processes were put in place to continuously evolve the business model. This results in the fourteenth practice-based design principle;

**Principle 6.3:** Established organisations in the high tech industry (C) that seek to replicate their business model across markets or industries (O) should set up some internal rules and business processes (I) because this triggers continuous management and evolution of the business model in the post-transition phase (M).

The importance of top management support is found in all BMI trajectories appeared to be of key importance in the success of BMI. Furthermore, the BMI process in all three cases had a clear corporate champion to support the innovation process. The importance of having top management support during and after the innovation process is widely agreed upon among scholars in the field of organisational change and entrepreneurship (Wolcott & Lippitz, 2007; Chesbrough, 2007). The cases indicate that top management support is expressed through dedicated change agents that guide the entire innovation process, as the Marketing Director of Alpha explains: “AlphaCo performed extremely well and possibilities were endless. If we needed headcount or additional CAPEX this was available. We received unlimited top management support”. The BMI process in Beta and Gamma was headed by top management and "the clear champion was the CEO. Additionally, there was me and several other senior executives. We were hundred per cent on-board and believed this was the right strategy" Gamma - CFO/COO. Additionally, the CEO of Beta indicated the importance of having a clear champion as change agent during the entire innovation process. This results in the fifteenth practice-based design principle;

**Principle 6.4:** Established organisations in the high tech industry (C) should install strong corporate champions (i.e. managers with discretionary power) (I) because this triggers a broadly communicated vision and strategic plan (M) in order to initiate and advocate business model innovation during the entire process. (O)
The analysis in this chapter has explicated the results from the six patterns identified in the multiple-case study. Due to specific case characteristics, some interesting insights could be derived that may contribute to successful BMI. These practice-based design principles shed light upon the practical solution of specific business problems. However, the abovementioned principles were derived solely from statements and notion by the interviewees for all three companies and company documents. Subsequently, these principles are more valid and generalizable when compared with research-based design principles derived in Chapter 3. Comparing practice- and research-based design principles will generate a final set of design principles, combining practical insights with finding grounded in academic literature. The next chapter will address the combination of both sets of principles, which is based upon comparison analysis in Appendix VIII.
5. Synthesis of design principles

This chapter presents the final set of design principles, by synthesizing eight research-based design principles and fifteen practice-based design principles. From this synthesis thirteen final design principles are derived. These design principles are primarily aimed to enable successful BMI in high tech established firms, thereby supporting practicing managers in managing this process, as well increasing the academic understanding of the structure and success factors in BMI. This chapter starts delineating the synthesis into a final set of design principles, outlined according the six patterns. Afterwards I shortly elaborate on how to design and implementing specific design principles in particular phases of the BMI process, and this chapter concludes with the BMI framework as I proposed in the introduction of this report.

5.1 Final set of design principles

Following Van Burg et al. (2008), the practice and research-based design principles are compared and synthesized into a set of final design principles to answer the science-based research question: “How can a high tech established organisation innovate its existing software business model?”

This is done by (re)configuration of the design principles suitable for (re)designing BMI processes in high tech established organisations. Table 9 visualizes the first step of the comparison to provide a quick overview of relations between practice and research-based design principles. Intersections marked grey indicate partial overlap of interventions, mechanisms or outcomes in the principles. The actual process of constructing the design principles as presented in this chapter is demonstrated in Appendix VIII. As visible in Table 9, research-based design principles 2 and 3a were not included in the construction of the final set of design principles. The former principle merely describes the context in which BMI is used to reinvent corporate strategies, which is explicated in the context of the BMI process. However, no design principle was derived from these BMI triggers. The latter research-based design principle is excluded in the confrontation because the phenomenon presented in this principle was not found in the BMI trajectories of the cases. Furthermore, practice-based design principles 6.1 and 6.2 emerged from detailed case analysis, largely ignored by prior research, and is elaborated on in section 5.1.6.

The six patterns from systematic literature review and six cross-case patterns were accessed on overlap. This resulted in coalescence of learning and experimentation patterns from literature and addition of network effects as pattern from cross-case analysis. The revealed this final set of six patterns: (1) new business development as organisational carrier (Chesbrough, 2003; Vanhaverbeke & Peeters, 2005), (2) ways to innovate business models, (3) effectuation during business model innovation (Sarasvathy, 2001; 2008), (4) learning during business model innovation, (5) network effects in business model innovation, and (6) business model innovation objectives and metrics. Although both research- and practice-based design principles have received extensive attention, the
final sets of design principles require a brief clarification explicated in the next sections structured in the six patterns.

5.1.1 New business development as ‘organisational carrier’

NBD is an important intervention in the pre-transition phase of the BMI process in high tech established organisations. As noted earlier, NBD should be used as an “organisational carrier” through which new competences are acquired (Chesbrough, 2003; Vanhaverbeke & Peeters, 2005). This intervention in the BMI process builds upon the notion of strategic importance and acts as trigger to rejuvenate business models in order to pursue new business opportunities.

Often existing knowledge is insufficient to deal with the complex structure of BMI and therefore creates competence gaps where new competence have to be acquired and existing competences have to be ‘unlearned’. Hence, the first design principle;

Design principle 1.1: Established organisations in the high tech industry (C) should use NBD as an organisational carrier for BMI (Chesbrough, 2003; Vanhaverbeke & Peeters, 2005) (I) because this creates and identifies competence gaps between the desired and existing business model and the desired and existing objectives and metrics (Vanhaverbeke & Peeters, 2005; Bröring & Herzog, 2008) (M) in order to provide guidance and sense to competence building (O).

5.1.2 Ways to innovate business models

Mitigating the negative effects of current business logic that hinder successful BMI is essential during the pre-transition phase (Frankenberger et al., 2012). Business model innovators should create a unified view in the organisation to capture more value from existing and future offerings in the pre-transition phase. This intervention largely emerges from external and internal triggers or episodes. Companies’ aggressive growth targets lead to better value capturing via reconfiguration of offerings and establish recurring revenue streams to validate R&D investments. This results in the second design principle;

Design principle 2.1: Established organisations in the high tech industry (C) that seek new growth/business opportunities via business model innovation and enhance customer experience (O) should start the innovation process via revenue model innovation in the pre-transition phase (I) because this triggers reconfiguration of offerings (a), recurring revenue (b), and better value capturing (c) (M).

Gradually the BMI process leapfrogs forward towards more formalized ways of delivering and capturing value from operations in the transition and post-transition phases. In the fast pace high tech environment creating and delivering higher value faster is key to success, and crucial in order to survive. Enterprise model innovation becomes the main tool to intervene during the last two phases of the innovation process, triggering external collaborations to generate network plays and extending value creation towards all stakeholders in the eco-system of the organisation. Thus, this results in the third design principle;

Design principle 2.2: Established organisations in the high tech industry (C) should shift towards enterprise model innovation in the transition and post-transition phase of the BMI process by (a) enhancing customer relationships and (b) providing a total solution (I) because this triggers fast value creation and delivery (Amit & Zott, 2012) (a), external collaboration and network plays (b), and (re)definition of organisational boundaries (Giesen, Berman, & Bell,
2007) (c) in order to deliver higher value faster and capitalize on technological innovations via new business development (O).

5.1.3 Effectuation during business model innovation
Innovating established business models in the corporate setting requires significant amount of entrepreneurship in order to cope with contextual events. Effectual reasoning – contrary to causal reasoning – builds upon the notion of taking action and enact upon the environment instead of having a neatly defined strategy upfront (Sarasvathy, 2001; 2008). This mechanism underlies entrepreneurial efforts during the entire BMI process, and results in the fourth design principle;

Design principle 3.1: Established organisations in the high tech industry (C) should use effectual reasoning during the entire BMI process (I) because this triggers improvisational learning and entrepreneurship (Sarasvathy, 2001; 2008) (M) in order to successfully enact on the environment and deal with uncertainties during the BMI process (O).

5.1.4 Learning during business model innovation
Briefly mentioned in the previous design principle, nonetheless present during the entire innovation process, learning mechanisms are the most important facilitator of knowledge acquisition in order to bridge gaps created by NBD activities and corporate performance objectives. Different stages in the BMI process require different learning mechanisms. In order to cope with high levels of uncertainty in the initial phases BMI benefits from learning-before-doing and trial-and-error learning (Teece, 2010; McGrath, 2010). While the innovation process progresses, learning mechanisms generally get oriented to long term knowledge acquisition and iterative experiments increase in their fidelity and informative learning aspects. Thus, the fifth design principle;

Design principle 4.1: Established organisations in the high tech industry (C) should (1) focus on trial-and-error learning and learning-before-doing in the pre-transition phase of the BMI process, while in the transition and post-transition phases the emphasis should be on learning-by-hiring and improvisational learning (I), and (2) perform high fidelity (a), low cost (b), discovery driven (c) and informative experiments (d) (I), because this triggers knowledge acquisition via learning mechanisms and experimentation (Teece, 2010; McGrath, 2010) (M) in order to cope with different types of uncertainty and adopt the right knowledge strategy during the BMI process (O).

As explicated in design principle 4.1, once the innovation process progresses – gradually evolves in transition and post-transition – having more formalized and systematic learning mechanisms become predominant. More specifically, firms that operate in the high tech industry where industry specific knowledge is a prerequisite to business success should install dedicated application engineers who are highly knowledgeable in specific industry fields, and create learning-by-hiring mechanisms. Not only provides this resource valuable knowledge, but enables – together with a dedicated account manager – to build a sustainable relationship with all stakeholders in the eco-system. Hence, the sixth design principle;

Design principle 4.2: Established organisations in the high tech industry (C) that seek to target specific industry verticals (O) should (1) install an application engineer during the transition and post-transition phase, and (2) install an application engineer and account manager as sales team in the sales process (I) because this gains industry vertical specific knowledge (M).
5.1.5 Network effects in business model innovation

Frankenberger et al. (2012) empirically researched 14 cases of BMI and present a framework to innovate established business models, including major hurdles to overcome. The authors found that organisations encounter significant challenges in managing partner networks. Furthermore, there is a widespread notion among scholars and academics of the importance to formulate clear reasons for collaborations, and building these collaborations early in the BMI process. This results in the seventh design principle;

*Design principle 5.1: Established organisations in the high tech industry (C) should clearly formulate reasons for collaboration in the pre-transition process (I) because this triggers direction and guidance to partner networks (M) in order to enhance the benefits from network effects (O).*

As noted earlier, BMI is often triggered by growth targets which create the need to rejuvenate existing business models in an effort to capture more value from operations. Once familiarizing the organisation with BMI in the pre-transition phase, strategic collaborations aid in the process of faster value creation and delivery when integrated early in the transition phase. Thus, this results in the eighth design principle;

*Design principle 5.2: Established organisations in the high tech industry (C) that seek growth opportunities of their software products (O) should build strategic collaboration alliances early in the transition process (I), because this triggers enterprise model innovation by enhancing the value proposition via total solution offering and improvement of visibility across markets (Chesbrough, 2007; Popp, 2013) (M).*

Several academics urge the importance of OSS for fast diffusion and adoption of software products to create network effects. Empirical results confirm this notion and, more specifically, results provide the relevance of these mechanisms in specific phases of the BMI process, namely pre-transition and early transition. Hence, the ninth design principle;

*Design principle 5.3: Established organisations in the high tech industry (C) should leverage OSC as partner in the pre-transition and early transition phase of the BMI process (I) because this triggers external collaboration and network plays, as well as knowledge sharing via trial-and-error learning (M) and creates an eco-system where members are co-developers, co-creators and stewards of the software products (O).*

5.1.6 Business model innovation objectives and metrics

Throughout this report the importance of entrepreneurship and creativity during the entire BMI process received extensive attention. More specifically, entrepreneurship is actively present during the initial phases of the innovation process and benefits from relaxing objectives and financial metrics in these phases. Frankenberger et al. (2012) set forth major hurdles during this phase which include redefinition of current business logic towards institutionalization of business models thinking and management of idea creation. This clearly indicates the importance to carefully manage this entrepreneurial process – fuelled by effectual mechanisms – and stimulate creativity and ‘out-of-the-box’ thinking to challenge industry laws. Hence, the tenth design principle;

*Design principle 6.1: Established organisations in the high tech industry (C) that seek new growth/business opportunities (O) should provide overarching objectives and relax explicit
goals, deadlines and financial targets in the pre-transition and transition phases of the BMI process (I) because this enhances the benefits from the effectual process to deal with uncertainties in this stage of the BMI process (Sarasvathy S. D., 2001; 2008; Chesbrough., 2010; McGrath, 2010) (M).

Empirical results show the importance of shifting towards a more causal or strategic approach in the post-transition phase of BMI. More specifically, installing ‘standard’ financial metrics and objectives ensures continuous evolution. However, implementing these metrics can expose significant challenges and internal resistance. Installing these metrics too early could lead the organisation to naturally favouring the old over the new business model since the rejuvenate business model is still immature and unable to compete with ‘business as usual’. Implementing these metrics too late could result in constraining resources too long and overachieving tangible commitment (Frankenberger, 2012). Empirical results indicate these metrics typically include sales targets and price per seat of the software product. This results in the eleventh design principle:

*Design principle 6.2: Established organisations in the high tech industry (C) should provide clear objectives and financial targets in the post-transition phase of the BMI process (I) because this results in higher (1) sales targets, and (2) price per seat of the software product (M), which ultimately drives growth of revenue and gross margins (O).*

Installing rules and business processes during the late transition and post-transition phases of BMI triggers replication (Aspara et al., 2010) and transferability (Kallio et al., 2006), which are important factors when firms aim to leverage their acquired knowledge and expend across markets and industries. Hence, the twelfth design principle:

*Design principle 6.3: Established organisations in the high tech industry (C) that seek to enhance their business model performance by replicating their business model across markets or industries (O) should set up some rules and business processes during the transition and post-transition phase (I) because this triggers replication (Aspara et al., 2010) and transferability (Kallio et al., 2006), and continuous management and evolution of the business model in the post-transition phase (M).*

The importance of top management support has been articulated by many scholars in the fields of organisational change and entrepreneurship (Wolcott & Lippitz, 2007; Chesbrough, 2007). Dedicated top management support in the entire innovation process acts as a corporate champion or change agent to advocate the importance of rejuvenation of established business models. This results in the thirteenth design principle:

*Design principle 6.4: Established organisations in the high tech industry (C) should install strong top management champions (i.e. managers with discretionary power) during the entire BMI process (I) because this triggers commitment and a broadly communicated vision and strategic plan (Covin & Miles, 1999; Wolcott & Lippitz, 2007) (M) in order to initiate and advocate business model innovation during the entire process (O).*

### 5.2 Designing and implementing the business model innovation process

I was able to specify for each of the design principles the phase in which they should be implemented. This results in specific process-oriented design recommendations for rejuvenating of
existing business models. Certain principles are in particular relevant in specific phases of the BMI trajectory. Figure 8 displays the process view on implementing the design principles.

![Figure 8 Process view on implementing design principles for business model innovation](image)

### 5.3 Business model innovation framework

Based on the results of the comparative case study I developed an integral framework, which encompasses the structure and success factors associated with BMI. The framework consists of the conceptual BMI phases as presented in section 4.2.2, and design principles which are particularly suitable in specific phases of the innovation process as presented in previous section. Within each phase I identified various design principles: in the pre-transition phase, which focusses on analysis of the eco-system, the emphasis is on reducing uncertainty via learning mechanisms, network plays and enhancing value capturing by stimulating entrepreneurship and strong top management support.

In the transition phase, which refers to design and implementation – parallel or sequential – of innovative business model architectures, managers should gradually focus on fast value creation and delivery via strategic collaborations and leverage the benefits from the OSC. Furthermore, managers should maintain strong entrepreneurship traits during this innovation phase by relaxing explicit objectives and financial metrics to trigger effectual mechanisms and create an iterative learning environment via improvisational learning and learning-by-hiring.

The last phase, post-transition, includes design principles that stimulate continuous evolution of the new business model. In this phase empirical results show it is crucial to maintain strong top management support and shift towards more causal logic, where the process is driven by strategy execution.

Subsequently, empirical results show a difference between the pre-transition and transition phases, where the actual design of the new business model takes place, and the evolution phase where the business model is carefully natured and managed in the post-transition phase. Additionally, both the design and evolution phases have an iterative relationship with BMI triggers.

Although the phases seem to form subsequent steps within a linear process, this is not the case. The framework rather displays an iterative process with multiple steps, which is essential to fully capture the complex structure of business model innovation. The framework has four major iterative loops build in. The first one refers to the alignment between external and internal BMI triggers – in the constantly changing eco-system – and the design phases of the innovation process. The second iterative loop emphasises the alignment between general knowledge of business model concepts in the entire organisation and the components of the business model, as well as the alignment of the individual business model components, and the alignment with the implementation of the selected business model – or business model direction. The third one stresses the alliance between the design phase as a whole and the evolution phase. Put differently, experiences made during this process can
require adjustments of the business model, as it needs continuous management and evolution after the transition phase. The last iterative loop highlights the alignment between the increasing foothold of the new business model in the organisation and internal BMI triggers. The integral framework is displayed in Figure 9.

### Business model innovation triggers

- Company growth targets
- Company valuation
- Scalability
- Contextual events

### Design

**Pre-transition**
- P1.1: New business development as ‘organisational carrier’
- P2.1: Revenue model innovation to focus on value capturing
- P3.1: Stimulate entrepreneurship and effectual mechanisms
- P4.1: Stimulate learning-before-doing and trial-and-error learning
- P5.1: Formulate clear reason for collaborations
- P5.3: Engage the Open Source Community early in the innovation process
- P6.1: Relax explicit objective and financial metrics
- P6.4: Strong top management support

**Transition**
- P2.2: Gradually shift towards enterprise model innovation to focus on value creation and delivery
- P3.1: Stimulate entrepreneurship and effectual mechanisms
- P4.1, P4.2: Gradually shift towards improvisational learning and Learning-by-hiring (application engineer and build sales team for customer relationship)
- P5.2: Build strategic collaborations
- P5.3: Use Open Source Community to jump start diffusion and adoption
- P6.1: Relax explicit objective and financial metrics
- P6.4: Strong top management support

### Evolution

**Post-transition**
- P2.2: Maintain enterprise model innovation to focus on value creation and delivery
- P3.1: Entrepreneurship and effectual mechanisms will gradually dissolve in causal logic and strategy execution
- P4.1, P4.2: Improvisational learning and Learning-by-hiring (application engineer and build sales team for customer relationship)
- P6.2: Provide clear objective and financial metrics
- P6.3: Rules and business processes for replication and transferability
- P6.4: Maintain strong top management support

Figure 9 Business model innovation framework including phases and design principles.

### 5.4 Validity study

The validation study consists of a single review by experts in the field of innovation processes. The study was conducted by means of a presentation and discussion session within AlphaCo. The aim of this meeting was to validate the design principles by a discussion session with experts in the high tech industry whom are specialists in software products and software business models. The group of experts included: Group Vice President ‘Software & solutions’, Director Solutions Programs, Software Scientist, and Director Product Marketing ‘Software & solutions’. All experts have lead or
participated in corporate innovation projects and have many years of experience in innovating and shaping businesses in the corporate setting.

The overall expert impression of design principles was good, and additions were mostly related to more practical content of the design principles. For example, one of the experts explained: “some interventions in the design principles are gather generically formulated and would benefit from clearer and actionable interventions”. This resulted in minor changes in the formulation of the concerned design principles.

Although this accounts for some validity of the conceptual BMI phases, design principles, and BMI framework, the results would benefit from multiple tests to increase validity and reliability. First, increasing the inter-rater reliability by have multiple coding perspectives increases the internal validity of the study. Second, a preliminary BMI test study within AlphaCo might reveal additions or redefinition of certain design principles to better fit the BMI process of specific software product or services. This study might comprise of real-life tests or simulation via a dynamic model. Lastly, the conceptual BMI phases, design principles and BMI framework might benefit from detailed analysis by the consulting firm that advises AlphaCo in the redefinition of downstream value creation.

The preceding chapters have addressed the derivation of research- and practice-based design principles, demonstrated the synthesis of principles into a final set of design principles that resulted in an integral framework for BMI processes, and with this section an external perspective on the design principles is provided. The next chapter builds upon these empirical results and aims to provide AlphaCo with two scenarios as pathways to innovate their existing software business model.
6. Directions for business model innovation at AlphaCo

This chapter outlines two scenarios for innovating AlphaCo’s software business model and aims to answer the practice-based research question: “How can AlphaCo innovate its existing software business model to generate new business opportunities?”

This section sets forth the business problem within AlphaCo, while in the next sections outline two possible BMI trajectories towards a rejuvenated software business model. The business problem within AlphaCo is visualized in Figure 10, where AlphaCo’s core business is in the upstream and hardware stages, while Beta – a recent acquisition of AlphaCo – its core business is in phase four. Downstream activities include software products and services. Given the complexity of these activities (e.g. scientific algorithms and solutions), and the amount of stakeholders involved – each with different views on how this processing phase should look like –, there is no single standard to aid in the downstream workflow.

Preliminary interviews with industry experts revealed that creating value in the complex downstream workflow (Figure 10) can be achieved via two routes; (1) choose the most compelling algorithms and implement solely this solution in the workflow – which creates standardization, however this could develop major resistance in the community since all stakeholders are forced to adopt this technologies and adhere to AlphaCo’s workflow – or, (2) create a multi-side platform where all stakeholders act as co-developers who are connected to share their algorithms, development codes, and place requests. This not only brings consensus in the long term, but also significantly reduces AlphaCo’s software R&D costs.

From extensive interviews with product marketing managers, strategic marketing managers and senior executives (see Appendix II) the most competing solution would be to create a multi-side platform for all stakeholders in the eco-system. This research project aids in the innovation process of transitioning building blocks of the business model by previously presented design principles, conceptual BMI phases, and BMI framework. Next, two possible scenarios to innovation AlphaCo’s existing software business model are outlined.

Research conducted by external consultants revealed two promising business models that might be suitable for AlphaCo’s software BU, business model “Store” and “Community”. This section of the research project investigates both BMI trajectories as depicted in Figure 11.
Analysing the design principles on their applicability on both BMI trajectories revealed a large fit between most design principles and the ‘store’ and ‘community’ trajectories. However, utilizing NBD as an ‘organisational carrier’ in order to provide guidance and sense to competence building is largely similar in both BMI trajectories and is therefore excluded from the trajectory descriptions in the next sections. The learning mechanisms in principle 1.1 are specifically addressed on their own in principles 4.1 and 4.2. The next two sections set forth a detailed analysis of both BMI trajectories, which were partly based upon characteristics in Appendix IX.

6.1 Business model innovation trajectory towards “Store”

The first BMI trajectory that is presented is towards a multi-sided platform in the form a ‘store’, much like the iStore from Apple. An eco-system is created where AlphaCo acts as mediator between co-developers and users. Products in the store are AlphaCo branded and undergo thorough quality and IP control before being launched in the store. Developers are required to use workflows, standards and development tool provided by AlphaCo and in turn for their IP get a defined percentage of revenue generated via their IP. Furthermore handpicked contributors might be selected by AlphaCo who have exclusive hardware access.

The design and implementation of design principles to innovate the existing business model towards the ‘store’ business model is visualized in Figure 12. This requires a different implementation of design principles than the ‘community’ business model, due to different BMI process characteristics as is depicted in Table 10. Differences might be explained by the duration of the transition and post-transition phases, which are largely related to the online or offline innovation strategy of the BMI trajectory.

<table>
<thead>
<tr>
<th>BMI patterns</th>
<th>Business model innovation trajectory ‘Store’</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ways to innovate</td>
<td>Revenue model innovation</td>
</tr>
<tr>
<td>Effectuation during BMI</td>
<td>More strategic: Corporate champion</td>
</tr>
<tr>
<td>Learning during BMI</td>
<td>Learning-before-doing; Trial-and-error learning</td>
</tr>
<tr>
<td>Network effects in BMI</td>
<td>Strategic alliances to create ‘store’ content (specifically in the initial phases)</td>
</tr>
<tr>
<td>BMI objectives and metrics</td>
<td>Cash flow, revenue, gross margin</td>
</tr>
</tbody>
</table>

First of all, there is a long initial focus on revenue model innovation where (re)configuration of the value proposition, recurring revenue streams, and value capturing from future operations has to be defined and communicated to create a mutual understanding in the entire organisation (P2.1). Gradually, the process tends to evolve towards enterprise model innovation, where the structure of the organisation and the way it creates value is criticized and results in redefinition of organisational boundaries (P2.2). Here the offline innovation strategy is clearly visible by the relatively long transition phase, because in this model ‘you have to get it right the first time’. Therefore the business model design of the ‘store’ model has to be crystallized beforehand via the strong iterative loop between the pre-transition and transition phase (see Figure 9).

Second, the BMI process is characterized by effectuation rather than causation during the pre-transition and early transition phases. However, once the iterative design phase reaches acceptance and gains a foothold in the organisation, the process most likely evolves characterized by a Brownian motion – where there is a clear strategy and heading where the organisation is bubbling around via entrepreneurial efforts – indicating the importance to maintain elements of effectual processes in the latter phases of this BMI process (P3.1).

Third, learning is an important mechanism during the pre-transition and transition phases where the emphasis lies on reducing uncertainty by learning-before-doing and trial-and-error learning via experiments. Learning-before-doing is typically achieved via quick data gathering (e.g. desk research,
opinion leaders, industry experts and strategic consultants), while experiments should be characterized by low cost, informative by nature and high fidelity to ensure optimum learning experiences. Case studies revealed that learning mechanisms in the late transition and post-transition phase tend to focus on knowledge acquisition via learning-by-hiring (P4.1). The ‘store’ business model might focus on specific industry verticals within AlphaCo, which require detailed knowledge of software applications and services in these markets via acquisition of application engineers (P4.2).

Fourth, more specifically, involving stakeholder early in the BMI process might enhance its success by creating valuable network effects. However, to mitigate risks in strategic alliances, the BMI process benefits from clearly formulate reasons for collaboration in the pre-transition phase (P5.1).

Fifth, strategic collaborations might aid in the rejuvenation process by: (1) initial ‘store’ content gathering, (2) establishing platforms and knowledge exchange, and (3) utilization of crowds where all stakeholders in the eco-system can become co-developers. This process needs careful nurturing and continuous management until long after the transition phase (P5.2). This notion accounts even more for firms engaging in the OSC. Pursuing this strategy creates two constituencies that have to remain vibrant and engaged. But when managed correctly the OSC can provide significant benefits in terms of quick diffusion and adoption of the ‘store’ business model, as indicated by interviewees of Gamma (P5.3).

Lastly, the cases revealed the importance to relax explicit goals and financial objectives until the ‘store’ is fully operational, gaining traction in the community of stakeholders and starts to create an eco-system in order to enhance the success of BMI (P6.1). After this transition phase ‘normal’ leading indicators (e.g. sales targets, price per seat, revenue and gross margin) might gradually be installed (P6.2). Several academics urge the necessity to focus on business model replication (Aspara, 2010) and transferability (Kallio, 2006) in order to increase its success across markets and industries. The ‘store’ model might fairly easy be replicated to other industries or segmented to address the different market verticals of each BU in AlphaCo (P6.3). Additionally, the importance of top management support has been clearly articulated throughout this report, and is of significant importance in the success of the innovation process (P6.4).

<table>
<thead>
<tr>
<th>Revenue model innovation</th>
<th>P2.1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enterprise model innovation</td>
<td>P2.2</td>
</tr>
<tr>
<td>Effectuation</td>
<td>P3.1</td>
</tr>
<tr>
<td>Learning</td>
<td>P4.1</td>
</tr>
<tr>
<td>Sales team</td>
<td>P4.2</td>
</tr>
<tr>
<td>Reasons for collaboration</td>
<td>P5.1</td>
</tr>
<tr>
<td>Strategic alliance</td>
<td>P5.2</td>
</tr>
<tr>
<td>Open source community</td>
<td>P5.3</td>
</tr>
<tr>
<td>Relax objectives and financial metrics</td>
<td>P6.1</td>
</tr>
<tr>
<td>Clear objectives and metrics</td>
<td>P6.2</td>
</tr>
<tr>
<td>Install rules and business processes</td>
<td>P6.3</td>
</tr>
<tr>
<td>Top management support</td>
<td>P6.4</td>
</tr>
</tbody>
</table>

Figure 12 Business model innovation trajectory towards ‘store’ model

6.2 Business model innovation trajectory towards “Community”

The second business model that is presented is a multi-sided platform in the form a ‘community’, where AlphaCo creates an open eco-system and takes the role of facilitator between co-developers and users. In a pool of workflows, standards and ingredients the ‘community manages the community’ via reviews and reputations. There is limited quality and IP control by AlphaCo, as well as very selective AlphaCo branding.
The design and implementation of design principles to innovate the existing business model towards the ‘community’ business model is visualized in Figure 13. This requires a different implementation of design principles than the ‘store’ business model, due to different BMI process characteristics as is depicted in Table 11. Building this ‘community’ is about fast value creation, delivery and capturing, and being the first to enhance ‘standardization’ in the scientific software community. Furthermore, this trajectory most likely adopts an online innovation strategy due to the relatively long presence of effectual processes in the post-transition phase. Innovating towards a ‘community’ model requires persistence, entrepreneurship and partnerships that are difficult to manage; careful implementation and monitoring of the design principles is therefore essential for successful BMI.

First, the short initial focus on revenue model innovation during the pre-transition phase, might assure (re)configuration of the value proposition, recurring revenue streams, and value capturing from the ‘community’ store to create a sustaining business (P2.1). Fast BMI diffusion throughout the organisation via change agents should kick-start the transition phase where organisational boundaries are disrupted and pathways for enterprise model innovation are cleared. The online innovation strategy is clearly visible in the relatively short transition phase and long post-transition phase, because this model primarily evolves through entrepreneurial efforts. In the ‘community’ model the primary goal is to build an eco-system of stakeholders as fast as possible in order to set the ‘standard’. The business model design of the ‘community’ model does not have to be crystallized beforehand, but good enough to create diffusion in the community, while continuously innovating the business model via the third iterative loop – between the design and evolution phases (see Figure 9) (P2.2).

Second, clearly indicating the importance of entrepreneurial mechanisms during the innovation process; in the ‘community’ model, effectual processes should be longer present after the transition phase. This might primarily be triggered by strong iterative characteristics between the evolution and design phases. However, case studies reveal that once the rejuvenated business model gains footing in the corporate organisation, a clear strategy and business process – fuelled by causal mechanisms – become predominant (P3.1).

Third, the learning mechanisms in the ‘store’ and ‘community’ model follow a similar path, where the goal in the initial phases is to reduce uncertainty, while in the late transition and post-transition phase the emphasis is on long-term knowledge acquisition. More specifically, learning-by-hiring becomes increasingly important as the innovation process progresses (P4.2). However, because this BMI trajectory evolves via stronger iteration between the evolution and design phases, improvisational learning will most likely be present long after the transition phase (P4.1).

Fourth, creating valuable network effects is crucial for successful BMI towards the ‘community’ model. Once operational, the ‘community should be manage the community’. However, to achieve
this state of the eco-system careful selection of collaborations should be defined in the pre-transition phase (P5.1). Subsequently, AlphaCo should carefully monitor the community lifecycle.

Fifth, strategic collaborations may aid in the rejuvenation process by knowledge exchange and utilization of crowds, and create an eco-system where all stakeholders are co-developers (P5.2). Providing easy access to development tools jumpstarts diffusion and adoption of the software technology and community. One way of achieving this is to engage in the OSC. When managed correctly the OSC can gain significant benefits in terms of adoption of the community model, software R&D investments, and the community may act as steward of the software solutions to enhance visibility across markets (P5.3).

Lastly, designing and evolving the ‘community’ model requires different BMI objectives and metrics. Most importantly, the ‘community model’ will most likely not provided an additional BU for AlphaCo, but merely bring ‘standardization’ within workflows and enhance the value of the hardware solutions. The initial metric should be to manage on cash flows and generate revenue flows to create a self-staining ‘community’ business model, thereby relaxing explicit objectives and financial metrics until the ‘community’ is gaining traction in the community of stakeholders and starts to create an eco-system (P6.1). Once this steady state of the system is reached, clear objectives and metrics should gradually be installed because this results in high sales targets and prices per seat of the software. The ‘community’ business model brings together specialists in specific industry verticals and is therefore difficult to replicate across markets and industries (P6.3). Additionally, the importance of top management support has been clearly articulated throughout this report, and is of significant importance in the success of this innovation trajectory (P6.4).

Table 11 Business model innovation process characteristics towards ‘Community’

<table>
<thead>
<tr>
<th>BMI patterns</th>
<th>Business model “Community”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ways to innovate</td>
<td>Enterprise model innovation</td>
</tr>
<tr>
<td>Effectuation during BMI</td>
<td>More effectual; Entrepreneurial mind-set throughout the organisation</td>
</tr>
<tr>
<td>Learning during BMI</td>
<td>Improvisational learning; learning-by-hiring</td>
</tr>
<tr>
<td>Network effects in BMI</td>
<td>Essential for success; create network effects fast</td>
</tr>
<tr>
<td>BMI objectives and metrics</td>
<td>Diffusion, adoption, growth, knowledge acquisition</td>
</tr>
</tbody>
</table>

The preceding chapters have addressed the derivation of both practice- and research-based design principles, demonstrated the synthesis of these sets of principles into a final set of design principles, and with this chapter two trajectories for BMI are presented for AlphaCo. Although the presentation and discussion validates some of the outcomes of this research study, certain issues require additional attention. The next chapter discusses the conclusions, contributions and sets forth the limitations and future research concerning this research project.
7. Conclusions, contributions, limitations and directions for future research

This final chapter discusses the main conclusions that can be derived from this research study and contributions to both academics and practitioners in the field of NBD and corporate entrepreneurship in the high tech industry. The chapter concludes this report with the acknowledgement of some of the main limitations and directions for future research.

7.1 Conclusions

This study attempted to increase the understanding of the structure and success factors of BMI processes in high tech established organisations by combining insights from both academics and practitioners. By building upon prior BMI literature and with practical experiences inhibited in the tacit knowledge of managers and entrepreneurs in high tech established organisations, guided by the design science methodology after Van Burg, Romme, Gilsing, & Reymen (2008), I aimed to fulfil the goal of the research:

“To generate insights in the structure and success factors of the business model innovation process within high tech established firms, specifically through development of design principles, by combining insights from both practitioners and academics.”

The results to answer the science-based research question in this research project are threefold: (1) the conceptual BMI phases as it is depicted in Figure 6 partially structures the BMI process, (2) the final set of design principles synthesized in chapter 5 helps to structure and generate a better understanding of success factors in BMI, and (3) the BMI framework as presented in Figure 9 combines the first two results and aims to structure the triggers, design and evolution of the BMI processes, in order to answer the question: “How should high tech established organisations innovate their existing software business model?”

The BMI process is perceived successful when the rejuvenated business model becomes an integral part of the organisation, complementing the existing business model in a hybrid form or completely replacing the old business model. The BMI trajectory starts with opportunity identification and mobilization of knowledge and resources to create a better understanding of business models and its innovation process specifically, throughout the entire organisation in the pre-transition phase. In the transition phase the design and implementation of the business model takes place via network effects, learning and experimentation, and effectual mechanisms. After this phase the rejuvenated business model has firm footing in the entire organisation and need careful nurturing and evolution during the post-transition phase. Design principles in all phases of the process partially contribute to successful management of BMI processes. These aspects include:

Interventions in the business model innovation process:
- Trigger BMI by employing new business development as ‘organisational carrier’ through which new competences are acquired (P1.1).
- Ways to innovate business models; focus on revenue model innovation in the initial phase (P2.1), while the trajectory gradually evolves towards enterprise model innovation in the transition and post-transition phases (P2.2).

Mechanisms in the business model innovation process:
- Create entrepreneurship to stimulate effectual mechanisms during the entire innovation process. However, these mechanisms tend to fade into more causal logic during the late post-transition phase (P3.1).
Focus on learning-before-doing and trial-and-error learning during pre-transition phase and improvisational learning and learning-by-hiring during transition and post-transition phases (P4.1). Furthermore, create long term knowledge acquisition via an application engineer and build the sales team for customer relationship (P4.2).

Managers should clearly formulate reasons for collaborations in the pre-transition phase (P5.1), because this provides guidance and sense making of strategic collaborations to enhance network effects early in the transition phase (P5.2). Engage in the OSC to gain fast distribution and adoption and leverage this constituent to build an eco-system of co-developers (P5.3).

Outcome in the business model innovation process:

Relax explicit goals and objectives during pre-transition (P6.1). While the innovation process leapfrogs further via multiple iterations, managers should provide clear objectives and install financial metrics in the post-transition phase (P6.2), and install rules and business processes during the late transition and post-transition phases to create business model replication and transferability (P6.3). Enhance BMI success by installing corporate champions throughout the entire BMI process (P6.4).

The fourth result of this research study to answer the practice-based research question in this research project; “How should AlphaCo innovate its existing software business model to generate new business opportunities?”, includes two possible BMI trajectories for AlphaCo to rejuvenate their existing software business model, as discussed in chapter 6. Throughout this study the importance of effectual processes during BMI trajectories has been clearly articulated by both academics and practitioners in high tech established organisations, indicating the ‘process’ evolves through entrepreneurial efforts and iterative loops without having a clearly defined goal or objective beforehand. Furthermore, the case studies noted that many factors, both internal and external, influence the BMI success factors. The results suggest that by at least attempting to intervene and control the design and evolution of the BMI process, high tech established firms increase their chances of successful BMI.

7.2 Contributions

The main contribution of this research project concerns its main goal: shed light upon and create insights in the structure and success factors of BMI in high tech established organisations, because academic research so far has shown limited attention for this innovation process. By developing the four main results to enhance BMI success, this study contributes to provide systematic ways to innovate existing business models as explicated by Frankenberger et al. (2012); “Contributions [in future research] from business model scholars that provide systematic ways of generating ideas for new business models would, as per our estimation, greatly benefit practitioners in their business model innovation efforts” (p.15).

The primary contribution concerns the thirteen design principles addressed in Chapter 5 and Chapter 6, in which knowledge that this thesis is built upon is applied in practical situations and by which practical experiences contribute to the academic understanding of BMI in high tech established organisations.

To addresses the complicated issues of managing the BMI process, the model of Frankenberger et al. (2012) and Osterwalder & Pigneur (2010) were integrated and reconfigured according empirical results from the cases. This resulted in the conceptual BMI phases. With this contribution I tried to structure BMI phases in the context for high tech established organisations that seek to rejuvenate their software business model.
Furthermore, these conceptual BMI phases are extended by actionable design principles for specific phases of the innovation process to build the framework as it is depicted in Figure 9. By combining these insights, both scholars and practitioners now have a comprehensive framework for systematic BMI – including a process diagram how to structure the management and implementation of specific design principles during particular phases of the BMI process (see Figure 8).

Practical contributions include two scenarios for systematic BMI trajectories for high tech established organisations. These scenarios might aid managers and practitioners within AlphaCo in the selection and management of BMI of the existing software business model. Furthermore, with this research project AlphaCo became closer to create awareness and discussion in the organisation for the necessity of BMI, and attempts to assist managers within AlphaCo to structure and enhance success factors when managing the BMI process.

In order to jump-start the innovation process in high tech established organisations, insights from the three cases revealed four explicit triggers for BMI. These triggers are found prior to the pre-transition phase, and are: (1) company growth targets, (2) company valuation, (3) scalability, and (4) contextual events. These triggers were presented separately but often occur simultaneously. This is a new insight contributing to academic literature by providing a better understanding how high tech established organisation may create an environment to foster successful BMI.

Subsequently, I added to Giesen, Berman, & Bell (2007) their research findings and concluded that ways to innovate business models in this research setting differentiates emphasis on revenue model innovation and enterprise model innovation during specific phases of the innovation process.

Several scholars and academics indicate that firms focussing on BMI significantly enhance their performance and even is essential for organisation success (Chesbrough, 2007; Giesen, Berman, & Bell, 2007; Teece, 2010; Lambert & Davidson, 2012). However, prior research has widely neglected BMI objectives and metrics. With this research project I tried to shed light upon these success factors, and create an initial understanding how objectives and metrics behave during different phases of the BMI process.

The final contribution of this research study contributes to systematic insight in the structure and success factors of BMI in high tech established organisations. By discerning six different patterns: (1) NBD, (2) ways to innovate business models, (3) Corporate entrepreneurship, (4) Learning modes, (5) network effects, and (6) business model innovation objectives and metrics, through two theoretical lenses: (1) NBD, and (2), corporate entrepreneurship, I offer a redefined view on the BMI process as previously presented in academic literature.

7.3 Limitations and directions for future research

One of the main concerns of this study is the use of ‘successful BMI’ as overarching outcome in this research study. This success is hard to measure, even more given the limited consensus among academics and practitioners about the definition, antecedents, and structure and success factors of BMI. With the presentation of thirteen design principles it was suggested that BMI success in high tech established organisations could be enhanced, however there is no grounded evidence that supports this suggestion. This can partly be explained by the array of external and internal influences on the innovation process.

A general limitation lies in the fact that only three BMI trajectories were used as data for this research project and there was a large similarity in case characteristics – which was well suited for derivation of design principles in a particular context. However, this might decrease the generalizability of the design principles, therefore the design principles might profit from testing in other industry settings.

Building upon previous limitation, the design principles developed in this research project provide an indication how BMI processes could look like and could be managed. Although a validation study
was conducted, the design principles would benefit from further testing and validation in other high tech established organisation that seek to rejuvenate their software business models.

Although revenue and enterprise model innovation after Giesen, Berman, & Bell (2007) were clearly visible in all cases, industry model innovation could not be found among the cases. The latter way to innovate business model is primarily found in organisations who managed to radically disrupt or build an entire industry (e.g. Dell) via novel business model design. Future research could investigate solely radical BMI trajectories to complement the design principles and framework as it is presented in Figure 9.

Although an attempt was made, the mechanisms underlying the principles are primarily based on existing academic literature, which resulted in the observation of rather generic and broadly formulated mechanisms underlying the BMI process. Although this was no problem for the exploratory nature of this study, future research should focus on specific theoretical constructs in the BMI process to increase the quality of the findings and evolve the understanding of particular interventions and mechanisms during specific phases of the BMI trajectory.

Finally, the design principles are presented according the six patterns found during cross-case analysis, and although some suggestions were made to prioritize them, no direct indications were found to prefer one principle over the other. Future research could investigate which design principles contribute most in particular phases of the BMI process.
Bibliography


### Appendix I. Business Model Canvas

![Business model canvas](image)

**Figure 1 Business model canvas**

<table>
<thead>
<tr>
<th>Building Block</th>
<th>Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Client Segment</strong></td>
<td>The Client Segment Building Block defines the different groups of people or organisations an enterprise aims to reach or serve</td>
<td>Mass market, niche, segmented, diversified, multi-sided platforms/markets</td>
</tr>
<tr>
<td><strong>Value Proposition</strong></td>
<td>The Value Propositions Building Block describes the bundle of products and services that create value for a specific Customer Segment</td>
<td>Newness, performance, customization, design, brand/status, price, cost or risk reduction, accessibility, convenience</td>
</tr>
<tr>
<td><strong>Channels</strong></td>
<td>The Channels Building Block describes how a company communicates with and reaches its Customer Segments to deliver a Value Proposition</td>
<td>Channel types and channel phases</td>
</tr>
<tr>
<td><strong>Customer Relationships</strong></td>
<td>The Customer Relationships Building Block describes the types of relationships a company establishes with specific Customer Segments</td>
<td>Personal assistance, self-service, automated service, communities, co-creation</td>
</tr>
<tr>
<td><strong>Revenue Streams</strong></td>
<td>The Revenue Streams Building Block represents the cash a company generates from each Customer Segment</td>
<td>Asset sale, usage fee, subscription fee, leasing, licensing, brokerage fees, advertising</td>
</tr>
<tr>
<td><strong>Key Resources</strong></td>
<td>The Key Resources Building Block describes the most important assets required to make a business model work</td>
<td>Physical, intellectual, human, financial</td>
</tr>
<tr>
<td><strong>Key Activities</strong></td>
<td>The Key Activities Building Block describes the most important things a company must do to make its business model work</td>
<td>Production, problem solving, platform/ network</td>
</tr>
<tr>
<td><strong>Key partnerships</strong></td>
<td>The Key Partnerships Building Block describes the network of suppliers and partners that make the business model work</td>
<td>Optimization &amp; economies of scale, reduction of risk &amp; uncertainty, acquisition of resources and activities</td>
</tr>
<tr>
<td><strong>Cost structure</strong></td>
<td>The Cost Structure describes all costs incurred to operate a business model</td>
<td>Cost-driven, value-driven, fixed costs, variable costs, economies of scale or scope</td>
</tr>
</tbody>
</table>
# Appendix II. Overview of conducted interviews

<table>
<thead>
<tr>
<th>Nr</th>
<th>Organisation</th>
<th>Job Title</th>
<th>Date of interview</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AlphaCo</td>
<td>Product Manager</td>
<td>15/09/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>2</td>
<td>AlphaCo</td>
<td>Product Marketing Manager BU</td>
<td>20/09/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>3</td>
<td>AlphaCo</td>
<td>Director Product Marketing BU</td>
<td>27/09/2012</td>
<td>Problem definition and validation</td>
</tr>
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<td>4</td>
<td>AlphaCo</td>
<td>Director BU Solutions Program</td>
<td>1/10/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>5</td>
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<td>11/10/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>6</td>
<td>AlphaCo</td>
<td>Director BU Solutions Program</td>
<td>29/10/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>7</td>
<td>AlphaCo</td>
<td>Director BU Solutions Program</td>
<td>30/10/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>8</td>
<td>AlphaCo</td>
<td>Applications Engineer</td>
<td>3/10/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>9</td>
<td>AlphaCo</td>
<td>Product Marketing Manager BU</td>
<td>30/11/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>10</td>
<td>AlphaCo</td>
<td>Software Scientist</td>
<td>30/11/2012</td>
<td>Problem definition and validation</td>
</tr>
<tr>
<td>11</td>
<td>AlphaCo</td>
<td>Technologist</td>
<td>17/10/2012</td>
<td>Problem definition and validation, and validation of within case analysis and design principles</td>
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<td>12</td>
<td>AlphaCo</td>
<td>Scientist software</td>
<td>22/10/2012</td>
<td>Problem definition and validation</td>
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<tr>
<td>13</td>
<td>AlphaCo</td>
<td>Group VP Software &amp; Solutions</td>
<td>30/05/2013</td>
<td>Gain an overview of existing software business models</td>
</tr>
<tr>
<td>14</td>
<td>AlphaCo</td>
<td>Group VP Software &amp; Solutions</td>
<td>26/06/2013</td>
<td>Gain an overview of existing software business models</td>
</tr>
<tr>
<td>15</td>
<td>Alpha</td>
<td>General Manager BU</td>
<td>9/4/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>16</td>
<td>Alpha</td>
<td>Sr. Business Development Manager</td>
<td>4/4/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>17</td>
<td>Alpha</td>
<td>Marketing Manager</td>
<td>1/2/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>18</td>
<td>Beta</td>
<td>CEO</td>
<td>22/3/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>19</td>
<td>Beta</td>
<td>Sales Director</td>
<td>20/03/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>20</td>
<td>Beta</td>
<td>Product Director</td>
<td>19/03/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>21</td>
<td>Beta</td>
<td>Marketing Director</td>
<td>20/03/2013</td>
<td>Informant</td>
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<tr>
<td>22</td>
<td>Gamma</td>
<td>CEO</td>
<td>12/2/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>23</td>
<td>Gamma</td>
<td>COO/ CFO</td>
<td>13/2/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>24</td>
<td>Gamma</td>
<td>Marketing Manager</td>
<td>6/2/2013</td>
<td>Informant</td>
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<tr>
<td>25</td>
<td>Gamma</td>
<td>Managing Director Europe</td>
<td>15/2/2013</td>
<td>Informant</td>
</tr>
<tr>
<td>26</td>
<td>Industry Expert</td>
<td>Director Software Engineering</td>
<td>21/2/2013</td>
<td>Validation of design principles</td>
</tr>
</tbody>
</table>
Appendix III. Interview protocol and questions

1. Introduction
   - Background and function within the organisation
   - Confidentiality issues
   - Permission to record the interview
   - History and current state of the firm

2. Business model (general)
   - How would you describe your market and the firm’s position in that market?
   - Describe the business model of your SBU?
   - Has your business model changed over the years of operation?
   - In what areas do you focus for strategy and business development?
   - What are the future expectations concerning your firm’s business model(s)?

3. Business model innovation (specific)
   - Could you give a general description of business models your organisation has cycled through?

3.1 When
   - When did you decide to initiate innovation of the existing business model?
   - Based on which decision making criteria did you make this decision?
   - What triggered the decision to innovate your existing business model?

3.2 Process
   - If you had to describe the innovation process as a step-by-step activity, which steps would you define?
   - Could you place these steps on a timeline?
   - Could you prioritize these steps?
   - Are their detailed descriptions or a general blueprint of the BMI process?
   - What are key areas of interest of the BMI process? And why?
   - What were important events during the BMI process?
   - Who or which team initiate the BMI process?
   - Who was responsible for the process?

3.3 Business network (general)
   - Which parties participated in the innovation process, and where?
   - What did you learn from these parties in the BMI process?

3.4 Performance (general)
   - What was the objective of the BMI process?
   - How was this measured ((non-)financial)?
   - In hindsight, did BMI achieve this objective?
   - What makes the process successful?
   - How did the BMI process help to develop business?
   - What was your overall feeling about the BMI process?

3.5 Challenges (general)
   - What, in your opinion, stood in your way for increasing BMI success?
   - What hurdles had to be tackled to achieve a successful new business model?
   - How and why did these hurdles occur?
   - How were these hurdles solved?
   - How did these hurdles affect the business model innovation process?
4. Manager*
- What was your first reaction on the innovation of the existing business model?
- Why did you respond that way?
- What was your role in the BMI process?
- How did the BMI process affect your role in the organisation?
- To whom did you report on the BMI process?
- How did you learn from this entrepreneurial process?
- What did you learn from this entrepreneurial process?
- <manager specific questions>
- In hindsight, would you participate in the BMI process again?
- Which software business models are, in your opinion, currently emerging in the software industry?
- What, in your opinion, would be an alternative for the business model innovation process?

5. Other
- In addition to yourself, is there someone else who could provide insight about the business model and its innovation process?
- Are there any documents (about your firm/products) available that would be useful for our research?
- Are there other important issues about business models or its innovation process that were not included in this interview?

* Managing director
- Did the BMI process initiate a new strategy?
- During which part of the innovation process were these changes made?
- What changes did you make to your strategy?
- What are differences between US and Europe? And regarding open source software?
- Who was responsible for these changes?

*Marketing manager
- Did the BMI process initiate a new marketing strategy?
- During which part of the innovation process were these changes made?
- What changes did you make to your marketing strategy?
- Who was responsible for these changes?
- In hindsight, has the BMI process enhanced your marketing/sales performance?
- How is this measured?

* Sales manager
- Did the BMI process initiate new sales strategies?
- During which part of the innovation process were these changes made?
- Why was the established sales strategy insufficient to deal with the new business model?
- What changes were made in the sales strategy or sales force?
- Who was responsible for these changes?
- In hindsight, has BMI process enhanced your sales performance?

* Product manager
- Did the BMI process initiate a new product strategy?
- During which part of the innovation process were these changes made?
- What changes did you make to your strategy?
- Who was responsible for these changes?
Appendix IV. Overview of empirical data analysis

Research question:
“How should AlphaCo Innovate its software business model to generate business opportunities?”

Coding data in Nvivo

Interesting intersections are further investigated by detailed transcript analysis and resulted in excerpts that support relationships.

Excerpts are grouped per theoretical construct to enable cross-case comparison and explore patterns across cases.

These patterns form organisational practices which are rewritten in practice-based design principles using CIMO logic (Denyer et al., 2008).
### Appendix V. Coding and definition list

<table>
<thead>
<tr>
<th>Codes</th>
<th>Construct</th>
<th>Definition</th>
<th>Theory</th>
<th>Author(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Organisational) Challenges</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organizational inertia</td>
<td>“Structures of organisations have high inertia when the speed of reorganization (core feature change) is much lower than the rate at which environmental conditions change” (p. 594)</td>
<td>Change</td>
<td>Kelly &amp; Amburgey (1991)</td>
</tr>
<tr>
<td></td>
<td>Lock-in</td>
<td>Organisations suffering from historical events to the monopoly of an inferior technology or process</td>
<td>Change</td>
<td>Arthur (1989)</td>
</tr>
<tr>
<td></td>
<td>Competency traps</td>
<td>Imbalance between knowledge or competence exploitation and exploration</td>
<td>Organizational Learning</td>
<td>Liu (2006)</td>
</tr>
<tr>
<td></td>
<td>Learning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Trail-and-error learning</td>
<td>Iterative learning process where experimentation involves organizational members retaining actions that product desired results and discarding those that don’t.</td>
<td>Learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimentation</td>
<td>“Process which fuels the discovery and creation of knowledge and thereby leads to the development an improvement of products, processes, systems and organisations” (p. 1)</td>
<td>Learning</td>
<td>Thomke (2003)</td>
</tr>
<tr>
<td></td>
<td>Double-loop learning</td>
<td>Learning practice where the actors question the fundamental aspects of the organisation and promote changes in how the organisation functions and performs.</td>
<td>Learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organizational learning/search</td>
<td>“Process in which an organisation its units acquires knowledge that it recognizes as potential useful to the organisation”. (p.89)</td>
<td>Learning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Organisational carrier</td>
<td>Process through which new competences and knowledge are acquired or developed.</td>
<td>Knowledge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Competence gaps</td>
<td>Gap between existing competences and those required</td>
<td>Competences/knowledge</td>
<td>(Vanhaverbeke &amp; Peeters, 2005; Bröring &amp; Herzog, 2008)</td>
</tr>
<tr>
<td></td>
<td>Competence building</td>
<td>Organisations actively monitoring and enacting upon competence gaps, in an effort to acquire or develop new competences</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Entrepreneurship</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Corporate entrepreneurship</td>
<td>Greater entrepreneurial behaviour on the part of established companies; where risk taking, innovation, and aggressive competitive action helps to identify and pursue lucrative business opportunities.</td>
<td>Change</td>
<td>Zahra &amp; Covin (1995)</td>
</tr>
<tr>
<td></td>
<td>Effectuation processes</td>
<td>“Effectuation processes take a set of means as given and focus on selecting between possible effects that can be created with that set of means”</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Entrepreneurial mind-set</td>
<td>Specific state of mind which orientates human conduct towards entrepreneurial activities and outcomes (e.g. drawn to opportunities,</td>
<td></td>
<td><a href="http://lexicon.ft.com/Term?term=entrepreneurial-mindset">http://lexicon.ft.com/Term?term=entrepreneurial-mindset</a></td>
</tr>
<tr>
<td>Organisational ownership</td>
<td>part of an established organisation that is responsible and accountable for new business creation (e.g. designed group(s) or diffused across organisation)</td>
<td>Control mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource authority</td>
<td>Responsibility and accountability of resources allocation to fund new business concepts. (e.g. dedicated, ad-hoc, corporate budgets)</td>
<td>Control mechanism</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business model innovation</td>
<td>the process of transforming, or completely reinventing, key elements of an organisation to new ways of doing business</td>
<td>Change/ strategy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strategy</td>
<td>Organizational change</td>
<td>Company or organization going through a transformation due to an altered business strategy.</td>
<td>Change/ strategy</td>
<td></td>
</tr>
<tr>
<td>Strategy</td>
<td>Organizational rejuvenation</td>
<td>Form of CE whereby the organisation seeks to sustain or improve its competitive position.</td>
<td>Change/ strategy</td>
<td></td>
</tr>
<tr>
<td>BM performance</td>
<td>NICE value drivers</td>
<td>Novelty, Lock-In, Complementarities and Efficiency to enhance the business model performance.</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>BM performance</td>
<td>Unique value proposition</td>
<td>“Selected bundle products and/or services that caters to the requirements of a specific customer segment”. (p.22)</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>BM performance</td>
<td>Sustainable competitive advantage</td>
<td>A long-term competitive advantage that is not easily duplicated or surpassed by competitors.</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>BM performance</td>
<td>Value chain</td>
<td>Chain of activities that a firm operating in a specific industry performs in order to deliver something valuable</td>
<td>Porter</td>
<td></td>
</tr>
<tr>
<td>BM performance</td>
<td>Business model replication</td>
<td>Degree to which extent the new business model is replicable in suitable geographical locations.</td>
<td>Value BM</td>
<td></td>
</tr>
<tr>
<td>BM performance</td>
<td>Customer experience</td>
<td>“A customer experience is an interaction between an organization and a customer as perceived through a customer’s conscious and subconscious mind. It is a blend of an organization’s rational performance, the senses stimulated and the emotions evoked and intuitively measured against customer expectations across all moments of contact”</td>
<td>Value delivery</td>
<td><a href="http://www.beyondphilosophy.com/customer-experience">http://www.beyondphilosophy.com/customer-experience</a></td>
</tr>
<tr>
<td>BM performance</td>
<td>Top management support</td>
<td>Appropriate where highly interdependent tasks are affected. Support should focus on reshaping the institutional context e.g. workflow patterns, routines, reward systems, control and coordination mechanisms.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business model innovation</td>
<td>Industry model innovation</td>
<td>Initiate the business model innovation process from the industry value chain (horizontal integration, redefinition, entirely new).</td>
<td>BMI</td>
<td></td>
</tr>
<tr>
<td>Business model innovation</td>
<td>Revenue model innovation</td>
<td>Initiate the business model innovation process from a revenue perspective. Generate revenue streams by reconfiguring offerings and introduction of new pricing strategies.</td>
<td>BMI</td>
<td></td>
</tr>
<tr>
<td>Business model innovation</td>
<td>Enterprise model innovation</td>
<td>Initiate the business model innovation process from the structure of the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rejuvenation of existing business model</td>
<td>Understanding an existing business model and reshape it to a new condition</td>
<td>BMI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network plays</td>
<td>All forms of collaboration with external parties (e.g. partnerships, acquisitions, joint ventures)</td>
<td>Network</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network plays</td>
<td>External collaboration</td>
<td>Cooperative arrangement in which two or more parties outside the span of the organisational boundaries work jointly towards a common goal.</td>
<td>Network</td>
<td></td>
</tr>
<tr>
<td>Organisational boundaries</td>
<td>“Determine an entity’s operation and whether it is owned or controlled by the reporting company”</td>
<td>Network</td>
<td><a href="http://www.justmeans.com/reports/Defining-Organizational-Boundaries/371.html">http://www.justmeans.com/reports/Defining-Organizational-Boundaries/371.html</a></td>
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</tr>
<tr>
<td>Other</td>
<td>Adjacent markets</td>
<td>Market segment that shares common characteristics in application requirements, ecosystems, community, or relationships.</td>
<td>Market</td>
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<tr>
<td>Established high tech organization</td>
<td>An organization that is recognized and accepted in the field of cutting edge technology, often referred to in micro-electronics</td>
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<tr>
<td>New business development</td>
<td>Firms actively seeking new business opportunities in unfamiliar markets, technologies, products or services</td>
<td>NBD</td>
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<tr>
<td>Technological innovations</td>
<td>A technological improvement to something already existing</td>
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<tr>
<td>Event types</td>
<td>Activity events</td>
<td>Activities that occur during the BMI process such as brainstorm meetings, budget meetings, evaluation meetings, strategy meeting, milestone meetings, market research, risk assessment, and experiments.</td>
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<tr>
<td>Idea events</td>
<td>Events that initiate changes to the idea, concept, and structure of the existing business model. Where information on which these changes are initiated is recorded to generate a comprehensive overview of the business model evolution.</td>
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<tr>
<td>People events</td>
<td>Events where important changes took place by changes in commitment of people in the innovation process. This is not limited by the formal BMI team, but also includes key people in strategic and decision making positions.</td>
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<tr>
<td>Resource commitment events</td>
<td>Changes that occur in the formal and informal assigned resources to the project.</td>
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<tr>
<td>Context events</td>
<td>Events that occur beyond the control of the innovation team, but may impact the innovation process. Context related events consist of internal and external events that might cause changes to the established business model.</td>
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<tr>
<td>Process intervention events</td>
<td>Interventions by one of the involved stakeholders. For instance, top management might want to speed-up the implementation phase or increase the diffusion throughout the organisation.</td>
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<tr>
<td>Outcome events</td>
<td>Poole et al. (2000) define outcome events as “a change in the value or criteria used to judge the progress or outcomes of the innovation” (p. 108). Changes in outcome events can be positive or negative by nature; and include goals, outcome criteria, schedules, and milestones. Criteria resulting in changes of outcome events are recorded whenever possible. For instance, positive results from high fidelity experiments.</td>
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## Appendix VI. Matrix coding tables

### Alpha: Theoretical constructs - Episodes

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### Beta: Theoretical constructs - Episodes

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### Gamma: Theoretical constructs - Episodes

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X
Appendix VII. BMI processes


2. Business model innovation process by Frankenberger, Weiblen, Csik, & Gassmann (2012)

## Appendix VIII. Construction of design principles

<table>
<thead>
<tr>
<th>Practice-based principle</th>
<th>Design principle</th>
<th>Research-based principle</th>
<th>Underlying theory/literature</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1</strong> Principle 1.1: Established organisations in the high tech industry (C) should use NBD as an organisational carrier for BMI (I) because this creates a competence gap between the desired and existing business model and the desired and existing objectives and metrics (M) to successfully evolve and manage the entire BMI process (O).</td>
<td>Design principle 1.1: Established organisations in the high tech industry (C) should use NBD as an organisational carrier for BMI (Chesbrough H., 2003; Vanhaverbeke &amp; Peeters, 2005) (I) because this creates and identifies competence gaps between the desired and existing business model and the desired and existing objectives and metrics (Vanhaverbeke &amp; Peeters, 2005; Bröring &amp; Herzog, 2008) (M) in order to provide guidance and sense to competence building (O).</td>
<td>Principle 1: High tech established organisations (C) should employ new business development as an “organisational carrier” (I) because this creates and identifies competence gaps (M) in order to provide guidance and sense to competence building (O).</td>
<td>(Vanhaverbeke &amp; Peeters, 2005; Bröring &amp; Herzog, 2008)</td>
</tr>
<tr>
<td>Principle 1.2: Established organisations in the high tech industry (C) should use NBD as an organisational carrier for BMI (I) to trigger coalescence between the corporate innovation strategy and NBD strategy, where the innovation strategy is intimately linked with the NBD strategy via entrepreneurial efforts (M) in order to support the entire BMI process (O).</td>
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<tr>
<td><strong>2.1</strong> Principle 2.1: Established organisations in the high tech industry (C) that seek new growth/business opportunities via business model innovation (O) should start the innovation process via revenue model innovation (I) because this triggers search for alternative revenue streams, which (a) provide recurring revenue and (b) better value capturing (M).</td>
<td>Design principle 2.1: Established organisations in the high tech industry (C) that seek new growth/business opportunities via business model innovation and enhance customer experience (O) should start the innovation process via revenue model innovation in the pre-transition phase (I) because this triggers reconfiguration of offerings (a), recurring revenue (b), and better value capturing (c) (Giesen, Berman, &amp; Bell, 2007) (M).</td>
<td>Principle 3b: High tech established organisations (C) that seek to capitalize on technological</td>
<td></td>
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</tbody>
</table>
and seek to deliver higher value faster (O) should shift towards enterprise model innovation in the transition and post-transition phase of the BMI process by (a) enhancing customer relationships and (b) providing a total solution (I) because this triggers fast value creation and delivery (M).

Design principle 3.1: Established organisations in the high tech industry (C) should use effectual reasoning during the entire BMI process (I) because this triggers improvisational learning and entrepreneurship (Sarasvathy S. D., 2001; 2008) (M) in order to successfully enact on the environment and deal with uncertainties during the BMI process (O).

Principle 7: High tech established organisations that have to deal with inertia, lock-in and competence traps (C) when seeking business model innovation (O) should employ corporate effectuation processes (I) to trigger corporate-wide entrepreneurship (M).

Principle 8: High tech established organisations (C) that seek to enhance their performance (O) should map and actively innovate their business model (I) because this triggers trial-and-error learning (a), experimentation (b), and effectual (c) processes (M).

| 3.1 | Principle 3.1: Established organisations operational in the high tech industry (C) should use effectual reasoning during the entire BMI process (I) because this triggers improvisational learning (M) in order to successfully enact on the environment and deal with uncertainties during the BMI process (O). |
| Design principle 3.1: Established organisations in the high tech industry (C) should use effectual reasoning during the entire BMI process (I) because this triggers improvisational learning and entrepreneurship (Sarasvathy S. D., 2001; 2008) (M) in order to successfully enact on the environment and deal with uncertainties during the BMI process (O). |
| Principle 7: High tech established organisations that have to deal with inertia, lock-in and competence traps (C) when seeking business model innovation (O) should employ corporate effectuation processes (I) to trigger corporate-wide entrepreneurship (M). |
| Principle 8: High tech established organisations (C) that seek to enhance their performance (O) should map and actively innovate their business model (I) because this triggers trial-and-error learning (a), experimentation (b), and effectual (c) processes (M). |

<p>| 4.1 | Principle 4.1: Established organisations in the high tech industry (C) should focus on trial-and-error learning and learning-before-doing in the pre-transition phase of the BMI process, while in the transition and post-transition phases the emphasis should be on learning-by-hiring and improvisational (I) because this triggers the conforming learning mechanisms during the BMI process (M) in order to adopt the right knowledge strategy (O). |
| Design principle 4.1: Established organisations in the high tech industry (C) should (1) focus on trial-and-error learning and learning-before-doing in the pre-transition phase of the BMI process, while in the transition and post-transition phases the emphasis should be on learning-by-hiring and improvisational (I), and (2) perform high fidelity (a), low cost (b), discovery driven (c) and informative experiments (d) (I), because this triggers knowledge acquisition via learning mechanisms and experimentation (Teece, 2010; McGrath, 2010) (M) in order to cope with different types of uncertainty along the innovation process (O). |
| Principle 5: Established organisations in the high tech industry (C) should install learning-before-doing and experimental learning during in the beginning of the BMI process, and trial-and-error learning, improvisational learning and learning-by-hiring during the end phases of the BMI process (I) because this triggers knowledge acquisition mechanisms (M) in order to cope with different types of uncertainty along the innovation process (O). |
| Principle 6: High tech established organisations that have to deal with inertia, lock-in and competence traps (C) when seeking business model innovation (O) should employ enterprise model innovation (I) because this triggers external collaboration, network plays and (re)definition of organisational boundaries (M). |</p>
<table>
<thead>
<tr>
<th></th>
<th>Principle 4.2: Established organisations in the high tech industry (C) that seek to target specific industry verticals (O) should install an application engineer during the transition and post-transition phase (I) because this gains industry vertical specific knowledge (M). Principle 4.3: High tech established organisations in the software industry (C) should install an application engineer and account manager in the sales process (I) to have a highly specialized and knowledgeable sales team (M) that is capable of solution sales in industry verticals (O).</th>
<th>Design principle 4.2: Established organisations in the high tech industry (C) that seek to target specific industry verticals (O) should (1) install an application engineer during the transition and post-transition phase, and (2) install an application engineer and account manager as sales team in the sales process (I) because this gains industry vertical specific knowledge (M).</th>
<th>Principle 1: High tech established organisations (C) should employ new business development as an “organisational carrier” (I) because this creates and identifies competence gaps (M) in order to provide guidance and sense to competence building (O). Principle 5: Established organisations in the high tech industry (C) should install learning-before-doing and experimental learning during in the beginning of the BMI process, and trial-and-error learning, improvisational learning and learning-by-hiring during the end phases of the BMI process (I) because this triggers knowledge acquisition mechanisms (M) in order to cope with different types of uncertainty along the innovation process (O). Principle 6: High tech established organisations that have to deal with inertia, lock-in and competence traps (C) when seeking business model innovation (O) should perform high fidelity (a), low cost (b), discovery driven (c) and informative experiments (d) (I) because this results in quick trial-and-error learning (M).</th>
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</thead>
<tbody>
<tr>
<td>5.1</td>
<td>Principle 5.1: Established organisations in the high tech industry (C) should clearly formulate reasons for collaboration in the pre-transition process (I) because</td>
<td>Design principle 5.1: Established organisations in the high tech industry (C) should clearly formulate reasons for collaboration in the pre-transition process (I) because</td>
<td>Principle 3c: High tech established organisations (C) that seek to capitalize on technological innovations via new business development (O) (Pisano, 1996; Teece, 2010)</td>
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<tr>
<td>Principle 5.1</td>
<td>Principle 5.2</td>
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<tr>
<td><strong>Principle 5.1</strong>: High tech established organisations (C) should leverage OSC as partner in the pre-transition and early transition phase of the BMI process (I) to trigger knowledge sharing and improvisational learning (M) where members are co-developers, co-creators and stewards in the software (O).</td>
<td><strong>Design principle 5.2</strong>: Established organisations in the high tech industry (C) that seek growth opportunities of their software products (O) should build strategic collaboration alliances early in the transition process (I), because this triggers enterprise model innovation by enhancing the value proposition (Giesen, Berman, &amp; Bell, 2007) via total solution offering and improvement of visibility across markets (Chesbrough, 2007; Popp, 2013) (M).</td>
<td><strong>Design principle 5.3</strong>: Established organisations in the high tech industry (C) should leverage OSC as partner in the pre-transition and early transition phase of the BMI process (I) because this triggers external collaboration and network plays (Giesen, Berman, &amp; Bell, 2007), as well as knowledge sharing via trial-and-error learning (Teece, 2010) (M) and creates an eco-system where members are co-developers, co-creators and stewards of the software products (O).</td>
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<tr>
<td><strong>Principle 5.2</strong>: Established organisations in the high tech industry (C) that seek growth opportunities of their software products (O) should build strategic collaboration alliances early in the transition process (I), because this triggers enterprise model innovation (I) because this triggers external collaboration, network plays and (re)definition of organisational boundaries (M).</td>
<td><strong>Principle 5.3</strong>: High tech established organisations (C) that seek to capitalize on technological innovations via new business development (O) should employ enterprise model innovation (I) because this triggers external collaboration, network plays and (re)definition of organisational boundaries (M).</td>
<td><strong>Principle 3c</strong>: High tech established organisations (C) that seek to capitalize on technological innovations via new business development (O) should employ enterprise model innovation (I) because this triggers external collaboration, network plays and (re)definition of organisational boundaries (M).</td>
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<td><strong>Principle 6.1</strong>: Established organisations in the high tech industry (C) that seek new growth/business (Sarasvathy S. D., 2001;</td>
<td><strong>Design principle 6.1</strong>: Established organisations in the high tech industry (C) that seek new growth/business (Sarasvathy S. D., 2001;</td>
<td><strong>Design principle 6.1</strong>: Established organisations in the high tech industry (C) that seek new growth/business (Sarasvathy S. D., 2001;</td>
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<tr>
<td>Principle 6.2: Established organisations in the high tech industry (C) should provide clear objectives and financial targets in the post-transition phase of the BMI process (I) because this results in higher (1) sales targets, and (2) price per seat of the software product (M), which ultimately drives growth of revenue and gross margins (O).</td>
<td>Design principle 6.2: Established organisations in the high tech industry (C) should provide clear objectives and financial targets in the post-transition phase of the BMI process (I) because this results in higher (1) sales targets, and (2) price per seat of the software product (M), which ultimately drives growth of revenue and gross margins (O).</td>
<td>Principle 4: High tech established organisations (C) that seek to enhance their business model performance (O) should emphasize the importance of top management support (a) and business model replication and transferability (b) (I), because this triggers commitment and transferability (M).</td>
<td>(Aspara et al., 2010) (Kallio et al., 2006)</td>
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<tr>
<td>Principle 6.3: Established organisations in the high tech industry (C) that seek to replicate their business model across markets or industries (O) should set up some rules and business processes (I) because this triggers continuous management and evolution of the business model in the post-transition phase (M).</td>
<td>Design principle 6.3: Established organisations in the high tech industry (C) that seek to enhance their business model performance by replicating their business model across markets or industries (O) should set up some rules and business processes during the transition and post-transition phase (I) because this triggers replication (Aspara et al., 2010) and transferability (Kallio et al., 2006), and continuous management and evolution of the business model in the post-transition phase (M).</td>
<td>Principle 4: High tech established organisations (C) that seek to enhance their business model performance (O) should emphasize the importance of top management support (a) and business model replication and transferability (b) (I), because this triggers commitment and transferability (M).</td>
<td>(Kallio et al., 2006)</td>
</tr>
<tr>
<td>Principle 6.4: Established organisations in the high tech industry (C) should install strong corporate champions (i.e. managers with discretionary power) (I) because this triggers a broadly communicated vision and strategic plan (M) in order to initiate and advocate business model innovation during the entire process. (O)</td>
<td>Design principle 6.4: Established organisations in the high tech industry (C) should install strong top management champions (i.e. managers with discretionary power) during the entire BMI process (Chesbrough, 2007) (I) because this triggers commitment and a broadly communicated vision and strategic plan (Covin &amp; Miles, 1999; Wolcott &amp; Lippitz, 2007) (M) in order to initiate and advocate business model innovation during the entire process (O).</td>
<td>Principle 4: High tech established organisations (C) that seek to enhance their business model performance (O) should emphasize the importance of top management support (a) and business model replication and transferability (b) (I), because this triggers commitment and transferability (M).</td>
<td>(Covin &amp; Miles, 1999; Wolcott &amp; Lippitz, 2007)</td>
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## Appendix IX. Business model innovation trajectory characteristics

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<thead>
<tr>
<th>Multi-sided platform design; business model building blocks</th>
<th>Business model “Store”</th>
<th>Business model “Community”</th>
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</thead>
<tbody>
<tr>
<td>Customer segment(s)</td>
<td>Users (PhD, Industrial users, facility managers) Co-developers (PhD, software developers)</td>
<td>Users (PhD, Industrial users, facility managers) Co-developers (PhD, software developers)</td>
</tr>
<tr>
<td>Value proposition</td>
<td>Proved AlphaCo branded analysis and visualization plug-ins Matchmaker between users and developers IP broker</td>
<td>Certain workflows and standard Matchmaker between users and developers IP indemnification</td>
</tr>
<tr>
<td>Revenue stream</td>
<td>Access fee store (subscription with tool) License fee development tools AlphaCo License fee plug-ins</td>
<td>License fee community access Free access for co-developers</td>
</tr>
<tr>
<td>Cost structure</td>
<td>Developing and maintaining the store and development tools</td>
<td>Developing and maintaining the community</td>
</tr>
<tr>
<td>Key resources</td>
<td>Development tools Store</td>
<td>Community platform</td>
</tr>
<tr>
<td>Key activities</td>
<td>Store management Service provisioning Quality control of content Store promotion</td>
<td>Community lifecycle management Community promotion</td>
</tr>
<tr>
<td>Key partners</td>
<td>Content providers</td>
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<tr>
<td>Business model innovation characteristics</td>
<td>Initial content generation: Handpicked suppliers Innovators, industry leaders, handpicked customers</td>
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<tr>
<td>Objective</td>
<td>Create additional revenue stream for AlphaCo; value towards software Facilitate eco-system and boost hardware sales</td>
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<tr>
<td>Time-to-launch (completion of transition phase)</td>
<td>Long(er)</td>
<td>Short(er)</td>
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<tr>
<td>Iterative loop (Figure 9)</td>
<td>Loop 2, between pre-transition and transition</td>
<td>Loop 3, between evolution and design phases</td>
</tr>
<tr>
<td>Innovation strategy</td>
<td>Offline</td>
<td>Online</td>
</tr>
<tr>
<td>Initial development costs and effort (completion of transition phase)</td>
<td>High(er)</td>
<td>Low(er)</td>
</tr>
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