Software innovation on firm level

Master thesis

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Summary

The aim of this master thesis *Software innovation on firm level* is to examine the cross-conceptual relationship between value proposition and Customer Perceived Value (CPV) in the context of innovative software development, by proposing a framework design aligning the process structures of business model, Essence (Aaen, 2019), and open innovation (Chesbrough, 2003).

The master thesis is composed of 7 main chapters, each of them sequentially relying on each other to arrive at the design of an alignment framework. The research design itself, detailing this sequence, can be found in chapter 1.2.

Chapter 1 is introductory, and defines the context of the problem statement (chaper 1.2).

Chapter 2 details the research methodology, and consists of two parts. The methodology chosen for the thesis was integrative literature review, to help synthesize the available academic knowledge of the selected concepts, and generate a new perspective. In this case, this is in the form of the framework design.

Chapter 3 is subdivided into three parts, and provides a detailed literature review of the business model, software innovation and Essence, and open innovation. The literature review includes some historical considerations, but mostly focuses on the role and definition of the value proposition, and how it may relate to the CPV in software business context. Chapter 3's primary goal is the hard decomposition of the thesis' main concepts, to eventually merge them into one framework. In other words, this chapter attempts to create a straightforward definition of how the value propositions of three different concepts can be aligned.

Chapter 4 concentrates on providing the answer(s) to the problem statement. Formally, this chapter consists of two parts, but they both relate to the findings, in the form of the presentation of the alignment framework, and the explanation as to why it answers the problem statement.

Chapter 5 consists of the discussion pertaining to the thesis. The findings are revisited in terms of their contribution to the larger academic context, and the limitations of the thesis are presented.

Conclusions are drawn in chapter 6 and 7, where the research process and the implications for future research are described.

Research Abstract

Purpose – The present research is conducted to explore the value propositions of Essence (Aaen, 2019), the business model, and open innovation (Chesbrough, 2003).
The primary purpose is to develop a conceptual framework, which integrates these concepts, allowing for the examination of the relationship between the value proposition and the Customer Perceived Value in software firms. The hypothesis is that such a framework would support the strategic alignment of business activities on multiple firm levels. According to Morrison et al. (2011), strategic alignment is 'the method for understanding the nature of a business through the correlation of business processes and strategies' (pg. 3).

Design / Methodology – The paper employs a theoretical approach in the form of integrative literature review. This type of review investigates and synthesize knowledge accumulated within the field of business model, software innovation, and open innovation, to conceptualize the value propositions of those fields. Due to the abstract nature of the research subject, such a theoretical qualitative research methodology was deemed most appropriate in this paper.

Findings - The findings point towards the positive connotations to be found when the value proposition of the open innovation processes are combined with both the operational level (Essence) and the resource management level (business model) of a software firm, by highlighting the importance of cross-domain knowledge sharing. It also recognizes the strength of a holistic approach to innovation management, rather than separating the strategy from the actual operations, by demonstrating the complementarity of the elements involved in it, yet also encompassing the ability to detect weaknesses in the business structure, thereby providing the opportunity to improve those weaknesses. It also emphasizes the strength to be found in implementing customer co-creation elements, which increases the chance of successful product launch.

Research limitations – The paper is based on strong theoretical foundations, but lacks empirical validation; however, it is still recognized as an important aspect of presenting the research topic, as theories are used to develop empirically testable ideas (White & Klein, 2002).

Originality/Value - The main value of this research lies in its attempt to create a unified model of the business model, Essence and the open innovation process to contribute to the debate of creating competitive advantage through the value proposition of innovative software development.

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1. Introduction

Each year, business is becoming more competitive. A recent survey conducted in 2019 (Crayon.co) on competitive intelligence revealed that, by and large, 87% of companies have observed a significant increase in competition in their respective market, and 49% characterized this increase as even larger. This means that similar or the same services or products can now be purchased from a plethora of different vendors. The world is slowly but surely becoming smaller, when it comes to buying.

Market saturation has reached the software industry, too. Generally, software as a business has a low entry barrier, accentuated by the overarching trends of globalization and facilitated by the accelerating rate of technological advancements (Pikkarainen et al., 2011). Software comes in many different shapes and sizes, but as its relevance grows, so do its purposes start to evolve to serve and enable more complex business objectives.

Customer Perceived Value

The key to survival has been, and remains, the factor of uniqueness found in the value proposition of the firm (D'Aveni, 2010). However, it is not only the world around us that has evolved, but customer demands, too. Customers want to see firm value propositions, which are aligned with the customer's own value perception. In other words, the ideal value proposition understands and provides for the customer's desire, by creating and delivering value that adds to the Customer Perceived Value (CPV hereon).

In simple terms, CPV describes the difference between the perceived costs and the perceived benefits of obtaining a product or a service (Aulia et al., 2016). If that difference is positive, the customer is supposed to have a favorable perception of the firm and its offering.
CPV, as such, has no clear definition, the majority of the academia agrees that it should be considered as a multi-dimensional concept (Sanches-Fernandez and Iniesta-Bonillo, 2007)**.**

Despite the lack of commonly accepted conceptualization, the CPV is generally understood to be involving the relationship of the customer with the firm's product and assumes an internal cost-benefit analysis (or rather, sacrifice-benefit analysis from the point of view of the customer) (Holbrook, 1996). According to Lin et al. (2005), CPV results in not only in temporarily satisfied customers, but can contribute to improving repurchase intentions and thus, customer loyalty, which can be making all the difference especially in a high competition industry.

Relationship between software development and business strategy

As a result, the quality of the relationship between software development and overall business strategy has become a crucial issue for firms to tackle. Regarding strategic alignment, it has been generally agreed upon, that a higher degree of alignment, or in other words, complementarity between a firm's internal activities (as well as with their external partners), can generate more value for the customer, and thereby increase profit for all parties involved (Katz et al, 2016; Wadström, 2019; Akter et al., 2016). It has also been noted that, in order to maximize return on investment (ROI), especially in the case of technology, coordination of the resources and decisions made in all departments are vital (Avison et al, 2004).

With this in mind, we may concur that, in the case of a software development company, alignment of software development projects with business objectives must be taken into careful consideration. Software companies must treat their development projects as the direct creation of business value, by creating synergy between their infrastructure and strategy. As a result, this can facilitate the fulfillment of the value proposition to improve the CPV (Papp, 2001; Avison et al, 2004).

The matter and the degree of interrelatedness between business model and software development have been explored in academic studies, albeit tentatively, especially regarding the cross-conceptual strategic alignment of the value proposition(s). Therefore, the question of how to create an alignment framework for software business, which would be able to exploit the value proposition of the business model concept and Essence (Aaen, 2019), together with the principles of open innovation (Chesbrough, 2003), and thereby improve the CPV, appeared to be a relevant field of inquiry.

1.1. Problem statement

The following paper seeks to synthesize the value proposition concept, as defined and redefined in the field of software innovation (Essence), the business model components, and open innovation. This is completed to create and present a framework of both horizontal and vertical alignment of the value propositions of said concepts. The framework seek to integrate the concepts into a software business environment, while investigating their value propositions in relation to the CPV. Thus my proposed problem statement is as follows:

How do the value propositions of Essence (Aaen, 2019), the business model, and the open innovation process (Chesbrough, 2003) influence Customer Perceived Value in a software firm and how can these concepts be presented in a framework?

1.2. Research design

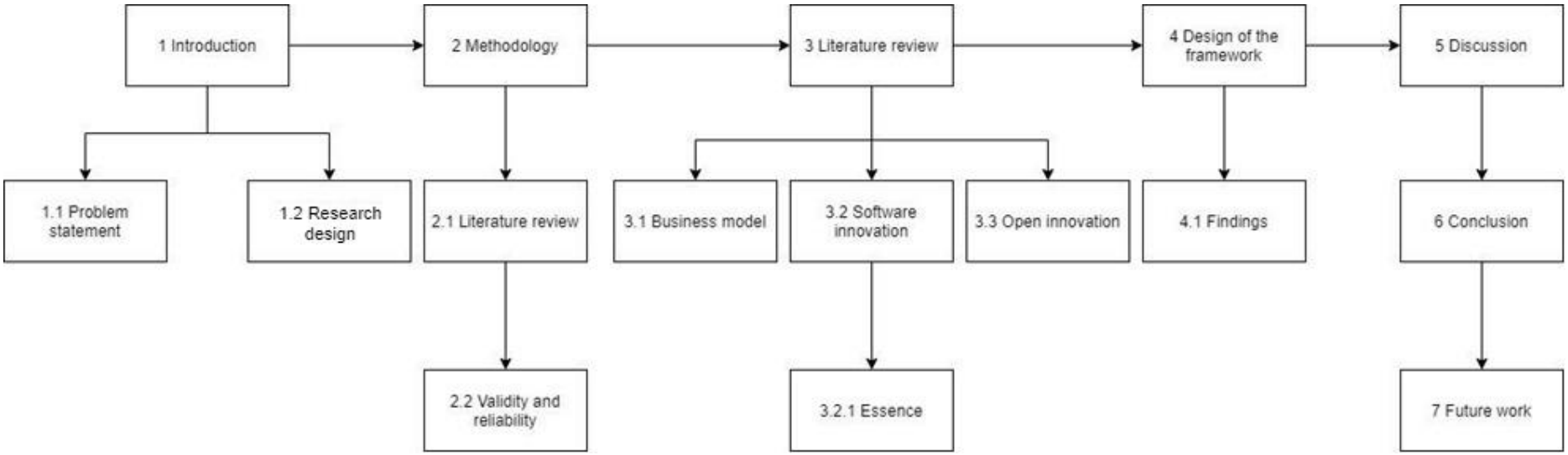

Figure 1. Thesis conceptual framework

Fig. 1 above depicts the conceptual framework the thesis' structure is fashioned after. Taking into consideration the decisiveness of the research direction, as well as the research methodology and the expected outcome, the thesis chapters follow a simple sequential order, similarly to the waterfall model. The numbering of the boxes correspond with the actual numbering of the chapters and their respective subchapters, as is found in the paper:

1. **Introduction** is used to give context to the problem statement.
2. **Methodology** is the detailed description of the research methods applied based on the problem statement and the scope of present paper. This includes the literature review conducted in the case of the business model concept, the topics of software innovation (including the decomposition of Essence (Aaen, 2019)) and open innovation (Chesbrough, 2003).
3. The **Literature review** chapter is the synthesis of the three main concepts of the paper (namely, business model, software innovation, and open innovation) and the findings related to how the concept of value proposition is present in these concepts, relative to the CPV.
4. The **Design of the framework** chapter consists of the presentation of the value proposition framework as derived from the findings of the theoretical conceptualization of the **Literature Review** chapter (3), in the form of a visual model showcasing all three main concepts of the current paper in relation to the value proposition they offer, and how these contribute to the CPV, thereby providing an answer to the **Problem statement** (1.1) in the **Findings** subchapter (4.1).
5. The **Discussion** chapter summarizes the relevance of the framework and explains the limitations of the current paper.
6. The **Conclusion** chapter summarizes the overall thesis and the importance of the research subject.
7. The **Future Work** chapter suggests future directions that the topic could take in terms of research.

2. Methodology

This section describes the literature review conducted during this research. As the thesis assumes a theoretical view on its subject matter(s), the integrative literature review was chosen as the main methodology. Subchapter 2.2 is dedicated to validity and reliability concerns regarding the paper. The main purpose of the literature review was to identify the most commonly found business model components and their relation to the software industry, as well as to contextualize Essence by defining software innovation, and conceptualize open innovation.
The findings of the literature review (ch. 3) facilitates the design of the CPV Alignment Framework, seen in ch. 4.

2.1. Literature review methodology

The literature review, as the name suggests, is a research methodology, which reviews and concretizes the established academic knowledge within the reviewed area with the purpose of contextualizing and objectively analysing the research subject. In this chapter, such methodological considerations are described in detail (Winchester and Salji, 2016).

The literature review is an essential part of any scientific inquiry, partially to ensure that the research carried out is a valuable contribution to the academia, and partially to systematically contextualize the research topic and familiarize both author and reader with the accumulated knowledge, in order to enable summary and critical evaluation of the concept(s) in question (Fink, 2014; Ridley, 2013).

Literature review as a research methodology

In general, literature review summarizes and synthesises the knowledge of primary research studies, with the purpose of offering a new perspective or interpretation, preferably expanding upon the original sources' results. McNabb (2018) argues for three purposes that a literature review has to fulfill:

1. Through the literature review, the author can show familiarity with the most relevant academic contributions done in the respective research topic.
2. The literature reviews can, and should, identify the current main issues arising in academia
3. Last, but not least, the literature review helps the reader to follow and comprehend the research theories deemed most important and presented in the research study.

The literature review is by no means only a list of published articles, but rather an evidence-based synopsis on the subject matter, ideally offering a balanced perspective, in order to identify possible discrepancies in the academia, and to review and further the current established knowledge (Winchester and Salji, 2016). These are also called formal literature reviews, where the subject matter is analysed in-depth, in order to qualify as a valid research methodology.

Literature reviews are vital for the research idea to mature, synthesizing pre-established knowledge, thus enabling the researcher to discover discrepancies and address them, thereby creating new knowledge (Winchester and Salji, 2016).

Literature review provides both context and content, making sure that any findings are taken into consideration, in order to avoid misappropriating scientific evidence. Additionally, literature review can provide much needed reference points, so that the implications of one's research can be clearly stated and understood.

Types of literature reviews

There are several types of literature reviews to choose from (see table 1 below).

Table 1. Literature review types. Source: libguides.usc.edu

Argumentative Review	Selective examination of the literature to either support or refute an assumption by establishing an opposing viewpoint.
Integrative Review	Collects and summarizes representative literature in order to generate new perspectives or frameworks on the topic.
Historical Review	Focuses on a particular issue or phenomenon present in the literature, and traces its development path back to its origins to suggest future development for the issue.
Methodological Review	Reviews methods of analysis to provide understanding on different methodological levels, ranging from conceptual to practical documentations.
Systematic Review	Provides an overview and critical summary summary of all the research done regarding a clearly formulated research question.
Theoretical Review	Examines the accumulated corpus of theory of an academic theory, in order to establish a conceptual foundation, and to offer a hypothesis to be tested. This is often a form of review used to address lack of appropriate theories or gaps in the current ones.

Main objectives of the my literature review

The main objective of my literature review is to facilitate a theoretical academic introspection regarding the foundations of the value proposition found in the business model concept, Essence and software innovation, and open innovation. This is based on a thorough collection of articles pertaining to the primary concepts of this thesis, including typologies of business model components, conceptual dimensions, business model innovation, software business models, architecture and organizational strategies, as well as resource- and value chain management.

The secondary objective is to link the value proposition defined by the three concepts to the CPV, and design a framework that would be applicable to create an explicitly software development-related business model. Such a model then is hypothesised to be capable of optimizing the implementation of said concepts, increase the CPV, and thereby strengthen competitive advantage.

How I conducted the literature review

The intentions of my literature review is three-fold:

1. to assess the current state of the main concepts of this thesis in academia,
2. to synthesize knowledge accumulated of the value proposition concept and determine its relation to the CPV in software in the form of a conceptual framework;
3. to successfully identify challenges and key concepts that can or should be addressed further.

Due to the above mentioned factors, I decided to carry out an integrative literature review, where I have scrutinized the academic literature offered within the fields of the business model, software innovation, and open innovation, mainly regarding the idea of the value proposition these concepts offer. This was seen as the most ideal choice for the methodology to be able to establish how the value proposition and the CPV concepts have been addressed in the academic corpus.

Integrative literature review is considered to be a research methodology that collects, critically reviews, and synthesizes the more representative literature on one or more topics, so that new perspectives can emerge (Russell, 2005). The literature chosen for this type of review addresses related theories.[1]

Even though integrative literature reviews usually do involve the use of both qualitative and quantitative research data, my research interest decidedly lies more in the qualitative aspects of the concepts addressed in this thesis, therefore these papers were preferred.

[1] https://guides.lib.ua.edu/literaturereview

The integrative literature review allowed me to critically analyse the concepts, which form an integral part in my research, to help create a focused context, and thus be able to develop a valid theoretical framework for my findings. It also meant that I would be able to understand both patterns and gaps in academia, which might help me direct my attention to a state where I can either confirm the patterns or address the gaps in my findings.

Cooper (1998) has proposed 5 stages to conduct integrative literature review:

1. problem formulation,
2. data collection or literature search,
3. evaluation of data,
4. data analysis,
5. interpretation and presentation of results.

1) First, the purpose of the thesis had been defined. This was later modified, according to the findings during the writing process. The purpose pertains to the assessment of the value proposition as found in the three main concepts of this thesis (business model, Essence, open innovation), and how its purpose can be cross-conceptually aligned and elevated to contribute positively to the CPV.

2) In the second phase, relevant articles were searched and located, using The SAGE Encyclopedia of Qualitative Research Methods (ed. Given, 2008) by identifying trustworthy academic journals and searching, based on keywords, titles, and abstracts. The second phase included obtaining the articles deemed relevant through the AAU university library access to these journals. The main purpose of the third phase was to read the articles selected and obtained, and develop a research structure based on the evidence collected from these articles. The fourth phase included the analysis of the key contributions of the selected and read articles, and that involved certain iterations to the key concepts of the current research. The total number of articles found and read for the literature review is 228, albeit it does not mean that all of these ended up in the final analysis, due to the iterative nature of the research problem. They remain, however, considered as part of the research, and due to the time and effort spent on collecting and evaluating these, thus they are included in the total number. The details regarding the research articles read for this thesis can be found in its entirety in Appendix 1.

3) The third phase can be said to overlap heavily with both the second and the fourth phase. This phase technically decides, whether or not the chosen data is valid to be included in the final analysis. Both during the selection of literature in phase two, and the data analysis in phase four, considerations regarding the validity of the data have been seen as a necessity.

4) The fourth phase includes the decomposition of the main concepts of this thesis, and interpretation of the value proposition concept found during this process.

5) The fifth phase is the final dissemination of the findings in the form of the presentation of the conceptual framework as a result of the data analysis in phase four.

There was no preferred theory emerging as a result of the conducting of the research.
At the same time, certain papers, especially related to the aspect of aligning business model components, may be observed to have influenced the alignment framework of the thesis. Such one notable example is the Triple Layer Business Model Canvas (TLBMC) (Joyce, 2016), or the Strategic Alignment Model (SAM) (Henderson and Venkatraman, 1989). There were some historical considerations in the early stages of the thesis, when I was still in the process of deciding on the business model framework to apply in this thesis as the basis of the conceptual framework, like the Business Model Canvas (Osterwalder, Pigneur, et al., 2010), as a more prevalent example. In the end, I decided on a more abstract conceptualization of the business model, thus the final conceptual framework can appear easier to overview, understand, and adapt.

Method of prioritisation

In all the cases, priority was given to:

1. the more recent articles,
2. articles with research subjects related to the software industry or software development,
3. articles including more than one of the main concepts of the current research,
4. articles explicitly investigating the degree of relationship between one or more of the main concepts of the current research,
5. articles explicitly investigating the question of strategic alignment of one or more of the main concepts of the current research.

Literature review: Business model

For the business model literature review (ch. 3.1), the following keywords were used for finding articles deemed relevant: ’business model’, ’software business model’, ’software business model

framework', 'business model value proposition', 'business model value creation', 'software business value proposition', 'business model value creation and appropriation', and 'customer perceived value value proposition'.

The majority of the articles cited in the paper were from peer-reviewed and/or academic journals, published in English. Finding sufficient literature posed no problem on the subject of 'business model', but after going through several iterations of narrowing the search, the terms of 'business model value proposition alignment', 'IT business alignment', 'IT business value proposition alignment', as well as 'IT business architecture' produced a still satisfying amount of literature sources, without being nearly as overwhelming as in the case of 'business model'. Thus, the sampling strategy remained open-ended, with a combination of iterative searches on several academic databases (Elsevier, SAGE Journals, ResearchGate, Springer, ScienceDirect) to achieve both cross-fertilization of theories and the saturation of data (Glaser and Strauss, 2017) where no new theory would significantly contribute to the outcome of this paper (Fragkandreas, 2018).

Literature review: Software innovation

For the software innovation literature review (ch. 3.2), 30 articles were identified as relevant, and read, and the following keywords were used for finding articles deemed relevant: 'software innovation', 'business software innovation', 'software innovation methodology', 'software innovation value proposition', 'value proposition in software', 'software value proposition', 'software customer perceived value', 'software value proposition customer perceived value', and 'create value software innovation'. Additionally, software innovation is used to contextualize Essence and place it as part of a software business strategy.

Literature review: Open innovation

For the open innovation literature review (ch. 3.3.), the main keywords used for finding articles deemed relevant were: 'open innovation business strategy', 'open innovation value proposition', 'open innovation open business', 'open innovation software business', 'open innovation software business strategy', and 'open innovation customer perceived value'.

2.2. Validity and reliability in integrative literature review

Validity and reliability are both vital concepts in the establishment of general guidelines to preserve the integral quality of a scientific inquiry. The degree of validity and reliability found in a research paper indicate the quality of the research methodologies chosen and carried out. While validity is

designated to show the accuracy of the methodological measures taken, reliability shows the consistency of said measure (Middleton, 2020).

In the case of the integrative literature review, maintaining research validity and reliability depends heavily on the balance of the operational (search) definitions, lest certain important studies be overlooked or data interpreted erroneously (Russell, 2005). Furthermore, unfounded positive representation of the research articles used is preferred to be avoided, which, partially due to the exploratory nature of this thesis, was mostly successful (Cooper, 1998).

Standards of validity

Brown (2006) writes about five basic standards based on which to assess the validity of one's literature review. These are:

- **Purpose**

The purpose of a source can show certain bias towards one or another position regarding its subjects, thus it is important to choose literature material advocating for a more objective standpoint.

- **Scope**

Refers to the range of material, as well as the time frame used in the source. Depending on the nature of one's research, it might be desirable to distinguish between sources of more exploratory or more quantitative studies.

- **Authority**

Authority denotes the degree of primary and secondary data used in the source material, including the credentials of the author.

- **Audience**

Audience refers to the group the information was primarily collected and presented for. It can also have significance regarding the scope used in the source material, in case it proves to be too narrow or too broad to be used in the literature review.

- **Format**

Format is related to the method the data in the source is organized, such as into tables, charts, or otherwise written narrative.

As each of the above mentioned criterias are deemed important, they were taken into consideration in the present paper as much as the format allowed. While validity is about the accuracy of the research measure taken, reliability is the consistency or robustness of the measure. Validity being more often mentioned in connection with the literature review as measure, it has more evidence pertaining to how to uphold it throughout the scientific inquiry (Brown, 2015). As a result, reliability, during the endeavors of the present paper, is understood to be the authenticity of the concepts used in the literature review (Middleton, 2020), or rather, what is the rate of convergence attainable between the business model components, value proposition, Essence, and the degree of vertical and horizontal alignment achievable between these, focusing on their value proposition, based on the literature examined.

Considerations for the research integrity

One of the key considerations during the selection of the articles used for this review has been to provide a representative picture, both to enable certain flexibility in terms of research directions, while demonstrating knowledge both accurate and sufficient for the purposes of this inquiry. A key concern of the article selection was to ensure both relevance and sufficient academic quality of the articles.

The articles were mostly found through keyword-based search on a variety of databases accessed primarily from the Aalborg University Library (aub.aau.dk) and Google Scholar, and some were found through what is called 'snowball sampling', which eventually led to the quick exponential accumulation of the literary sample chosen for review. In hindsight, the percentage of articles for each keyword used, as well as selected for final inclusion in this paper could have been even more limited; however, the iterative nature of this research could not be avoided, hence the number of articles as mentioned above in chapter 2.1. On another note, inadequate sampling is one of the key pitfalls to the research results (Cooper, 1998), and the articles considered and used for the final version of this thesis have been, in fact, heavily vetted throughout the writing process.

Finally, one of the more important aspects of conducting a valid and reliable integrative literature review is to explicitly report the review findings, and make information about the review methods available (Cooper, 1998). These guidelines have been largely followed, albeit flexibility of methodology was required at times, during the pivots on research approaches in this thesis.

3. Literature review

This chapter examines and summarizes the concepts of business model, software innovation and open innovation, all found to be relevant topics to answer the problem statement. The findings regarding the value propositions of each concept of this chapter will form the components for the framework presented in the Design chapter (4).

3.1. Business model literature review

This section is a literature review of the most important academic research, regarding the concept of the business model and its value proposition. The purpose of the chapter is both to demonstrate the level of complexity found within the business model concept, and to position the value proposition as an essential component in reaching the optimal CPV.

According to Osterwalder et al., (2005, p.17), 'a business model can be seen as the conceptual link between strategy, business organization, and systems', making the business model concept both vague yet extremely valuable, when done right. Consequently, the literature seems to prove that creating or modifying a business model requires more attention, than initially appears.

The purpose of business models

Until recently, business models have been understood and applied as a more static or linear concept, which may have sufficed in the case of traditional business management; however, the digital age we live in requires different paradigmatic approaches as to how a firm creates and delivers value (Heavin and Power, 2018; Gobble, 2018; Biloshapka and Osiyevskyy, 2018), and part of the business model reconceptualization begins with the value proposition. This includes the dissection of how it can be both reinvented and extended beyond its original context, in this case within the frames of innovation management in a software development firm (Powell and Hughes, 2016).

Business models are commonly understood as the 'commercial logic of value proposition' (Laasch, 2018, p. 158), involving its creation and appropriation of its value proposition. Despite the goal of business models (in a commercial sense) being dominantly the creation of value based on potential profitability, the model behind this logic is being built upon several types of activities, all contributing to the financial sustainability of the firm and its value proposition.

The value of business models

These theories bring the discussion to a whole new cognitive level, where the nature of business models are no longer understood purely from a commercial perspective or 'the money earning logic' (Osterwalder, 2004, p. 47), but rather as the holistic representations of what Linder and Cantrell (2001, p. 1) describes as the 'organization's core logic for (...) value'. This value logic, or 'logic of value', as named by Arend (2013, p. 391) is then assumed to be of higher ordinance than the purely profit-generating nature of a firm's value proposition.

Business models do not necessarily have a single predetermined self-serving organizational purpose anymore; in fact, in the pursuit of sustainable business objectives, a firm cannot disregard to iterate through several versions of its business model, including its value proposition, to create a nuanced offering, capable of meeting the needs of its customers in an increasingly hypercomplex world.

Business models as representations of reality

To reiterate, all authors previously cited seem to agree that a business model is the representation of the desired way a company does business (Taran and Boer, 2013). To emphasize, it is a *representation* of reality, rather than reality itself, and as such should be carefully interpreted. There is, moreover, a consensus concerning the primary goal of a business model, which is to generate revenue through creating, appropriating, and delivering value in a sustainable manner. As such, the actual representation of the modus operandi of the firm activities, however, can be vastly different, with the most well-known, the Business Model Canvas by Osterwalder et al. (2005), spanning 9 building blocks, while on average the business model components can be categorized into 4 collective blocks (Morris et al, 2005).

The business model remains a highly fluid term, as well as a potentially powerful source of competitive advantage. Yet it is only possible, if a firm can take advantage of it by defining its components and activities, and manages to align it with all its direct and indirect organizational levels. This is also one of the reasons why interest in the evolution of business- and innovation ecosystems and its role in innovation management has been rising (Annanperä et al., 2015; Valkokari, 2015; Talmar, 2018).

The role of business models

When it comes to defining the role of the business model, according to Petrovic et al. (2001), it should be understood as an entity meant to connect all other business concepts related, such as operational activities, or firm strategy. This view is also reflected in some notions of enterprise

architecture (Aier et al., 2008), where the goal is to create a shared understanding of the application scenarios, as well as to accurately represent the business layers and their relations.

Value as a business model component

In recent years, studies have focused on investigating the value of business models when it comes to its ability to gain profit of its innovation capacity (Björkdahl and Holmén, 2013; Chesbrough & Rosenbloom, 2002). According to Szeto (2000), innovation capacity denotes the continuous refinement of firm capabilities and the development of its resources to make use of the opportunities that lead to new product ideas, in accordance with customer needs and perceived value.

Value in a business is commonly defined as to be dependent on the Quality-Price-Ratio (or QPR), or the measure of perceived value against the perceived costs of the product or service. Value is generally a description of both the problem of the customer, and the value of the solution offered to it (Chesbrough and Rosenbloom, 2002).

The study of business models and their components can thus become a complex task, as no established definition of the business model exists, or rather it appears to be a rapidly evolving one; however, certain patterns of theory-building point towards possible points of intersection between the multi dimensionalization of the business model and the explanatory nature of these constructs. Some of these intersections include the more widely researched topic of value creation and value delivery (Peteraf and Barney, 2003), and how the organizational strategy supports these activities. More recently, value appropriation and value networks have come under closer inspection, also due to the growing interest in open business models (Chesbrough et al., 2006; Di Gregorio, 2013; Ellegaard, Medlin & Geersbro, 2014**;** Memili, Fang & Welsh, 2015).

Value logic as business strategy

This apparent complexity of the business model does not only show in its intentions to create and contain a value logic, but in its architecture, or in other words the complementary nature of its building blocks. These blocks are considered to be value drivers on their own (Foss & Saebi, 2018), but furthermore, their interconnectedness may help generate the unique value that sets the firm apart from its competitors. Additionally, such a complex system may involve relationships that are both hard to imitate – but also hard to change. This appears to make the complementarity of these blocks one of the key considerations in the recent research of business models (Zott and Amit, 2010; Foss and Stieglitz, 2015). Furthermore, Foss and Stieglitz (2015) write that the establishment and

optimal alignment of said complementarity is a management decision variable, and thus part of the business strategy.

The issue of these management decision variables has also been emphasized for its moderator/mediator role in the value delivery of the firm's offerings. According to Chesbrough and Rosenbloom (2002), a new idea in itself contains no value unless it can be commercialized through the mediative complementarity of a firm's business model. The right choices pertaining to the business model can thus enable the firm to capture the underlying value logic through technology innovation and align it with the business model building blocks (Chesbrough and Rosenbloom, 2002). This alignment, in essence, should also be consistent with the firm's strategy and vica versa. Failing to make use of the moderating dimension of the business model, firms might prove incapable of aligning their business model with a new strategy they intend to follow, and thus see loss of profit or market share (Saebi and Foss, 2015).

The concept of value in business models

To be sure, the concept of value within the bounds of the business model is just as abstract as the main theory itself. On the other hand, just as with the business model, the value logic of a business model can be determined by its contextual relativity. Value can refer to both goods or services, and the value or worth of something can only be explicitly determined by contrasting it against similar alternative offerings (Ellegaard, Geersbro & Medlin, 2009). Moreover, value can also be understood as the difference between the benefits received and the sacrifices made (Zeithaml, 1988).

Other definitions of value, such as by Anderson, Jain and Chintagunta (1992, p. 5), emphasizes its 'perceived worth in monetary units', in terms of the benefits it provides to the customer in exchange for the asking price and considering the existing alternative suppliers of the same or similar offering.

The above definition highlights how value is a combination of the perceived benefits and sacrifices of obtaining it, including but notwithstanding the costs associated with the acquisition of said value (Ulaga and Eggert, 2006a). Moreover, further implications of this idea of the role of the perceived value of a product may also suggest that buyers can and will perceive the value of the same goods or services from a different cognitive level, assigning inherently different value logic to its perceived benefits (Mencarelli & Riviére, 2014; Medberg, 2016). However, this perception of value is neither static nor one-sided, but assumes a transactional relationship (between customer and firm) of a more fluid nature.

Software business models

Software business models are somewhat different from traditional vendors, both due to the nature of the product they provide, and therefore it is important to be aware of those differences when creating software development-related business strategy. Becker et al. (1999) found several environmental factors that seem to have a large impact on software business models, even though many of these can and do overlap with business models of more traditional businesses, including the market environment (competition, software laws, digital platforms, software pricing strategies), managing knowledge-intensive work and knowledge workers, handling the resources and the stakeholders of the organization, as well as CPV of software. The latter, according to Raymond (2009) can either have an economic value in *use* or an economic value of *sales*, with use value being of more worth to the user, and subsequently, to the vendor.

In case of software firms, the primary decisions concern choices regarding product development and design, the degree of product vs. service present in the value offering, the supply chain or distribution channels, employee competences (often requiring continuous training courses to maintain skill level), and R&D policies, among others (Rajala et al., 2003). According to Popp (2017), most software firms use a hybrid business model, or in other words, a business model created of one or more business patterns. Presumably, whereas the business model presents the type of business the firm conducts, the business pattern(s) shows the operational level, which is then linked to a revenue stream on a causal basis (meaning that the business pattern shows the cause for the revenue stream to exist). More importantly, hybrid business models can facilitate competitive advantage, for example, through synergies between multiple business patterns, as one revenue stream may support other business operations or the creation of a new product line. In this paper, I am predominantly concerned with Software as a Product (SaaP).

Software as a Product

SaaP, in short, means that the software product is sold to the customer in the form of a licence, but it does not signify ownership of the software. Instead, the user gains the rights to use the software for a specific purpose for a specific period of time (as the licence allows). The support and maintenance fees then fall on the software company's end, whereas the cost of operation and the fee itself is to be paid by the customer. Software companies are especially well-inclined to use hybrid business models, often acting as both Inventors (original creators of the product) and IP lessors (for software). One type of business model for Software as a Product can be seen below (*fig. 2*).

	Type of Goods/Services offered			
	Financial	Physical	Intangible	Human
Creator	Entrepreneur	Manufacturer	Inventor	n/a
Distributor	Financial trader	Wholesaler, Retailer	IP distributor	n/a
Lessor	Financial lessor	Physical lessor	IP lessor	Contrac-tor
Broker	Financial broker	Physical broker	IP broker	HR broker

Figure 2. Hybrid business model for SaaP. Source: www.drkarlpopp.com

The four business model archetypes depicted on *Fig. 2* above are: creator, distributor, lessor, and broker. The creator designs and transforms goods and internal assets into a product. The distributor buys and sells the same product to the customer. The lessor grants usage rights to a product or a service. The broker may be thought of as a middleman, facilitating a relationship between company and customer (Popp, 2011).

In SaaP terms, the inventor is responsible for the creation of the software product, a role, which is fairly widespread in the software industry. By itself, the act of invention may not lead to commercialization, thus many consider the inventor archetype as connected to sunk costs in business. The commercialization often happens through IP distributors or IP lessors. The contractor is responsible for the maintenance and support functions.

Additionally, research about the specificity of the software industry has resulted in the identification of unique economic characteristics (Schief, 2014), in support of the hypothesis that the value offerings of the software industry are, indeed, inherently different from any other business sectors. As a result, a table of 28 economic properties of the software industry, grouped into 6 larger categories, have been created, based on software firm resources and software markets (Buxmann et al., 2013; Schief, 2014). The economic properties seen in table 2 (below) have been collected based on various literary sources pertaining specifically to the characteristics of the market and the resources typically found in the software industry (Messerschmitt and Syperski, 2005**;** Engelhardt,

2008). The economic properties are a collection of both tangible and intangible factors, found most or only in the software industry.

Table 2. Economic properties of Software Business (Schief, 2013).

	Group	Economic Property
Software Firm Resources	Hardware	EP 1 Cheap storage of increasing EP 2 Increasing computing power EP 3 Secondary role of performance EP 4 Tradeoff between availability and capacity utilization EP 5 Development with information system EP 6 System dependency
	Human Resources	EP 7 High complexity EP 8 High need for good product- and system architecture EP 9 Possibility of standardization of software EP 10 Special requirements for security and authenticity EP 11 Iterative development
	Intellectual Property	EP 12 Intangibility EP 13 Ease of replication EP 14 Ease of modification EP 15 High requirements for technology and innovation management
Software markets	Financials	EP 16 High economies of scale EP 17 High economies of scope EP 18 New pricing models
	Customer	EP 19 Integration of external factor EP 20 Software as an experience good EP 21 Utility dependent value EP 22 Customer oriented design of goods and services EP 23 Opportunities of differentiation EP 24 High importance of broad user basis
	Relation	EP 25 High change barriers for customers EP 26 Customer involvement during product development EP 27 Support of users during information processing EP 28 Portability by information systems

Economic properties of software business models

The first group *Hardware* contains properties about software companies' dependency on hardware performance and the reliability of information systems, which the software product may depend on to run. The *Human Resources* group shows how software has high complexity, thus requiring dynamic and context specific behavior. The last group of software firm resources, *Intellectual Property*, shows that software is both easily copied and modified, thus the high requirements for technology and innovation management. The last three groups include factors pertaining to the software market. *Financials* cover the new pricing models needed to develop, price, and sell software. Often, parts of software can be reused to save time and costs, but it may take time to develop the software initially. *Customer* deals with the high degree of dependence on customer involvement during development, and *Relation* shows the importance of a high degree of customer-centric software products and communication.

However, success of these software business models may lie in both the optimal alignment of all these characteristics in a business model, as well as the ability to monitor the fulfillment of the factors detailed above, and change it if need be. Furthermore, later findings will be showcasing that often the aspects that are at first seemingly invisible (internal cross-department communication, project management capacities, technical skills) that can ultimately determine whether or not a software firm can, in fact, deliver on the value proposition promise.

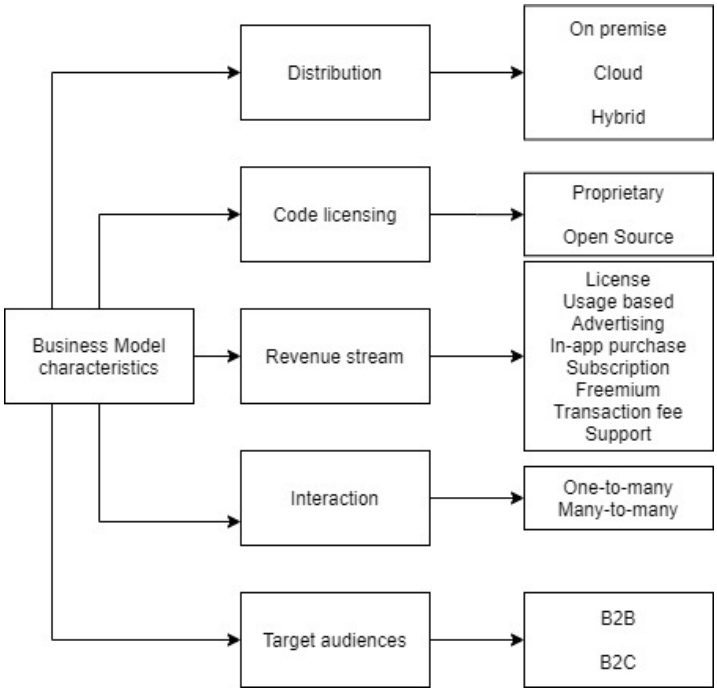

Figure 3. Software business model characteristics (2018). Adapted from altexsoft.com.

Cusumano (2004, p.1.) writes that 'software is not like other businesses', claiming it to be inherently different from any other industries, in terms of its economic properties.

These dynamics will slowly begin to see change, as new aspects of collaboration and business networks emerge. In the software business, the business model components and factors are said to be a combination of the following characteristics (see *fig. 3* to the left).

Value proposition in software business

Based on the findings so far, it would seem to be limiting to understand the value proposition in software business purely from an economic point of view, as Arend (2013, p. 398) attempts to recontextualize the value proposition as 'what is value to humans', even extending it further to include what value is to non-human elements. The value system of business models may be related to how value is represented to stakeholders of the organization (Randles and Laasch, 2016), which leaves the firm with a number of value types to choose from, which then can be turned into a number of value propositions with potentially largely different characteristics. Woodall (2003) makes it a point that human values influence decision-making on a daily basis, and thus influence how one perceives value. He further states that 'value is neither use, nor exchange; it is neither object-based, nor subject-based; it is neither my view, nor your view, it is all of these things' (p.5). Depending on the recognition of those variables, and translating them into relevant value propositions may be crucial in order to create a business model which can (financially) exploit those value propositions. Therefore, co-creation of value and the shared value logic emerging from that is the first step towards the cohesive alignment between value and business model (Laasch, 2018).

Value proposition is also inherently connected with the behavior of the customers, essentially creating the baseline for any business. However, software- and technology-intensive businesses have been shown to have difficulties developing and maintaining an interface between their development activities and the customer's perception, leading to being called 'too engineering and technology driven' (Helander and Ulkuniemi, 2012).

Helander and Ulkuniemi (2012) also found that, in the context of software, the interaction during an exchange transaction actually contains a lot of aspects not directly involved with the exchange object, but these may still have a significant impact on the total value perception of the software product or service. The difficulty thus lies in determining the concrete field of influence of the relationship-related value; nevertheless, what remains important is that the CVP is in fact a sum of things, both directly and indirectly involved with the business offering. This is also confirmed by Shanker (2012), who, in his article about open-source software value creation, has uncovered five value offerings a firm can use to define superior value propositions to their customers, which supposedly provide distinctive, measurable and sustainable benefits over the competitors (Anderson et al., 2006) (see *fig. 4* below).

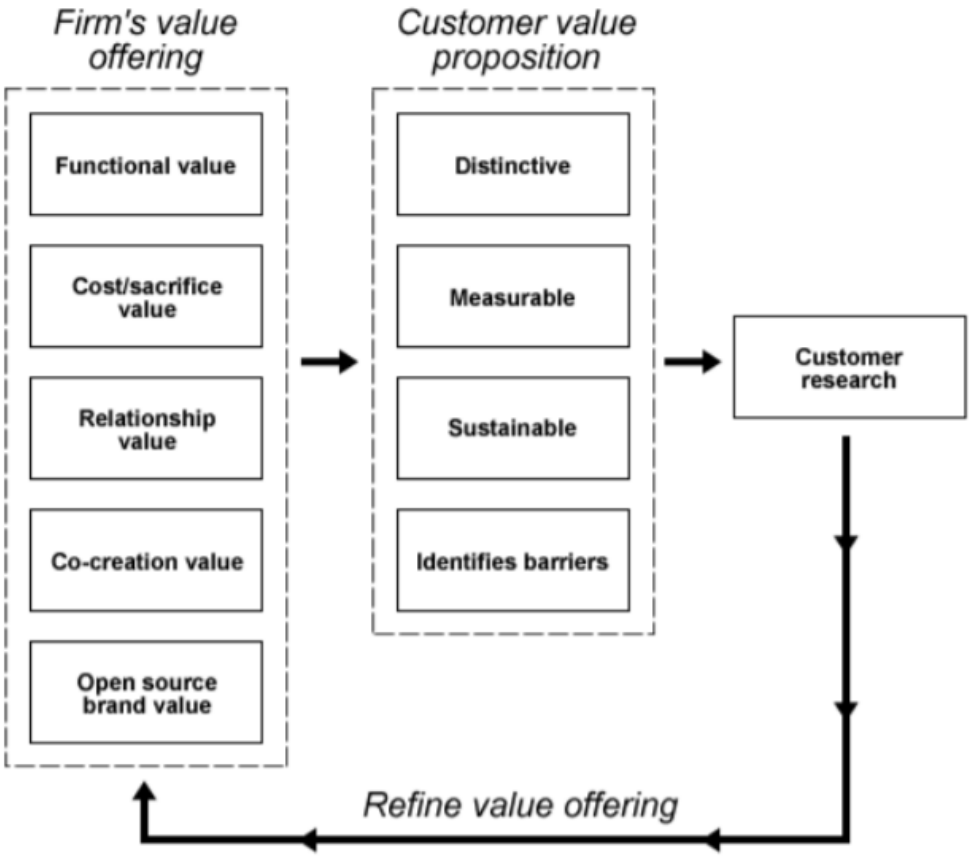

Figure 4. The flow of CPV. (Shanker, 2002)

Value proposition is composed of both the firm's capabilities (what it can do for a customer) and its offering's impact (the solution and the costs or trade-off of the offering) (Barnes et. al, 2009). The costs associated with the value proposition can be nominal (Shoham and Fiegenbaum, 2002; Slater and Narver, 2000), or non-nominal, including the risks and the effort required to obtain the value offering as perceived by the customer (Kambil et al., 1996). Value is created and generated over time; however, the perception of value happens instantaneously, creating an instantaneous cognitive cost-benefit analysis in the customer's mind (Barnes et al., 2009).

Customer Perceived Value (CPV) defined

As a formula, CPV is the total perceived benefit minus total perceived costs. Even so, what is exactly the benefit and the costs associated with a specific offering? One must consider the traits and functionalities of the product (Kambil et al., 1996), as well as the nominal and non-nominal costs of it. It is a complex process, adding also the fact that a company can essentially differentiate its value proposition in virtually infinite ways, such as location, service and service support, product features and product mix, reputation, relationship with other companies, and linkage between the firm's products (Caruana et al. 2000; Trkman, 2010).

When it comes to the customer, CPV is often emphasized as being the single most important, as well as the most challenging task of a firm, considering how they tend to lack a working method for measuring the quality of 'value-in-use' (Lusch and Vargo, 2014), and yet knowing one's customer will influence every other decisions pertaining to operating the business. Even more perplexing is the generic service settings becoming constantly diversified and thus the phenomenon of customer engagement and customer co-creation challenged, making the evaluation of CPV in place difficult or near impossible. The discrepancy between the firm value proposition and the customer perceived value of value-in-use may be one of the constant challenges that a firm has to tackle successfully.

Being able to define the CPV may provide the most important lifeline of a business – it tells about the benefits that a customer thinks the product provides, which then makes purchasing it desirable. Evidently, the outcome of the decision-making process is not necessarily dependent on the objective quality of the goods or services that are to-be-purchased, but rather on the perceived benefits that these things provide. Such considerations are also shown in *fig.5* below.

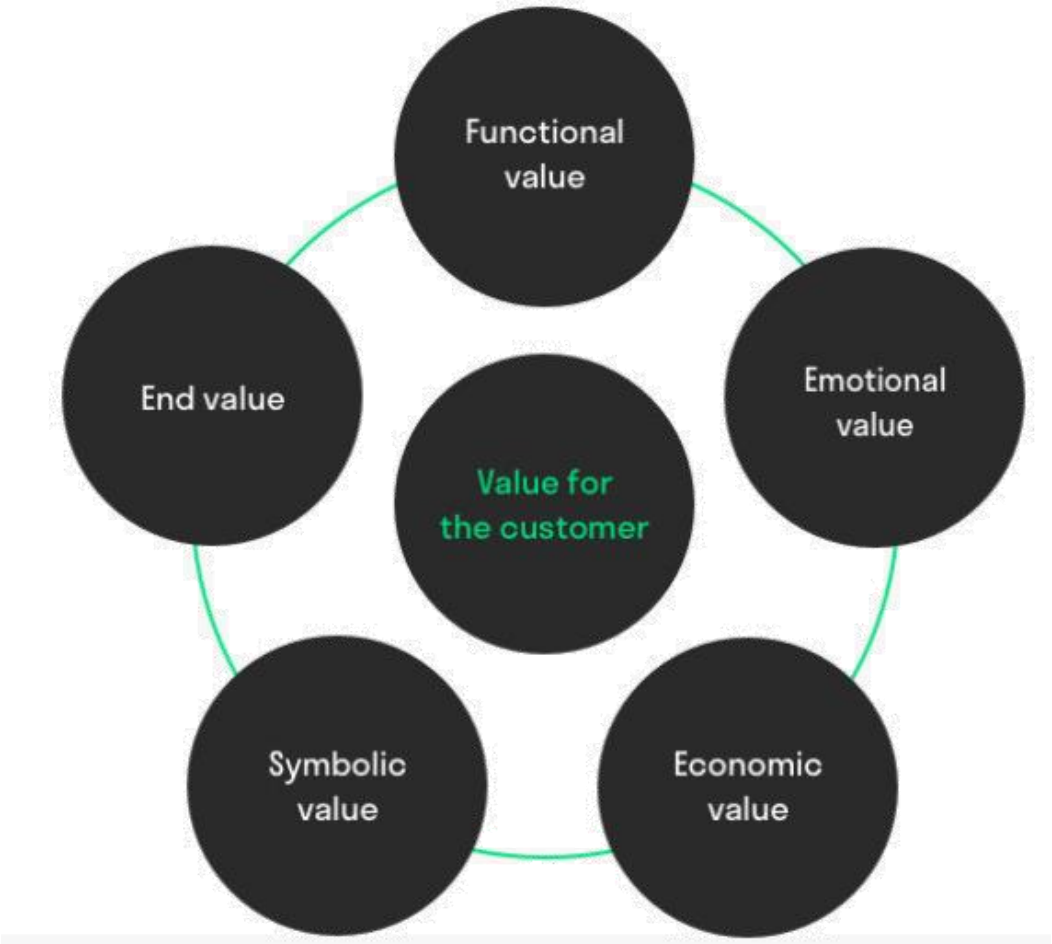

Figure 5. Customer Value Proposition Framework. (Mulder, 2012)

Functional Value	The convenience of using the product/service and its ability to solve an acute customer problem compared with the competitors
Emotional Value	Personal attachment to the use of product/service
Economic Value	The use of product/service is financially beneficial for the customer
Symbolic Value	Often refers to the status represented by using/owning the product/service, and may be connected to brand awareness
End Value	All the other categories represented and how they contribute to total customer satisfaction

In fact, the objective value may just be one small part compared with the number of other factors that can influence the CPV of a product or service. With that being said, during the value proposition assessment, the customer will take into consideration certain perceived cost-related characteristics of the product, such as the nominal prices, as well as the costs related to the act of buying and using the product (Slater and Narver, 2000; Montoya-Weiss et al., 2003). This means that apart from the actual price of the product, the costs of other factors, such as time, risk, effort will all add up to the total perceived price. Thus, the CPV may be defined as the amalgamation of the perceived benefits and the perceived costs. In other words, the CPV is assumed to become higher in the case of higher perceived benefits and lower perceived costs (Lindic and Marques Silva, 2011).

CPV and value proposition in software business

A value proposition is for the company to know and embrace, but it defines the company's core method of relating to the customer, concerns the efforts made at providing the customer the highest quality of value there is while maintaining profitability. However, some studies mention that generally, value propositions lack clarity and alignment with customers (Anderson et al. 2006; Lindic and Marques Silva, 2011), and that might be due to companies defining their value proposition not in terms of CPV but rather in what they offer, which is to say without too much consideration for either customers or competitors (Anderson et al. 2006). As a result, the proposed business value

proposition may provide neither real benefits nor be unique to the industry the firm is located in (Anderson et al., 2006; Kim and Mauborgne, 1999).

Anderson et al (2006) offers some suggestions as to the characteristics of the good value proposition, namely that it should be distinctive, measurable, and sustainable. Barnes et al. (2009) adds that the value proposition should not reflect on the company's self-perception about the features of their offering so much as about the proposed / potential customer experience when interacting with the firm's products or services.

In the case of the software industry, the challenge has always been about meeting the customer demands to solve real life problems with the use of software, and that remains the core software value proposition. However, it also carries the burden of always having to be able to release system-critical fixes, updates, and maintain and enhance performance and stability of the software product. Sweeny (2017) in his article regarding the fulfillment of software value proposition asks whether or not it is the continuous delivery of newer and newer features that deliver the value the customer really needs. Or perhaps it perpetuates a narrative, where software companies end up competing through the features of the product and disregard adopting so-called service mindset. This is also a notion the literature seemingly corroborates, by highlighting the positive connotations between the CPV and customer co-creation and engagement between customer and firm.

Sjödin et al. (2020) also writes that the involvement of the customer remains vital, both when defining the value proposition and when designing the distribution system of the value in-use. Following that, regular monitoring and refining of the processes related to the value logic is recommended. Value proposition encompasses everything that is perceived valuable by the customer (Barnes et al. 2009), thus the customer decision-making process should be an essential part of the business strategy. Overall, the need for a strong value proposition is the same in every industry, but as the software business is becoming ever more competitive, as well as the offerings becoming more and more complex, there is a clear use for a customer-centric value proposition, which is efficiently and transparently communicated to the right audience on every level of the business.

Synthesizing the business model literature and its value proposition concept enabled both the recognition of the patterns that are more present in software businesses, thereby separating the concerns and the CPV of the software industry from more traditional ones. Furthermore, the importance of the customer involvement in creating and delivering value successfully has been established, as well as the need of a more unified overview of the business activities to make strategically sound decisions.

3.2. Software innovation literature review

The following chapter includes the conceptualization of the term 'software innovation', as well as a decomposition of Essence (see chapter 3.2.1) as a software innovation methodology. Positive CPV seems to be facilitated by emphasizing the problem-solving capacity of software innovation, matching actual customer needs with technical aptitude.

Schumpeter (1934) claimed that innovation, when understood as the creation of new resources or the combination of existing ones, is 'the main engine of economic progress in capitalist societies' (Fragkandreas, 2018, p. 1). Innovation begets competitive advantage through creating more resilient and sustainable organizations (Fagerberg, 2005; Tidd et al., 2005), despite the high risks associated with it (Van der Panne el al., 2003). The notion of economic benefits associated with innovation has also permeated the software development industry, where it has developed characteristics unlike in other industries, presumably due to the extraordinary nature of software (Pikkarainen et al., 2011).

Innovation in itself signifies great potential to create added value for a business, but what to innovate exactly might be challenging to determine, as innovation neither appears to lead directly to enhanced perception of benefits (Anderson et al., 2006), nor does product innovation (as in, better or more product features) create an increased perception of value proposition (Bower and Christensen, 1995; Christensen and Overdorf, 2000).

The purpose of software innovation

Software innovation has been a core concern of most software companies, and many have mastered what Codenie et al. (2011) calls the *art of software engineering*, in other words the ability to deliver software of reasonable quality in a timely manner. However, these authors also argue that companies should consider becoming more innovation-driven, rather than engineering-driven.

Software innovation, in general, is concerned with the development of software-intensive systems (Eckroth et al., 2007), where software provides the utmost value. It means that software is required for both the input and the output of the system. In business model terms, it is required both for the creation, the appropriation, and the delivery of value. Innovation formulates a decidedly large part of the software development industry (Edison et al., 2013). Software innovation should aim to support development teams in generating, maturing and implementing solutions that are considered valuable to the end-user – or customer. This also means that, throughout the course of the development, the team is required to reflect on their process and decide whether or not to persevere with the course of the project development. It also means that innovation is typically a

continuous process, and something that can happen during any point of the development process, making it even more difficult to conceptualize. Innovation is thus becoming ubiquitous.

Software innovation is context-dependent, as software companies come in different sizes, with different needs, for both creativity and innovation, albeit there can be found a set of common patterns and needs which can and should be addressed with comprehensive software innovation frameworks. However, some characteristics can be determined in terms of what makes software innovation both challenging yet different from any other industry. For one, software is both change-driven and drives change, thus innovation should be expected to happen in any stage of the development; moreover, software is intangible, thus instead of physical and tangible characteristics, a different way of thinking should be applied. Rose and Furneaux (2016) has published one of the most recent comprehensive literature reviews about software innovation, which I use as a reference material for the present chapter.

Innovation and software innovation is not the same concept; however, the underlying philosophy of innovation and innovativeness should be transferable regardless of industry. Innovation is described as the combination of a 'creative act and the process of invention that is carried into wider use' (Rose and Furneaux, 2016, p.2), in order to bring about conscious changes to individuals or groups of individuals. Product innovation is straightforward, inasmuch as it is the development of 'a useful new software application' (Rose and Furneaux, 2016, p.2)and is often the most explicit value proposition of a software firm.

Software product innovation

Usually, software product innovation means new software functionality, and by that logic, new code. Software product innovation, however, does not only require the presence of software systems, but also the processes, such as procedures, organizational culture and the tasks associated with the development efforts, to support the creation of the software product. Such processes can be interpreted as tools or methods to coordinate the work needed, and as such can be also referred to as software process innovation (Carlo et al., 2011). In other words, alterations made to the way the software development team organizes its work and is being supervised are categorized as process innovation. This is interesting to mention in the current paper, because Essence (Aaen, 2019), as it will be introduced in the next chapter, is a software innovation methodology that is preoccupied explicitly with software product development; however, at the same time, it does offer a framework for the creative process involved with the software development work, emphasizing teamwork and user-centered development. Rose and Furneaux (2016) considers software process

innovation as a key contributor to the successful development of innovative software products, and, as such, the driver of product innovation.

The academia furthermore has attempted to categorize innovation types in many shapes and forms, but if one follows the Oslo Manual (2018) definition, product innovation is described as 'A good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, software in the product, user friendliness or other functional characteristics.[2] (*fig. 6* below).

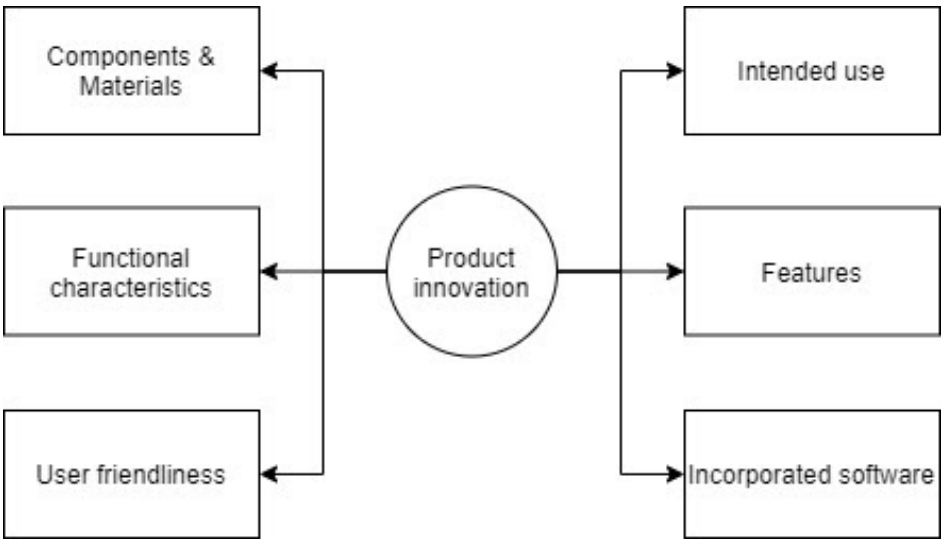

Figure 6. Product innovation factors.

The figure above may not be directly pertaining to software product innovation, but these traits appear more or less transferable; more importantly, they offer an idea that (software) product innovation is a similarly multidimensional concept, requiring the understanding of several actors, as in the case of the business model.

Software innovation and customer co-creation

Regarding the role of customer involvement with co-creation of value and software innovation activities, Kristensson et al. (2008) writes that the pre-existence of trust between stakeholders, as well as intrinsic motivation suggested by the proposed personally beneficial outcome of the co-creation activity, would signify a much larger chance for the value co-creation and thus, the innovation activity, to be ultimately objectively successful. In the case of a business-to-business (B2B) negotiations, these variables may play an even bigger role, seeing how vital trust is in order to form and maintain a strategic business alliance. This involvement resonates with the more or less

[2] https://www.oecd.org/site/innovationstrategy/defininginnovation.htm

shared understanding that customers have, in fact, an important role as value co-creators along with the firm (Vargo et al., 2007).

Furthermore, Rose (2010) in an earlier writing of his, urges software developers, to consider the role of the customer, as well as the impact the product makes on the customer, more carefully, given that 'successful software innovation can promote (...) widespread changes in the behaviour of its user community' (pg. 43). In other words, the nature of innovation is evolving. What may originate from the confines of the R&D department will and should create a cycle of feedback in the form of response, and perhaps, 'social change' (pg. 43) within the customer groups. This creates just as much of a challenge, as an opportunity, by implying that the customer should be part of the development process from end-to-end. In fact, according to the Stanford School Design Thinking Process[3], the creative problem solving process (or in this case, the product innovation process) starts with empathizing (see *fig. 7* below).

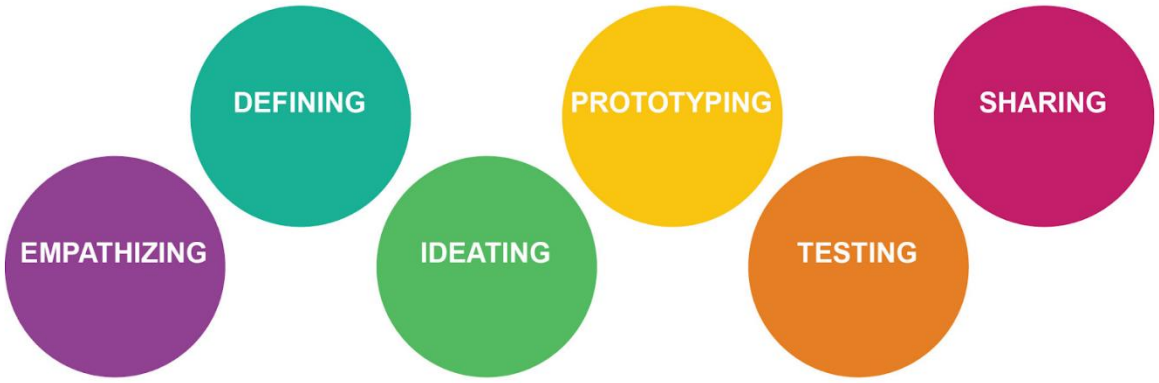

Figure 7. Design Thinking Process, as defined by Stanford School.

Drivers of software innovation

Ultimately, Rose and Furneaux (2016) identified eleven factors of four categories that are positively associated with software innovation or seen as a moderating effect on it, and these will be taken into consideration when answering the present paper's problem statement, as many of their observations and findings were seen as to be converging with the topic of the current discussion.

1) Managerial drivers (organizational environment, strategic goals)
   a) Innovation leadership
   b) Innovation evaluation

[3] https://dschool-old.stanford.edu/sandbox/groups/designresources/wiki/36873/attachments/74b3d/ModeGuideBOOTCAMP2010L.pdf

2) Knowledge drivers (exploitation of external and internal knowledge)
   a) Knowledge leverage
   b) Community and network
   c) User involvement

3) Team process drivers (the software development team's processes)
   a) Creative cognition
   b) Software design capability
   c) Teamwork
   d) Innovation tools and techniques
   e) Development framework

4) Infrastructure moderators (technological ecosystems)
   a) Installed base
   b) Path dependency

Their findings as to what drives software (product) innovation is quite in-depth, but it may be possible to categorize them according to the different business architectural layers. The knowledge drivers (2) seem to be best aligned with the open innovation processes, as part of the business model strategy. They assume leveraging both internal and external knowledge, deriving from the business network and an, ideally heavy, user involvement.

The team process drivers (3) seem to agree most with the operational layer, or the layer, which Essence is assumed to occupy, as part of the product development methodology. The managerial drivers and the infrastructure moderators both relate most to the business model layer, where both the strategic goals are formulated, and the resource management takes place.

Additionally, one needs to realize that innovation does not happen in a vacuum. As Karlsson and Olson (1996) wrote, 'it [innovation] results from either 'random collisions' or a cautious matching between technical opportunities and customer needs. A necessary condition for such 'collisions' or matching is communication' (p.31). This latter observation, regarding the role communication plays in facilitating the ideation phase of identifying problems and often the solutions, too, will be touched upon in more detail in the chapter for the open innovation literature review (3.3).

3.2.1 Essence

Innovation, according to its most basic definition, is understood as profitable creativity. While creativity is hailed as the main source of innovation, innovation is the 'value adding process leading to commercialisation of ideas' (Williams, 1999, p.1), in other words, innovation is the main source of value for the customer, and thereby the organisation. Innovation then is also potentially more successful, if it is connected with a defined value proposition, to be able to meet the needs of the customer (Fragkandreas, 2018). There can be found various innovation typologies, alluding to a number of innovation dimensions, such as the 4P model of Francis & Bessant (2005), Garcia &

Calantone (2002), or the multidimensional framework of Hanchi and Kerzazi (2019), but for the sake of a focused argument, this paper only uses Essence as innovation framework. In short, Essence is innovative problem-solving, made for software development teams.

Essence takes its inspiration from the concept of Deweyan pragmatism (1938). It is important to draw a distinction, as pragmatism itself is a paradigm with a large history (Pierce, 1877; James, 1907; Dewey, 1938), and many philosophers have tried to formulate their own version of it. Since it is mentioned in detail in Essence (Aaen, 2019), it was thought fitting to take a closer look at how Deweyan pragmatism can be a part of software innovation.

Most philosophical, as well as scientific, inquiry begin by attempting to define what constitutes Truth for them. In general (and for the sake of the brevity of this paper), the three most widespread contemporary theories of Truth are Pragmatic, Coherence, and Correspondence. Correspondence theory is closest to what we would call 'objective reality' or positivism, for that matter. Coherence theory (Young, 2018) is a little more complex, but it asserts truth as the logical consistency that exists within an entire system. In other words, truth *can* be assigned to single entities, insofar as they can be coherently placed within the system of beliefs they belong to.

Essence and pragmatism

Essence, according to its author, is a 'methodology for innovation based on pragmatic philosophy'. (Aaen, 2020, pg. 3). Innovation here is understood as it being experienced through problem solving with a group of (presumably) individuals of different academic backgrounds.

As it has its roots in pragmatism, Essence defines software innovation as a learning process, where each new experience contributes to a deeper understanding of the problem, thus resulting in the pragmatic combination of establishing a problem and translating it into a problem-solving action.

As mentioned, valuable problems are considered those which encompass 'all or nearly all elements (...) of a problem' (Aaen, 2020, p. 7). This means that the ideal teams to work with innovation would be considered those of interdisciplinary *and* heterogenous nature. However, this is rarely the case in reality, as most software developing teams tend to have similar or the very same technical background. One argument diffusing the severity of this statement may be that even in the case of similar education backgrounds, people still have their individual skill sets and their unique point of view to offer. This also holds the conviction that there is no one solution to a problem, but one that the team has to choose, based on a number of problem-dependent criteria through a number of iterations.

Value in Essence

Value is created through the ’systematic use of diverse viewpoints’ and ’focus on idea maturation’ as opposed to idea generation (Aaen, 2019, p. 8.) Moreover, it uses user driven innovation (Bogers et al., 2010), as well as open innovation as some of its primary sources of inspiration. This also should emphasize that Essence recognizes the value to be found in creating shared value / value co-creation, mainly regarding the domain knowledge necessary to develop a product.

The main idea behind Essence is that software projects are becoming hypercomplex (Bohman, 1995) in a world, where systems are ’no longer clearly separated from each other’, but rather become interdependent to form new human-computer ecosystems, increasing the possible choices of solutions to software-related problems. Moreover, the field of software innovation does show a disturbing lack of tradition for systematically supporting creativity during software-intensive product development (Tharp, 2007). In fact, Desouza and Awazu (2005) and Shneiderman (2007) both report on innovation in software often being unplanned and occur as a result of ’risky behaviour’.

Innovation in Essence is the result and the process of continuous inquiry by a community, in this case, the development team. It converges the expertise of software development and problem domain, which results in the explicit need for cross-disciplinary communication.

Problem-solving in Essence

A project in Essence starts with a specific problem, and considering the wider problem domain (Ecology Filter) of the project, as well as the opportunities and threats (Leverage Filter) that may have a ’great effect’ on the outcome. These are categorized and rated, eventually arriving at an early Project Profile, denoting an initial project scope (see *fig. 8* below).

The Initial Project Profile is considered ’a meaningful starting point’ (Aaen, 2019, pg. 22), but it is inherently assumed that both the scope of the problem and the factors affecting it will change throughout development, as new knowledge emerges. This is more of a brainstorming session, relying more on pre-existing domain knowledge and *intuition*, especially when it comes to the rating of different factors. The Filters are meant for the team to converge their ideas into (hopefully) valuable solutions.

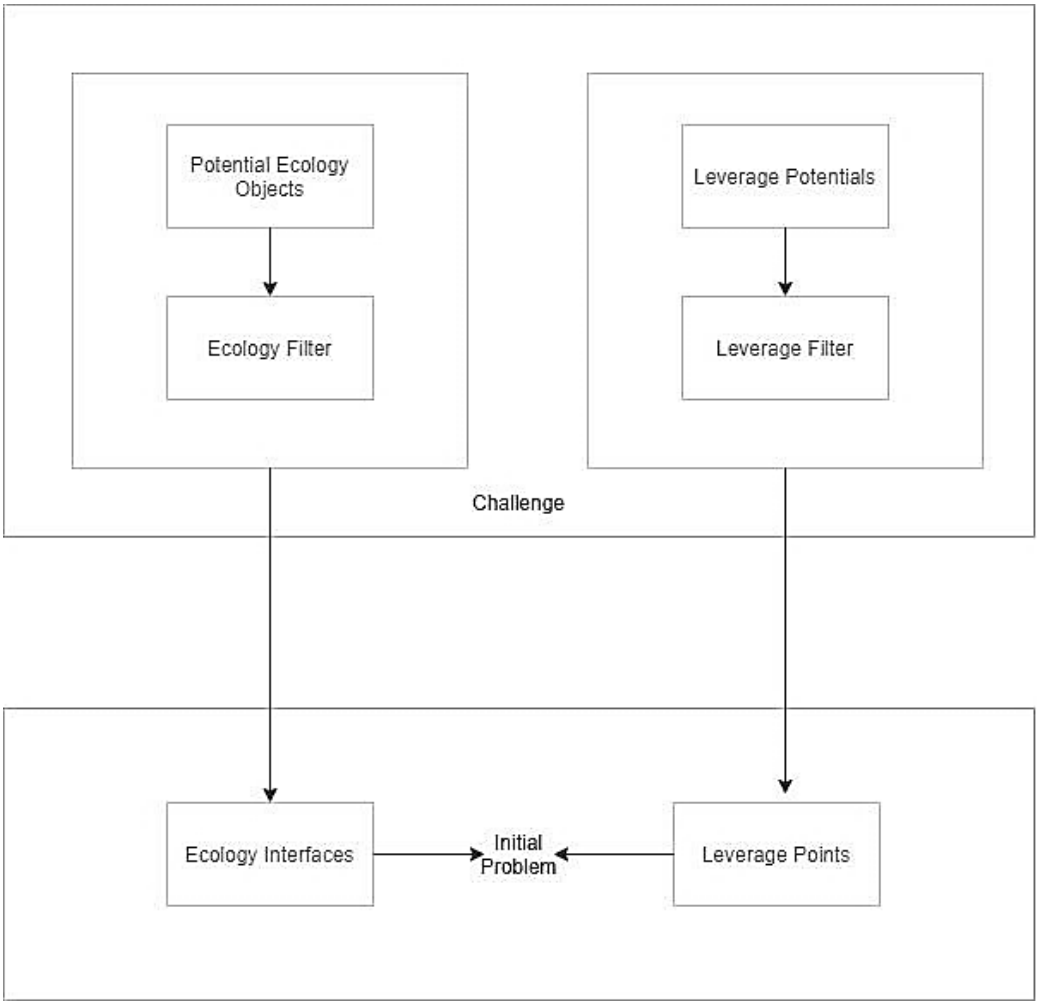

Figure 8. Initial Project Profile, adapted from Aaen (2019).

The team, after discussing the Ecology interfaces and Leverage Points, decide to prioritize one possible solution, acting as a development goal, but generally accepting it as a temporary measure. This means that, in the case that the team is aware that their chosen solution may not be appropriate for the specific user / customer, they have to be sure that they will receive user feedback, so that they can pivot during development.

After deciding on a temporary project objective, the team discusses system specifications for the product. This leads to the second phase of idea generation, namely the development of Prospect Scenarios. These are explicitly opposing or alternative ideas for defining both a problem and its solution.

In some way, the act of creating Prospect Scenarios axes resembles the Value Proposition Canvas, where both problem and suggested solutions are discussed and defined in relatively clear terms. After having defined the axes, the team moves on to coming up with concrete ideas for each quadrant in the form of Prototype, Metaphor, Proposition, and Icon.

The Prototype represents the physical design idea. Metaphors include strategies and cross-domain principles that might provide a solution. Proposition is the project objective. Icons represent the 'fundamental qualities to pursue in the project' (Aaen, 2019, pg. 37). Each team member gets one of these representation forms to come up with something for each quadrant. The choice of representation form seems to be depending heavily on personal preferences, and one team member is responsible for the same form for each quadrant.

After working individually on these Prospects, then discussing the results, the team collectively decides to focus on one particular quadrant, and moves on to the next phase to elaborate the representation forms found in there (see *fig. 9* below).

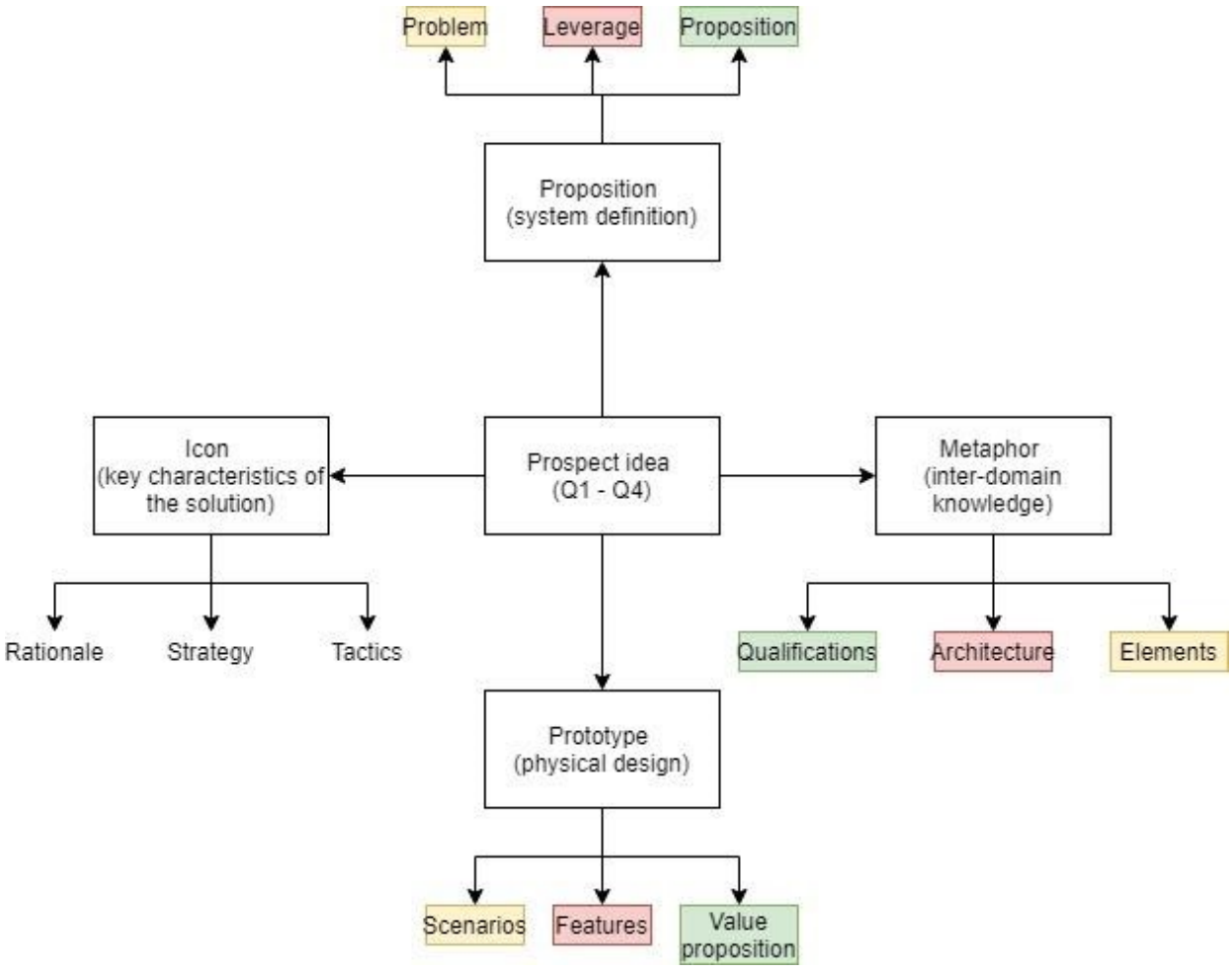

Figure 9. I need a caption here

The Icon quadrant is, in fact, supposedly establishing the baseline for the rest of the project, while dividing the rest of the quadrant aspects, depending on whether or not they belong to the *Rationale* level (why), the *Strategy* level (what), or the *Tactics* level (what). It is almost possible to draw similarities to how the Golden Circle describes the act of value creation in an organization, by answering the questions *why, what* and *how*, in this order (see *fig. 10* below)

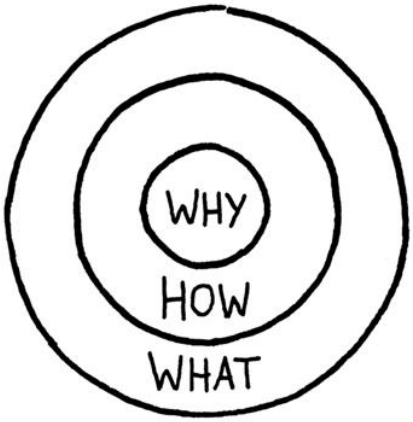

Figure 10. The Golden Circle.[4]

To interpret this concept and transform it in a way so that it becomes conceptually related to the business model logic, the prospect ideas of the chosen quadrant may be categorized according to generic business model components (see *fig. 11* below). Color coding according to *fig. 9*.

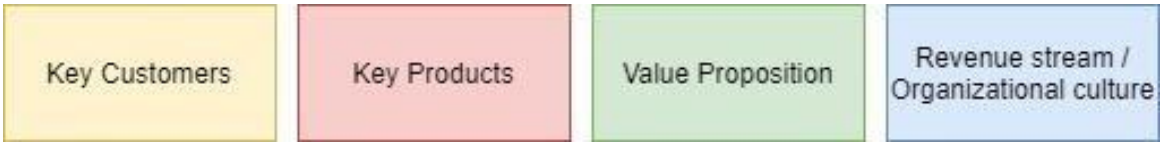

Figure 11. Essence Pre-Project Prospect ideas integrated into business model components. Made by author.

The definition of value proposition in Essence is very similar to that of the one in the business model: Something desired as a (partial) solution to the problem, which would benefit stakeholders (Aaen, 2019, p. 46).

However, the elements of the software project are seemingly equal to each other, as they are all considered of equal priority on all the three layers. All three layers overlap, yet they do have specific purposes. *Tactics* are concerned with the actual product / service in development. *Strategy* is concerned with the organization of the development work. Lastly, *Rationale* describes the larger value logic of the activities planned and completed in *Tactics* and *Strategy*.

[4] *https://www.scicomvisuals.com/giving-an-oral-presentation/*

The final product of applying Essence in the software development process is the Configuration Table, acting as the sum of all the above-mentioned interdependent aspects. The Configuration Table, in this sense, may be compared to the generic business model concept, as it is a Prospect, or rather, a grounded promise.

However, as opposed to most business model frameworks, the Configuration Table seems to contain a much larger focus on the issue of pivoting or persevering during development, almost inherently encouraging the development team to continuously reflect on the process and the potential outcome of it, in an attempt, no doubt, to try and optimize the product / service quality.

The Essence lifecycle is shown in table 3 (below), which allows me to break the framework up into components, to be later integrated with the business model concept.

Table 3. Essence Lifecycle. Made by author, based on Essence (Aaen, 2019).

Step/element name	Step/element description
1) Pre-project **Phase outcome:** **Customer pain discovered**	The customer problem is experienced. Nature of the perceived problem concretized. Informal discussions with customers. Tool as solution may be suggested.
2) Project initiation **Phase outcome:** **Team assembled** **Project start**	Formal meeting with (possible) stakeholders / investors / domain experts, possibly involving either the target customer or a customer representative, too. Broader problem domain agreed upon. Team is assembled and roles are divided, project milestones/KPIs, revision conditions decided.
3) Initial Project Profile **Phase outcome:** **Potentials Filter** **(*initial*) Project Profile**	Team brainstorms about project scope and customer needs. Available domain knowledge, data, tools listed as part of the potential solution. Potentials Filter are created to arrive at the Project Profile / Initial Problem.
4) Prospect Scenario(s) **Phase outcome:** **Prospect Scenario quadrants**	Prioritization of features. Developing a number of contrasting ideas (*prospects*). Identify both problem and solution based on the initial Project Profile. Establishing customer profile (*Problem Scenario*) and main product features (*Solution Scenario*).
5) Idea representation Form **Phase outcome:** **Prospect ideas x4**	Development team chooses and works on a specific Prospect Scenario quadrant individually. Define *Prototype, Metaphor, Proposition, Icon*. Team decides on one Prospect Scenario, and starts the (actual) development of the product.

6) Elaborated Prospect Idea **Phase outcome:** **Prospect**	Development team further develops each idea representation form of the chosen Prospect Idea individually. *Scenarios, Features, Value Proposition* *Elements, Architecture, Qualifications* *Problem, Leverage, Proposition* *Rationale, Strategy, Tactics*
7) Developing the Prospect **Phase outcome:** **Tactics Diagram** **Strategy Diagram** **Rationale Diagram**	First solution design. *Tactics* (how to achieve the solution), *Strategy* (what is required to achieve the solution), and *Rationale* (why should the solution be reached) are discussed.
8) Prospect Configuration **Phase outcome:** **Configuration Table**	The three Diagrams are integrated into a Configuration Table to provide overview and reflection on the current understanding of the problem(s) and the solution(s) offered by the development team. *Paradigm* – Problem Domain *Product* – Solution Domain *Project* – Value Proposition *Process (point of possible iteration -> pivot or persevere)* – self-observation
9) Pivot or persevere **Phase outcome:** **RST Reviews**	Solicitation of customer feedback on current state of product build. Team reviews current Configuration Table and checks for alignment issues between the RST rows.
10) RST Review	Informing stakeholders about current project status, and creates shared understanding between the team members (in case there are issues with it). Done between major development activities. The development team assumes specific roles during the review.
11) Pivoting to the second Configuration **Phase outcome:** **new Configuration Table**	Further development on the project. Pivot if necessary.

The largest benefits connected to using Essence may be its capacity to expand upon the existing agile software development principles, not through the necessary addition of further protocol, but by advocating for heterogeneous teams, where the customer is an inherent part of the entire

project, and not only the requirements elicitation phase. However, as with everything connected to innovation, it is always advised to adapt practices to the environment and the context of the working teams, to make sure that additional processes do not create unnecessary overhead.

On another note, Essence highlights the very important issue of having to constantly maintain active creative problem-solving capacity within a software firm, lest it should fall behind its competitors. It is neither a commodity, nor accidental: creativity, hence innovation, has to make up a substantial part of a firm's innovation strategy, in order to create value for the customer. Naturally, this requires the understanding of how said innovation will contribute to the value-adding activities. One suggestion is to redirect all resources and processes that maintain their integral value-creating capacity, such as facilitating contact with the customer, such as in the case of Essence, and thereby ensuring that the solutions built are, in fact, empowering the customer.

Coupled innovation process

While successful innovation has been linked to the effective combination of diverse clusters of knowledge (Nonaka and Toyama, 2003; Tidd et al., 2005), and the open innovation framework (Gassmann and Enkel, 2004) offers three perspectives on the exploitation of intra- and inter-organisational knowledge (*fig. 12* below), the Coupled process seems to be best suited for the purposes of maximizing the innovation capacity of a firm and minimize investment risks, including the use of Essence in software development activities.

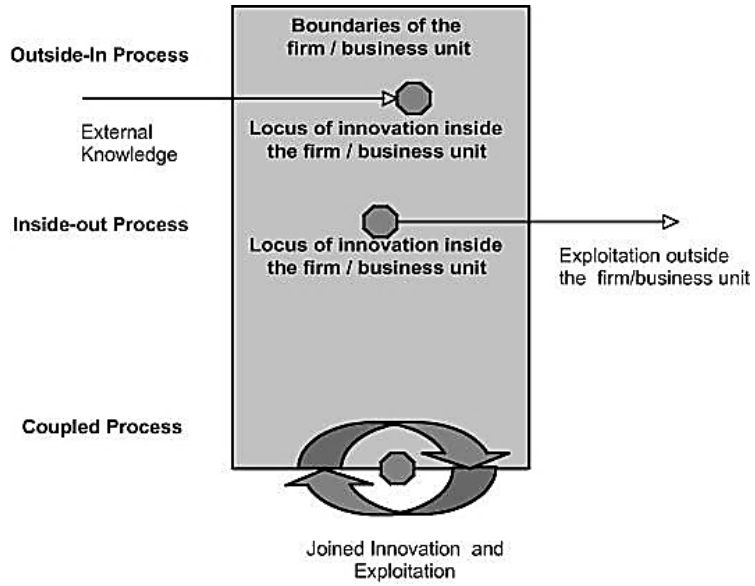

Figure 12. Adapted framework for open innovation from Conboy and Morgan (2011)

The Coupled process is the combination of the Outside-in and the Inside-out process, where the firm collaborates with actors in its network (or ecosystem), in order to strengthen the value creating

resources and capabilities of each partner through mutual exchange of knowledge. These cooperative innovation processes can then lead to increased innovation capacity, fewer costs associated with the acquisition of needed resources or skills, and overall improved process of value creation, resulting in revenue growth. Essence, if the innovation processes allow, can make up for knowledge gaps, associated with increased risk of failure, by encouraging the maximization of individual input through collaborative brainstorming, and as such, offset the risks connected with failed commercialization of the product.

3.3. Open innovation literature review

This section details the consideration regarding open innovation and its potentially positive impact on software firms' strategy as it encourages cross-domain and transparent communication.

In the last decade or so, open innovation research has seen a surge of interest (Chesbrough & Schwartz, 2007; Saebi & Foss, 2014; Keinz, Hienerth & Lettl, 2012), and, despite certain differences, they all seem to agree that firms, when successfully implementing open innovation practices, can directly benefit from capitalizing on external domain knowledge, in no small part due to organizational agility, or in other words, disposition to redesign the existing business model framework and its components.

Value creation with open innovation

These days, the core activities associated with value creation do not necessarily happen inside the boundaries of a firm, but rather occur as a result of the co-creation between actors of a curated business network. open innovation was already mentioned, and is one of the most prolific innovation processes as of late (Chesbrough, 2003), and one which is based on knowledge-sharing and collaboration in- and outside the firm. open innovation, defined as 'a distributed innovation process based on purposively managed knowledge flows across organizational boundaries, using pecuniary and non-pecuniary mechanisms in line with the organization's business model' (Chesbrough and Bogers, 2014, p.3), encourages knowledge sharing and collective creativity with the purpose of creating sustainable value. As such, open innovation is defined as the distribution of useful knowledge (Chesbrough et al, 2018), which may appear highly contextual at first, but it emphasizes the growing need of communication between the network actors throughout the entire open innovation process, as the sustainability of the process relies on value being generated to all participants of it.

Open innovation in business models

The core purpose of the business model is commonly accepted to be the creation and delivery of value (Teece, 2010; Zott et al., 2011). Traditionally, value creation is perceived to happen in one of two ways. One type of business model focuses on the optimal exploitation of internal resources to create value (Morris, Schindehutte & Allen, 2005; Timmers, 1998). Another type of business model emphasizes the value to be gained from the external network and arranging it as a way to further interfirm cooperation (Amit & Zott, 2001; Hienerth, Keinz & Lettl, 2011). The latter definition seems to be more in sync with studies alluding to the network-based structure of the business model, including studies of open business models (Chesbrough, 2006), dynamic business models (Mason & Leek, 2008), and collaborative business models (Chen & Cheng, 2010). However, among all of the new paradigmatic views of the business model, the notion of the open business model and the open innovation concept (Chesbrough, 2006a) is becoming more and more prevalent.

According to Chesbrough (2006b, p.1.), open innovation is 'the use of purposive inflows and outflows of knowledge to accelerate internal innovation and to expand the markets for external use of innovation', and is considered to be closely connected to the open business model. open innovation attempts to capture and generalize what is seen as a growing need for better customer engagement, integrated customer co-creation, collaborative and coopetitive alliances and technology innovation into the value proposition of a firm's business model (Gassmann, Enkel & Chesbrough, 2010), essentially turning into one of the go-to methodologies of business model innovation, with focus on knowledge sharing and knowledge. In a general sense, business model innovation is the process of implementing any change in a firm's business model, in order to enhance its value proposition and the operational activities that support it (Amit and Zott, 2012).

Furthermore, Chesbrough (2006a, p. 107) maintains that 'companies must develop open business models if they are to make the most of the opportunities offered by open innovation', by actively seeking external ideas and aligning them with the internal value creating activities in order to reach the firm's earning potential. As indefinite as this conceptualization may sound, the importance of knowing and exploiting the business ecosystem surrounding a firm is clear. This includes customers and suppliers (Sandulli & Chesbrough, 2009b), industry participants (Chu & Chen, 2011), and the employees (Purdy et al., 2012).

The merit of the open business model is that it encourages firms to involve this ecosystem of theirs into their strategy and decision-making processes, and use it as the new source of value by creating and developing useful relationships internally and externally to the firm (Romero & Molina, 2011).

In fact, when it comes to discussions about business models, specifically in the software business, the application of the open business model and the open innovation concepts is becoming more of a need, rather than a choice, especially regarding gaining and maintaining competitive advantage through extensive interfirm cooperation within various business networks (Rajala, Rossi and Tuunainen, 2003). Most recent academic research has begun to focus also on the nature and components of the firm activities outside and inside its business ecosystem, highlighting the importance of a firm's ability to align its business strategy with its value network, which forms a part of this paper. However, these aspects may depend very much on suitability of the particular business model, which can differ widely, depending on the type of enterprise.

Software product innovation with open innovation

Open innovation is just as much of a process, as a mindset. It mainly embraces the idea that it is only through the optimal combination of internal and external knowledge that a firm can achieve competitive advantage, thus, success.

At the same time, open innovation also remains a largely abstract concept, sometimes implemented well, sometimes not. There are no preset guidelines as to how it can be best applied in the case of software product innovation. Some firms may choose to use open innovation in order to create value from the information they receive from their external knowledge domains to come up with new product ideas; others may be able to add value to their hardware or software they are currently developing.

According to Morikawa (2016), the systematic approach to use open innovation involves the collection and prioritization of ideas, the development of said ideas into concepts, and ultimately the analysis of the results of the product launched, in order to improve the process next time.

According to the business model network perspective (Palo and Tähtinen, 2011), both value creation and value appropriation occurs primarily within the firm boundaries, but they are reliant on the cross-boundary relationships present in the firm network. Similarly, the open innovation model supports and encourages business models to become more collaborative both internally and externally to the firm for the sake of 'purposeful inflows and outflows of knowledge' (Chesbrough, 2006). Furthermore, Chesbrough and Rosenbloom (2002) defines the business model as a mediator between the domains of technological inputs and economic outputs (see *fig. 13* below):

[T]he business model provides a coherent framework that takes technological characteristics and potentials as inputs, and converts them through customers and markets into economic outputs. The

business model is thus conceived as a focusing device that mediates between technology development and economic value creation. (p. 532)

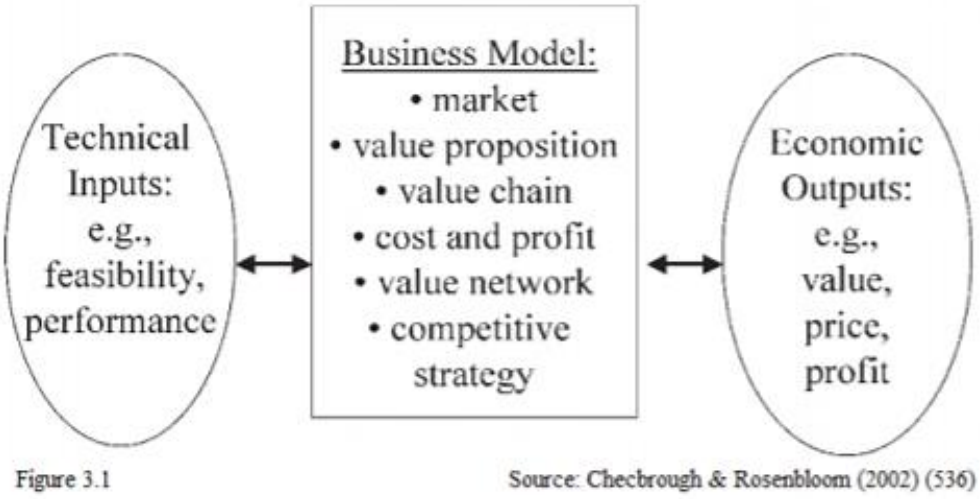

Figure 13. Business Model Framework by Chesbrough & Rosenbloom (2002).

Overall, the literature suggests that gradually turning to open business models by implementing open innovation strategies can benefit firms, especially those of knowledge-based economies, such as software. As part of the open innovation literature, I have adapted a process partially taken from the original open innovation model (Chesbrough, 2003) (*fig.14* below) and from a R&D software company who previously cooperated with me for the 9th semester project.

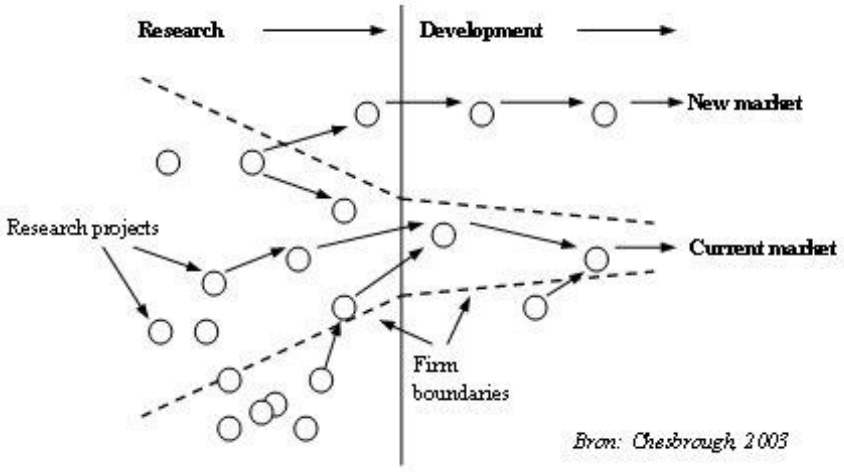

Figure 14. Open innovation by Chesbrough (2003).

The value proposition of open innovation mainly seen in its capacity to offer a product idea, facilitate collaboration, improve or create community involvement, increase transparency within and without the firm, thereby generating a culture of sharing (ideas).

4. Design of the framework

The following chapter is considered to be the result of the synthesis of the literature review, offering a unified framework of the business model concept, Essence, and a process model based on the principles of open innovation, with focus on the value proposition and how the alignment of these concepts can enhance CPV, where the interaction between these concepts offer the alignment of business strategy, and therefore better decision-making on firm level.

Ultimately, the key to financial sustainability of a business is customer satisfaction (De Mendonca et al., 2019; Strenitzerová, 2018). Translating the value offered by software into CPV is then the challenge that firms need to address first. As mentioned earlier during this research, a business model should no longer be considered as a single solid entity, but rather as a fluid layer of abstraction in the larger enterprise architecture (Iacob et al., 2014), where the interrelationship of the business model components have an impact on the overall business performance (Peters et al., 2013).

One business model concept, which was taken into consideration but not used explicitly during this research, is the St. Gallen Business Model Navigator (Gassmann et al., 2013), offering a simplified version of the generic business model dimensions (see *fig.15* below).

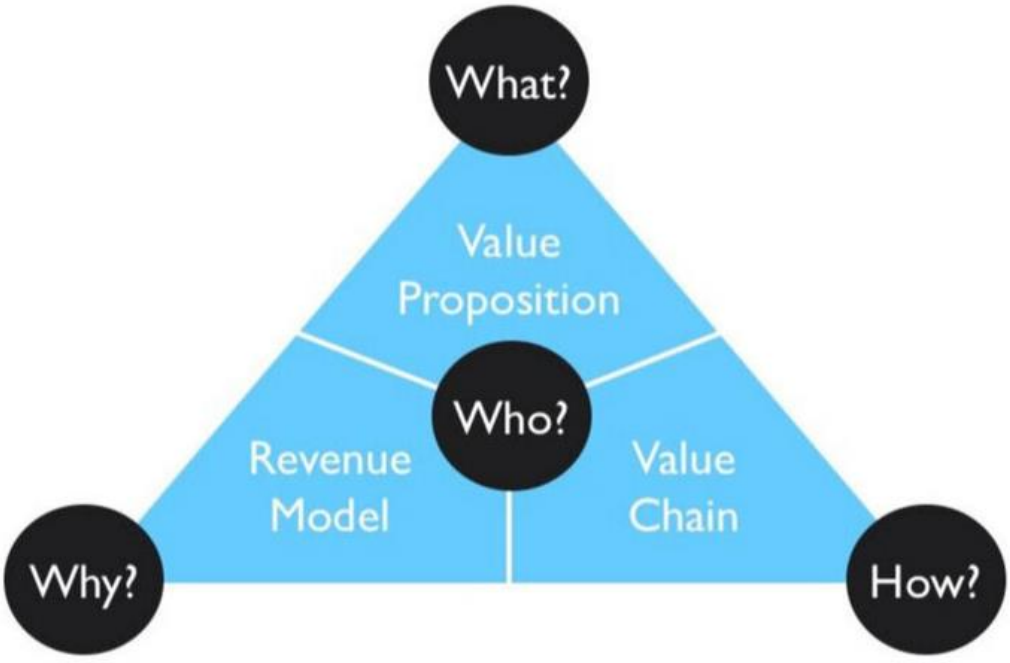

Figure 15. St. Gallen Business Model Navigator.

As mentioned, it is not explicitly used for the purposes of this research, but it must be mentioned that, similarly to the findings below, the triangle above centers the client / customer in the center of

the company's value logic, signifying that the needs of the customer must be met through all actions carried out on all layers of the firm.

Similarly also to the Golden Circle, *fig.16* (below) gives an overview of the relationship between the processes that are meant to be in place, in order for the value proposition alignment to happen.

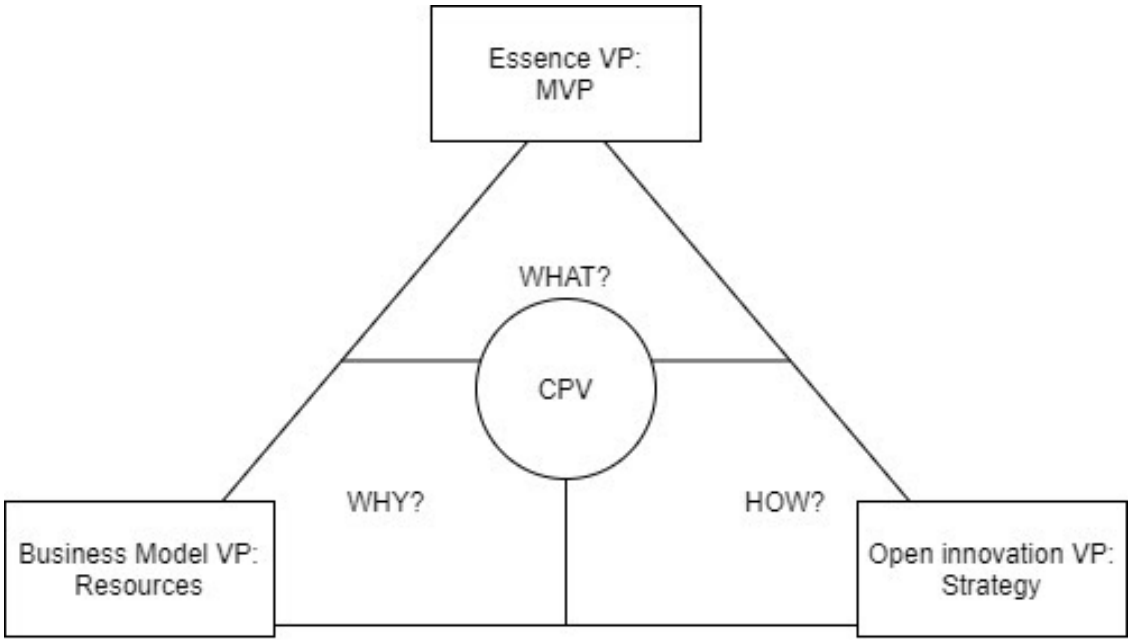

Figure 16. Golden Circle adapted to the current thesis to include the main components of the proposed alignment framework. Made by the author.

The three concepts at the three corners of the triangle represent different business layers, which are responsible for ensuring the presence of resources needed for the business to run successfully. As a result, all three concepts also contain their own respective value propositions, depending on what they provide for the software organization *internally*. Essence (*What*) is suggested as the component to represent the Minimum Viable Product (MVP) (Ries, 2011). The business model (*Why)* is the organizational framework, responsible for the resource allocation and management, while open innovation (*How)* may be considered to provide value in the form of strategy with the explicit purpose of obtaining external domain knowledge, and turn it into innovative software product ideas.

The notion of including the concept of MVP arose at a later stage during the research process, but has been observed to potentially be applicable as a type of value proposition, containing the idea of a product, allowing for the validation of that idea (see *fig. 17* below).

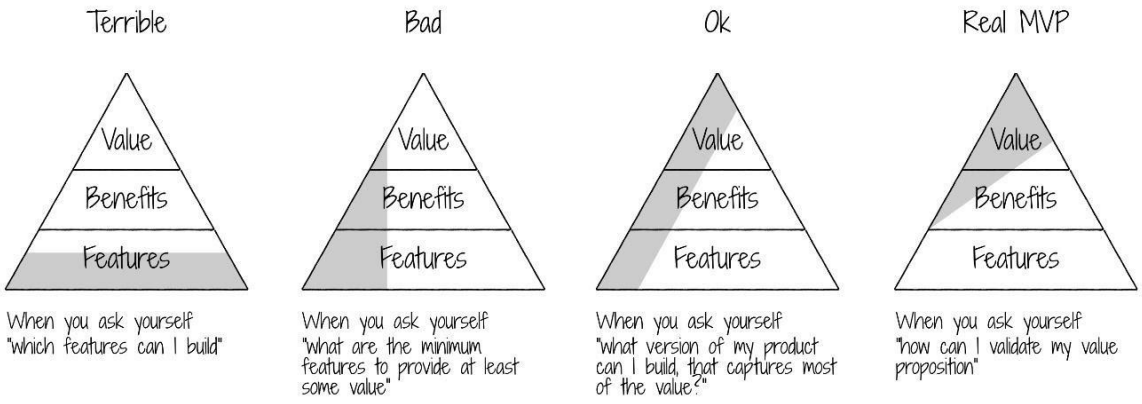

Figure 17. Decomposition of the MVP concept from worst to best. Source: nestholma.com.

MVP, fundamentally, is more about problem-solving, than anything else: MVP, as a validated value proposition, is the problem-solving process for the customer, which benefits the software firm internally.

The CPV is observed to be potentially positively impacted by the optimal alignment of the business model value proposition, and the MVP of Essence, assuming both customer engagement, when developing the product, as well as offering a product based on the resources found inside (and outside) the firm. CPV, as it has been established earlier, is the combined result of a number of customer interactions, where the customer comes to believe (or not), that the product offered to them satisfies their needs. CPV may be hard to measure, but there are some dimensions by which a firm may be able to compare its efforts against, such as the customer perceived value model of Heinonen (2004) (see *fig* 18 below).

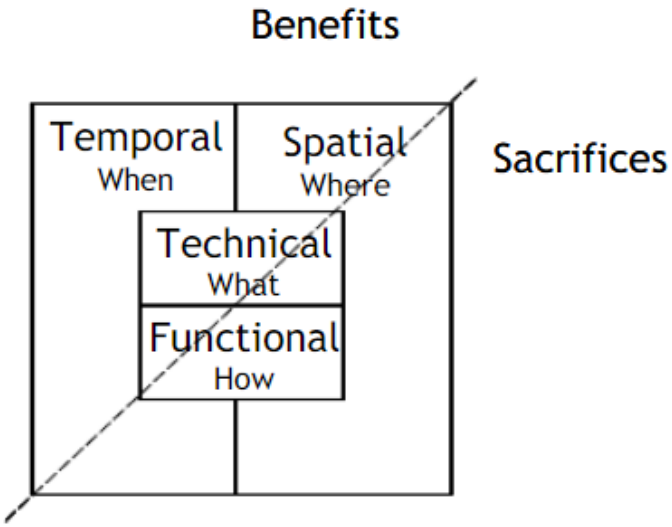

Figure 18. CPV model. Adapted from Heinonen (2004).

The figure above details the four value dimensions of what contributes to the overall CPV, such as the technical (service outcome), functional (service process), temporal (time of the service delivery), and spatial (location of the service delivery) dimensions.

The technical and functional dimensions represent the core service evaluation, answering the *what* and the *how* regarding the service interaction results. The temporal and spatial dimensions are considered more contextual, yet still important when it comes to their ability to influence the overall CPV.

Moreover, Heinonen and Strandvik (2003) also write about three additional factors that may have an impact on the CPV. The customer-related factors influence the value perception that stems from the relationship and engagement with the firm. The situation-related factors include time, task and experience of the customer when choosing to engage with the service/product of the firm. Finally, the situation-related factors are related to the style of customer engagement / participation in the service co-creation and the degree of digitization of said service or product. Ultimately, every company has to make sure that they understand their target audience and build the service or product for them accordingly.

The question of how to successfully align the two original concepts of different scale and focus has been a difficult one to tackle; nonetheless, it appears that the inclusion of the open innovation process provided a useful and potentially important angle, especially in the case of software firms that work with knowledge-intensive software. This also implies that both Essence and open innovation are inherently a part of the larger business model architecture, where Essence may provide the operational layer (production), the business model the value logic of the firm (resource management), and open innovation the firm strategy.

Table 4 (below) is the integration of the Essence lifecycle steps (seen in table 3) and the business model activities combined to provide an aligned value proposition, or more to concretize the expected value proposition outcome as a result of the alignment of Essence and the business model.

The table combines the value generating capacity of both Essence and the business model concept, in view of what clear benefits they offer to the customer. The table represents the problem-solving lifecycle of using the structure of Essence to create both the idea of a solution, and build it. Meanwhile, the actions taken on the operational level of the business should correspond to the variables defined in the business model components seen below, to make sure that the work undertaken is strategically logical and creates value for the company.

Table 4. Lifecycle aspects and how each factor influences the successful delivery of the value proposition. Made by the author.

Essence	Value proposition	Business model
Pre-project **Project initiation** **Initial Project Profile**	Identification of customer pain Solution outline	**Key Customers**
Prospect Scenario(s)	User segmentation Solution ideas proposed	**Key Products**
Idea Representation Forms	High level project goals Main features of Solution proposed	**Revenue stream**
Elaborated Prospect Idea **Developing the Prospect** **Prospect Configuration**	MVP defined MVP development starts	**Key Activities**
Pivot or persevere **RST Review**	User / stakeholder feedback on state of product (Revision of product) Product launch	**Value Proposition refined** **Cost structure**

Visual representations of the table 4's contents above can be seen below (*fig. 19 and 20*).

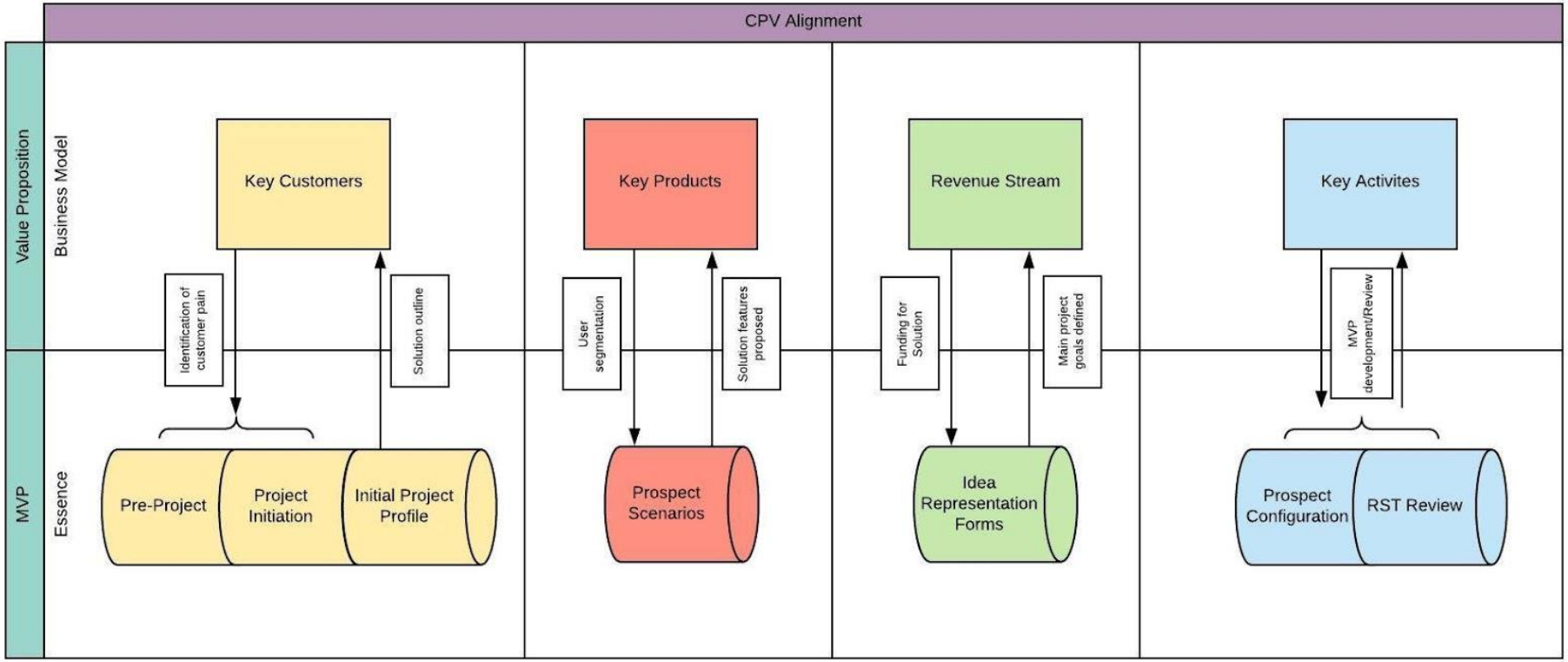

Figure 19. CPV Alignment of Essence and the business model. Made by the author.

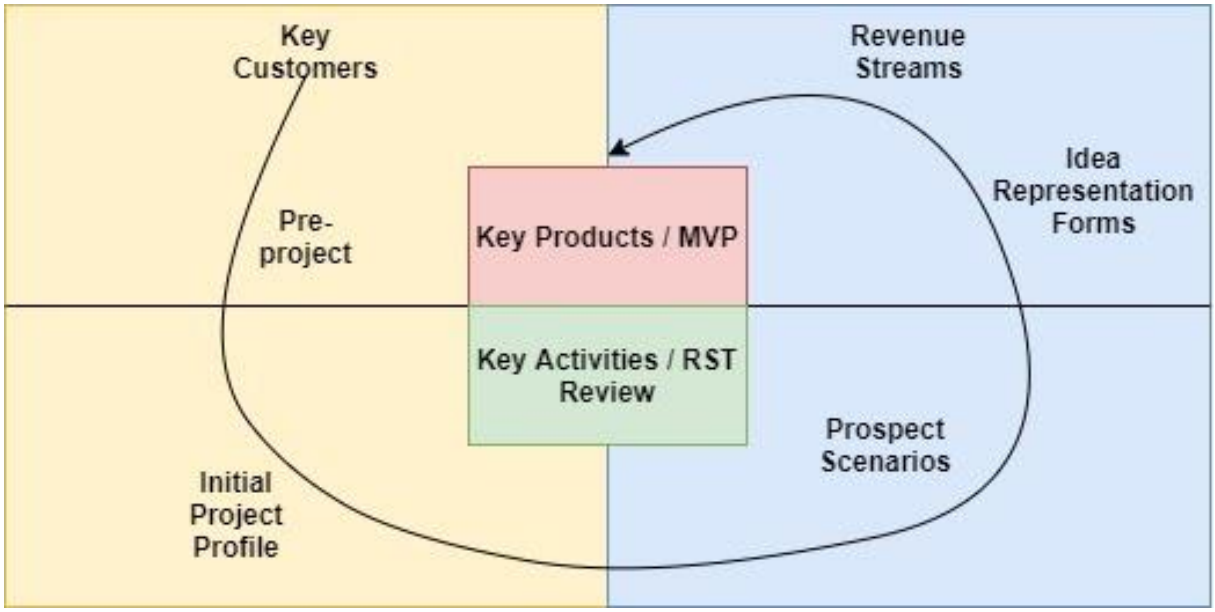

Figure 20. CPV Alignment of Essence and the business model. Made by author.

The relevance of *fig. 19* lies in its visualization of the vertical and horizontal alignment of the Essence and business model components, proving that it is possible to align the value propositions offered by these concepts.

The relevance of *fig. 20* lies in its representation of a dynamic interdependency and more process-focused, rather than component-focused, between the Essence and the business model components, where the main activities of the two concepts are seen to be organically leading to the consecutive steps. This image takes after the model created by Heinonen (2004). The coloring is based on *fig. 9* and *fig. 11*.

The process reflects on the creation of mutual value, for both business and customer, but it is achieved through the structural integrity and clarity of Essence and the business model components.

Following that, the open innovation process framework was taken into consideration, and these three theoretical concepts (open innovation, business model, Essence) were gathered and aligned in a table 5 (below), which then forms the final alignment framework below.

Table 5. Integration and alignment of the three core concepts of the present paper.

Open innovation process	External ideas + internal ideas	Product draft	Funding (external / internal)	Product development / Product launch
Business Model	Key Customers	Key Products	Revenue Stream	Key Activities
Essence	Pre-project Project Initiation Initial Project Profile	Prospect Scenarios	Idea Representation Forms	Prospect Configuration RST Review
Value Proposition	**Identifying customer pain / problem***	**Identifying solution to the identified problem***	**Define main features of the solution**	**Develop MVP** **Refining CPV** **Deliver solution**

*pattern can be altered

The table above follows the structural integrity of the framework on the next page, insofar as the open innovation process is placed on the top of the model, the business model components are placed in the middle (taken from Chesbrough's Business Model Framework, where the business model is seen as a moderating tool, mediating between the technical and the economic or strategic domains), and Essence is placed on the lower tier of the model, acting as the operational layer, where the software development itself takes place. However, in the table, the value proposition is placed as the last row, acting as if it was the sum of each column, whereas in the framework below it is placed in the top, almost as a header part, as the most centric of concepts. The two different placements represent the same theoretical consideration.

There are four core phases in total for each concept, aiming to provide both horizontal and vertical alignment by grouping together the activities identified in those concepts with similar outcomes regarding the value proposition (found in the bottom section of the figure).

The phases are described as follows:

1. The main Value Proposition is the Identification of the Problem (alternatively, the Identification of the Opportunity), based on the absorption and adaptation of external domain knowledge, aligning it with the firm's Key Customers, thereby turning it into a Pre-Project as part of the Essence methodology.

2. The main Value Proposition becomes the Identification of the Solution to the Problem, in other words, the Key Product(s). However, these sections especially are thought to be prone to overlap with the user segmentation activities, and thus it is entirely possible that the software firm already has a substantial customer base whose needs the software development team can address in this section.

3. The main Value Proposition is the conceptual development of the Solution, securing the Funding phase. Development may be seen as deceptive an expression, but the Solution here is in process of an early prototype, and thus considerations of the possible revenue sources based on it should be evaluated, as this section is still considered the part where the project may be reiterated or cancelled without substantial loss of funds (this may differ depending on the software firm's profile and level of maturity).

4. The main Value Proposition is the review and delivery of the Solution / MVP – in other words, the software development team develops the software, which is evaluated by the team and stakeholders/users, and as a result, the product may be ready to be launched, representing the Key Activities of the business model.

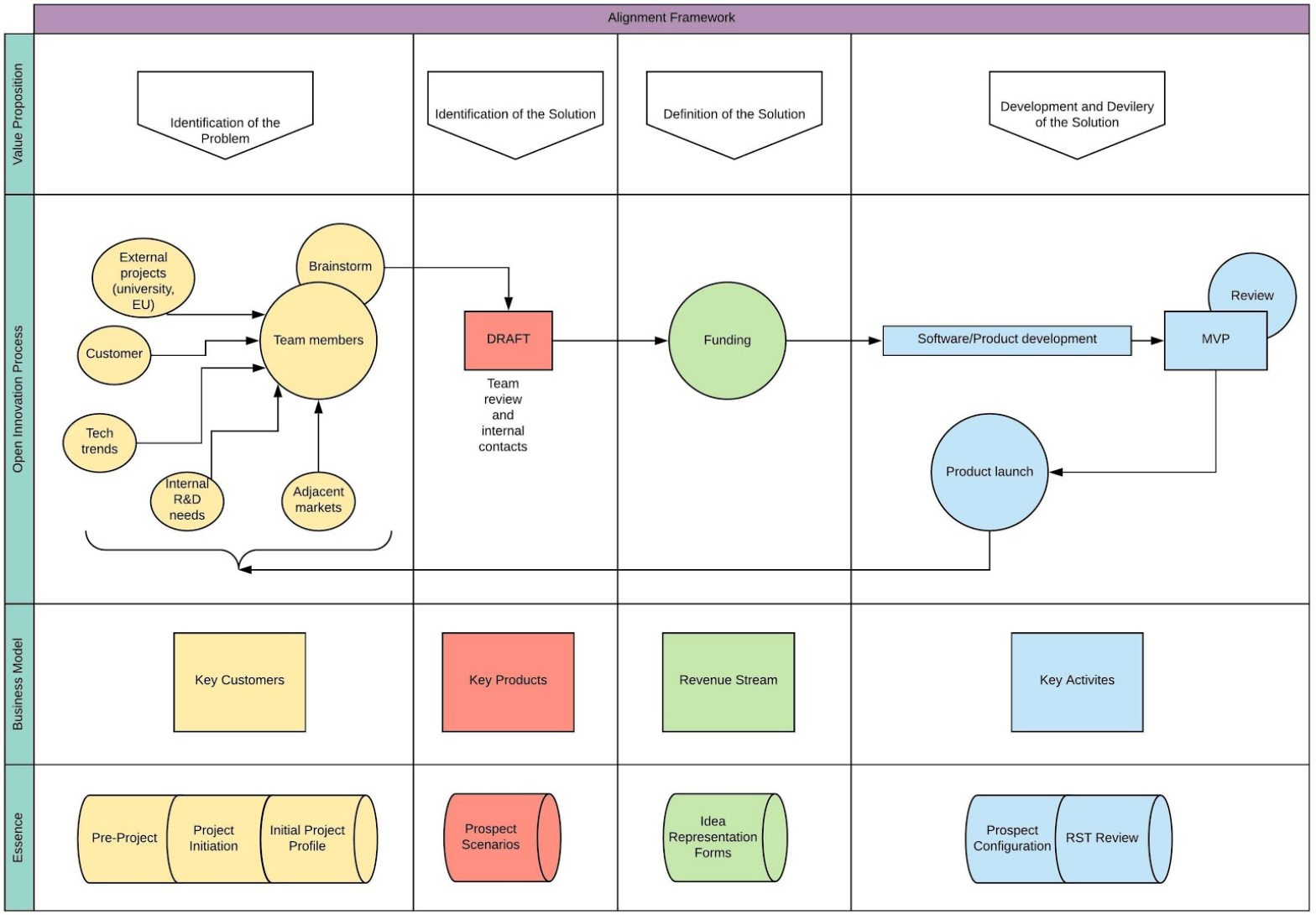

Figure 21. CPV Alignment Framework. Made by the author.

4.1. Findings: CPV and VP Alignment

In this subchapter, the results of chapter 4 will be substantiated with arguments from the literature, in order to concisely answer the problem statement of this research paper.

The problem statement of this thesis posed the question: *How do the value propositions of Essence (Aaen, 2019), the business model, and the open innovation process (Chesbrough, 2003) influence Customer Perceived Value in a software firm and how can these concepts be presented in a framework?*

The answer to the problem statement was provided by decomposing the three primary concepts of this research: the business model, Essence, and open innovation. The original problem statement only took into consideration the business model and Essence, and they are still considered the main focus of this research. The most important implications based on the findings are that every action of a business should strive to create/appropriate/deliver value to the customer and contribute to the CPV. The CPV Alignment Framework (*fig. 21)* is all but one suggestion as to how it can be achieved, through being able to both vertically and horizontally align the business activities of all levels, ensuring that they interface with and support each other.

The CPV is observed to be affected by all levels of business activities, here categorized as the operational level (Essence), the level of resource management (business model), and the larger strategy level (open innovation). In other words, Essence's VP was identified as the MVP, the business model's VP was identified as the resources it channels, and open innovation's VP was identified as the strategic partnerships and external domain knowledge, through which the problem and the solution thereof can be acquired. The difficulty lies in defining the CPV due to its rather multidimensional nature.

The complexity of the above considerations are also reflected in the theories, such as the value-based software engineering (VBSE). In this paper, it has been established that CPV is not solely reliant upon the (perceived) quality of the product (such as its features), but is a more complex variable. VBSE, from a customer perspective, is primarily concerned with improving and monitoring the CPV throughout production and in-use. This means that two subdimensions of the CPV should be especially interesting for software developers, and software innovation managers: value-in-use and co-production (Ranjan and Read, 2016). Value-in-use may refer to the customer experience using the product, while co-production is defined as the knowledge gained through the customer involvement and, as a result, the creation of a product (Vargo & Lusch, 2004).

It has always been the final goal to create a framework, where these, otherwise vastly different theoretical concepts, can appear as one process and one system. Due to lack of experience with such

a task, it may appear simplified, but I believe that the potential of the framework lies in its simplicity - and its versatility in addressing both large- and small-scale software development.

Previously, there have been some studies attempting to identify factors influencing the success of business-IT alignment, including domain knowledge (Gutierrez et al., 2009, p.198); most important predictor of alignment was 'high level of communication between IT and business executives (Reich and Benbasat, 2000) and high level of shared domain knowledge (otherwise, short-term alignment). However, it appears that organisational size affects alignment (Chen et al., 2010), in terms of the level of centralized units/processes (in small and medium enterprises), where alignment is implicit due to the lack of need for explicit alignment mechanisms vs. decentralized governance (large firms), where more explicit strategic alignment is needed. Furthermore, in terms of planning, developing the business and IT strategies simultaneously is said to be advantageous for long-term alignment purposes (King and Teo, 1997).

Internally, it is particularly the presence (or lack thereof) of shared domain knowledge, connection between planning as a result of cross-department communication, and customer engagement during the product development, which appears to affect the degree of alignment; while externally, it is the presence of partnerships and use of external domain knowledge, which are mainly required for the concepts to be aligned.

Ultimately, the CPV Alignment Framework highlights the importance of aligning internal organizational aspects of the business model activities with open innovation strategies to carry out and deliver the value proposition. Organizational processes and procedures that allow for the in- and outflow of knowledge across firm boundaries are therefore encouraged and advised to be implemented. However, the chosen business model needs to be suitable for the purposes of the value proposition, and as a result, regular monitoring of the structural integrity of the VPAF in relation to its external environment is observed as necessary, also to maintain the adaptive capacity of the firm.

However, the framework also assumes all these concepts to be either already implemented within the company, or they are underway. This can pose another challenge, if the required internal change is larger than originally anticipated, such as in the case of educating a team to adapt to working with Essence, which can take time and resources. These issues are not addressed here, but the author is aware of certain practicalities, which may be required in a system-wide restructuring, and can be perceived as a sacrifice from the business perspective.

To sum it up, a new business model, which incorporates effective innovation management, is formed in alignment of all its layers (from the larger open innovation environment down to operational level), and preferably including the customer, to ensure that the value proposition is relevant and is delivered. Internally, the free flow of information, or transparent communication seems to make a difference. One of the more important findings points out that employees should be turned into self-organizing communities, and encouraged to engage across departments, share ideas, and be able to engage and interact with the customers directly - or at the very least to gather feedback on the product during development and in-use. This notion is supported both by Essence and open innovation.

Ronkko et al. (2011) discusses the usage-based CPV, stating that the skill level of the user of any product will determine the perceived value of it - namely, if the user has no understanding of the full benefits of using the product, they will certainly look to estimate it to be worth (in an abstract term) much lower, than it may be. If that is the case, then one may be able to argue that indeed, being able to involve the user much more in the software development process will ultimately lead to a more satisfying product.

Furthermore, this might be offset also by encouraging certain co-innovation practices with customers, both to implement more collaborative practices on all levels of a firm, and in order to secure customer satisfaction with the final product (Saragih & Tan, 2018).

5. Discussion

The purpose of this section is to interpret and describe the significance of the findings in ch. 4 and 4.1. in light of the investigated research problem and to explain the insights that may have emerged as a result of this study. Furthermore, the limitations and perceived issues of the research will be discussed, and alternative research methodologies will be offered, if certain conditions would have been allowed.

Limitations of the research methodology

Admittedly, my paper has become more and more complex, while trying to find an answer to how it is possible to align the business model value proposition with that of Essence, while maintaining the theoretical integrity of both concepts. The applicability of the models above begets the assumption that these frameworks are already in place in the organization (operating with existing processes and structures), that they work with knowledge-intensive software development (such as R&D), and that the development team(s) of the software firm work with some form of agile software development methodology, or at the very least, self-organizing to a large degree.

This thesis does not suggest that the framework would fit any organization working with software innovation; however, as the paper at least partially has taken inspiration from both academic and real-life cases (for the open innovation process), it can be inferred that the need for similar frameworks will continue to emerge, and this paper certainly attempts to address that need. Without a doubt, more and more parts of software firms will require careful coordination of their resource- and innovation management, and the suggested framework is supposed to provide, in the least, inspiration for further positive changes in software businesses.

Main purpose of the paper revisited

The thesis has been mainly concerned with the building of a cross-conceptual framework, by decomposing its main components (concepts) into building blocks (phases), in order to understand how the unification of the different business model layers are possible. The expected findings would then show how such a framework can support the alignment of the different value propositions in a software firm both horizontally and vertically. CPV has been established as the sum of individual customer's pre-conditions (such as time or experience), personal engagement / relationship with the firm, and perception of the service delivery before, during and after the transaction. As such, it is considered as the ultimate validation of whether or not the creation and the delivery of the value proposition is successful. In other words, it may also be perceived as the ultimate validation of the product quality.

The process of creating the framework involved the identification of the main components it should involve. The initial idea involved only the business model, possibly using the Business Model Canvas (Osterwalder, Pigneur & al. 2010), as well as Essence (Aaen, 2019). The original premise of the thesis work was more specifically concerned with the extent of alignment achievable between the value propositions of these two concepts, while examining the role the customer plays in this inquiry. On the other hand, I was encouraged to make use of my undergraduate degree in economics, and therefore I consciously started drifting towards a more business-centric viewpoint throughout the investigation.

The main considerations were the conceptualization of the business model and Essence components, and finding the method to align both of these with the value proposition intact.

The conceptual logic included the decomposition of both business model and Essence, and to contextualize the value proposition in light of said decomposition, to be able to build a framework akin to the one in the previous chapter. The lack of empirical evidence is obvious, but the theoretical foundations of the paper are all based on the works of established authors, and it is therefore assumed that testing the current paper's theoretical findings would prove to be valuable if applied in real life.

The decomposition and conceptualization of the business model might appear arbitrary, as there exists numerous publications and conceptualizations of the business model concept, and therefore there is no one way to describe its most vital components. Nevertheless, the literature examined all include the final components chosen to be included in the VPAF, and can therefore provide a potential baseline to develop the concept further, based on the individual firm's own business model.

The decomposition of Essence is another matter, which may need to be addressed, as the research case presented here relied on the somewhat heavy-handed repurposing of Essence, setting it in a purely commercial environment, whereas the original author's own intentions did not do so. I trust, however, that this discourse may help further the academic advancements done in connection with Essence.

Risks conducting purely theoretical research

Additionally, one must address the risks carried by conducting a purely theoretical research, as is the case here. The credibility of the framework presented in chapter 4 is solely based on the credibility of the concepts its creation involved. On the other hand, possible misrepresentations and subjective bias when applying the concepts to my research are all on my account. The methodology, due to the

overwhelming use of secondary data, may not be varied enough, therefore potential academic tunnel vision may be present, as certain concepts were preferred, based on previous experience working with these during my university studies. On the other hand, as a conceptual learning experience, systematically aligning different theoretical frameworks together, has been both challenging and rewarding, seeing how the world of commercial software is becoming more complex every year, as customers are becoming smarter and demanding value for their money on more dimensions, than ever before.

Relevance of the research topic

I found that the topic most relevant yet not a part of the current research was the state of innovation management in (R&D) software companies, as based on the literature and the CPV Alignment framework, it appears that effective innovation management requires both new product development and enabler processes, which allows for the exploitation of opportunities to minimize external uncertainties (and the optimal use of internal resources), thereby allowing that innovation capacity to be delivered as part of the firm's value proposition, and in turn shaping a more resilient organization.

6. Conclusion

This chapter brings the thesis work to its conclusion. In this chapter, I will summarize the research process, while providing the final answer to the problem statement, reflecting on the research conduct and its outcome, and make recommendations for future work on the research topic.

The central topic of the investigation was, and at this stage remains, the continuously evolving nature of the business model, and how it is necessary for software firms to adopt a more complex view on how the different business layers interact with each other, and, most importantly, how they serve the customer's best interest. This complex view is also reflected in the recent surge of articles pertaining to the concept of business ecosystems (an expression first coined in 1993 by James Moore), where the key to continuous success is no longer *just* to evolve, but to *co-evolve*. Since that time, several comparatively related concepts have come to be, such as innovation or knowledge ecosystems (Valkokari, 2015). The crucial part lies in the participating actors' (or in this case, firms') ability to create connections between the different ecosystem logic (Clarysse et al., 2014). At one point, in the early stages of writing, this angle was also considered for the problem statement. However, due to the perceived difficulties conceptualizing such a broad topic given the amount of time and research methodologies available, the original concept was taken upon instead, with the changes the reader is already familiar with.

This process has been presented as the CPV Alignment framework, a model (from a visual standpoint) merging the decomposed process of open innovation (Chesbrough, 2003), the general components of the business model concept, and the structural phases of Essence (Aaen, 2019). As the research advanced, the original problem statement was altered in accordance with the changes. Competitive advantage was observed to be closely related to both the successful creation and delivery of the value proposition, while innovation was seen as the most important, albeit often informally present, aspect of software product development. The business model literature, as the basis of the current inquiry, was perceived as a concept heavily expanding towards the state of open business ecosystems, and as such, the involvement of open innovation was seen relevant, and a natural addition to the CPV Alignment framework.

The CPV Alignment framework constitutes both the object of the inquiry, and the answer to the inquiry. The main question was regarding the possible unification of the three concepts based on the value of the output they have. Initially, the value proposition was deemed to be central to the current inquiry. However, at the later stages, it became more obvious, that the value propositions themselves, identified separately in all three concepts, do not necessarily qualify as precise metrics for determining the success of a software product, or to find the source of issues when developing a

product, as they only represent the firm's internal vision of itself. Thus, the involvement of CPV, as the unavoidable outcome of any business venture, and how it may be impacted by the correct configuration of every business component.

The most important steps addressed in this paper is the identification of the existing business components / processes and their degree of interrelatedness. If the alignment exists, then the strategic decisions made on upper business levels (open innovation) should be reflected in the product being developed on the lower (operational) levels (Essence), while maintaining the integrity of the knowledge shared or extracted as part of the business strategy; and in the meantime, the business has to be able to sustain itself through careful resource management (business model components) - so as to ensure the financial viability of the enterprises undertaken. The structures and processes considered in this research require the higher involvement of the customer in the product development, and this is also reflected in the CPV dimensions, suggesting more favorable results in the case of co-creation and higher engagement present with the firm.

7. Implications for future work

The current work presents a holistic innovation management framework for software firms, who wish to switch their business strategy to more customer-focused, through creating alignment between their business levels both vertically and horizontally. That is to say, alignment across and within business components on all levels of the firm.

The goal is to move towards a more value-based software development. Complex as it sounds, it may require better oversight over the firm structure and the processes thereof; however, it also carries the promise of better accountability of employees, when their actions are directly seen as contributing to the overall customer experience.

Engaging with the client should not be a bullet point on the agenda, but rather a core strategy, one where the value of the customer creates value for the customer.

Innovation is often hailed, but misunderstood, either because of those projects failing, or because it is too costly (or both). While the former is an inevitable part of innovating, the latter might suggest innovating in the wrong direction or in direct misalignment to what the market wishes.

Holistic innovation management means that the individual phases can be supported by the overarching value that the software product itself brings. As each step carries the product forward, the firm has the option to form a kinship with the employees and customers alike, by enabling them to bring new ideas, to fail quickly, and to have space for their feedback.

Firms are both encouraged therefore to focus on the individual's innovation capacity, as well as the innovation manager's competency and experience to support the implementation of more innovative software development practices, which then, in turn, can support more innovative software product development. Being innovative is also about being agile, on all levels of the business, from the top management to the software development team.

In this endeavour, I believe that the framework I propose can provide certain insights, through highlighting the assumed positive influence of involving the customer through the product development process, as well as the role of management, when it comes to the multidimensional alignment of the value propositions, and implement it as part of a larger business strategy to improve CPV.

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